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ANALYTICAL REPORT

Job Number: 180-86110-1

Job Description: JSF_BS_20190124_1B

For:
Environmental Standards Inc.
1140 Valley Forge Road
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Valley Forge, PA 19482-0810

Attention: Amanda Cover

Approved for release.
Gail Lage
Senior Project Manager
5/16/2019 2:47 PM

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05/16/2019
Revision: 2

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Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

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	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
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 (Radiochemistry)
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)

Job Narrative
180-86110-1

Revised Report
This report was revised to update the results for sample 3 to adjust the solid sample results for dry weight using the dry weight results from TA-Pittsburgh This replaces the previous final report.

Receipt
The samples were received on 1/26/2019 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 5 coolers at receipt time were 0.8º C, 1.8º C, 2.4º C, 2.6º C and 3.1º C.

Receipt Exceptions
The container label for the following sample did not match the information listed on the Chain-of-Custody (COC):
JSF-BS-BG10-0.0/0.5-20190124 (180-86109-17). The container labels list a sample collection time of 1548, while the COC lists 1556.
The collection time of 1556 was confirmed by the client.

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

Detection Summary

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

Client Sample ID: JSF-BS-BG12-0.8/2.8-20190123 — Lab Sample ID: 180-86110-1

No Detections.

Client Sample ID: JSF-BS-BG12-5.0/10.0-20190123 — Lab Sample ID: 180-86110-2

No Detections.

Client Sample ID: JSF-BS-BG12-10.75/12.75-20190123 — Lab Sample ID: 180-86110-3

No Detections.

Client Sample ID: JSF-BS-BG12-13.5/15.0-20190123 — Lab Sample ID: 180-86110-4

No Detections.

Client Sample ID: JSF-BS-BG12-0.0/0.5-20190123 — Lab Sample ID: 180-86110-5

No Detections.

Client Sample ID: JSF-BS-FB01-20190123 — Lab Sample ID: 180-86110-6

No Detections.

Client Sample ID: JSF-BS-BG11-1.1/3.1-20190124 — Lab Sample ID: 180-86110-7

No Detections.

Client Sample ID: JSF-BS-BG11-5.5/8.5-20190124 — Lab Sample ID: 180-86110-8

No Detections.

Client Sample ID: JSF-BS-FD01-20190124 — Lab Sample ID: 180-86110-9

No Detections.

Client Sample ID: JSF-BS-BG11-11.3/13.3-20190124 — Lab Sample ID: 180-86110-10

No Detections.

Client Sample ID: JSF-BS-BG11-0.0/0.5-20190124 — Lab Sample ID: 180-86110-11

No Detections.

Client Sample ID: JSF-BS-EB01-20190124 — Lab Sample ID: 180-86110-12

No Detections.

Client Sample ID: JSF-BS-FB02-20190124 — Lab Sample ID: 180-86110-13

No Detections.

Client Sample ID: JSF-BS-BG10-1.4/3.4-20190124 — Lab Sample ID: 180-86110-14

No Detections.

Client Sample ID: JSF-BS-BG10-6.5/8.5-20190124 — Lab Sample ID: 180-86110-15

No Detections.

Client Sample ID: JSF-BS-BG10-10.5/12.5-20190124 — Lab Sample ID: 180-86110-16

No Detections.

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

Client Sample ID: JSF-BS-BG10-0.0/0.5-20190124 Lab Sample ID: 180-86110-17

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

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

Client Sample ID: JSF-BS-BG12-0.8/2.8-20190123
Date Collected: 01/23/19 11:19
Date Received: 01/26/19 09:30

Lab Sample ID: 180-86110-1
Matrix: Solid

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.08		0.282	0.304	1.00	0.222	pCi/g	01/30/19 00:23	02/20/19 08:13	1
Radium-228	1.60		0.385	0.418		0.230	pCi/g	01/30/19 00:23	02/20/19 08:13	1
Radium 226 and Radium 228	2.68		0.477	0.517			pCi/g	01/30/19 00:23	02/20/19 08:13	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

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

Client Sample ID: JSF-BS-BG12-5.0/10.0-20190123
Date Collected: 01/23/19 12:05
Date Received: 01/26/19 09:30

Lab Sample ID: 180-86110-2
Matrix: Solid

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.603		0.225	0.233	1.00	0.219	pCi/g	01/30/19 00:23	02/21/19 01:55	1
Radium-228	1.57		0.287	0.328		0.230	pCi/g	01/30/19 00:23	02/21/19 01:55	1
Radium 226 and Radium 228	2.17		0.365	0.402			pCi/g	01/30/19 00:23	02/21/19 01:55	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

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

Client Sample ID: JSF-BS-BG12-10.75/12.75-20190123
Date Collected: 01/23/19 12:32
Date Received: 01/26/19 09:30

Lab Sample ID: 180-86110-3
Matrix: Solid

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.779		0.196	0.213	1.00	0.163	pCi/g	01/30/19 00:23	02/20/19 08:11	1
Radium-228	1.26		0.232	0.265		0.107	pCi/g	01/30/19 00:23	02/20/19 08:11	1
Radium 226 and Radium 228	2.04		0.304	0.340		0.163	pCi/g	01/30/19 00:23	02/20/19 08:11	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

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

Client Sample ID: JSF-BS-BG12-13.5/15.0-20190123
Date Collected: 01/23/19 12:44
Date Received: 01/26/19 09:30

Lab Sample ID: 180-86110-4
Matrix: Solid

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.752		0.209	0.223	1.00	0.174	pCi/g	01/30/19 00:23	02/20/19 08:14	1
Radium-228	1.04		0.252	0.273		0.460	pCi/g	01/30/19 00:23	02/20/19 08:14	1
Radium 226 and Radium 228	1.79		0.327	0.353			pCi/g	01/30/19 00:23	02/20/19 08:14	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

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

Client Sample ID: JSF-BS-BG12-0.0/0.5-20190123
Date Collected: 01/23/19 12:47
Date Received: 01/26/19 09:30

Lab Sample ID: 180-86110-5
Matrix: Solid

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.254	U	0.147	0.149	1.00	0.482	pCi/g	01/30/19 00:23	02/20/19 09:34	1
Radium-228	**0.744**		0.238	0.250		0.141	pCi/g	01/30/19 00:23	02/20/19 09:34	1
Radium 226 and Radium 228	**0.998**		0.280	0.291			pCi/g	01/30/19 00:23	02/20/19 09:34	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

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

Client Sample ID: JSF-BS-FB01-20190123
Date Collected: 01/23/19 15:30
Date Received: 01/26/19 09:30

Lab Sample ID: 180-86110-6
Matrix: Water

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	6.11	U	9.98	10.0	50.0	13.9	pCi/L	01/29/19 22:58	02/19/19 07:35	1
Radium-228	1.41	U	17.9	17.9	50.0	29.6	pCi/L	01/29/19 22:58	02/19/19 07:35	1
Radium 226 and Radium 228	7.52	U	20.5	20.5			pCi/L	01/29/19 22:58	02/19/19 07:35	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

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

Client Sample ID: JSF-BS-BG11-1.1/3.1-20190124
Date Collected: 01/24/19 11:16
Date Received: 01/26/19 09:30

Lab Sample ID: 180-86110-7
Matrix: Solid

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.829		0.209	0.226	1.00	0.174	pCi/g	01/30/19 00:23	02/20/19 09:36	1
Radium-228	1.53		0.273	0.314		0.145	pCi/g	01/30/19 00:23	02/20/19 09:36	1
Radium 226 and Radium 228	2.36		0.344	0.387			pCi/g	01/30/19 00:23	02/20/19 09:36	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

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

Client Sample ID: JSF-BS-BG11-5.5/8.5-20190124
Date Collected: 01/24/19 11:36
Date Received: 01/26/19 09:30

Lab Sample ID: 180-86110-8
Matrix: Solid

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.897		0.175	0.198	1.00	0.118	pCi/g	01/30/19 00:23	02/20/19 09:37	1
Radium-228	1.43		0.242	0.283		0.111	pCi/g	01/30/19 00:23	02/20/19 09:37	1
Radium 226 and Radium 228	2.33		0.299	0.345			pCi/g	01/30/19 00:23	02/20/19 09:37	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

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

Client Sample ID: JSF-BS-FD01-20190124
Date Collected: 01/24/19 11:21
Date Received: 01/26/19 09:30

Lab Sample ID: 180-86110-9
Matrix: Solid

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.872		0.215	0.234	1.00	0.163	pCi/g	01/30/19 00:23	02/21/19 01:54	1
Radium-228	1.22		0.325	0.348		0.289	pCi/g	01/30/19 00:23	02/21/19 01:54	1
Radium 226 and Radium 228	2.09		0.390	0.419			pCi/g	01/30/19 00:23	02/21/19 01:54	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

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

Client Sample ID: JSF-BS-BG11-11.3/13.3-20190124
Date Collected: 01/24/19 12:02
Date Received: 01/26/19 09:30

Lab Sample ID: 180-86110-10
Matrix: Solid

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.820		0.164	0.185	1.00	0.103	pCi/g	01/30/19 00:23	02/20/19 10:46	1
Radium-228	1.37		0.240	0.278		0.182	pCi/g	01/30/19 00:23	02/20/19 10:46	1
Radium 226 and Radium 228	2.19		0.291	0.334			pCi/g	01/30/19 00:23	02/20/19 10:46	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

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

Client Sample ID: JSF-BS-BG11-0.0/0.5-20190124
Date Collected: 01/24/19 12:47
Date Received: 01/26/19 09:30

Lab Sample ID: 180-86110-11
Matrix: Solid

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.737		0.189	0.204	1.00	0.153	pCi/g	01/30/19 00:23	02/21/19 01:56	1
Radium-228	1.30		0.415	0.436		0.282	pCi/g	01/30/19 00:23	02/21/19 01:56	1
Radium 226 and Radium 228	2.04		0.456	0.481			pCi/g	01/30/19 00:23	02/21/19 01:56	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

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

Client Sample ID: JSF-BS-EB01-20190124
Date Collected: 01/24/19 12:35
Date Received: 01/26/19 09:30

Lab Sample ID: 180-86110-12
Matrix: Water

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**30.6**		16.9	17.2	50.0	17.1	pCi/L	01/29/19 22:58	02/19/19 09:40	1
Radium-228	-2.53	U	12.0	12.0	50.0	28.0	pCi/L	01/29/19 22:58	02/19/19 09:40	1
Radium 226 and Radium 228	**30.6**		16.9	17.2			pCi/L	01/29/19 22:58	02/19/19 09:40	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

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

Client Sample ID: JSF-BS-FB02-20190124
Date Collected: 01/24/19 14:34
Date Received: 01/26/19 09:30

Lab Sample ID: 180-86110-13
Matrix: Water

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	3.59	U	3.52	3.54	50.0	31.4	pCi/L	01/29/19 22:58	02/19/19 09:39	1
Radium-228	4.39	U	10.0	10.0	50.0	33.4	pCi/L	01/29/19 22:58	02/19/19 09:39	1
Radium 226 and Radium 228	7.98	U	10.6	10.6			pCi/L	01/29/19 22:58	02/19/19 09:39	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

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

Client Sample ID: JSF-BS-BG10-1.4/3.4-20190124
Date Collected: 01/24/19 15:07
Date Received: 01/26/19 09:30

Lab Sample ID: 180-86110-14
Matrix: Solid

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.647		0.194	0.205	1.00	0.176	pCi/g	01/30/19 00:23	02/20/19 10:47	1
Radium-228	1.56		0.266	0.310		0.110	pCi/g	01/30/19 00:23	02/20/19 10:47	1
Radium 226 and Radium 228	2.21		0.329	0.372			pCi/g	01/30/19 00:23	02/20/19 10:47	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

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

Client Sample ID: JSF-BS-BG10-6.5/8.5-20190124
Date Collected: 01/24/19 15:27
Date Received: 01/26/19 09:30

Lab Sample ID: 180-86110-15
Matrix: Solid

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.35		0.267	0.300	1.00	0.139	pCi/g	01/30/19 00:23	02/20/19 10:47	1
Radium-228	2.37		0.442	0.503		0.170	pCi/g	01/30/19 00:23	02/20/19 10:47	1
Radium 226 and Radium 228	3.72		0.516	0.586			pCi/g	01/30/19 00:23	02/20/19 10:47	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

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

Client Sample ID: JSF-BS-BG10-10.5/12.5-20190124
Date Collected: 01/24/19 15:48
Date Received: 01/26/19 09:30

Lab Sample ID: 180-86110-16
Matrix: Solid

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.780		0.243	0.256	1.00	0.218	pCi/g	01/30/19 00:23	02/20/19 11:48	1
Radium-228	1.75		0.342	0.385		0.348	pCi/g	01/30/19 00:23	02/20/19 11:48	1
Radium 226 and Radium 228	2.53		0.420	0.462			pCi/g	01/30/19 00:23	02/20/19 11:48	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

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

Client Sample ID: JSF-BS-BG10-0.0/0.5-20190124
Date Collected: 01/24/19 15:56
Date Received: 01/26/19 09:30

Lab Sample ID: 180-86110-17
Matrix: Solid

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**0.927**		0.219	0.239	1.00	0.151	pCi/g	01/30/19 00:23	02/20/19 11:51	1
Radium-228	0.538	U	0.278	0.284		0.597	pCi/g	01/30/19 00:23	02/20/19 11:51	1
Radium 226 and Radium 228	**1.47**		0.354	0.371			pCi/g	01/30/19 00:23	02/20/19 11:51	1

QC Sample Results

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

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

Lab Sample ID: MB 160-412878/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 415565 — **Prep Batch: 412878**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-1.807	U	21.4	21.4	50.0	36.6	pCi/L	01/29/19 22:58	02/19/19 09:29	1
Radium-228	-17.50	U	24.0	24.1	50.0	48.0	pCi/L	01/29/19 22:58	02/19/19 09:29	1
Radium 226 and Radium 228	0.0000	U	0.00000	0.00000			pCi/L	01/29/19 22:58	02/19/19 09:29	1

Lab Sample ID: LCS 160-412878/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 415565 — **Prep Batch: 412878**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	136000	131800		15200		347	pCi/L	97	90 - 111
Cesium-137	44900	40200		4030		187	pCi/L	90	90 - 111
Cobalt-60	30500	29570		2930		69.4	pCi/L	97	89 - 110

Lab Sample ID: 180-86110-6 DU — **Client Sample ID: JSF-BS-FB01-20190123**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 415543 — **Prep Batch: 412878**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Radium-226	6.11	U	-20.31	U	14.8	50.0	41.6	pCi/L	1.06	1
Radium-228	1.41	U	-15.81	U	17.3	50.0	33.8	pCi/L	0.49	1
Radium 226 and Radium 228	7.52	U	0.0000	U	0.00000			pCi/L	0.17	

Lab Sample ID: MB 160-412881/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 415646 — **Prep Batch: 412881**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.04047	U	0.138	0.138	1.00	0.259	pCi/g	01/30/19 00:23	02/20/19 07:58	1
Radium-228	-0.05015	U	0.181	0.181		0.219	pCi/g	01/30/19 00:23	02/20/19 07:58	1
Radium 226 and Radium 228	0.0000	U	0.00000	0.00000			pCi/g	01/30/19 00:23	02/20/19 07:58	1

Lab Sample ID: LCS 160-412881/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 415647 — **Prep Batch: 412881**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.7	95.72		11.2		1.12	pCi/g	99	87 - 116
Cesium-137	27.9	30.39		3.20		0.332	pCi/g	109	87 - 120
Cobalt-60	12.0	12.66		1.33		0.168	pCi/g	105	87 - 115

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

Lab Sample ID: 180-86110-1 DU
Matrix: Solid
Analysis Batch: 415646

Client Sample ID: JSF-BS-BG12-0.8/2.8-20190123
Prep Type: Total/NA
Prep Batch: 412881

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Radium-226	1.08			0.8629		0.207	1.00	0.140	pCi/g			0.43	1
Radium-228	1.60			1.497		0.341		0.123	pCi/g			0.14	1
Radium 226 and Radium 228	2.68			2.360		0.399			pCi/g			0.35	

QC Association Summary

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

Rad

Prep Batch: 412878

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-86110-6	JSF-BS-FB01-20190123	Total/NA	Water	Fill_Geo-21	
180-86110-12	JSF-BS-EB01-20190124	Total/NA	Water	Fill_Geo-21	
180-86110-13	JSF-BS-FB02-20190124	Total/NA	Water	Fill_Geo-21	
MB 160-412878/1-A	Method Blank	Total/NA	Water	Fill_Geo-21	
LCS 160-412878/2-A	Lab Control Sample	Total/NA	Water	Fill_Geo-21	
180-86110-6 DU	JSF-BS-FB01-20190123	Total/NA	Water	Fill_Geo-21	

Prep Batch: 412881

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-86110-1	JSF-BS-BG12-0.8/2.8-20190123	Total/NA	Solid	Fill_Geo-21	
180-86110-2	JSF-BS-BG12-5.0/10.0-20190123	Total/NA	Solid	Fill_Geo-21	
180-86110-3	JSF-BS-BG12-10.75/12.75-20190123	Total/NA	Solid	Fill_Geo-21	
180-86110-4	JSF-BS-BG12-13.5/15.0-20190123	Total/NA	Solid	Fill_Geo-21	
180-86110-5	JSF-BS-BG12-0.0/0.5-20190123	Total/NA	Solid	Fill_Geo-21	
180-86110-7	JSF-BS-BG11-1.1/3.1-20190124	Total/NA	Solid	Fill_Geo-21	
180-86110-8	JSF-BS-BG11-5.5/8.5-20190124	Total/NA	Solid	Fill_Geo-21	
180-86110-9	JSF-BS-FD01-20190124	Total/NA	Solid	Fill_Geo-21	
180-86110-10	JSF-BS-BG11-11.3/13.3-20190124	Total/NA	Solid	Fill_Geo-21	
180-86110-11	JSF-BS-BG11-0.0/0.5-20190124	Total/NA	Solid	Fill_Geo-21	
180-86110-14	JSF-BS-BG10-1.4/3.4-20190124	Total/NA	Solid	Fill_Geo-21	
180-86110-15	JSF-BS-BG10-6.5/8.5-20190124	Total/NA	Solid	Fill_Geo-21	
180-86110-16	JSF-BS-BG10-10.5/12.5-20190124	Total/NA	Solid	Fill_Geo-21	
180-86110-17	JSF-BS-BG10-0.0/0.5-20190124	Total/NA	Solid	Fill_Geo-21	
MB 160-412881/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-412881/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
180-86110-1 DU	JSF-BS-BG12-0.8/2.8-20190123	Total/NA	Solid	Fill_Geo-21	

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

Client Sample ID: JSF-BS-BG12-0.8/2.8-20190123 — Lab Sample ID: 180-86110-1

Date Collected: 01/23/19 11:19 — **Matrix: Solid**
Date Received: 01/26/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			260.3 g	1.0 g	412881	01/30/19 00:23	MPT	TAL SL
Total/NA	Analysis	901.1		1			415651	02/20/19 08:13	KLS	TAL SL
	Instrument ID: GAMMAVISION									

Client Sample ID: JSF-BS-BG12-5.0/10.0-20190123 — Lab Sample ID: 180-86110-2

Date Collected: 01/23/19 12:05 — **Matrix: Solid**
Date Received: 01/26/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			381.1 g	1.0 g	412881	01/30/19 00:23	MPT	TAL SL
Total/NA	Analysis	901.1		1			415891	02/21/19 01:55	KLS	TAL SL
	Instrument ID: GAMMAVISION									

Client Sample ID: JSF-BS-BG12-10.75/12.75-20190123 — Lab Sample ID: 180-86110-3

Date Collected: 01/23/19 12:32 — **Matrix: Solid**
Date Received: 01/26/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			432.6 g	1.0 g	412881	01/30/19 00:23	MPT	TAL SL
Total/NA	Analysis	901.1		1			415652	02/20/19 08:11	KLS	TAL SL
	Instrument ID: GAMMAVISION									

Client Sample ID: JSF-BS-BG12-13.5/15.0-20190123 — Lab Sample ID: 180-86110-4

Date Collected: 01/23/19 12:44 — **Matrix: Solid**
Date Received: 01/26/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			375.6 g	1.0 g	412881	01/30/19 00:23	MPT	TAL SL
Total/NA	Analysis	901.1		1			415654	02/20/19 08:14	KLS	TAL SL
	Instrument ID: GAMMAVISION									

Client Sample ID: JSF-BS-BG12-0.0/0.5-20190123 — Lab Sample ID: 180-86110-5

Date Collected: 01/23/19 12:47 — **Matrix: Solid**
Date Received: 01/26/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			384.8 g	1.0 g	412881	01/30/19 00:23	MPT	TAL SL
Total/NA	Analysis	901.1		1			415647	02/20/19 09:34	KLS	TAL SL
	Instrument ID: GAMMAVISION									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

Client Sample ID: JSF-BS-FB01-20190123 — Lab Sample ID: 180-86110-6

Date Collected: 01/23/19 15:30 — **Matrix: Water**
Date Received: 01/26/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			1000 mL	1.0 mL	412878	01/29/19 22:58	MPT	TAL SL
Total/NA	Analysis	901.1		1			415544	02/19/19 07:35	KLS	TAL SL
	Instrument ID: GAMMAVISION									

Client Sample ID: JSF-BS-BG11-1.1/3.1-20190124 — Lab Sample ID: 180-86110-7

Date Collected: 01/24/19 11:16 — **Matrix: Solid**
Date Received: 01/26/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			343.1 g	1.0 g	412881	01/30/19 00:23	MPT	TAL SL
Total/NA	Analysis	901.1		1			415653	02/20/19 09:36	KLS	TAL SL
	Instrument ID: GAMMAVISION									

Client Sample ID: JSF-BS-BG11-5.5/8.5-20190124 — Lab Sample ID: 180-86110-8

Date Collected: 01/24/19 11:36 — **Matrix: Solid**
Date Received: 01/26/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			390.2 g	1.0 g	412881	01/30/19 00:23	MPT	TAL SL
Total/NA	Analysis	901.1		1			415652	02/20/19 09:37	KLS	TAL SL
	Instrument ID: GAMMAVISION									

Client Sample ID: JSF-BS-FD01-20190124 — Lab Sample ID: 180-86110-9

Date Collected: 01/24/19 11:21 — **Matrix: Solid**
Date Received: 01/26/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			375.6 g	1.0 g	412881	01/30/19 00:23	MPT	TAL SL
Total/NA	Analysis	901.1		1			415889	02/21/19 01:54	KLS	TAL SL
	Instrument ID: GAMMAVISION									

Client Sample ID: JSF-BS-BG11-11.3/13.3-20190124 — Lab Sample ID: 180-86110-10

Date Collected: 01/24/19 12:02 — **Matrix: Solid**
Date Received: 01/26/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			372.9 g	1.0 g	412881	01/30/19 00:23	MPT	TAL SL
Total/NA	Analysis	901.1		1			415652	02/20/19 10:46	KLS	TAL SL
	Instrument ID: GAMMAVISION									

Client Sample ID: JSF-BS-BG11-0.0/0.5-20190124 — Lab Sample ID: 180-86110-11

Date Collected: 01/24/19 12:47 — **Matrix: Solid**
Date Received: 01/26/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			392.9 g	1.0 g	412881	01/30/19 00:23	MPT	TAL SL
Total/NA	Analysis	901.1		1			415892	02/21/19 01:56	KLS	TAL SL
	Instrument ID: GAMMAVISION									

Client Sample ID: JSF-BS-EB01-20190124 — Lab Sample ID: 180-86110-12

Date Collected: 01/24/19 12:35 — **Matrix: Water**
Date Received: 01/26/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			1000 mL	1.0 mL	412878	01/29/19 22:58	MPT	TAL SL
Total/NA	Analysis	901.1		1			415544	02/19/19 09:40	KLS	TAL SL
	Instrument ID: GAMMAVISION									

Client Sample ID: JSF-BS-FB02-20190124 — Lab Sample ID: 180-86110-13

Date Collected: 01/24/19 14:34 — **Matrix: Water**
Date Received: 01/26/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			1000 mL	1.0 mL	412878	01/29/19 22:58	MPT	TAL SL
Total/NA	Analysis	901.1		1			415542	02/19/19 09:39	KLS	TAL SL
	Instrument ID: GAMMAVISION									

Client Sample ID: JSF-BS-BG10-1.4/3.4-20190124 — Lab Sample ID: 180-86110-14

Date Collected: 01/24/19 15:07 — **Matrix: Solid**
Date Received: 01/26/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			323 g	1.0 g	412881	01/30/19 00:23	MPT	TAL SL
Total/NA	Analysis	901.1		1			415646	02/20/19 10:47	KLS	TAL SL
	Instrument ID: GAMMAVISION									

Client Sample ID: JSF-BS-BG10-6.5/8.5-20190124 — Lab Sample ID: 180-86110-15

Date Collected: 01/24/19 15:27 — **Matrix: Solid**
Date Received: 01/26/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			303.5 g	1.0 g	412881	01/30/19 00:23	MPT	TAL SL
Total/NA	Analysis	901.1		1			415647	02/20/19 10:47	KLS	TAL SL
	Instrument ID: GAMMAVISION									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

Client Sample ID: JSF-BS-BG10-10.5/12.5-20190124

Lab Sample ID: 180-86110-16

Date Collected: 01/24/19 15:48
Date Received: 01/26/19 09:30

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			329 g	1.0 g	412881	01/30/19 00:23	MPT	TAL SL
Total/NA	Analysis	901.1		1			415654	02/20/19 11:48	KLS	TAL SL
	Instrument ID: GAMMAVISION									

Client Sample ID: JSF-BS-BG10-0.0/0.5-20190124

Lab Sample ID: 180-86110-17

Date Collected: 01/24/19 15:56
Date Received: 01/26/19 09:30

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			352.6 g	1.0 g	412881	01/30/19 00:23	MPT	TAL SL
Total/NA	Analysis	901.1		1			415651	02/20/19 11:51	KLS	TAL SL
	Instrument ID: GAMMAVISION									

Laboratory References:

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

Analyst References:

Lab: TAL SL
- Batch Type: Prep
  - MPT = Michael Tucker
- Batch Type: Analysis
  - KLS = Kody Saulters

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

Laboratory: Eurofins TestAmerica, Pittsburgh

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Arkansas DEQ	State Program	6	88-0690	06-27-19
California	State Program	9	2891	04-30-20
Connecticut	State Program	1	PH-0688	09-30-20
Florida	NELAP	4	E871008	06-30-19
Illinois	NELAP	5	200005	06-30-19
Kansas	NELAP	7	E-10350	01-31-20
Louisiana	NELAP	6	04041	06-30-19
Nevada	State Program	9	PA00164	07-31-19
New Hampshire	NELAP	1	2030	04-04-20
New Jersey	NELAP	2	PA005	06-30-19
New York	NELAP	2	11182	03-31-20
North Carolina (WW/SW)	State Program	4	434	12-31-19
Oregon	NELAP	10	PA-2151	02-06-20
Pennsylvania	NELAP	3	02-00416	04-30-20
South Carolina	State Program	4	89014	04-30-19 *
Texas	NELAP	6	T104704528-15-2	03-31-20
US Fish & Wildlife	Federal		LE94312A-1	07-31-19
USDA	Federal		P330-16-00211	06-26-19
Utah	NELAP	8	PA001462015-4	05-31-19 *
Virginia	NELAP	3	460189	09-14-19
West Virginia DEP	State Program	3	142	01-31-20
Wisconsin	State Program	5	998027800	08-31-19

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

Laboratory: Eurofins TestAmerica, St. Louis

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska	State Program	10	MO00054	06-30-19
ANAB	DoD		L2305	04-06-22
Arizona	State Program	9	AZ0813	12-08-19
California	State Program	9	2886	06-30-19 *
Connecticut	State Program	1	PH-0241	03-31-21
Florida	NELAP	4	E87689	06-30-19 *
Hawaii	State Program	9	NA	06-30-19
Illinois	NELAP	5	200023	11-30-19
Iowa	State Program	7	373	12-01-20
Kansas	NELAP	7	E-10236	10-31-19
Kentucky (DW)	State Program	4	KY90125	12-31-19
Louisiana	NELAP	6	04080	06-30-19
Louisiana (DW)	NELAP	6	LA011	12-31-19
Maryland	State Program	3	310	09-30-19
Michigan	State Program	5	9005	06-30-19
Missouri	State Program	7	780	06-30-19
Nevada	State Program	9	MO000542018-1	07-31-19
New Jersey	NELAP	2	MO002	06-30-19 *
New York	NELAP	2	11616	03-31-20
North Dakota	State Program	8	R207	06-30-19 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-19
Pennsylvania	NELAP	3	68-00540	02-28-20
South Carolina	State Program	4	85002001	06-30-19
Texas	NELAP	6	T104704193-18-13	07-31-19
US Fish & Wildlife	Federal		058448	07-31-19
USDA	Federal		P330-17-0028	02-02-20
Utah	NELAP	8	MO000542018-10	07-31-19
Virginia	NELAP	3	460230	06-14-19 *
Washington	State Program	10	C592	08-30-19
West Virginia DEP	State Program	3	381	08-31-19

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

Method	Method Description	Protocol	Laboratory
901.1	Radium-226 & Other Gamma Emitters (GS)	EPA	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

Protocol References:

EPA = US Environmental Protection Agency
None = None

Laboratory References:

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

Sample Summary

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
180-86110-1	JSF-BS-BG12-0.8/2.8-20190123	Solid	01/23/19 11:19	01/26/19 09:30
180-86110-2	JSF-BS-BG12-5.0/10.0-20190123	Solid	01/23/19 12:05	01/26/19 09:30
180-86110-3	JSF-BS-BG12-10.75/12.75-20190123	Solid	01/23/19 12:32	01/26/19 09:30
180-86110-4	JSF-BS-BG12-13.5/15.0-20190123	Solid	01/23/19 12:44	01/26/19 09:30
180-86110-5	JSF-BS-BG12-0.0/0.5-20190123	Solid	01/23/19 12:47	01/26/19 09:30
180-86110-6	JSF-BS-FB01-20190123	Water	01/23/19 15:30	01/26/19 09:30
180-86110-7	JSF-BS-BG11-1.1/3.1-20190124	Solid	01/24/19 11:16	01/26/19 09:30
180-86110-8	JSF-BS-BG11-5.5/8.5-20190124	Solid	01/24/19 11:36	01/26/19 09:30
180-86110-9	JSF-BS-FD01-20190124	Solid	01/24/19 11:21	01/26/19 09:30
180-86110-10	JSF-BS-BG11-11.3/13.3-20190124	Solid	01/24/19 12:02	01/26/19 09:30
180-86110-11	JSF-BS-BG11-0.0/0.5-20190124	Solid	01/24/19 12:47	01/26/19 09:30
180-86110-12	JSF-BS-EB01-20190124	Water	01/24/19 12:35	01/26/19 09:30
180-86110-13	JSF-BS-FB02-20190124	Water	01/24/19 14:34	01/26/19 09:30
180-86110-14	JSF-BS-BG10-1.4/3.4-20190124	Solid	01/24/19 15:07	01/26/19 09:30
180-86110-15	JSF-BS-BG10-6.5/8.5-20190124	Solid	01/24/19 15:27	01/26/19 09:30
180-86110-16	JSF-BS-BG10-10.5/12.5-20190124	Solid	01/24/19 15:48	01/26/19 09:30
180-86110-17	JSF-BS-BG10-0.0/0.5-20190124	Solid	01/24/19 15:56	01/26/19 09:30

REAGENT TRACEABILITY SUMMARY

Lab Name: Eurofins TestAmerica, St. Louis Job No.: 180-86110-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
1L Marn LCS_00005	09/21/19	Eckert & Ziegler, Lot 83924-334			(Purchased Reagent)		Americium-241	305.85 dpm/g
							Cesium-137	120.21 dpm/g
							Cobalt-60	197.61 dpm/g
1L Marn_00002	03/02/16	Eckert & Ziegler, Lot 83924-334			(Purchased Reagent)		Americium-241	5097.5 pCi/L
							Ce-139	2399.2 pCi/L
							Cesium-137	2003.5 pCi/L
							Co-57	1564.3 pCi/L
							Cobalt-60	3293.9 pCi/L
							Mn-54	3083.6 pCi/L
							Sn-113	4248.4 pCi/L
							Y-88	6929.6 pCi/L
1L Marn_00003	02/09/17	Eckert & Ziegler, Lot 90062			(Purchased Reagent)		Americium-241	5072.4 Bq
							Cd-109	72078 Bq
							Ce-139	2418 Bq
							Cesium-137	2056.4 Bq
							Co-57	1593.5 Bq
							Cobalt-60	3233.8 Bq
							Hg-203	5155.9 Bq
							Mn-54	3114.6 Bq
							Sn-113	4253.1 Bq
							Y-88	7000 Bq
Source A_00001	04/01/59	02/23/11	water, Lot 79670-334	0.9986 Source	Gamma Ampuole_00001	0.9986 g	Americium-241	9.4429 Bq
							Cd-109	132.909 Bq
							Ce-139	4.4538 Bq
							Cesium-137	3.7296 Bq
							Co-57	2.9513 Bq
							Cobalt-60	6.2002 Bq
							Hg-203	9.6996 Bq
							Sn-113	7.6266 Bq
							Y-88	12.712 Bq
.Gamma Ampuole_00001	04/07/59	Analytics, Lot 79670-334			(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source B_00001	04/01/59	02/23/11	water, Lot 79670-334	1.0511 Source	Gamma Ampuole_00001	1.0511 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

REAGENT TRACEABILITY SUMMARY

Lab Name: Eurofins TestAmerica, St. Louis Job No.: 180-86110-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: Eurofins TestAmerica, St. Louis Job No.: 180-86110-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							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
							Cesium-137	774.911 Bq
							Co-57	605.079 Bq
							Cobalt-60	1273.92 Bq
							Hg-203	2007.23 Bq
							Sn-113	1643.41 Bq
							Y-88	2681.34 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: Eurofins TestAmerica, St. Louis Job No.: 180-86110-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.Gamma Ampuole_00003	01/19/61	Analytics, Lot 83725-334			(Purchased Reagent)		Americium-241	9083.6 Bq
							Cd-109	131939 Bq
							Ce-139	4380.5 Bq
							Cesium-137	3658 Bq
							Co-57	2856.3 Bq
							Cobalt-60	6013.6 Bq
							Hg-203	9475.2 Bq
							Sn-113	7757.8 Bq
							Y-88	12657.4 Bq
Tuna Can LCS_00008	09/14/19	Analytics, Lot 74139-334			(Purchased Reagent)		Americium-241	219 dpm/g
							Cesium-137	82.3 dpm/g
							Cobalt-60	136 dpm/g
Tuna Can_00002	02/03/15	Eckert & Ziegler, Lot 81427-334			(Purchased Reagent)		Americium-241	1164 Bq
							Cd-109	16063 Bq
							Ce-139	546 Bq
							Cesium-137	465 Bq
							Co-57	357 Bq
							Cobalt-60	742 Bq
							Hg-203	1208 Bq
							Pb-210	15186 Bq
							Sn-113	943 Bq
							Y-88	1571 Bq
Tuna Can_00003	02/09/17	Eckert & Ziegler, Lot 90099			(Purchased Reagent)		Americium-241	1164 Bq
							Cd-109	16373 Bq
							Ce-139	549 Bq
							Cesium-137	467 Bq
							Co-57	362 Bq
							Cobalt-60	735 Bq
							Hg-203	1171 Bq
							Pb-210	14936 Bq
							Sn-113	967 Bq
							Y-88	1590 Bq
Tuna Can_00006	03/01/16	Eckert & Ziegler, Lot 83814-334			(Purchased Reagent)		Americium-241	1195 Bq
							Cd-109	16353 Bq
							Ce-139	543 Bq
							Cesium-137	453 Bq
							Co-57	354 Bq
							Cobalt-60	745 Bq
							Hg-203	1175 Bq
							Pb-210	14606 Bq
							Sn-113	961 Bq
							Y-88	1568 Bq

Reagent

1L Marn LCS_00005

St. Louis Radiological Standard Verification

Printed: 9/26/2018 1:11 PM

Standard ID Number: 1L Marn LCS_00005 (1575310)
True Value = 136100 pCi/L
Date Analyzed: 9/21/2018

Radionuclide: Am-241

	Replicates	
#1	134000	pCi/L
#2	132500	pCi/L
#3	134200	pCi/L

Mean = 133566.667

1 sigma = 929.157324

1.96 sigma = 1821.148

True Value minus 5% = 129295 (True Value - 5%)
True Value plus 5% = 142905 (True Value + 5%)

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

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

Standard Reverification Acceptable? **Yes**

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

1st Reviewed By/Date: 9-26-18

2nd Reviewed By/Date: 9-26-18

St. Louis Radiological Standard Verification

Printed: 9/26/2018 1:13 PM

Standard ID Number: 1L Marn LCS_00005 (1575310)
True Value = 45320 pCi/L
Date Analyzed: 9/21/2018

Radionuclide: Cs-137

	Replicates	
#1	42620	pCi/L
#2	44850	pCi/L
#3	42540	pCi/L

Mean = 43336.6667

1 sigma = 1311.19538

1.96 sigma = 2569.943

True Value minus 5% = 43054 (True Value - 5%)
True Value plus 5% = 47586 (True Value + 5%)

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

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

Standard Reverification Acceptable? Yes

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

1st Reviewed By/Date: 9.26.18

2nd Reviewed By/Date:

St. Louis Radiological Standard Verification

Printed: 9/26/2018 1:12 PM

Standard ID Number: 1L Marn LCS_00005 (1575310)
True Value = 32250 pCi/L
Date Analyzed: 9/21/2018

Radionuclide: Co-60

	Replicates	
#1	31190	pCi/L
#2	31280	pCi/L
#3	30960	pCi/L

Mean = 31143.3333

1 sigma = 165.025251

1.96 sigma = 323.4495

True Value minus 5% = 30637.5 (True Value - 5%)
True Value plus 5% = 33862.5 (True Value + 5%)

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

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

Standard Reverification Acceptable? Yes

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

1st Reviewed By/Date: 9.26.18

2nd Reviewed By/Date:

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 386459 **Operator:**

MQO

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
LCS 160-386459~2-	LCS	1000.00mL	1.00	GammaVision	GV15	9 / 21 / 18 14:17	120

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA	
AC-228	11136	1.035E+002pCi/L	2.005E+002	2.004E+002	4.793E+002	2.377E+002	0.22	200.4858
AG-108M	10982	-5.300E+001pCi/L	2.386E+001	2.371E+001	1.091E+002	5.419E+001	-0.49	23.8631
AG-110M	10973	8.334E+001pCi/L	5.824E+001	5.810E+001	2.424E+002	1.204E+002	0.34	58.2405
AM-241	10818	1.340E+005pCi/L	7.740E+003	2.590E+002	3.721E+002	1.856E+002	360.17	7,740.3899
BA-133	10469	8.584E+001pCi/L	7.450E+001	7.437E+001	1.688E+002	8.398E+001	0.51	74.4993
BA-140	10463	1.931E+002pCi/L	1.940E+002	1.938E+002	3.605E+002	1.788E+002	0.54	194.0195
BE-7	10435	-4.615E+002pCi/L	4.649E+002	4.643E+002	1.532E+003	7.631E+002	-0.30	464.8973
BI-207	10195	4.927E+001pCi/L	8.581E+001	8.577E+001	1.832E+002	9.071E+001	0.27	85.8052
BI-210M	10173	6.737E+001pCi/L	5.895E+001	5.882E+001	1.708E+002	8.500E+001	0.39	58.9545
BI-212	10160	3.670E+002pCi/L	4.786E+002	4.782E+002	1.582E+003	7.850E+002	0.23	478.5874
BI-214	10154	1.535E+001pCi/L	1.191E+002	1.191E+002	3.939E+002	1.961E+002	0.04	119.0880
CD-109	9254	2.156E+004pCi/L	1.514E+003	8.779E+002	2.799E+003	1.396E+003	7.70	1,513.7360
CD-113M	17462	-5.192E+005pCi/L	3.841E+005	3.827E+005	1.262E+006	6.276E+005	-0.41	384,137.3570
CE-139	9241	-2.871E+001pCi/L	2.698E+001	2.686E+001	8.863E+001	4.413E+001	-0.32	26.9832
CE-141	9235	-4.485E+001pCi/L	6.458E+001	6.454E+001	2.130E+002	1.062E+002	-0.21	64.5814
CE-144	9221	1.840E+002pCi/L	2.670E+002	2.668E+002	8.806E+002	4.391E+002	0.21	267.0147
CF-249	9215	0.000E+000pCi/L	2.988E+001	2.988E+001	2.196E+002	1.094E+002	0.00	29.8837
CF-251	13690	-1.405E+002pCi/L	1.368E+002	1.363E+002	3.405E+002	1.693E+002	-0.41	136.8355
CO-56	8704	2.888E+000pCi/L	2.115E+000	2.111E+000	1.294E+002	6.419E+001	0.02	2.1155
CO-57	13694	1.934E+002pCi/L	2.808E+002	2.806E+002	9.262E+002	4.618E+002	0.21	280.8223
CO-58	8698	-6.131E+001pCi/L	5.008E+001	4.999E+001	1.650E+002	8.198E+001	-0.37	50.0789
CO-60	8692	3.119E+004pCi/L	1.542E+003	9.996E+001	6.630E+001	3.237E+001	470.35	1,542.2814
CR-51	8604	3.388E+002pCi/L	3.583E+002	3.578E+002	1.181E+003	5.881E+002	0.29	358.2727
CS-134	8553	-1.207E+000pCi/L	6.647E-001	6.620E-001	1.728E+002	8.580E+001	-0.01	0.6647
CS-136	8546	-6.250E+001pCi/L	5.138E+001	5.126E+001	1.692E+002	8.408E+001	-0.37	51.3815
CS-137	8539	4.262E+004pCi/L	2.135E+003	1.312E+002	1.282E+002	6.359E+001	332.49	2,135.1029
EU-152	7145	2.846E+002pCi/L	1.275E+002	1.266E+002	2.783E+002	1.382E+002	1.02	127.4882
EU-154	7138	1.919E+002pCi/L	8.005E+001	7.936E+001	1.404E+002	6.988E+001	1.37	80.0535
EU-155	7131	0.000E+000pCi/L	4.641E+001	4.641E+001	5.377E+002	2.682E+002	0.00	46.4059
FE-59	7073	6.715E+001pCi/L	7.070E+001	7.063E+001	2.641E+002	1.309E+002	0.25	70.7033
GA-68	18005	-4.602E+002pCi/L	3.516E+003	3.516E+003	7.519E+003	3.725E+003	-0.06	3,516.4104
GD-153	6824	0.000E+000pCi/L	1.738E+001	1.738E+001	3.764E+002	1.878E+002	0.00	17.3828
HF-181	6495	6.941E+000pCi/L	5.121E+000	5.109E+000	2.027E+002	1.010E+002	0.03	5.1213
HG-203	6466	-1.547E+001pCi/L	3.228E+001	3.226E+001	1.067E+002	5.308E+001	-0.15	32.2762
I-131	6380	2.136E+001pCi/L	4.208E+001	4.206E+001	1.006E+002	4.999E+001	0.21	42.0784
IR-192	6303	6.074E+001pCi/L	4.180E+001	4.165E+001	1.357E+002	6.759E+001	0.45	41.8000
K-40	6148	5.789E+001pCi/L	1.939E+002	1.939E+002	3.995E+002	1.917E+002	0.14	193.8961
KR-85	6111	1.188E+003pCi/L	8.342E+003	8.342E+003	2.763E+004	1.374E+004	0.04	8,342.0502
LA-140	6096	3.546E+001pCi/L	4.383E+001	4.379E+001	3.868E+001	1.837E+001	0.92	43.8329
MN-54	5382	2.126E+002pCi/L	5.289E+001	5.184E+001	1.057E+002	5.233E+001	2.01	52.8921
NA-22	5201	0.000E+000pCi/L	2.389E+001	2.389E+001	7.863E+001	3.856E+001	0.00	23.8924
NB-94	5160	-7.517E+000pCi/L	1.455E+001	1.454E+001	9.326E+001	4.617E+001	-0.08	14.5496
NB-95	5154	-5.383E+001pCi/L	4.732E+001	4.724E+001	1.560E+002	7.750E+001	-0.35	47.3167
ND-147	5083	-2.604E+002pCi/L	3.068E+002	3.064E+002	7.030E+002	3.488E+002	-0.37	306.7661
NP-237	4757	-1.423E+002pCi/L	2.669E+002	2.668E+002	8.803E+002	4.392E+002	-0.16	266.8842
NP-239	4751	-8.698E+001pCi/L	1.542E+002	1.541E+002	5.086E+002	2.537E+002	-0.17	154.2180
PA-231	4541	1.206E+003pCi/L	1.380E+003	1.378E+003	5.991E+003	2.987E+003	0.20	1,379.6125
PA-233	4535	1.540E+002pCi/L	1.496E+002	1.493E+002	3.232E+002	1.610E+002	0.48	149.5557
PA-234	4528	1.125E+002pCi/L	1.627E+002	1.626E+002	5.365E+002	2.675E+002	0.21	162.6680

			MQO					
PA-234M	19453	-9.531E+003pCi/L	6.497E+003	6.480E+003	2.137E+004	1.061E+004	-0.45	6,496.5904
PB-210	4467	2.845E+004pCi/L	3.289E+003	2.054E+003	6.714E+003	3.354E+003	4.24	3,289.4702
PB-212	4454	1.535E+001pCi/L	8.378E+001	8.377E+001	2.768E+002	1.379E+002	0.06	83.7785
PB-214	4448	7.774E+001pCi/L	1.065E+002	1.064E+002	2.856E+002	1.421E+002	0.27	106.4705
PM-144	19585	-7.733E-001pCi/L	4.106E+001	4.106E+001	9.110E+001	4.510E+001	-0.01	41.0648
PM-146	2464	-7.762E+001pCi/L	3.443E+001	3.421E+001	1.769E+002	8.795E+001	-0.44	34.4266
RH-106	1882	2.165E+002pCi/L	5.625E+002	5.624E+002	1.859E+003	9.256E+002	0.12	562.4837
RU-103	1828	4.769E+001pCi/L	4.401E+001	4.394E+001	1.007E+002	4.999E+001	0.47	44.0094
SB-124	1784	-4.612E+001pCi/L	4.287E+001	4.281E+001	1.869E+002	9.307E+001	-0.25	42.8705
SB-125	1777	2.396E+001pCi/L	1.577E+001	1.573E+001	3.251E+002	1.615E+002	0.07	15.7742
SC-46	1739	1.626E+001pCi/L	3.114E+001	3.113E+001	1.962E+002	9.756E+001	0.08	31.1361
SN-113	1570	-4.344E+001pCi/L	6.884E+001	6.881E+001	2.273E+002	1.132E+002	-0.19	68.8431
SN-126	17459	3.520E+001pCi/L	1.113E+002	1.113E+002	3.303E+002	1.638E+002	0.11	111.3081
TA-182	1301	-2.367E+002pCi/L	1.845E+002	1.842E+002	6.077E+002	3.019E+002	-0.39	184.5316
TC-99M	17412	2.640E+001pCi/L	3.829E+001	3.826E+001	1.263E+002	6.297E+001	0.21	38.2922
TH-227	1058	2.543E+002pCi/L	2.483E+002	2.478E+002	1.018E+003	5.060E+002	0.25	248.2593
TH-229	1046	-6.412E+002pCi/L	8.344E+002	8.329E+002	1.512E+003	7.524E+002	-0.42	834.3777
TH-234	1027	-1.599E+002pCi/L	1.263E+003	1.263E+003	2.018E+003	1.007E+003	-0.08	1,262.8041
TL-208	929	8.063E+001pCi/L	6.859E+001	6.847E+001	1.182E+002	5.864E+001	0.68	68.5922
TL-210	20861	1.063E+001pCi/L	1.717E+001	1.716E+001	1.515E+002	7.524E+001	0.07	17.1664
U-235	281	1.284E+002pCi/L	2.811E+002	2.811E+002	9.280E+002	4.627E+002	0.14	281.1422
Y-88	74	1.566E+001pCi/L	2.077E+001	2.075E+001	4.182E+001	1.984E+001	0.37	20.7712
ZN-65	31	3.193E+002pCi/L	7.196E+001	7.027E+001	2.268E+002	1.121E+002	1.41	71.9602
ZR-95	7	6.869E+001pCi/L	5.909E+001	5.899E+001	2.616E+002	1.299E+002	0.26	59.0897

Laboratory Control Sample Information

Sample ID	WRKNO	Analyte	Activity		StdAdded	Recovery	ZFactor
LCS 160-386459~2-A	LCS 160-386459~2-A	CS-137	4.262E+004	pCi/L	4.532E+004	94.03%	-0.8676
		CO-60	3.119E+004	pCi/L	3.225E+004	96.70%	-0.4800
		AM-241	1.340E+005	pCi/L	1.361E+005	98.47%	-0.1881

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

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 390595 **Operator:**

MQO

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
LCS 160-390595~2-	LCS	1000.00 mL	1.00	GammaVision	GV14	9 / 22 / 18 10:27	60

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA	
AC-228	11136	3.752E+002pCi/L	2.027E+002	2.019E+002	5.601E+002	2.769E+002	0.67	202.7300
AG-108M	10982	-9.076E+000pCi/L	5.199E+001	5.199E+001	1.305E+002	6.471E+001	-0.07	51.9942
AG-110M	10973	8.849E+000pCi/L	2.546E+001	2.546E+001	3.229E+002	1.603E+002	0.03	25.4607
AM-241	10818	1.325E+005pCi/L	7.657E+003	3.065E+002	4.249E+002	2.118E+002	311.92	7,657.2346
BA-133	10469	9.225E+001pCi/L	8.665E+001	8.652E+001	2.061E+002	1.023E+002	0.45	86.6496
BA-140	10463	2.729E+002pCi/L	2.187E+002	2.183E+002	4.289E+002	2.121E+002	0.64	218.7456
BE-7	10435	-5.133E+002pCi/L	4.613E+002	4.606E+002	1.521E+003	7.555E+002	-0.34	461.3417
BI-207	10195	6.198E+001pCi/L	4.336E+001	4.325E+001	2.224E+002	1.098E+002	0.28	43.3586
BI-210M	10173	8.704E+001pCi/L	8.105E+001	8.089E+001	2.038E+002	1.012E+002	0.43	81.0486
BI-212	10160	7.499E+002pCi/L	6.153E+002	6.142E+002	2.029E+003	1.005E+003	0.37	615.3067
BI-214	10154	9.133E+001pCi/L	1.445E+002	1.445E+002	4.777E+002	2.375E+002	0.19	144.5363
CD-109	9254	2.138E+004pCi/L	1.368E+003	6.125E+002	1.782E+003	8.857E+002	12.00	1,367.9171
CD-113M	17462	5.504E+005pCi/L	5.366E+005	5.354E+005	1.768E+006	8.785E+005	0.31	536,565.0363
CE-139	9241	9.910E+000pCi/L	3.217E+001	3.216E+001	1.065E+002	5.292E+001	0.09	32.1702
CE-141	9235	-4.678E+001pCi/L	5.824E+001	5.819E+001	1.922E+002	9.564E+001	-0.24	58.2388
CE-144	9221	0.000E+000pCi/L	1.427E+002	1.427E+002	8.261E+002	4.110E+002	0.00	142.7379
CF-249	9215	9.371E+001pCi/L	7.417E+001	7.401E+001	2.412E+002	1.199E+002	0.39	74.1658
CF-251	13690	-7.832E+001pCi/L	1.544E+002	1.543E+002	4.063E+002	2.017E+002	-0.19	154.4371
CO-56	8704	-5.664E+001pCi/L	5.754E+001	5.747E+001	1.900E+002	9.418E+001	-0.30	57.5397
CO-57	13694	3.393E+001pCi/L	3.489E+001	3.484E+001	8.084E+001	4.017E+001	0.42	34.8909
CO-58	8698	1.623E+000pCi/L	5.793E+001	5.793E+001	1.925E+002	9.543E+001	0.01	57.9332
CO-60	8692	3.128E+004pCi/L	1.549E+003	1.257E+002	7.726E+001	3.738E+001	404.87	1,548.8481
CR-51	8604	3.301E+002pCi/L	3.653E+002	3.649E+002	9.135E+002	4.528E+002	0.36	365.3205
CS-134	8553	-7.693E+001pCi/L	6.245E+001	6.234E+001	2.059E+002	1.020E+002	-0.37	62.4547
CS-136	8546	4.768E+001pCi/L	4.825E+001	4.818E+001	1.671E+002	8.271E+001	0.29	48.2485
CS-137	8539	4.485E+004pCi/L	2.250E+003	1.770E+002	1.324E+002	6.538E+001	338.82	2,249.6895
EU-152	7145	9.224E+001pCi/L	1.042E+002	1.040E+002	2.462E+002	1.224E+002	0.37	104.1549
EU-154	7138	2.142E+002pCi/L	3.857E+001	3.674E+001	1.183E+002	5.862E+001	1.81	38.5737
EU-155	7131	8.665E+001pCi/L	1.064E+002	1.063E+002	3.513E+002	1.747E+002	0.25	106.4245
FE-59	7073	1.682E+002pCi/L	1.176E+002	1.173E+002	3.869E+002	1.916E+002	0.43	117.5714
GA-68	18005	-9.321E+002pCi/L	2.518E+003	2.518E+003	8.362E+003	4.139E+003	-0.11	2,518.3025
GD-153	6824	1.010E+002pCi/L	6.625E+001	6.594E+001	2.343E+002	1.165E+002	0.43	66.2474
HF-181	6495	5.378E+001pCi/L	6.225E+001	6.219E+001	2.043E+002	1.015E+002	0.26	62.2457
HG-203	6466	-8.242E+000pCi/L	4.470E+001	4.470E+001	1.121E+002	5.564E+001	-0.07	44.7034
I-131	6380	-5.059E+001pCi/L	4.906E+001	4.899E+001	1.226E+002	6.076E+001	-0.41	49.0560
IR-192	6303	2.759E+001pCi/L	4.438E+001	4.435E+001	1.358E+002	6.747E+001	0.20	44.3783
K-40	6148	-1.689E+002pCi/L	1.788E+003	1.788E+003	5.988E+002	2.867E+002	-0.28	1,787.9980
KR-85	6111	-8.131E+003pCi/L	9.969E+003	9.959E+003	3.295E+004	1.634E+004	-0.25	9,969.0431
LA-140	6096	2.804E+001pCi/L	2.277E+001	2.272E+001	4.682E+001	2.187E+001	0.60	22.7700
MN-54	5382	1.803E+002pCi/L	5.598E+001	5.527E+001	1.209E+002	5.960E+001	1.49	55.9828
NA-22	5201	0.000E+000pCi/L	2.797E+001	2.797E+001	9.321E+001	4.541E+001	0.00	27.9704
NB-94	5160	-1.302E+001pCi/L	4.865E+001	4.865E+001	1.124E+002	5.545E+001	-0.12	48.6509
NB-95	5154	-1.095E+001pCi/L	4.075E+001	4.075E+001	1.356E+002	6.701E+001	-0.08	40.7505
ND-147	5083	2.576E+002pCi/L	3.422E+002	3.419E+002	8.196E+002	4.054E+002	0.31	342.1901
NP-237	4757	1.416E+002pCi/L	2.490E+002	2.489E+002	8.223E+002	4.095E+002	0.17	249.0417
NP-239	4751	8.152E+001pCi/L	9.434E+001	9.420E+001	3.113E+002	1.547E+002	0.26	94.3355
PA-231	4541	1.288E+003pCi/L	1.453E+003	1.451E+003	6.324E+003	3.149E+003	0.20	1,452.6558
PA-233	4535	4.015E+001pCi/L	6.408E+001	6.404E+001	5.243E+002	2.611E+002	0.08	64.0788
PA-234	4528	1.032E+002pCi/L	7.060E+001	7.038E+001	5.076E+002	2.526E+002	0.20	70.5964

			MQO					
PA-234M	19453	4.761E+003pCi/L	8.029E+003	8.025E+003	2.659E+004	1.318E+004	0.18	8,028.7569
PB-210	4467	1.570E+003pCi/L	2.213E+003	2.209E+003	7.285E+003	3.636E+003	0.22	2,213.2728
PB-212	4454	6.704E+001pCi/L	1.014E+002	1.013E+002	3.348E+002	1.667E+002	0.20	101.4314
PB-214	4448	1.462E+002pCi/L	1.153E+002	1.151E+002	3.456E+002	1.717E+002	0.42	115.3381
PM-144	19585	-5.428E+001pCi/L	1.589E+002	1.589E+002	1.112E+002	5.487E+001	-0.49	158.9330
PM-146	2464	3.581E+001pCi/L	8.420E+001	8.418E+001	1.993E+002	9.886E+001	0.18	84.2020
RH-106	1882	5.271E+002pCi/L	4.428E+002	4.421E+002	1.377E+003	6.822E+002	0.38	442.8373
RU-103	1828	-2.435E+001pCi/L	5.183E+001	5.182E+001	1.243E+002	6.154E+001	-0.20	51.8329
SB-124	1784	4.155E+001pCi/L	4.740E+001	4.735E+001	2.197E+002	1.092E+002	0.19	47.3967
SB-125	1777	2.998E+002pCi/L	1.163E+002	1.153E+002	3.073E+002	1.520E+002	0.98	116.2576
SC-46	1739	-8.480E+001pCi/L	7.368E+001	7.357E+001	2.429E+002	1.206E+002	-0.35	73.6837
SN-113	1570	1.923E+001pCi/L	7.544E+001	7.543E+001	2.498E+002	1.242E+002	0.08	75.4405
SN-126	17459	1.861E+002pCi/L	1.420E+002	1.416E+002	4.187E+002	2.071E+002	0.44	141.9909
TA-182	1301	2.340E+001pCi/L	1.525E+002	1.525E+002	5.082E+002	2.510E+002	0.05	152.5449
TC-99M	17412	-2.589E+001pCi/L	3.051E+001	3.047E+001	1.007E+002	5.006E+001	-0.26	30.5061
TH-227	1058	3.538E+003pCi/L	4.109E+002	3.510E+002	1.225E+003	6.077E+002	2.89	410.9180
TH-229	1046	-6.728E+002pCi/L	6.771E+002	6.751E+002	1.808E+003	8.979E+002	-0.37	677.1331
TH-234	1027	2.163E+002pCi/L	5.679E+002	5.678E+002	1.876E+003	9.345E+002	0.12	567.9376
TL-208	929	-6.103E+001pCi/L	2.843E+001	2.827E+001	1.374E+002	6.795E+001	-0.44	28.4308
TL-210	20861	2.187E+001pCi/L	3.472E+001	3.470E+001	1.770E+002	8.769E+001	0.12	34.7162
U-235	281	1.542E+002pCi/L	1.039E+002	1.036E+002	3.419E+002	1.688E+002	0.45	103.9356
Y-88	74	1.246E+000pCi/L	2.661E+001	2.661E+001	5.467E+001	2.565E+001	0.02	26.6149
ZN-65	31	-2.037E+000pCi/L	1.327E+002	1.327E+002	4.930E+002	2.444E+002	0.00	132.7018
ZR-95	7	2.765E+000pCi/L	9.390E+001	9.390E+001	2.171E+002	1.072E+002	0.01	93.8977

Laboratory Control Sample Information

Sample ID	WRKNO	Analyte	Activity		StdAdded	Recovery	ZFactor
LCS 160-390595~2-A	LCS 160-390595~2-A	CS-137	4.485E+004	pCi/L	4.532E+004	98.97%	-0.1466
		CO-60	3.128E+004	pCi/L	3.224E+004	97.02%	-0.4317
		AM-241	1.325E+005	pCi/L	1.361E+005	97.39%	-0.3232

Sample Duplicate Information

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

Blanks Information

SamplD	WRKNO	Analyte	Activity	UncTotal	ZFactor

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 390816 **Operator:**

MQO

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
LCS 160-390816~2-	LCS	1000.00mL	1.00	GammaVision	GV15	9 / 22 / 18 2:04	120

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA	
AC-228	11136	1.236E+002pCi/L	1.388E+002	1.387E+002	5.480E+002	2.718E+002	0.23	138.7922
AM-241	10818	1.342E+005pCi/L	7.754E+003	2.541E+002	3.619E+002	1.806E+002	370.91	7,753.6395
BA-133	10469	8.903E+001pCi/L	7.245E+001	7.230E+001	1.768E+002	8.799E+001	0.50	72.4479
BE-7	10435	-3.896E+001pCi/L	4.354E+002	4.354E+002	9.999E+002	4.968E+002	-0.04	435.3608
BI-211	10165	3.678E+002pCi/L	2.502E+002	2.495E+002	2.373E+003	1.179E+003	0.15	250.1705
BI-212	10160	7.041E+002pCi/L	6.179E+002	6.169E+002	2.069E+003	1.028E+003	0.34	617.8503
BI-214	10154	4.227E+001pCi/L	5.699E+001	5.695E+001	2.499E+002	1.241E+002	0.17	56.9943
CO-57	13694	7.610E+001pCi/L	1.548E+001	1.490E+001	4.845E+001	2.407E+001	1.57	15.4793
CO-58	8698	-1.101E+001pCi/L	4.887E+001	4.886E+001	1.083E+002	5.362E+001	-0.10	48.8676
CO-60	8692	3.096E+004pCi/L	1.531E+003	1.018E+002	7.249E+001	3.546E+001	427.15	1,531.4170
CS-134	8553	-4.593E+001pCi/L	3.612E+001	3.605E+001	1.190E+002	5.908E+001	-0.39	36.1249
CS-137	8539	4.254E+004pCi/L	2.131E+003	1.309E+002	1.263E+002	6.264E+001	336.87	2,131.1849
EU-152	7145	2.936E+002pCi/L	1.346E+002	1.339E+002	1.440E+003	7.152E+002	0.20	134.6341
EU-154	7138	1.890E+002pCi/L	1.193E+002	1.189E+002	1.049E+003	5.202E+002	0.18	119.2998
EU-155	7131	3.468E+001pCi/L	6.505E+001	6.502E+001	2.839E+002	1.414E+002	0.12	65.0538
FE-59	7073	-1.728E+000pCi/L	9.654E+000	9.653E+000	2.652E+002	1.315E+002	-0.01	9.6537
K-40	6148	4.013E+001pCi/L	1.936E+002	1.936E+002	3.995E+002	1.917E+002	0.10	193.6132
MN-54	5382	1.899E+002pCi/L	5.133E+001	5.046E+001	1.047E+002	5.183E+001	1.81	51.3265
MN-56		5.028E+001pCi/L	6.938E+001	6.934E+001	1.533E+002	7.596E+001	0.33	69.3834
NA-22	5201	0.000E+000pCi/L	2.392E+001	2.392E+001	7.874E+001	3.862E+001	0.00	23.9200
PB-210	4467	-1.246E+003pCi/L	6.646E+002	6.551E+002	5.790E+003	2.891E+003	-0.22	664.6441
PB-212	4454	6.391E+001pCi/L	8.849E+001	8.839E+001	2.917E+002	1.454E+002	0.22	88.4878
PB-214	4448	6.082E+001pCi/L	1.060E+002	1.059E+002	2.976E+002	1.481E+002	0.20	105.9520
RH-106	1882	1.502E+002pCi/L	1.654E+002	1.652E+002	9.004E+002	4.461E+002	0.17	165.3513
SC-46	1739	3.288E+001pCi/L	2.551E+001	2.545E+001	1.332E+002	6.604E+001	0.25	25.5054
TH-230	1040	3.872E+003pCi/L	4.945E+003	4.940E+003	1.298E+004	6.455E+003	0.30	4,944.5710
TH-231	1034	-2.465E+002pCi/L	1.916E+002	1.783E+002	1.399E+003	6.978E+002	-0.18	191.5726
TH-234	1027	-1.457E+003pCi/L	6.327E+002	6.276E+002	9.503E+003	4.748E+003	-0.15	632.7001
TL-208	929	4.647E+000pCi/L	5.673E+000	5.668E+000	1.033E+002	5.121E+001	0.04	5.6727
V-48	18028	5.279E+000pCi/L	4.196E+000	4.188E+000	1.396E+002	6.922E+001	0.04	4.1959
ZN-65	31	1.590E+002pCi/L	1.196E+002	1.193E+002	3.937E+002	1.955E+002	0.40	119.5897
ZR-95	7	1.078E+002pCi/L	4.887E+001	4.857E+001	1.310E+002	6.460E+001	0.82	48.8693

Laboratory Control Sample Information

Sample ID	WRKNO	Analyte	Activity		StdAdded	Recovery	ZFactor
LCS 160-390816~2-A	LCS 160-390816~2-A	CS-137	4.254E+004	pCi/L	4.532E+004	93.86%	-0.8930
		CO-60	3.096E+004	pCi/L	3.224E+004	96.02%	-0.5800
		AM-241	1.342E+005	pCi/L	1.361E+005	98.65%	-0.1669

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

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

83924-334

1.0 Liter Solid in 130G GA-MA Beaker

Customer: Test America St. Louis
P.O. No.: 2401509, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.015372

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. Density of solid matrix 1.15 g/cc.

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	———	1.830E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	2.609E+03	0.8	2.3	4.9	HPGe
Co-57	122.1	2.718E+02	8.711E+04	1.339E+03	0.5	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	1.917E+03	0.5	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	4.232E+03	0.4	1.9	3.9	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	2.719E+03	0.5	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	1.705E+03	0.7	1.9	4.0	HPGe
Mn-54	834.9	3.121E+02	———	3.083E+03	0.1	1.7	3.3	IC
Y-88	898.0	1.066E+02	4.224E+05	6.493E+03	0.5	1.9	3.9	HPGe
Zn-65	1115.6	2.441E+02	———	3.181E+03	0.1	1.7	3.5	IC
Co-60	1173.2	1.925E+03	2.142E+05	3.293E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	3.294E+03	0.6	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	6.874E+03	0.5	1.9	3.9	HPGe

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

6675
ID: 1L Marn_00002
Exp: 03/02/16 Prpd: JW Open: 03/02/11
Mixed Gamma 1L Marn 2011

91608
ID: 1L Marn_00004
Exp:02/15/14 Prpd:JW Opn:03/
Mixed Gamma 1L Marn

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

ANA Form005 Rev. —

This standard will expire one year after the reference date.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 2/23/4
J. D. McCorvey, QA Manager Alternate

Reagent

1L Marn_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

83924-334

1.0 Liter Solid in 130G GA-MA Beaker

Customer: Test America St. Louis
P.O. No.: 2401509, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.015372

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. Density of solid matrix 1.15 g/cc.

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	———	1.830E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	2.609E+03	0.8	2.3	4.9	HPGe
Co-57	122.1	2.718E+02	8.711E+04	1.339E+03	0.5	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	1.917E+03	0.5	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	4.232E+03	0.4	1.9	3.9	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	2.719E+03	0.5	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	1.705E+03	0.7	1.9	4.0	HPGe
Mn-54	834.9	3.121E+02	———	3.083E+03	0.1	1.7	3.3	IC
Y-88	898.0	1.066E+02	4.224E+05	6.493E+03	0.5	1.9	3.9	HPGe
Zn-65	1115.6	2.441E+02	———	3.181E+03	0.1	1.7	3.5	IC
Co-60	1173.2	1.925E+03	2.142E+05	3.293E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	3.294E+03	0.6	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	6.874E+03	0.5	1.9	3.9	HPGe

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1968

6675
ID: 1L Marn_00002
Exp 03/02/18 Prpd: JW Open 03/02/11
Mixed Gamma 1L Marn 2011

91608
ID: 1L Marn_00004
Exp:02/15/14 Prpd:JW Opn:03/
Mixed Gamma 1L Marn

ANA Form005 Rev. —

MGS Certificate, Rev 2 09-28-2009

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

This standard will expire one year after the reference date.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 2/23/11
J. D. McCorvey, QA Manager Alternate

Reagent

1L Marn_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

90062

1.0 Liter Solid in 130G GA-MA Beaker

Customer: TestAmerica St. Louis
P.O. No.: 2455298, Item 1
Reference Date: 01-Jan-2012 12:00 PM EST **Grams of Master Source:** 0.015513

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.
Density of solid matrix 1.15 g/cc.

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	———	1.821E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.677E+05	2.602E+03	0.5	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	8.795E+04	1.364E+03	0.4	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.245E+05	1.932E+03	0.4	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.707E+05	4.200E+03	0.3	1.9	3.8	HPGe
Sn-113	391.7	1.151E+02	1.755E+05	2.722E+03	0.4	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.128E+05	1.750E+03	0.7	1.9	4.0	HPGe
Mn-54	834.9	3.121E+02	———	3.114E+03	0.1	1.7	3.3	IC
Y-88	898.0	1.066E+02	4.228E+05	6.559E+03	0.5	1.9	3.9	HPGe
Zn-65	1115.6	2.441E+02	———	3.134E+03	0.1	1.7	3.5	IC
Co-60	1173.2	1.925E+03	2.084E+05	3.233E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.084E+05	3.233E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.476E+05	6.944E+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)

This standard will expire one year after the reference date.

Source Prepared by: M. Williford
M. Williford, Radiochemist

QA Approved: J. M.
J.D. McCorvey, Counting Room Manager

Date: 26 Jan 12

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 B_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)

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

Tuna Can LCS_00008

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	———	3079.5	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 Date: 12-21-06

End of Certificate

St. Louis Radiological Standard Verification

Printed: 9/26/2018 10:19 AM

Standard ID Number: Tuna Can LCS_00008 (1574200)
True Value = 96.78 pCi/g
Date Analyzed: 9/14/2018

Radionuclide: Am-241

	Replicates	
#1	91.54	pCi/g
#2	96.47	pCi/g
#3	96.46	pCi/g

Mean = 94.8233333

1 sigma = 2.84345447

1.96 sigma = 5.573171

True Value minus 5% = 91.941 (True Value - 5%)
True Value plus 5% = 101.619 (True Value + 5%)

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

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

Standard Reverification Acceptable? **Yes**

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

1st Reviewed By/Date: Jody Watson 9-26-18

2nd Reviewed By/Date: [illegible] 9-26-18

Standard ID Number: Tuna Can LCS_00007 (1282974)
True Value = 12.72 pCi/g
Date Analyzed: 9/14/2018

Radionuclide: Co-60

	Replicates	
#1	11.97	pCi/g
#2	12.84	pCi/g
#3	12.2	pCi/g

Mean = 12.3366667

1 sigma = 0.45081408

1.96 sigma = 0.883596

True Value minus 5% = 12.084 (True Value - 5%)
True Value plus 5% = 13.356 (True Value + 5%)

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

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

Standard Reverification Acceptable? Yes

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

1st Reviewed By/Date: 9.26.18

2nd Reviewed By/Date: 9-26-18

St. Louis Radiological Standard Verification

Printed: 9/26/2018 10:19 AM

Standard ID Number: Tuna Can LCS_00008 (1574200)
True Value = 28.15 pCi/g
Date Analyzed: 9/14/2018

Radionuclide: Cs-137

	Replicates	
#1	26.93	pCi/g
#2	25.94	pCi/g
#3	28.16	pCi/g

Mean = 27.01

1 sigma = 1.11216006

1.96 sigma = 2.179834

True Value minus 5% = 26.7425 (True Value - 5%)
True Value plus 5% = 29.5575 (True Value + 5%)

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

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

Standard Reverification Acceptable? **Yes**

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

1st Reviewed By/Date: Judy Watson 9.26.18

2nd Reviewed By/Date: [illegible] 9-26-18

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 389261 **Operator:**

MQO

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
LCS 160-389261~2-	LCS	341.90g	1.00	GammaVision	GV09	9 / 14 / 18 22:56	30

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA	
AC-228	11136	1.341E+000pCi/g	3.038E-001	2.960E-001	5.461E-001	2.586E-001	2.46	0.3038
AG-108M	10982	7.467E-002pCi/g	5.938E-002	5.926E-002	2.180E-001	1.063E-001	0.34	0.0594
AG-110M	10973	1.322E-001pCi/g	1.169E-001	1.167E-001	3.881E-001	1.884E-001	0.34	0.1169
AM-241	10818	9.154E+001pCi/g	4.806E+000	7.265E-001	1.043E+000	5.171E-001	87.74	4.8061
BA-133	10469	1.100E-001pCi/g	1.059E-001	1.058E-001	3.510E-001	1.721E-001	0.31	0.1059
BA-140	10463	4.927E-002pCi/g	3.429E-002	3.419E-002	7.208E-001	3.488E-001	0.07	0.0343
BE-7	10435	-1.005E+000pCi/g	9.917E-001	9.904E-001	3.282E+000	1.617E+000	-0.31	0.9917
BI-207	10195	6.742E-002pCi/g	1.448E-001	1.447E-001	3.073E-001	1.473E-001	0.22	0.1448
BI-210M	10173	1.327E-001pCi/g	1.351E-001	1.348E-001	3.569E-001	1.750E-001	0.37	0.1351
BI-212	10160	-5.107E-002pCi/g	8.052E-001	8.052E-001	2.743E+000	1.325E+000	-0.02	0.8052
BI-214	10154	5.901E-001pCi/g	1.113E-001	1.070E-001	2.813E-001	1.339E-001	2.10	0.1113
CD-109	9254	1.414E+000pCi/g	2.403E+000	2.401E+000	7.952E+000	3.945E+000	0.18	2.4025
CD-113M	17462	1.055E+003pCi/g	8.782E+002	8.755E+002	2.900E+003	1.421E+003	0.36	878.1737
CE-139	9241	1.688E-002pCi/g	5.662E-002	5.660E-002	1.891E-001	9.296E-002	0.09	0.0566
CE-141	9235	-1.018E-001pCi/g	1.542E-001	1.542E-001	5.109E-001	2.530E-001	-0.20	0.1542
CE-144	9221	0.000E+000pCi/g	1.910E-001	1.909E-001	2.155E+000	1.067E+000	0.00	0.1910
CF-249	9215	0.000E+000pCi/g	4.358E-002	4.358E-002	4.122E-001	2.027E-001	0.00	0.0436
CF-251	13690	1.515E-002pCi/g	2.844E-001	2.844E-001	9.520E-001	4.683E-001	0.02	0.2844
CO-56	8704	9.671E-002pCi/g	8.335E-002	8.320E-002	1.807E-001	8.640E-002	0.54	0.0834
CO-57	13694	-3.257E-002pCi/g	5.493E-002	5.491E-002	1.826E-001	8.999E-002	-0.18	0.0549
CO-58	8698	4.411E-002pCi/g	7.471E-002	7.468E-002	2.510E-001	1.216E-001	0.18	0.0747
CO-60	8692	1.197E+001pCi/g	6.231E-001	1.658E-001	9.170E-002	4.018E-002	130.48	0.6231
CR-51	8604	-6.121E-001pCi/g	9.798E-001	9.793E-001	3.251E+000	1.606E+000	-0.19	0.9798
CS-134	8553	-8.266E-002pCi/g	8.838E-002	8.828E-002	2.946E-001	1.429E-001	-0.28	0.0884
CS-136	8546	8.342E-002pCi/g	7.338E-002	7.322E-002	2.456E-001	1.189E-001	0.34	0.0734
CS-137	8539	2.693E+001pCi/g	1.431E+000	2.910E-001	1.803E-001	8.630E-002	149.33	1.4308
EU-152	7145	2.822E-002pCi/g	2.124E-002	2.119E-002	5.359E-001	2.640E-001	0.05	0.0212
EU-154	7138	3.376E-001pCi/g	1.308E-001	1.296E-001	3.714E-001	1.830E-001	0.91	0.1308
EU-155	7131	-1.842E-003pCi/g	3.128E-003	3.127E-003	1.167E+000	5.783E-001	0.00	0.0031
FE-59	7073	-1.905E-002pCi/g	2.084E-001	2.084E-001	4.439E-001	2.133E-001	-0.04	0.2084
GA-68	18005	2.916E+000pCi/g	3.403E+000	3.399E+000	7.196E+000	3.429E+000	0.41	3.4029
GD-153	6824	-1.801E-001pCi/g	2.583E-001	2.581E-001	8.548E-001	4.236E-001	-0.21	0.2583
HF-181	6495	-1.326E-001pCi/g	1.329E-001	1.327E-001	4.398E-001	2.166E-001	-0.30	0.1329
HG-203	6466	8.344E-002pCi/g	6.652E-002	6.635E-002	2.196E-001	1.076E-001	0.38	0.0665
I-131	6380	1.279E-001pCi/g	1.342E-001	1.340E-001	2.019E-001	9.836E-002	0.63	0.1342
IR-192	6303	1.162E-001pCi/g	1.083E-001	1.081E-001	3.532E-001	1.744E-001	0.33	0.1083
K-40	6148	1.217E-001pCi/g	5.299E-001	5.298E-001	1.212E+000	5.487E-001	0.10	0.5299
KR-85	6111	7.490E+000pCi/g	1.641E+001	1.640E+001	5.497E+001	2.685E+001	0.14	16.4096
LA-140	6096	-5.595E-003pCi/g	6.377E-002	6.377E-002	9.605E-002	4.115E-002	-0.06	0.0638
MN-54	5382	0.000E+000pCi/g	3.445E-002	3.445E-002	1.963E-001	9.421E-002	0.00	0.0344
NA-22	5201	-5.383E-003pCi/g	3.075E-002	3.075E-002	1.111E-001	5.008E-002	-0.05	0.0308
NB-94	5160	-1.008E-002pCi/g	1.099E-002	1.098E-002	1.793E-001	8.612E-002	-0.06	0.0110
NB-95	5154	4.345E-002pCi/g	6.600E-002	6.596E-002	2.217E-001	1.072E-001	0.20	0.0660
ND-147	5083	5.656E-001pCi/g	5.483E-001	5.473E-001	1.274E+000	6.153E-001	0.44	0.5483
NP-237	4757	4.120E-001pCi/g	6.956E-001	6.952E-001	2.303E+000	1.142E+000	0.18	0.6956
NP-239	4751	-1.633E-001pCi/g	3.332E-001	3.330E-001	1.104E+000	5.472E-001	-0.15	0.3332
PA-231	4541	-2.487E+000pCi/g	3.322E+000	3.320E+000	1.101E+001	5.440E+000	-0.23	3.3224
PA-233	4535	1.902E-001pCi/g	2.522E-001	2.519E-001	8.359E-001	4.126E-001	0.23	0.2522
PA-234	4528	1.715E-001pCi/g	1.455E-001	1.452E-001	1.333E+000	6.602E-001	0.13	0.1455

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PA-234M	19453	4.315E+000pCi/g	1.117E+001	1.117E+001	3.763E+001	1.828E+001	0.11	11.1722
PB-210	4467	7.802E+002pCi/g	4.650E+001	7.948E+000	1.327E+001	6.579E+000	58.81	46.4964
PB-212	4454	5.453E-001pCi/g	1.322E-001	1.274E-001	2.968E-001	1.447E-001	1.84	0.1322
PB-214	4448	2.206E-001pCi/g	2.033E-001	2.030E-001	5.171E-001	2.530E-001	0.43	0.2033
PM-144	19585	3.938E-002pCi/g	2.591E-002	2.583E-002	2.272E-001	1.102E-001	0.17	0.0259
PM-146	2464	1.543E-001pCi/g	1.242E-001	1.239E-001	3.279E-001	1.601E-001	0.47	0.1242
RH-106	1882	3.846E-001pCi/g	2.008E-001	1.998E-001	2.177E+000	1.057E+000	0.18	0.2008
RU-103	1828	-4.202E-002pCi/g	3.869E-002	3.863E-002	2.123E-001	1.032E-001	-0.20	0.0387
SB-124	1784	-1.348E-002pCi/g	7.064E-003	7.029E-003	3.697E-001	1.817E-001	-0.04	0.0071
SB-125	1777	-4.391E-002pCi/g	2.456E-001	2.456E-001	6.928E-001	3.383E-001	-0.06	0.2456
SC-46	1739	-1.127E-001pCi/g	1.001E-001	9.991E-002	3.318E-001	1.618E-001	-0.34	0.1001
SN-113	1570	7.149E-002pCi/g	1.067E-001	1.066E-001	3.554E-001	1.742E-001	0.20	0.1067
SN-126	17459	-1.434E+000pCi/g	3.069E+000	3.068E+000	1.013E+001	5.051E+000	-0.14	3.0692
TA-182	1301	1.272E-001pCi/g	1.975E-001	1.974E-001	9.529E-001	4.623E-001	0.13	0.1975
TC-99M	17412	0.000E+000pCi/g	2.888E-002	2.888E-002	2.810E-001	1.391E-001	0.00	0.0289
TH-227	1058	2.998E-001pCi/g	8.821E-001	8.819E-001	2.140E+000	1.046E+000	0.14	0.8821
TH-229	1046	-1.435E+000pCi/g	1.438E+000	1.433E+000	3.446E+000	1.691E+000	-0.42	1.4376
TH-234	1027	9.441E-001pCi/g	1.569E+000	1.568E+000	5.192E+000	2.575E+000	0.18	1.5686
TL-208	929	3.261E-001pCi/g	7.776E-002	7.590E-002	1.518E-001	7.236E-002	2.15	0.0778
TL-210	20861	1.314E-002pCi/g	5.901E-002	5.900E-002	2.643E-001	1.283E-001	0.05	0.0590
U-235	281	6.217E-001pCi/g	5.153E-001	5.144E-001	2.132E+000	1.055E+000	0.29	0.5153
Y-88	74	-5.486E-003pCi/g	8.738E-003	8.733E-003	1.261E-001	5.565E-002	-0.04	0.0087
ZN-65	31	0.000E+000pCi/g	3.657E-002	3.657E-002	6.606E-001	3.206E-001	0.00	0.0366
ZR-95	7	-1.806E-001pCi/g	1.602E-001	1.599E-001	3.464E-001	1.665E-001	-0.52	0.1602

Laboratory Control Sample Information

Sample ID	WRKNO	Analyte	Activity		StdAdded	Recovery	ZFactor
LCS 160-389261~2-A	LCS 160-389261~2-A	CS-137	2.693E+001	pCi/g	2.815E+001	95.67%	-0.5889
		CO-60	1.197E+001	pCi/g	1.272E+001	94.06%	-0.8304
		AM-241	9.154E+001	pCi/g	9.678E+001	94.59%	-0.7486

Sample Duplicate Information

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

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 389176 **Operator:**

MQO

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
LCS 160-389176~2-	LCS	341.90g	1.00	GammaVision	GV15	9 / 15 / 18 3:47	30

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA	
AC-228	11136	5.945E-001pCi/g	5.178E-001	5.169E-001	1.121E+000	5.373E-001	0.53	0.5178
AG-108M	10982	-3.427E-002pCi/g	7.437E-002	7.435E-002	2.746E-001	1.333E-001	-0.12	0.0744
AG-110M	10973	1.037E-001pCi/g	8.632E-002	8.616E-002	5.961E-001	2.890E-001	0.17	0.0863
AM-241	10818	9.647E+001pCi/g	5.088E+000	9.042E-001	1.330E+000	6.588E-001	72.55	5.0877
BA-133	10469	1.521E-001pCi/g	1.375E-001	1.372E-001	4.554E-001	2.227E-001	0.33	0.1375
BA-140	10463	-1.304E-001pCi/g	9.834E-002	9.811E-002	9.996E-001	4.820E-001	-0.13	0.0983
BE-7	10435	-1.280E+000pCi/g	1.300E+000	1.298E+000	4.309E+000	2.117E+000	-0.30	1.3002
BI-207	10195	-1.916E-001pCi/g	1.380E-001	1.377E-001	4.645E-001	2.219E-001	-0.41	0.1380
BI-210M	10173	-9.562E-002pCi/g	1.350E-001	1.349E-001	4.502E-001	2.201E-001	-0.21	0.1350
BI-212	10160	1.900E+000pCi/g	7.417E-001	7.351E-001	2.325E+000	1.088E+000	0.82	0.7417
BI-214	10154	5.760E-001pCi/g	1.195E-001	1.157E-001	3.813E-001	1.802E-001	1.51	0.1195
CD-109	9254	1.079E+000pCi/g	3.011E+000	3.010E+000	9.986E+000	4.951E+000	0.11	3.0110
CD-113M	17462	-1.218E+002pCi/g	9.861E+002	9.860E+002	3.325E+003	1.621E+003	-0.04	986.0697
CE-139	9241	7.278E-002pCi/g	6.980E-002	6.946E-002	2.305E-001	1.130E-001	0.32	0.0698
CE-141	9235	1.206E-001pCi/g	1.228E-001	1.227E-001	3.093E-001	1.512E-001	0.39	0.1228
CE-144	9221	4.990E-001pCi/g	7.369E-001	7.365E-001	2.444E+000	1.207E+000	0.20	0.7369
CF-249	9215	1.145E-001pCi/g	1.083E-001	1.081E-001	5.585E-001	2.742E-001	0.21	0.1083
CF-251	13690	-4.067E-001pCi/g	3.994E-001	3.978E-001	1.002E+000	4.903E-001	-0.41	0.3994
CO-56	8704	-2.030E-002pCi/g	1.160E-001	1.160E-001	2.667E-001	1.270E-001	-0.08	0.1160
CO-57	13694	5.237E-001pCi/g	7.863E-001	7.858E-001	2.607E+000	1.289E+000	0.20	0.7863
CO-58	8698	-1.062E-001pCi/g	6.541E-002	6.518E-002	3.600E-001	1.738E-001	-0.30	0.0654
CO-60	8692	1.284E+001pCi/g	7.167E-001	3.127E-001	1.821E-001	8.163E-002	70.54	0.7167
CR-51	8604	-9.699E-001pCi/g	4.116E-001	4.083E-001	5.000E+000	2.471E+000	-0.19	0.4116
CS-134	8553	-1.350E-001pCi/g	1.227E-001	1.225E-001	4.080E-001	1.970E-001	-0.33	0.1227
CS-136	8546	2.303E-001pCi/g	7.444E-002	7.326E-002	3.468E-001	1.672E-001	0.66	0.0744
CS-137	8539	2.594E+001pCi/g	1.396E+000	3.562E-001	3.586E-001	1.732E-001	72.34	1.3956
EU-152	7145	-6.901E-002pCi/g	6.125E-002	6.115E-002	1.654E+000	8.157E-001	-0.04	0.0613
EU-154	7138	1.714E-001pCi/g	8.740E-002	8.693E-002	2.848E-001	1.386E-001	0.60	0.0874
EU-155	7131	-6.378E-003pCi/g	9.618E-001	9.618E-001	1.714E+000	8.496E-001	0.00	0.9618
FE-59	7073	1.741E-001pCi/g	1.411E-001	1.408E-001	5.752E-001	2.735E-001	0.30	0.1411
GA-68	18005	-1.855E+000pCi/g	5.302E+000	5.301E+000	1.172E+001	5.580E+000	-0.16	5.3023
GD-153	6824	0.000E+000pCi/g	1.148E-001	1.148E-001	1.225E+000	6.076E-001	0.00	0.1148
HF-181	6495	-9.282E-002pCi/g	8.413E-002	8.399E-002	5.791E-001	2.846E-001	-0.16	0.0841
HG-203	6466	-1.100E-001pCi/g	1.048E-001	1.046E-001	3.057E-001	1.497E-001	-0.36	0.1048
I-131	6380	-1.289E-002pCi/g	1.141E-002	1.139E-002	2.822E-001	1.372E-001	-0.05	0.0114
IR-192	6303	1.015E-002pCi/g	9.589E-003	9.570E-003	6.022E-001	2.978E-001	0.02	0.0096
K-40	6148	4.266E-001pCi/g	6.184E-001	6.180E-001	1.475E+000	6.417E-001	0.29	0.6184
KR-85	6111	-2.748E+001pCi/g	2.408E+001	2.403E+001	7.977E+001	3.891E+001	-0.34	24.0827
LA-140	6096	7.674E-002pCi/g	2.608E-002	2.576E-002	6.304E-002	1.993E-002	1.22	0.0261
MN-54	5382	1.181E-001pCi/g	1.001E-001	9.993E-002	2.260E-001	1.067E-001	0.52	0.1001
NA-22	5201	-5.789E-002pCi/g	5.516E-002	5.508E-002	1.876E-001	8.477E-002	-0.31	0.0552
NB-94	5160	4.688E-002pCi/g	5.587E-002	5.582E-002	2.363E-001	1.126E-001	0.20	0.0559
NB-95	5154	7.756E-002pCi/g	7.645E-002	7.635E-002	2.559E-001	1.221E-001	0.30	0.0765
ND-147	5083	1.221E-001pCi/g	7.428E-001	7.428E-001	1.757E+000	8.455E-001	0.07	0.7428
NP-237	4757	-1.626E-001pCi/g	8.818E-001	8.818E-001	2.928E+000	1.451E+000	-0.06	0.8818
NP-239	4751	-2.847E-001pCi/g	4.784E-001	4.781E-001	1.584E+000	7.852E-001	-0.18	0.4784
PA-231	4541	0.000E+000pCi/g	7.192E-001	7.192E-001	1.609E+001	7.949E+000	0.00	0.7192
PA-233	4535	0.000E+000pCi/g	9.938E-002	9.938E-002	1.318E+000	6.510E-001	0.00	0.0994
PA-234	4528	3.128E-001pCi/g	4.620E-001	4.618E-001	1.532E+000	7.571E-001	0.20	0.4620

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PA-234M	19453	1.179E+001pCi/g	1.514E+001	1.513E+001	5.076E+001	2.450E+001	0.23	15.1421
PB-210	4467	7.674E+002pCi/g	4.605E+001	9.487E+000	1.655E+001	8.203E+000	46.37	46.0456
PB-212	4454	5.580E-001pCi/g	1.783E-001	1.746E-001	3.959E-001	1.926E-001	1.41	0.1783
PB-214	4448	2.493E-001pCi/g	2.710E-001	2.707E-001	7.741E-001	3.788E-001	0.32	0.2710
PM-144	19585	6.426E-002pCi/g	8.290E-002	8.283E-002	2.173E-001	1.032E-001	0.30	0.0829
PM-146	2464	-1.683E-001pCi/g	1.078E-001	1.075E-001	4.651E-001	2.267E-001	-0.36	0.1078
RH-106	1882	-1.371E+000pCi/g	6.001E-001	5.959E-001	5.757E+000	2.829E+000	-0.24	0.6001
RU-103	1828	8.351E-003pCi/g	1.144E-001	1.144E-001	2.699E-001	1.305E-001	0.03	0.1144
SB-124	1784	-1.280E-001pCi/g	1.638E-001	1.636E-001	5.443E-001	2.673E-001	-0.24	0.1638
SB-125	1777	-4.468E-001pCi/g	3.463E-001	3.455E-001	9.482E-001	4.619E-001	-0.47	0.3463
SC-46	1739	-1.696E-001pCi/g	1.437E-001	1.434E-001	4.763E-001	2.315E-001	-0.36	0.1437
SN-113	1570	1.449E-001pCi/g	1.684E-001	1.683E-001	5.595E-001	2.745E-001	0.26	0.1684
SN-126	17459	-1.688E+000pCi/g	3.779E+000	3.778E+000	1.248E+001	6.219E+000	-0.14	3.7793
TA-182	1301	5.126E-001pCi/g	3.000E-001	2.989E-001	1.232E+000	5.927E-001	0.42	0.3000
TC-99M	17412	4.947E-002pCi/g	9.906E-002	9.902E-002	3.289E-001	1.626E-001	0.15	0.0991
TH-227	1058	2.986E-001pCi/g	3.464E-001	3.459E-001	2.708E+000	1.319E+000	0.11	0.3464
TH-229	1046	1.291E+000pCi/g	1.256E+000	1.252E+000	3.989E+000	1.950E+000	0.32	1.2563
TH-234	1027	-4.877E-001pCi/g	3.748E+000	3.748E+000	6.694E+000	3.319E+000	-0.07	3.7480
TL-208	929	1.717E-001pCi/g	1.661E-001	1.659E-001	2.615E-001	1.253E-001	0.66	0.1661
TL-210	20861	0.000E+000pCi/g	3.122E-002	3.122E-002	3.704E-001	1.791E-001	0.00	0.0312
U-235	281	-2.253E-002pCi/g	1.982E+000	1.982E+000	2.643E+000	1.307E+000	-0.01	1.9817
Y-88	74	7.405E-002pCi/g	3.176E-002	3.147E-002	6.882E-002	2.176E-002	1.08	0.0318
ZN-65	31	0.000E+000pCi/g	9.389E-002	9.389E-002	9.321E-001	4.501E-001	0.00	0.0939
ZR-95	7	1.517E-001pCi/g	1.329E-001	1.327E-001	3.819E-001	1.804E-001	0.40	0.1329

Laboratory Control Sample Information

Sample ID	WRKNO	Analyte	Activity	StdAdded	Recovery	ZFactor
LCS 160-389176~2-A	LCS 160-389176~2-A	CS-137	2.594E+001 pCi/g	2.815E+001	92.16%	-1.0716
		CO-60	1.284E+001 pCi/g	1.272E+001	100.98%	0.1240
		AM-241	9.647E+001 pCi/g	9.678E+001	99.69%	-0.0422

Sample Duplicate Information

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

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 389018 **Operator:**

MQO

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
LCS 160-389018~2-	LCS	341.90g	1.00	GammaVision	GV08	9 / 15 / 18 1:43	30

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA	
AC-228	11136	4.210E-001pCi/g	4.900E-001	4.895E-001	1.061E+000	5.081E-001	0.40	0.4900
AG-108M	10982	2.125E-002pCi/g	8.284E-002	8.283E-002	2.820E-001	1.372E-001	0.08	0.0828
AG-110M	10973	-1.147E-001pCi/g	1.939E-001	1.938E-001	6.497E-001	3.162E-001	-0.18	0.1939
AM-241	10818	9.646E+001pCi/g	5.059E+000	7.319E-001	1.181E+000	5.849E-001	81.65	5.0591
BA-133	10469	1.500E-001pCi/g	1.358E-001	1.355E-001	4.497E-001	2.201E-001	0.33	0.1358
BA-140	10463	-4.905E-001pCi/g	5.777E-001	5.771E-001	1.023E+000	4.945E-001	-0.48	0.5777
BE-7	10435	-1.223E+000pCi/g	1.263E+000	1.261E+000	4.185E+000	2.057E+000	-0.29	1.2628
BI-207	10195	2.796E-001pCi/g	1.465E-001	1.458E-001	3.143E-001	1.473E-001	0.89	0.1465
BI-210M	10173	-1.406E-002pCi/g	9.140E-002	9.139E-002	4.406E-001	2.156E-001	-0.03	0.0914
BI-212	10160	3.712E-001pCi/g	1.055E+000	1.055E+000	3.587E+000	1.723E+000	0.10	1.0552
BI-214	10154	5.444E-001pCi/g	1.533E-001	1.506E-001	3.418E-001	1.609E-001	1.59	0.1533
CD-109	9254	1.722E+000pCi/g	2.799E+000	2.798E+000	9.268E+000	4.595E+000	0.19	2.7995
CD-113M	17462	-3.005E+002pCi/g	1.153E+003	1.153E+003	3.865E+003	1.894E+003	-0.08	1,153.2361
CE-139	9241	-6.184E-002pCi/g	6.994E-002	6.969E-002	2.315E-001	1.137E-001	-0.27	0.0699
CE-141	9235	1.075E-001pCi/g	7.104E-002	7.082E-002	2.338E-001	1.137E-001	0.46	0.0710
CE-144	9221	0.000E+000pCi/g	1.280E-001	1.280E-001	2.546E+000	1.260E+000	0.00	0.1280
CF-249	9215	9.174E-002pCi/g	1.221E-001	1.220E-001	5.472E-001	2.688E-001	0.17	0.1221
CF-251	13690	-5.475E-002pCi/g	3.524E-001	3.524E-001	8.966E-001	4.382E-001	-0.06	0.3524
CO-56	8704	3.401E-001pCi/g	1.372E-001	1.360E-001	2.328E-001	1.104E-001	1.46	0.1372
CO-57	13694	0.000E+000pCi/g	3.091E-002	3.091E-002	2.016E-001	9.913E-002	0.00	0.0309
CO-58	8698	4.129E-002pCi/g	1.034E-001	1.034E-001	3.495E-001	1.689E-001	0.12	0.1034
CO-60	8692	1.220E+001pCi/g	6.449E-001	2.016E-001	7.237E-002	2.727E-002	168.59	0.6449
CR-51	8604	-9.354E-001pCi/g	4.471E-001	4.443E-001	4.714E+000	2.330E+000	-0.20	0.4471
CS-134	8553	2.224E-001pCi/g	1.341E-001	1.336E-001	3.731E-001	1.798E-001	0.60	0.1341
CS-136	8546	-1.346E-002pCi/g	1.675E-002	1.673E-002	2.588E-001	1.235E-001	-0.05	0.0167
CS-137	8539	2.816E+001pCi/g	1.509E+000	3.637E-001	2.250E-001	1.067E-001	125.14	1.5094
EU-152	7145	3.357E-001pCi/g	2.623E-001	2.617E-001	5.940E-001	2.920E-001	0.57	0.2623
EU-154	7138	8.728E-002pCi/g	5.365E-002	5.345E-002	4.108E-001	2.019E-001	0.21	0.0536
EU-155	7131	-1.949E-003pCi/g	4.792E-001	4.792E-001	1.599E+000	7.928E-001	0.00	0.4792
FE-59	7073	1.178E-002pCi/g	1.059E-002	1.057E-002	5.899E-001	2.816E-001	0.02	0.0106
GA-68	18005	5.564E+000pCi/g	4.713E+000	4.703E+000	1.025E+001	4.860E+000	0.54	4.7129
GD-153	6824	0.000E+000pCi/g	1.407E-001	1.407E-001	1.144E+000	5.672E-001	0.00	0.1407
HF-181	6495	-1.029E-001pCi/g	1.066E-001	1.065E-001	5.489E-001	2.697E-001	-0.19	0.1066
HG-203	6466	9.624E-003pCi/g	8.040E-002	8.040E-002	2.705E-001	1.322E-001	0.04	0.0804
I-131	6380	-6.581E-002pCi/g	5.355E-002	5.345E-002	2.701E-001	1.314E-001	-0.24	0.0536
IR-192	6303	-1.046E-001pCi/g	1.593E-001	1.592E-001	5.283E-001	2.610E-001	-0.20	0.1593
K-40	6148	1.897E-001pCi/g	4.131E-001	4.130E-001	1.122E+000	4.707E-001	0.17	0.4131
KR-85	6111	8.919E+000pCi/g	2.150E+001	2.149E+001	7.220E+001	3.517E+001	0.12	21.4958
LA-140	6096	1.206E-001pCi/g	9.614E-002	9.593E-002	1.114E-001	4.475E-002	1.08	0.0961
MN-54	5382	-2.942E-003pCi/g	1.180E-001	1.180E-001	2.710E-001	1.295E-001	-0.01	0.1180
NA-22	5201	-1.064E-001pCi/g	6.079E-002	6.056E-002	1.975E-001	9.015E-002	-0.54	0.0608
NB-94	5160	5.330E-002pCi/g	8.697E-002	8.692E-002	1.989E-001	9.415E-002	0.27	0.0870
NB-95	5154	1.133E-001pCi/g	8.277E-002	8.257E-002	2.737E-001	1.313E-001	0.41	0.0828
ND-147	5083	9.789E-001pCi/g	4.486E-001	4.451E-001	1.082E+000	5.094E-001	0.90	0.4486
NP-237	4757	2.309E-001pCi/g	8.409E-001	8.408E-001	2.790E+000	1.383E+000	0.08	0.8409
NP-239	4751	-2.810E-001pCi/g	4.514E-001	4.511E-001	1.494E+000	7.409E-001	-0.19	0.4514
PA-231	4541	1.523E+000pCi/g	2.436E+000	2.434E+000	1.522E+001	7.521E+000	0.10	2.4356
PA-233	4535	5.669E-002pCi/g	3.737E-001	3.737E-001	1.245E+000	6.150E-001	0.05	0.3737
PA-234	4528	-3.278E-001pCi/g	4.626E-001	4.623E-001	1.533E+000	7.581E-001	-0.21	0.4626

				MQO				
PA-234M	19453	**1.028E+001**pCi/g	7.387E+000	7.369E+000	5.165E+001	2.499E+001	0.20	7.3869
PB-210	4467	**8.412E+002**pCi/g	5.035E+001	9.787E+000	1.667E+001	8.267E+000	50.45	50.3548
PB-212	4454	**4.765E-001**pCi/g	1.154E-001	1.112E-001	3.489E-001	1.694E-001	1.37	0.1154
PB-214	4448	**4.011E-001**pCi/g	2.128E-001	2.117E-001	7.018E-001	3.431E-001	0.57	0.2128
PM-144	19585	**2.751E-002**pCi/g	2.930E-002	2.927E-002	2.250E-001	1.073E-001	0.12	0.0293
PM-146	2464	**6.558E-003**pCi/g	1.887E-001	1.887E-001	4.417E-001	2.153E-001	0.01	0.1887
RA-226	1950	**1.701E+000**pCi/g	1.604E+000	1.597E+000	5.297E+000	2.594E+000	0.32	1.6042
RH-106	1882	**-5.353E-001**pCi/g	8.589E-001	8.584E-001	2.887E+000	1.396E+000	-0.19	0.8589
RU-103	1828	**-2.948E-002**pCi/g	1.151E-001	1.151E-001	2.703E-001	1.309E-001	-0.11	0.1151
SB-124	1784	**1.712E-001**pCi/g	1.336E-001	1.332E-001	2.338E-001	9.396E-002	0.73	0.1336
SB-125	1777	**-3.779E-001**pCi/g	3.656E-001	3.651E-001	8.816E-001	4.292E-001	-0.43	0.3656
SC-46	1739	**1.512E-001**pCi/g	1.315E-001	1.313E-001	4.363E-001	2.118E-001	0.35	0.1315
SN-113	1570	**1.610E-001**pCi/g	1.638E-001	1.636E-001	5.429E-001	2.664E-001	0.30	0.1638
SN-126	17459	**-1.744E+000**pCi/g	3.592E+000	3.591E+000	1.186E+001	5.911E+000	-0.15	3.5922
TA-182	1301	**2.095E-001**pCi/g	1.861E-001	1.858E-001	5.475E-001	2.432E-001	0.38	0.1861
TC-99M	17412	**-7.271E-002**pCi/g	1.005E-001	1.004E-001	3.328E-001	1.647E-001	-0.22	0.1005
TH-227	1058	**-1.113E+000**pCi/g	6.377E-001	6.341E-001	2.915E+000	1.425E+000	-0.38	0.6377
TH-229	1046	**-7.218E-001**pCi/g	1.540E+000	1.539E+000	3.899E+000	1.908E+000	-0.19	1.5400
TH-234	1027	**1.583E-001**pCi/g	1.870E+000	1.870E+000	6.209E+000	3.078E+000	0.03	1.8696
TL-208	929	**2.924E-001**pCi/g	1.362E-001	1.353E-001	2.358E-001	1.126E-001	1.24	0.1362
TL-210	20861	**8.260E-003**pCi/g	1.003E-001	1.003E-001	3.415E-001	1.649E-001	0.02	0.1003
U-235	281	**-6.432E-001**pCi/g	2.935E-001	2.917E-001	2.696E+000	1.334E+000	-0.24	0.2935
Y-88	74	**-7.868E-003**pCi/g	8.966E-003	8.955E-003	1.614E-001	6.882E-002	-0.05	0.0090
ZN-65	31	**0.000E+000**pCi/g	1.647E-001	1.647E-001	9.076E-001	4.387E-001	0.00	0.1647
ZR-95	7	**-5.968E-002**pCi/g	1.789E-001	1.789E-001	4.104E-001	1.951E-001	-0.15	0.1789

Laboratory Control Sample Information

Sample ID	WRKNO	Analyte	Activity	StdAdded	Recovery	ZFactor
LCS 160-389018~2-A	LCS 160-389018~2-A	**CS-137**	2.816E+001 pCi/g	2.815E+001	100.05%	0.0060
		CO-60	1.220E+001 pCi/g	1.272E+001	95.93%	-0.5563
		AM-241	9.646E+001 pCi/g	9.678E+001	99.67%	-0.0448

Sample Duplicate Information

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

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)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1955

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia 30318

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

Source Prepared by: _____
W. Mao, Radiochemist

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

Reagent

Tuna Can_00003

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

90099

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

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

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

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

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

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

(Certificate continued on reverse side)

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

Source Prepared by: _____
Z. Dimitrova, Radiochemist

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

Reagent

Tuna Can_00006

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83814-334

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Corporate Office
Laboratory

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

Source Prepared by: _____
Z. Dimitrova, Radiochemist

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

GAMMA SPECTROSCOPY

Method 901.1
Ra-226

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

Prep Batch: 412878

Fill Geometry, 21-Day In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 412878

Lab Id: MB 160-412878/1-A | Analyzed: 02/19/19 09:29 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV7 | Decay Corrected: No | Ingrowth:

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	-1.807	21.4	21.4	U	pCi/L	50.0	36.6	415565
Radium-228	-17.50	24.0	24.1	U	pCi/L	50.0	48.0	415565
Radium 226 and Radium 228	0.0000	0.00000	0.00000	U	pCi/L		48.0	415565

Lab Id: LCS 160-412878/2-A | Analyzed: 02/19/19 11:49 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV7 | Decay Corrected: No | Ingrowth:

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	131800	481	15200		pCi/L		347	415565
Cesium-137	40200	268	4030		pCi/L		187	415565
Cobalt-60	29570	199	2930		pCi/L		69.4	415565

Lab Id: 180-86110-6 | Analyzed: 02/19/19 07:35 | Ts: 120 | Sigma: 2
Client ID: JSF-BS-FB01-20190123 | Detector: GV17 | Decay Corrected: No | Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	6.11	9.98	10.0	U	pCi/L	50.0	13.9	415544
Radium-228	1.41	17.9	17.9	U	pCi/L	50.0	29.6	415544
Radium 226 and Radium 228	7.52	20.5	20.5	U	pCi/L		29.6	415544

Lab Id: 180-86110-6 DU | Analyzed: 02/19/19 09:41 | Ts: 120 | Sigma: 2
Client ID: JSF-BS-FB01-20190123 | Detector: GV16 | Decay Corrected: No | Ingrowth:

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	-20.31	14.7	14.8	U	pCi/L	50.0	41.6	415543
Radium-228	-15.81	17.3	17.3	U	pCi/L	50.0	33.8	415543
Radium 226 and Radium 228	0.0000	0.00000	0.00000	U	pCi/L		41.6	415543

Lab Id: 180-86110-12 | Analyzed: 02/19/19 09:40 | Ts: 120 | Sigma: 2
Client ID: JSF-BS-EB01-20190124 | Detector: GV17 | Decay Corrected: No | Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	30.6	16.9	17.2		pCi/L	50.0	17.1	415544
Radium-228	-2.53	12.0	12.0	U	pCi/L	50.0	28.0	415544
Radium 226 and Radium 228	30.6	16.9	17.2		pCi/L		28.0	415544

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 412878

Lab Id:	180-86110-13	Analyzed:	02/19/19 09:39	Ts:	120	Sigma:	2
Client ID:	JSF-BS-FB02-20190124	Detector:	GV14	Decay Corrected:	No	Ingrowth:	

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	3.59	3.52	3.54	U	pCi/L	50.0	31.4	415542
Radium-228	4.39	10.0	10.0	U	pCi/L	50.0	33.4	415542
Radium 226 and Radium 228	7.98	10.6	10.6	U	pCi/L		33.4	415542

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 160-412878/1-A	Radium-226			-1.807	U	pCi/L							-.16871138
MB 160-412878/1-A	Radium-228			-17.50	U	pCi/L							-1.45421781
MB 160-412878/1-A	Radium 226 and Radium 228			0.0000	U	pCi/L							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-412878/2-A	Americium-241		136000	131800		pCi/L	97	90 - 111					-.5240044908
LCS 160-412878/2-A	Cesium-137		44900	40200		pCi/L	90	90 - 111					-2.125925369
LCS 160-412878/2-A	Cobalt-60		30500	29570		pCi/L	97	89 - 110					-.6164010906

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
180-86110-6	Radium-226	6.11		-20.31	U	pCi/L			372	1.06	2.95	1	
180-86110-6	Radium-228	1.41		-15.81	U	pCi/L			239	0.49	1.38	1	
180-86110-6	Radium 226 and Radium 228	7.52		0.0000	U	pCi/L			200	0.17	0.49		

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: Eurofins TestAmerica, St. Loui Job No.: 180-86110-1

SDG No.:

Batch Number: 412878 Batch Start Date: 01/29/19 22:58 Batch Analyst: Tucker, Michael P

Batch Method: Fill_Geo-21 Batch End Date: 01/29/19 23:13

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	IngDecDate1	IngDecDate3	Geometry	1L Marn LCS 00005	
MB 160-412878/1		Fill_Geo-21, 901.1		1000 mL	1/29/2019 23:00	2/19/19	1 L Marn		
LCS 160-412878/2		Fill_Geo-21, 901.1		1000 mL	1/29/2019 23:00	2/19/19	1 L Marn	# mL	
180-86110-A-6	JSF-BS-FB01-2019 0123	Fill_Geo-21, 901.1	T	1000 mL	1/29/2019 23:00	2/19/19	1 L Marn		
180-86110-A-6 DU	JSF-BS-FB01-2019 0123	Fill_Geo-21, 901.1	T	1000 mL	1/29/2019 23:00	2/19/19	1 L Marn		
180-86110-A-12	JSF-BS-EB01-2019 0124	Fill_Geo-21, 901.1	T	1000 mL	1/29/2019 23:00	2/19/19	1 L Marn		
180-86110-A-13	JSF-BS-FB02-2019 0124	Fill_Geo-21, 901.1	T	1000 mL	1/29/2019 23:00	2/19/19	1 L Marn		

Batch Notes	
Balance ID	1121432711
SOP Number	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: 7_Gamma_20190280

Sample Description: 412878_Gamma_MB 160-412878~1-A
Detector: Detector # 7
Batch ID: 412878
Work Order Number: Gamma
Lot Number: MB 160-412878~1-A

Decay to Time: 2/19/2019 09:29 Live Time: 7200 sec
Acquisition Time: 2/19/2019 09:29:16 Real Time: 7219 sec
Analysis Time: 2/19/2019 11:29 Dead Time: 0.26 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Liquid_Marinelli 1L.Clb
Efficiency Cal Desc: 7_1Lmarn_90062_032612
Efficiency Cal Date: 3/28/2012 09:18
Energy Cal Date: 2/23/2012 08:40
Library: Client_Long_Rev15.lib
Bkgd Correction File: 7_2019-01-20_1017.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	9.104E-01	106.9	9.736E-01	9.747E-01	3.303E+00
NA-22	7.937E-02	104.9	8.326E-02	8.335E-02	2.957E-01
K-40	-1.301E+00	125.8	1.637E+00	1.638E+00	5.049E+00
Sc-46	-2.280E-01	87.2	1.987E-01	1.990E-01	6.664E-01
CR-51	6.599E-01	214.7	1.417E+00	1.417E+00	4.792E+00
MN-54	-2.600E-01	74.4	1.933E-01	1.938E-01	4.737E-01
FE-59	-2.441E-01	125.6	3.067E-01	3.069E-01	7.804E-01
Co-56	2.719E-02	250.8	6.821E-02	6.822E-02	4.262E-01
CO-57	-1.904E-02	107.8	2.052E-02	2.055E-02	1.947E-01
CO-58	8.318E-02	133.3	1.109E-01	1.110E-01	3.855E-01
CO-60	-1.954E-01	73.1	1.428E-01	1.432E-01	5.615E-01
ZN-65	0.000E+00	1.#INF	5.122E-02	5.122E-02	1.319E+00
NB-94	0.000E+00	1.#INF	2.487E-02	2.487E-02	3.403E-01
ZR-95	-1.975E-01	157.4	3.110E-01	3.111E-01	6.554E-01
NB-95	-1.227E-01	102.8	1.261E-01	1.262E-01	4.294E-01
RU-103	2.994E-02	428.8	1.284E-01	1.284E-01	3.175E-01
RH-106	1.089E+00	94.6	1.030E+00	1.032E+00	3.495E+00
AG-108M	2.803E-02	404.0	1.132E-01	1.132E-01	2.912E-01
AG-110M	4.799E-02	61.6	2.958E-02	2.967E-02	7.455E-01
SN-113	-2.222E-01	114.0	2.532E-01	2.534E-01	8.488E-01
SB-124	2.267E-01	79.1	1.793E-01	1.797E-01	5.481E-01
SB-125	1.921E-01	68.7	1.320E-01	1.323E-01	8.713E-01
I-131	1.773E-01	73.9	1.311E-01	1.315E-01	2.780E-01
Gd-153	-1.786E-01	145.1	2.591E-01	2.594E-01	8.704E-01
Ga-68	-5.002E+00	201.6	1.008E+01	1.009E+01	2.273E+01
Tc-99m	-6.566E-03	1241.0	8.148E-02	8.148E-02	2.798E-01
BA-133	-2.966E-02	553.7	1.642E-01	1.642E-01	5.679E-01
CS-134	-8.550E-02	79.7	6.815E-02	6.828E-02	6.131E-01
CS-137	1.033E-01	163.1	1.685E-01	1.686E-01	5.743E-01
CE-139	6.432E-02	107.0	6.881E-02	6.906E-02	2.322E-01
Ba-140	3.201E-01	97.8	3.132E-01	3.136E-01	7.746E-01
La-140	1.824E-01	37.8	6.893E-02	6.959E-02	1.970E-01
CE-141	9.697E-02	109.2	1.059E-01	1.060E-01	3.577E-01

CE-144	1.466E-08	3704308802.4	5.429E-01	5.429E-01	1.872E+00
PM-144	1.440E-01	79.2	1.141E-01	1.143E-01	3.581E-01
EU-152	4.175E-01	32.3	1.350E-01	1.369E-01	4.472E-01
EU-154	1.280E-01	132.7	1.698E-01	1.700E-01	3.753E-01
EU-155	-5.293E-02	616.2	3.262E-01	3.262E-01	1.112E+00
HF-181	1.227E-01	65.2	8.005E-02	8.028E-02	4.668E-01
Ta-182	-6.243E-01	100.8	6.291E-01	6.298E-01	2.128E+00
Hg-203	-6.287E-02	166.7	1.048E-01	1.048E-01	3.572E-01
TL-208	7.568E-02	164.4	1.244E-01	1.245E-01	2.969E-01
PM-146	-2.275E-01	73.6	1.674E-01	1.678E-01	4.774E-01
Y-88	8.648E-02	97.2	8.410E-02	8.425E-02	4.235E-01
Cd-113m	5.291E+02	181.6	9.606E+02	9.612E+02	3.328E+03
Cd-109	0.000E+00	1.#INF	3.328E-01	3.328E-01	7.322E+00
Cf-251	-2.832E-01	139.8	3.960E-01	3.967E-01	1.029E+00
Cf-249	-9.232E-02	101.2	9.344E-02	9.356E-02	7.227E-01
Sn-126	-1.399E-01	498.7	6.976E-01	6.977E-01	2.382E+00
PB-210	1.258E+00	150.4	1.893E+00	1.896E+00	5.305E+00
PB-212	2.484E-01	64.2	1.595E-01	1.603E-01	4.359E-01
PB-214	-2.589E-01	42.2	1.093E-01	1.101E-01	8.036E-01
BI-207	6.407E-02	347.2	2.225E-01	2.225E-01	5.203E-01
BI-212	9.135E-01	169.1	1.545E+00	1.545E+00	5.376E+00
U-235	-1.442E-01	494.0	7.123E-01	7.123E-01	2.092E+00
BI-214	-6.688E-02	592.7	3.964E-01	3.964E-01	1.355E+00
BI-210M	-1.736E-01	88.9	1.544E-01	1.547E-01	4.886E-01
AC-228	-6.476E-01	68.6	4.442E-01	4.453E-01	1.777E+00
TH-227	1.014E-01	972.6	9.859E-01	9.859E-01	2.652E+00
TH-229	6.699E-01	152.6	1.022E+00	1.023E+00	3.796E+00
TH-234	2.237E+00	48.0	1.075E+00	1.083E+00	3.279E+00
PA-231	1.913E+00	213.9	4.093E+00	4.094E+00	1.806E+01
PA-233	1.231E-01	299.9	3.692E-01	3.693E-01	1.251E+00
PA-234	2.882E-01	91.5	2.637E-01	2.642E-01	1.187E+00
PA-234M	-5.347E+00	67.2	3.591E+00	3.600E+00	8.582E+01
AM-241	-1.585E-01	112.7	1.785E-01	1.788E-01	4.825E-01
Np-237	3.133E-01	197.2	6.177E-01	6.179E-01	2.080E+00
Ir-192	1.076E-01	146.3	1.575E-01	1.576E-01	5.311E-01
Cs-136	-1.159E-01	127.7	1.480E-01	1.482E-01	3.507E-01
Np-239	1.990E-01	140.6	2.799E-01	2.802E-01	9.440E-01
Nd-147	-5.162E-01	186.0	9.602E-01	9.606E-01	2.346E+00
TL-210	-2.274E-02	112.6	2.561E-02	2.564E-02	5.891E-01
Kr-85	-3.441E+01	130.4	4.488E+01	4.492E+01	1.510E+02
Total	5.428E+02				

Analyst: conrad.reuscher

Sample description
412878_Gamma_MB 160-412878~1-A

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20190280.An1

Acquisition information
Start time: 2/19/2019 9:29:16 AM
Live time: 7200
Real time: 7219
Dead time: 0.26 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Liquid_Marinelli 1L.Clb
7_1Lmarn_90062_032612

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: 3/28/2012 9:18:24 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -7.054602E-01 + (-2.848254E-01*Log(E)) + (-4.423998E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.43 %
Log(Eff): -1.484435E+01 + (5.183775E+00*Log(E)) + (-5.730519E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev15.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	2/19/2019 9:29:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2019-01-20_1017.PBC 1/20/2019 10:17:25 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 9 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2419

***** 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	13.	150.44	0.83	3.376E-02	46.54	4.250	PBC<MDA	PB210
63.13	20.	96.83	1.61	4.068E-02	63.29	3.810	PBC<MDA	TH234
86.49	13.	197.17	0.88	4.400E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.337E-01	EU155
92.67	45.	48.04	1.17	4.410E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	2.523E+00	AC228
99.50	10.	222.22	0.89	4.395E-02	99.50	15.000	PBC<MDA	Np239
105.31	-4.	616.18	0.90	4.365E-02	105.31	21.200	PBC<MDA	EU155
106.13	14.	140.62	0.90	4.359E-02	106.13	22.700	PBC<MDA	Np239
121.78	39.	32.33	0.92	4.217E-02	121.78	28.580	4.494E-01	EU152
					122.06	85.600	1.502E-01	CO57
123.35	2.	552.01	0.92	4.202E-02	123.10	40.790	PBC<MDA	EU154
132.98	7.	141.24	0.93	4.081E-02	133.02	43.300	PBC<MDA	HF181
136.26	12.	72.66	0.93	4.038E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	3.722E-01	CO57
136.47	8.	203.87	0.93	4.036E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.578E-01	CO57
145.44	13.	109.23	0.94	3.913E-02	145.44	48.200	PBC<MDA	CE141
165.85	13.	106.99	0.96	3.626E-02	165.85	79.900	PBC<MDA	CE139
185.72	42.	37.18	0.99	3.334E-02	185.72	54.000	3.265E-01	U235
193.51	10.	152.57	0.99	3.233E-02	193.51	4.400	PBC<MDA	TH229
210.85	2.	889.61	1.01	3.031E-02	210.85	2.990	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
227.00	12.	104.05	1.03	2.865E-02	227.00	6.300	PBC<MDA	Cf251
238.73	21.	64.22	1.33	2.757E-02	238.63	43.300	PBC<MDA	PB212
242.00	15.	138.90	1.04	2.728E-02	242.00	7.430	PBC<MDA	PB214
256.24	1.	972.59	1.06	2.610E-02	256.24	7.000	PBC<MDA	TH227
263.70	6.	181.56	1.07	2.552E-02	263.70	0.006	PBC<MDA	Cd113m
277.28	2.	730.75	1.08	2.454E-02	277.28	6.310	PBC<MDA	TL208
284.30	12.	101.94	1.09	2.407E-02	284.30	6.140	PBC<MDA	I131
295.09	9.	266.07	1.10	2.337E-02	295.09	19.300	PBC<MDA	PB214
296.00	14.	177.04	1.10	2.331E-02	296.00	79.000	PBC<MDA	TL210
300.03	14.	180.43	1.10	2.307E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	3.390E+00	PA231
					300.18	6.200	1.345E+00	PA233
300.07	8.	321.63	1.10	2.306E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.935E+00	PA231
					300.18	6.200	7.678E-01	PA233
302.41	9.	282.19	1.11	2.291E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	2.978E-01	BA133
304.90	10.	198.76	1.11	2.277E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	2.223E-01	BI210M
308.44	10.	202.98	1.11	2.257E-02	308.44	31.750	PBC<MDA	Ir192
312.01	7.	299.91	1.12	2.236E-02	312.01	36.000	PBC<MDA	PA233
316.49	10.	210.83	1.12	2.211E-02	316.49	87.040	PBC<MDA	Ir192
320.08	10.	214.70	1.13	2.191E-02	320.08	9.940	PBC<MDA	CR51
328.76	5.	251.05	1.13	2.145E-02	328.76	20.300	PBC<MDA	La140
333.44	8.	168.48	1.14	2.121E-02	333.44	15.510	PBC<MDA	Cf249
344.29	15.	122.95	1.15	2.067E-02	344.29	26.500	PBC<MDA	EU152
364.48	12.	107.15	1.17	1.975E-02	364.48	81.700	PBC<MDA	I131
433.94	3.	403.96	1.24	1.713E-02	433.94	90.480	PBC<MDA	AG108M
477.60	11.	106.94	1.28	1.583E-02	477.60	10.520	PBC<MDA	BE7
482.04	11.	114.33	1.29	1.571E-02	482.00	80.500	PBC<MDA	HF181
487.02	9.	129.63	1.29	1.557E-02	487.02	45.500	PBC<MDA	La140
497.05	3.	428.82	1.30	1.531E-02	497.05	90.900	PBC<MDA	RU103
511.86	122.	12.75	2.56	1.494E-02	511.86	20.000	5.671E+00	RH106
537.26	8.	97.83	1.34	1.434E-02	537.26	24.390	PBC<MDA	Ba140
569.70	-1.	738.50	1.37	1.365E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	PBC<MDA	PA234
					569.70	97.740	PBC<MDA	BI207
583.02	6.	164.41	1.38	1.339E-02	583.02	84.500	PBC<MDA	TL208
600.50	11.	129.79	1.40	1.306E-02	600.50	17.860	PBC<MDA	SB125
602.73	11.	136.49	1.40	1.301E-02	602.73	98.260	PBC<MDA	SB124
604.71	11.	142.87	1.40	1.298E-02	604.71	97.620	PBC<MDA	CS134
609.31	-3.	592.71	1.41	1.290E-02	609.31	46.090	PBC<MDA	BI214
610.30	11.	154.64	1.41	1.288E-02	610.30	5.750	PBC<MDA	RU103
618.06	11.	128.51	1.42	1.274E-02	618.06	99.100	PBC<MDA	PM144
621.92	10.	94.61	1.42	1.267E-02	621.92	9.930	PBC<MDA	RH106
635.89	7.	96.51	1.43	1.243E-02	635.89	11.310	PBC<MDA	SB125
661.66	8.	163.14	1.46	1.202E-02	661.66	85.210	PBC<MDA	CS137
696.54	14.	92.66	1.49	1.150E-02	696.54	99.000	PBC<MDA	PM144

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
722.79	11.	79.92	1.51	1.113E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.443E-01	AG108M
					723.36	20.220	6.486E-01	EU154
727.17	6.	169.10	1.51	1.108E-02	727.17	7.550	PBC<MDA	BI212
763.94	5.	133.46	1.55	1.061E-02	763.94	22.280	PBC<MDA	AG110M
766.41	10.	79.61	1.55	1.058E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	4.614E+01	PA234M
801.95	8.	149.51	1.58	1.017E-02	801.95	8.690	PBC<MDA	CS134
810.78	6.	133.33	1.59	1.007E-02	810.78	99.460	PBC<MDA	CO58
873.23	6.	132.65	1.64	9.435E-03	873.23	12.270	PBC<MDA	EU154
880.53	8.	86.72	1.65	9.366E-03	880.53	6.000	PBC<MDA	PA234
883.24	8.	99.80	1.65	9.340E-03	883.24	9.600	PBC<MDA	PA234
898.04	8.	97.25	1.66	9.204E-03	898.04	93.700	PBC<MDA	Y88
964.11	13.	40.18	1.72	8.641E-03	964.11	14.605	PBC<MDA	EU152
968.97	3.	279.13	1.72	8.602E-03	968.97	17.460	PBC<MDA	AC228
1037.84	4.	250.83	1.78	8.089E-03	1037.84	14.130	PBC<MDA	Co56
1063.66	3.	347.19	1.80	7.912E-03	1063.66	74.500	PBC<MDA	BI207
1120.29	-7.	149.30	1.85	7.549E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1221.41	5.	145.77	1.92	6.978E-03	1221.41	27.000	PBC<MDA	Ta182
1274.07	0.	883.18	1.96	6.712E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	2.940E-02	EU154
1274.53	4.	104.89	1.96	6.712E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	2.254E-01	EU154
1291.60	3.	192.84	1.98	6.630E-03	1291.60	43.200	PBC<MDA	FE59
1313.00	2.	248.05	1.99	6.531E-03	1313.00	21.000	PBC<MDA	TL210
1384.30	7.	87.14	2.04	6.220E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	9.	33.33	2.06	6.123E-03	1408.00	21.005	9.719E-01	EU152
1460.83	-6.	125.77	2.10	5.917E-03	1460.83	10.670	PBC<MDA	K40
1596.21	7.	37.80	2.19	5.447E-03	1596.21	95.400	PBC<MDA	La140
1836.06	2.	382.88	2.33	4.773E-03	1836.06	99.200	PBC<MDA	Y88

No unknown peaks passed sensitivity test.

This section based on library: Client_Long_Rev15.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	185.70	46.54	125.	13.	0.002	150.44	0.831s
TH-227	200.12	50.14	262.	-17.	-0.002	140.64	0.840s
AM-241	237.70	59.54	100.	-16.	-0.002	112.66	0.850s
TH-234	252.09	63.13	125.	20.	0.003	96.83	1.613s
Sn-126	256.68	64.28	197.	-4.	-0.001	498.75	0.856s
BA-133	323.52	80.99	107.	-17.	-0.002	109.63	0.874s
Np-237	345.53	86.49	322.	13.	0.002	197.17	0.880

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-155	345.74	86.54	335.	0.	0.000	1000.00	0.880
Sn-126	347.33	86.94	335.	0.	0.000	1000.00	0.880
Sn-126	349.85	87.57	335.	0.	0.000	1000.00	0.881s
Cd-109	351.73	88.04	335.	0.	0.000	1000.00	0.881s
Nd-147	363.97	91.10	372.	-17.	-0.002	166.39	0.885s
TH-234	370.27	92.67	141.	45.	0.006	48.04	1.174s
AC-228	372.97	93.35	366.	-17.	-0.002	159.34	0.887s
Gd-153	389.57	97.50	295.	-17.	-0.002	145.09	0.892s
Np-239	397.57	99.50	241.	10.	0.001	222.22	0.894s
Gd-153	412.38	103.20	231.	0.	0.000	1000.00	0.898s
Np-239	414.38	103.70	231.	0.	0.000	1000.00	0.898s
EU-155	420.83	105.31	235.	-4.	0.000	616.18	0.900s
Np-239	424.10	106.13	187.	14.	0.002	140.62	0.901s
EU-152	486.70	121.78	60.	39.	0.005	32.33	0.918s
CO-57	487.83	122.06	106.	-14.	-0.002	107.78	0.918s
EU-154	491.98	123.10	88.	2.	0.000	552.01	0.919s
PA-234	524.77	131.29	168.	-12.	-0.002	153.39	0.928s
HF-181	531.68	133.02	40.	7.	0.001	141.24	0.930D
HF-181	544.79	136.30	29.	12.	0.002	72.66	0.933D
CO-57	545.48	136.47	129.	8.	0.001	203.87	0.933s
U-235	574.73	143.79	178.	-4.	-0.001	494.01	0.941
CE-141	581.35	145.44	97.	13.	0.002	109.23	0.943s
Ba-140	650.24	162.66	139.	-8.	-0.001	203.29	0.961s
CE-139	663.01	165.85	96.	13.	0.002	106.99	0.965s
Cf-251	706.00	176.60	77.	-12.	-0.002	139.82	0.976s
U-235	742.49	185.72	59.	42.	0.006	37.18	0.986s
TH-229	773.64	193.51	60.	10.	0.001	152.57	0.994s
TH-229	843.01	210.85	62.	2.	0.000	889.61	1.012s
Cf-251	907.62	227.00	44.	12.	0.002	104.05	1.029s
TH-227	943.50	235.97	139.	-15.	-0.002	115.00	1.039
PB-212	954.53	238.73	56.	21.	0.003	64.22	1.331s
PB-214	967.61	242.00	196.	15.	0.002	138.90	1.045
EU-152	978.39	244.69	210.	-6.	-0.001	365.35	1.048
TH-227	1024.59	256.24	48.	1.	0.000	972.59	1.060s
Cd-113m	1054.43	263.70	53.	6.	0.001	181.56	1.067s
BI-210M	1062.96	265.83	81.	-16.	-0.002	88.92	1.070s
TL-208	1108.77	277.28	73.	2.	0.000	730.75	1.081s
Hg-203	1116.44	279.20	108.	-9.	-0.001	166.67	1.083s
I-131	1136.83	284.30	41.	12.	0.002	101.94	1.089s
PB-214	1180.00	295.09	282.	9.	0.001	266.07	1.100
TL-210	1183.64	296.00	291.	14.	0.002	177.04	1.101s
PB-212	1199.76	300.03	305.	14.	0.002	180.43	1.105
PA-231	1199.92	300.07	319.	8.	0.001	321.63	1.105
PA-231	1210.24	302.65	318.	9.	0.001	282.19	1.107s
BI-210M	1219.23	304.90	201.	10.	0.001	198.76	1.110s
Ir-192	1233.41	308.44	211.	10.	0.001	202.98	1.113s
PA-233	1247.69	312.01	224.	7.	0.001	299.91	1.117s
Ir-192	1265.61	316.49	231.	10.	0.001	210.83	1.122s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CR-51	1279.99	320.08	242.	10.	0.001	214.70	1.125s
La-140	1314.69	328.76	91.	5.	0.001	251.05	1.134s
Cf-249	1333.41	333.44	83.	8.	0.001	168.48	1.139s
AC-228	1352.93	338.32	199.	-23.	-0.003	62.11	1.144s
Cs-136	1361.93	340.57	209.	-18.	-0.003	114.50	1.146s
EU-152	1376.80	344.29	164.	15.	0.002	122.95	1.150s
PB-214	1407.39	351.93	79.	-14.	-0.002	42.19	1.157
BA-133	1423.66	356.00	108.	-3.	0.000	553.68	1.162s
I-131	1457.59	364.48	40.	12.	0.002	107.15	1.170
BA-133	1535.03	383.84	159.	-17.	-0.002	107.25	1.189s
Cf-249	1551.47	387.95	176.	-17.	-0.002	112.22	1.193s
SN-113	1566.43	391.69	227.	-19.	-0.003	113.96	1.197s
SB-125	1711.18	427.88	40.	-10.	-0.001	127.80	1.233s
AG-108M	1735.43	433.94	41.	3.	0.000	403.96	1.239
PM-146	1815.20	453.88	54.	-18.	-0.002	73.59	1.258s
SB-125	1853.15	463.37	93.	-16.	-0.002	89.48	1.268s
Ir-192	1871.93	468.06	102.	-3.	0.000	462.83	1.272s
BE-7	1910.07	477.60	63.	11.	0.002	106.94	1.282s
HF-181	1927.68	482.00	73.	11.	0.002	114.33	1.286s
La-140	1947.77	487.02	63.	9.	0.001	129.63	1.291s
RU-103	1987.91	497.05	39.	3.	0.000	428.82	1.301s
RH-106	2047.15	511.86	60.	122.	0.017	12.75	2.565
Kr-85	2055.62	513.98	206.	-16.	-0.002	130.42	1.317s
Nd-147	2123.70	531.00	39.	-7.	-0.001	185.99	1.333s
Ba-140	2148.74	537.26	13.	8.	0.001	97.83	1.339s
CS-134	2252.65	563.24	43.	-14.	-0.002	97.40	1.364s
PA-234	2277.59	569.47	44.	-7.	-0.001	145.43	1.370s
BI-207	2278.51	569.70	51.	-1.	0.000	738.50	1.370s
TL-208	2331.79	583.02	21.	6.	0.001	164.41	1.382s
SB-125	2401.71	600.50	94.	11.	0.002	129.79	1.399s
SB-124	2410.64	602.73	105.	11.	0.002	136.49	1.401s
CS-134	2418.55	604.71	116.	11.	0.002	142.87	1.403s
BI-214	2436.96	609.31	141.	-3.	0.000	592.71	1.407
RU-103	2440.91	610.30	138.	11.	0.002	154.64	1.408s
PM-144	2471.96	618.06	94.	11.	0.002	128.51	1.415s
RH-106	2487.38	621.92	39.	10.	0.001	94.61	1.419s
SB-125	2543.28	635.89	18.	7.	0.001	96.51	1.432s
I-131	2547.62	636.97	44.	-11.	-0.002	91.61	1.433s
AG-110M	2630.77	657.76	53.	-16.	-0.002	69.37	1.452s
CS-137	2646.36	661.66	72.	8.	0.001	163.14	1.455s
PM-144	2785.90	696.54	33.	14.	0.002	92.66	1.487s
NB-94	2810.25	702.63	28.	0.	0.000	1000.00	1.493s
SB-124	2890.87	722.79	30.	11.	0.001	79.92	1.511s
AG-108M	2891.48	722.94	49.	-8.	-0.001	136.20	1.511s
EU-154	2893.17	723.36	41.	0.	0.000	1000.00	1.511s
ZR-95	2896.52	724.20	41.	0.	0.000	1000.00	1.512
BI-212	2908.41	727.17	40.	6.	0.001	169.10	1.515s
PM-146	2942.61	735.72	29.	-4.	-0.001	298.24	1.523s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-146	2988.37	747.16	30.	-8.	-0.001	152.56	1.533s
ZR-95	3026.65	756.73	28.	-8.	-0.001	157.45	1.541s
AG-110M	3055.51	763.94	23.	5.	0.001	133.46	1.548s
NB-95	3062.89	765.79	41.	-9.	-0.001	102.77	1.549s
PA-234M	3065.38	766.41	29.	10.	0.001	79.61	1.550s
EU-152	3115.41	778.92	16.	-3.	0.000	406.04	1.561s
BI-212	3141.41	785.42	19.	-5.	-0.001	201.78	1.567s
CS-134	3183.22	795.87	60.	-14.	-0.002	79.71	1.576s
TL-210	3198.14	799.60	74.	-9.	-0.001	139.14	1.579s
CS-134	3207.54	801.95	76.	8.	0.001	149.51	1.581s
CO-58	3242.84	810.78	29.	6.	0.001	133.33	1.589s
Cs-136	3273.74	818.50	23.	-8.	-0.001	127.75	1.596s
MN-54	3339.13	834.85	44.	-18.	-0.003	74.36	1.610s
Co-56	3386.82	846.77	34.	-3.	0.000	526.09	1.620
TL-208	3442.00	860.56	26.	-9.	-0.001	160.29	1.632s
NB-94	3484.13	871.10	30.	-6.	-0.001	204.80	1.641s
EU-154	3492.66	873.23	33.	6.	0.001	132.65	1.643
PA-234	3521.86	880.53	21.	8.	0.001	86.72	1.649s
PA-234	3532.70	883.24	29.	8.	0.001	99.80	1.652
AG-110M	3538.47	884.68	52.	-11.	-0.002	93.71	1.653
Sc-46	3556.86	889.28	81.	-15.	-0.002	87.15	1.657s
Y-88	3591.90	898.04	10.	8.	0.001	97.25	1.664s
AC-228	3644.02	911.07	44.	-12.	-0.002	68.59	1.675s
AG-110M	3749.71	937.49	20.	-2.	0.000	496.66	1.697s
PA-234	3783.82	946.02	25.	-8.	-0.001	106.44	1.704s
EU-152	3856.18	964.11	8.	13.	0.002	40.18	1.719s
AC-228	3875.62	968.97	32.	3.	0.000	279.13	1.724s
EU-154	3985.06	996.33	61.	-15.	-0.002	78.68	1.746
PA-234M	4003.73	1001.00	76.	-12.	-0.002	108.17	1.750s
Co-56	4151.10	1037.84	20.	4.	0.001	250.83	1.780s
Cs-136	4192.02	1048.07	32.	-14.	-0.002	65.63	1.788s
BI-207	4254.38	1063.66	17.	3.	0.000	347.19	1.801s
Ga-68	4309.34	1077.40	21.	-5.	-0.001	201.56	1.812s
FE-59	4396.74	1099.25	22.	-8.	-0.001	125.63	1.829s
EU-152	4448.04	1112.07	45.	-8.	-0.001	128.46	1.839s
ZN-65	4461.92	1115.55	52.	0.	0.000	1000.00	1.842s
BI-214	4480.88	1120.29	60.	-7.	-0.001	149.30	1.845s
Sc-46	4481.94	1120.55	52.	0.	0.000	1000.00	1.846s
Ta-182	4484.94	1121.30	65.	-12.	-0.002	100.76	1.846s
CO-60	4692.68	1173.24	16.	0.	0.000	1000.00	1.886s
Ta-182	4755.93	1189.05	21.	-3.	0.000	319.69	1.899s
Ta-182	4885.37	1221.41	11.	5.	0.001	145.77	1.923s
Co-56	4952.84	1238.28	21.	-10.	-0.001	106.26	1.936s
NA-22	5097.84	1274.53	6.	4.	0.001	104.89	1.963s
EU-154	5097.88	1274.54	10.	0.	0.000	883.18	1.963s
FE-59	5166.10	1291.60	7.	3.	0.000	192.84	1.975s
TL-210	5251.71	1313.00	6.	2.	0.000	248.05	1.991
CO-60	5329.71	1332.50	25.	-9.	-0.001	73.09	2.005s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-110M	5536.89	1384.30	6.	7.	0.001	87.14	2.042s
EU-152	5631.70	1408.00	0.	9.	0.001	33.33	2.059s
K-40	5843.01	1460.83	19.	-6.	-0.001	125.77	2.095
La-140	6384.49	1596.21	0.	7.	0.001	37.80	2.185s
BI-214	7057.56	1764.49	16.	-7.	-0.001	121.24	2.290s
Y-88	7343.81	1836.06	6.	2.	0.000	382.88	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	9.1041E-01				5.31E+01	
			477.60	9.104E-01	?(	3.303E+00 1.07E+02 1.05E+01	G
NA-22	C	7.9375E-02				9.50E+02	
			1274.53	7.937E-02	?(	2.957E-01 1.05E+02 9.99E+01	G
K-40	N	-1.3014E+00				4.66E+11	
			1460.83	-1.301E+00	(P	5.049E+00 1.26E+02 1.07E+01	G
Sc-46	F	-2.2799E-01				8.38E+01	
			889.28	-2.280E-01	?(	6.664E-01 8.72E+01 1.00E+02	G
			1120.55	0.000E+00	+	6.703E-01 1.00E+03 1.00E+02	G
CR-51	F	6.5993E-01				2.77E+01	
			320.08	6.599E-01	?(	4.792E+00 2.15E+02 9.94E+00	G
MN-54	C	-2.6003E-01				3.12E+02	
			834.85	-2.600E-01	?(P	4.737E-01 7.44E+01 1.00E+02	G
FE-59	F	-2.4412E-01				4.45E+01	
			1099.25	-2.441E-01	?(P	7.804E-01 1.26E+02 5.65E+01	G
			1291.60	1.540E-01	+ P	7.218E-01 1.93E+02 4.32E+01	G
Co-56	C	2.7194E-02				7.73E+01	
			846.77	-3.769E-02	?(P	4.262E-01 5.26E+02 9.99E+01	G
			1238.28	-3.152E-01	+	7.392E-01 1.06E+02 6.61E+01	G
			1037.84	4.861E-01	&(	2.862E+00 2.51E+02 1.41E+01	G
			1771.35	3.028E-02	%	3.405E+00 2.93E+03 1.55E+01	A
CO-57	C	-1.9039E-02				2.72E+02	
			122.06	-5.358E-02	&(	1.947E-01 1.08E+02 8.56E+01	G
			136.47	2.578E-01	*(	1.793E+00 2.04E+02 1.07E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-58	C	8.3184E-02					7.09E+01	
			810.78	8.318E-02	?(	3.855E-01	1.33E+02	9.95E+01 G
CO-60	F	-1.9543E-01					1.93E+03	
			1332.50	-1.954E-01	?(P	5.615E-01	7.31E+01	1.00E+02 G
			1173.24	0.000E+00	+	4.100E-01	1.00E+03	9.99E+01 G
ZR-95	I	-1.9749E-01					6.40E+01	
			756.73	-1.975E-01	?(P	6.554E-01	1.57E+02	5.45E+01 G
			724.20	0.000E+00	+	9.212E-01	1.00E+03	4.42E+01 G
NB-95	I	-1.2269E-01					6.40E+01	
			765.79	-1.227E-01	?(	4.294E-01	1.03E+02	9.98E+01 G
RU-103	I	2.9939E-02					3.93E+01	
			497.05	2.994E-02	?(	3.175E-01	4.29E+02	9.09E+01 G
			610.30	2.053E+00	?	1.077E+01	1.55E+02	5.75E+00 GA
RH-106	I	1.0888E+00					3.74E+02	
			621.92	1.089E+00	?(	3.495E+00	9.46E+01	9.93E+00 G
			1050.36	3.709E-01	%	3.881E+01	2.93E+03	1.56E+00 G
			511.86	5.671E+00		1.804E+00	1.28E+01	2.00E+01 GA
AG-108M	C	2.8031E-02					1.53E+05	
			433.94	2.803E-02	?(P	2.912E-01	4.04E+02	9.05E+01 G
			722.94	-1.031E-01	&	4.830E-01	1.36E+02	9.08E+01 G
			614.28	3.360E-03	%	7.187E-01	6.20E+03	8.98E+01 G
AG-110M	F	4.7988E-02					2.50E+02	
			884.68	-2.354E-01	?(	7.455E-01	9.37E+01	7.27E+01 G
			657.76	-1.940E-01	+	4.464E-01	6.94E+01	9.46E+01 G
			937.49	-9.126E-02	+	1.075E+00	4.97E+02	3.44E+01 G
			1384.30	6.526E-01	?(	1.269E+00	8.71E+01	2.43E+01 G
			763.94	3.133E-01	?(	1.463E+00	1.33E+02	2.23E+01 G
SN-113	F	-2.2217E-01					1.15E+02	
			391.69	-2.222E-01	?(	8.488E-01	1.14E+02	6.40E+01 G
SB-124	F	2.2672E-01					6.02E+01	
			602.73	1.183E-01	?(	5.481E-01	1.36E+02	9.83E+01 G
			1690.98	-2.207E-02	% P	8.162E-01	1.94E+03	4.78E+01 G
			722.79	1.212E+00	&(	3.258E+00	7.99E+01	1.08E+01 G
SB-125	I	1.9205E-01					1.01E+03	
			427.88	-2.707E-01	?(	8.713E-01	1.28E+02	2.96E+01 G
			600.50	6.477E-01	&(	2.855E+00	1.30E+02	1.79E+01 G
			635.89	6.836E-01	?(P	2.225E+00	9.65E+01	1.13E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			463.37	-1.299E+00	+	3.898E+00	8.95E+01	1.05E+01 G
I-131	I	1.7734E-01					8.02E+00	
			364.48	1.037E-01	&(	2.780E-01	1.07E+02	8.17E+01 G
			284.30	1.157E+00	&(P	3.057E+00	1.02E+02	6.14E+00 G
			636.97	-1.696E+00	+	5.256E+00	9.16E+01	7.17E+00 G
Gd-153	F	-1.7861E-01					2.42E+02	
			97.50	-1.786E-01	&(	8.704E-01	1.45E+02	3.00E+01 G
			103.20	0.000E+00	+	1.070E+00	1.00E+03	2.18E+01 G
Ga-68	C	-5.0022E+00					4.71E-02	
			1077.40	-5.002E+00	?(	2.273E+01	2.02E+02	3.30E+00 G
Tc-99m	I	-6.5658E-03					2.51E-01	
			140.51	-6.566E-03	%(	2.798E-01	1.24E+03	8.93E+01 G
BA-133	F	-2.9657E-02					3.85E+03	
			356.00	-2.966E-02	?(	5.679E-01	5.54E+02	6.20E+01 G
			302.85	1.262E-07	%	2.878E+00	6.70E+08	1.83E+01 G
			383.84	-1.399E+00	+	5.038E+00	1.07E+02	8.94E+00 GA
			80.99	-1.604E-01	+	4.746E-01	1.10E+02	3.41E+01 GA
CS-134	I	-8.5501E-02					7.54E+02	
			795.87	-2.299E-01	?(	6.131E-01	7.97E+01	8.55E+01 G
			604.71	1.196E-01	+	5.797E-01	1.43E+02	9.76E+01 G
			569.32	2.204E-02	%	1.993E+00	2.50E+03	1.54E+01 G
			801.95	1.336E+00	?(	6.832E+00	1.50E+02	8.69E+00 G
			563.24	-1.730E+00	&	4.028E+00	9.74E+01	8.35E+00 G
CS-137	I	1.0330E-01					1.10E+04	
			661.66	1.033E-01	?(P	5.743E-01	1.63E+02	8.52E+01 G
CE-139	F	6.4319E-02					1.38E+02	
			165.85	6.432E-02	?(	2.322E-01	1.07E+02	7.99E+01 G
Ba-140	I	3.2012E-01					1.28E+01	
			537.26	3.201E-01	&(	7.746E-01	9.78E+01	2.44E+01 G
			162.66	-5.079E-01	+	3.518E+00	2.03E+02	6.22E+00 G
			304.85	-5.422E-07	&	1.236E+01	6.70E+08	4.29E+00 G
La-140	I	1.8238E-01					1.28E+01	
			1596.21	1.871E-01	?(	1.970E-01	3.78E+01	9.54E+01 G
			487.02	1.759E-01	?(	7.793E-01	1.30E+02	4.55E+01 G
			328.76	1.747E-01	(P	1.501E+00	2.51E+02	2.03E+01 G
			815.77	-2.963E-02	& P	1.815E+00	2.70E+03	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	9.6967E-02					3.25E+01	
			145.44	9.697E-02	&(	3.577E-01	1.09E+02	4.82E+01 G
CE-144	I	1.4657E-08					2.85E+02	
			133.54	1.466E-08	%(	1.872E+00	3.70E+09	1.11E+01 G
PM-144	C	1.4398E-01					3.63E+02	
			696.54	1.669E-01	?(	3.581E-01	9.27E+01	9.90E+01 G
			618.06	1.210E-01	&(	5.280E-01	1.29E+02	9.91E+01 G
EU-152	F	4.1754E-01					4.94E+03	
			121.78	4.494E-01	?(	4.472E-01	3.23E+01	2.86E+01 G
			344.29	3.831E-01	?(P	1.582E+00	1.23E+02	2.65E+01 G
			1112.07	-1.027E+00	-	4.535E+00	1.28E+02	1.36E+01 G
			778.92	-3.370E-01	- P	2.213E+00	4.06E+02	1.29E+01 G
			964.11	1.477E+00	+	1.734E+00	4.02E+01	1.46E+01 G
			244.69	-3.823E-01	-	4.755E+00	3.65E+02	7.58E+00 G
			1408.00	9.719E-01	?	7.959E-01	3.33E+01	2.10E+01 GA
EU-154	I	1.2803E-01					3.14E+03	
			123.10	1.956E-02	?(	3.753E-01	5.52E+02	4.08E+01 G
			1274.54	2.940E-02	?(	1.004E+00	8.83E+02	3.52E+01 G
			723.36	0.000E+00	-	2.009E+00	1.00E+03	2.02E+01 G
			873.23	7.715E-01	(P	3.516E+00	1.33E+02	1.23E+01 G
			1004.77	6.174E-02	%	4.360E+00	2.02E+03	1.80E+01 G
			996.33	-2.322E+00	+	6.107E+00	7.87E+01	1.06E+01 G
EU-155	I	-5.2934E-02					1.81E+03	
			105.31	-5.293E-02	&(P	1.112E+00	6.16E+02	2.12E+01 G
			86.54	0.000E+00	+	9.049E-01	1.00E+03	3.07E+01 G
HF-181	F	1.2271E-01					4.24E+01	
			482.00	1.203E-01	?(	4.668E-01	1.14E+02	8.05E+01 G
			133.02	5.202E-02	(	2.540E-01	1.41E+02	4.33E+01 G
			345.83	-2.285E-02	%	2.867E+00	3.65E+03	1.51E+01 G
			136.30	6.792E-01	(	1.646E+00	7.27E+01	5.85E+00 G
Ta-182	F	-6.2431E-01					1.14E+02	
			1121.30	-6.243E-01	?(	2.128E+00	1.01E+02	3.49E+01 G
			1221.41	3.931E-01	+	1.322E+00	1.46E+02	2.70E+01 G
			1189.05	-3.996E-01	+	2.905E+00	3.20E+02	1.62E+01 G
Hg-203	F	-6.2866E-02					4.66E+01	
			279.20	-6.287E-02	&(	3.572E-01	1.67E+02	8.15E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N	7.5682E-02					6.98E+02	
			583.02	7.017E-02	&(P	2.969E-01	1.64E+02	8.45E+01 G
			277.28	1.495E-01	(	3.822E+00	7.31E+02	6.31E+00 G
			860.56	-1.020E+00	+ P	3.082E+00	1.60E+02	1.24E+01 G
PM-146	C	-2.2746E-01					2.02E+03	
			453.88	-2.275E-01	?(P	4.774E-01	7.36E+01	6.50E+01 G
			747.16	-3.201E-01	& P	1.074E+00	1.53E+02	3.40E+01 G
			735.72	-2.384E-01	& P	1.571E+00	2.98E+02	2.25E+01 G
Y-88	F	8.6485E-02					1.07E+02	
			1836.06	4.889E-02	?(	4.235E-01	3.83E+02	9.92E+01 G
			898.04	1.263E-01	?(P	2.850E-01	9.72E+01	9.37E+01 G
Cd-113m		5.2908E+02					5.33E+03	
			263.70	5.291E+02	?(	3.328E+03	1.82E+02	6.00E-03 K
Cf-251	T	-2.8320E-01					3.28E+05	
			176.60	-2.832E-01	?(	1.029E+00	1.40E+02	1.70E+01 G
			227.00	9.539E-01	&	2.587E+00	1.04E+02	6.30E+00 GA
Cf-249	T	-9.2321E-02					1.28E+05	
			387.95	-1.917E-01	&(	7.227E-01	1.12E+02	6.60E+01 G
			333.44	3.307E-01	?(	1.909E+00	1.68E+02	1.55E+01 G
Sn-126		-1.3988E-01					3.65E+07	
			87.57	0.000E+00	+	7.402E-01	1.00E+03	3.75E+01 GA
			64.28	-1.399E-01	?(	2.382E+00	4.99E+02	9.70E+00 G
			86.94	0.000E+00	&	3.072E+00	1.00E+03	9.04E+00 GA
PB-210	N	1.2583E+00					8.14E+03	
			46.54	1.258E+00	*(P	5.305E+00	1.50E+02	4.25E+00 G
PB-212	N	2.4837E-01					6.98E+02	
			238.63	2.484E-01	(P	4.359E-01	6.42E+01	4.33E+01 G
			300.03	2.542E+00		1.544E+01	1.80E+02	3.28E+00 GA
PB-214	N	-2.5893E-01					5.84E+05	
			351.93	-2.589E-01	?(P	8.036E-01	4.22E+01	3.76E+01 G
			295.09	2.779E-01	+ P	2.495E+00	2.66E+02	1.93E+01 G
			242.00	9.959E-01	+	4.662E+00	1.39E+02	7.43E+00 GA
BI-207	C	6.4074E-02					1.18E+04	
			1063.66	6.407E-02	?(P	5.203E-01	3.47E+02	7.45E+01 G
			569.70	-1.431E-02	+ P	3.747E-01	7.38E+02	9.77E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-212	N	9.1350E-01					6.98E+02	
			727.17	9.135E-01	?(	5.376E+00	1.69E+02	7.55E+00 G
			785.42	-4.889E+00	+	2.393E+01	2.02E+02	1.28E+00 GA
U-235	N	-1.4419E-01					2.57E+11	
			143.79	-1.442E-01	(P	2.092E+00	4.94E+02	1.10E+01 G
			205.33	1.339E-01	% P	3.650E+00	1.03E+03	5.01E+00 G
			163.38	-1.627E-01	& P	4.472E+00	1.03E+03	5.08E+00 G
			185.72	3.265E-01	*	2.962E-01	3.72E+01	5.40E+01 GA
BI-214	N	-6.6877E-02					5.84E+05	
			609.31	-6.688E-02	?(P	1.355E+00	5.93E+02	4.61E+01 G
			1120.29	-8.772E-01	+ P	4.711E+00	1.49E+02	1.51E+01 G
			1764.49	-1.292E+00	+ P	3.895E+00	1.21E+02	1.54E+01 G
BI-210M	T	-1.7363E-01					1.10E+09	
			265.83	-1.736E-01	&(P	4.886E-01	8.89E+01	5.00E+01 G
			304.90	2.223E-01	&	1.497E+00	1.99E+02	2.80E+01 G
AC-228	N	-6.4762E-01					2.10E+03	
			911.07	-6.476E-01	?(P	1.777E+00	6.86E+01	2.90E+01 G
			968.97	2.746E-01	+ P	2.689E+00	2.79E+02	1.75E+01 G
			338.32	-1.265E+00	& P	3.771E+00	6.21E+01	1.20E+01 G
			93.35	-9.727E-01	+	5.202E+00	1.59E+02	5.56E+00 XA
TH-227	N	1.0137E-01					7.95E+03	
			256.24	1.014E-01	?(	2.652E+00	9.73E+02	7.00E+00 G
			235.97	-6.046E-01	+	2.342E+00	1.15E+02	1.23E+01 G
			50.14	-8.040E-01	+	3.800E+00	1.41E+02	8.00E+00 G
TH-229	N	6.6988E-01					2.68E+06	
			193.51	9.515E-01	?(P	3.796E+00	1.53E+02	4.40E+00 G
			210.85	2.555E-01	?(	6.054E+00	8.90E+02	2.99E+00 G
TH-234	N	2.2373E+00					1.63E+12	
			92.59	2.512E+00	*(P	3.279E+00	4.80E+01	5.58E+00 G
			63.29	1.834E+00	(P	4.903E+00	9.68E+01	3.81E+00 G
PA-231	N	1.9130E+00					1.20E+07	
			302.65	1.895E+00	?(	1.806E+01	2.82E+02	2.88E+00 G
			300.07	1.935E+00	(	2.104E+01	3.22E+02	2.46E+00 G
PA-233	C	1.2311E-01					7.82E+08	
			312.01	1.231E-01	?(P	1.251E+00	3.00E+02	3.60E+01 G
			300.18	3.706E-07	%	8.450E+00	6.70E+08	6.20E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	N	2.8821E-01					1.63E+12	
			131.29	-2.289E-01	&(	1.187E+00	1.53E+02	1.80E+01 G
			946.02	-9.570E-01	+ P	3.074E+00	1.06E+02	1.34E+01 G
			569.47	-8.268E-01	+	4.155E+00	1.45E+02	8.20E+00 G
			883.24	1.258E+00	?(	4.292E+00	9.98E+01	9.60E+00 G
			880.53	2.004E+00	?	5.906E+00	8.67E+01	6.00E+00 GA
PA-234M	N	-5.3470E+00					1.63E+12	
			1001.00	-2.343E+01	?(	8.582E+01	1.08E+02	8.37E-01 G
			766.41	4.614E+01	?(	1.235E+02	7.96E+01	2.94E-01 G
AM-241	T	-1.5846E-01					1.58E+05	
			59.54	-1.585E-01	?(	4.825E-01	1.13E+02	3.59E+01 G
Np-237	F	3.1327E-01					2.14E+06	
			86.49	3.133E-01	?(	2.080E+00	1.97E+02	1.31E+01 G
Ir-192	F	1.0760E-01					7.40E+01	
			316.49	7.445E-02	?(	5.311E-01	2.11E+02	8.70E+01 G
			468.06	-5.182E-02	+	8.296E-01	4.63E+02	5.18E+01 G
			308.44	1.985E-01	?(	1.364E+00	2.03E+02	3.18E+01 G
Cs-136	F	-1.1587E-01					1.30E+01	
			818.50	-1.159E-01	?(	3.507E-01	1.28E+02	1.00E+02 G
			1048.07	-2.923E-01	&	6.340E-01	6.56E+01	8.00E+01 G
			340.57	-2.593E-01	+	9.960E-01	1.15E+02	4.69E+01 G
Np-239	T	1.9905E-01					2.36E+00	
			103.70	0.000E+00	-	9.849E-01	1.00E+03	2.40E+01 X
			106.13	1.990E-01	*(	9.440E-01	1.41E+02	2.27E+01 G
			99.50	2.129E-01	?	1.601E+00	2.22E+02	1.50E+01 X
Nd-147		-5.1624E-01					1.11E+01	
			531.00	-5.162E-01	?(	2.346E+00	1.86E+02	1.30E+01 G
			91.10	-1.844E-01	+	1.030E+00	1.66E+02	2.83E+01 G
TL-210	N	-2.2743E-02					5.84E+05	
			799.60	-1.240E-01	?(	5.891E-01	1.39E+02	9.90E+01 G
			296.00	1.040E-01	&(	6.204E-01	1.77E+02	7.90E+01 G
			1313.00	2.363E-01	?	1.398E+00	2.48E+02	2.10E+01 GA
Kr-85	I	-3.4408E+01					3.92E+03	
			513.98	-3.441E+01	?(	1.510E+02	1.30E+02	4.30E-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	262.	-17.	-0.002	140.64	-8.040E-01	
AM-241	59.54	100.	-16.	-0.002	112.66	-1.585E-01	
Sn-126	64.28	197.	-4.	-0.001	498.75	-1.399E-01	
BA-133	80.99	107.	-17.	-0.002	109.63	-1.604E-01	
Np-237	86.49	322.	13.	0.002	197.17	3.133E-01	
Nd-147	91.10	372.	-17.	-0.002	166.39	-1.844E-01	
AC-228	93.35	366.	-17.	-0.002	159.34	-9.727E-01	
Gd-153	97.50	295.	-17.	-0.002	145.09	-1.786E-01	
Np-239	99.50	241.	10.	0.001	222.22	2.129E-01	
EU-155	105.31	235.	-4.	0.000	616.18	-5.293E-02	P
Np-239	106.13	187.	14.	0.002	140.62	1.990E-01	
EU-152	121.78	60.	39.	0.005	32.33	4.494E-01	
CO-57	122.06	106.	-14.	-0.002	107.78	-5.358E-02	
PA-234	131.29	168.	-12.	-0.002	153.39	-2.289E-01	
CO-57	136.47	129.	8.	0.001	203.87	2.578E-01	
U-235	143.79	178.	-4.	-0.001	494.01	-1.442E-01	P
CE-141	145.44	97.	13.	0.002	109.23	9.697E-02	
Ba-140	162.66	139.	-8.	-0.001	203.29	-5.079E-01	
CE-139	165.85	96.	13.	0.002	106.99	6.432E-02	
Cf-251	176.60	77.	-12.	-0.002	139.82	-2.832E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
U-235	185.72	59.	42.	0.006	37.18	3.265E-01		
TH-229	193.51	60.	10.	0.001	152.57	9.515E-01		P
TH-229	210.85	62.	2.	0.000	889.61	2.555E-01		
Cf-251	227.00	44.	12.	0.002	104.05	9.539E-01		
TH-227	235.97	139.	-15.	-0.002	115.00	-6.046E-01		
EU-152	244.69	210.	-6.	-0.001	365.35	-3.823E-01		
TH-227	256.24	48.	1.	0.000	972.59	1.014E-01		
Cd-113m	263.70	53.	6.	0.001	181.56	5.291E+02		
BI-210M	265.83	81.	-16.	-0.002	88.92	-1.736E-01		P
TL-208	277.28	73.	2.	0.000	730.75	1.495E-01		
Hg-203	279.20	108.	-9.	-0.001	166.67	-6.287E-02		
I-131	284.30	41.	12.	0.002	101.94	1.157E+00		P
TL-210	296.00	291.	14.	0.002	177.04	1.040E-01		
BI-210M	304.90	201.	10.	0.001	198.76	2.223E-01		
Ir-192	308.44	211.	10.	0.001	202.98	1.985E-01		
PA-233	312.01	224.	7.	0.001	299.91	1.231E-01		P
Ir-192	316.49	231.	10.	0.001	210.83	7.445E-02		
CR-51	320.08	242.	10.	0.001	214.70	6.599E-01		
La-140	328.76	91.	5.	0.001	251.05	1.747E-01		P
Cf-249	333.44	83.	8.	0.001	168.48	3.307E-01		
AC-228	338.32	199.	-23.	-0.003	62.11	-1.265E+00		P
Cs-136	340.57	209.	-18.	-0.003	114.50	-2.593E-01		
EU-152	344.29	164.	15.	0.002	122.95	3.831E-01		P
BA-133	356.00	108.	-3.	0.000	553.68	-2.966E-02		
I-131	364.48	40.	12.	0.002	107.15	1.037E-01		
BA-133	383.84	159.	-17.	-0.002	107.25	-1.399E+00		
Cf-249	387.95	176.	-17.	-0.002	112.22	-1.917E-01		
SN-113	391.69	227.	-19.	-0.003	113.96	-2.222E-01		
SB-125	427.88	40.	-10.	-0.001	127.80	-2.707E-01		
AG-108M	433.94	41.	3.	0.000	403.96	2.803E-02		P
PM-146	453.88	54.	-18.	-0.002	73.59	-2.275E-01		P
SB-125	463.37	93.	-16.	-0.002	89.48	-1.299E+00		
Ir-192	468.06	102.	-3.	0.000	462.83	-5.182E-02		
BE-7	477.60	63.	11.	0.002	106.94	9.104E-01		
La-140	487.02	63.	9.	0.001	129.63	1.759E-01		
RU-103	497.05	39.	3.	0.000	428.82	2.994E-02		
RH-106	511.86	60.	122.	0.017	12.75	5.671E+00		
Kr-85	513.98	206.	-16.	-0.002	130.42	-3.441E+01		
Nd-147	531.00	39.	-7.	-0.001	185.99	-5.162E-01		
Ba-140	537.26	13.	8.	0.001	97.83	3.201E-01		
CS-134	563.24	43.	-14.	-0.002	97.40	-1.730E+00		
PA-234	569.47	44.	-7.	-0.001	145.43	-8.268E-01		
BI-207	569.70	51.	-1.	0.000	738.50	-1.431E-02		P
TL-208	583.02	21.	6.	0.001	164.41	7.017E-02		P
SB-125	600.50	94.	11.	0.002	129.79	6.477E-01		
SB-124	602.73	105.	11.	0.002	136.49	1.183E-01		
CS-134	604.71	116.	11.	0.002	142.87	1.196E-01		
BI-214	609.31	141.	-3.	0.000	592.71	-6.688E-02		P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
RU-103	610.30	138.	11.	0.002	154.64	2.053E+00		
PM-144	618.06	94.	11.	0.002	128.51	1.210E-01		
RH-106	621.92	39.	10.	0.001	94.61	1.089E+00		
SB-125	635.89	18.	7.	0.001	96.51	6.836E-01		P
I-131	636.97	44.	-11.	-0.002	91.61	-1.696E+00		
AG-110M	657.76	53.	-16.	-0.002	69.37	-1.940E-01		
CS-137	661.66	72.	8.	0.001	163.14	1.033E-01		P
PM-144	696.54	33.	14.	0.002	92.66	1.669E-01		
SB-124	722.79	30.	11.	0.001	79.92	1.212E+00		
AG-108M	722.94	49.	-8.	-0.001	136.20	-1.031E-01		
BI-212	727.17	40.	6.	0.001	169.10	9.135E-01		
PM-146	735.72	29.	-4.	-0.001	298.24	-2.384E-01		P
PM-146	747.16	30.	-8.	-0.001	152.56	-3.201E-01		P
ZR-95	756.73	28.	-8.	-0.001	157.45	-1.975E-01		P
AG-110M	763.94	23.	5.	0.001	133.46	3.133E-01		
NB-95	765.79	41.	-9.	-0.001	102.77	-1.227E-01		
PA-234M	766.41	29.	10.	0.001	79.61	4.614E+01		
EU-152	778.92	16.	-3.	0.000	406.04	-3.370E-01		P
BI-212	785.42	19.	-5.	-0.001	201.78	-4.889E+00		
CS-134	795.87	60.	-14.	-0.002	79.71	-2.299E-01		
TL-210	799.60	74.	-9.	-0.001	139.14	-1.240E-01		
CS-134	801.95	76.	8.	0.001	149.51	1.336E+00		
CO-58	810.78	29.	6.	0.001	133.33	8.318E-02		
Cs-136	818.50	23.	-8.	-0.001	127.75	-1.159E-01		
MN-54	834.85	44.	-18.	-0.003	74.36	-2.600E-01		P
Co-56	846.77	34.	-3.	0.000	526.09	-3.769E-02		P
TL-208	860.56	26.	-9.	-0.001	160.29	-1.020E+00		P
NB-94	871.10	30.	-6.	-0.001	204.80	-8.823E-02		
PA-234	880.53	21.	8.	0.001	86.72	2.004E+00		
PA-234	883.24	29.	8.	0.001	99.80	1.258E+00		
AG-110M	884.68	52.	-11.	-0.002	93.71	-2.354E-01		
Sc-46	889.28	81.	-15.	-0.002	87.15	-2.280E-01		
Y-88	898.04	10.	8.	0.001	97.25	1.263E-01		P
AC-228	911.07	44.	-12.	-0.002	68.59	-6.476E-01		P
AG-110M	937.49	20.	-2.	0.000	496.66	-9.126E-02		
PA-234	946.02	25.	-8.	-0.001	106.44	-9.570E-01		P
EU-152	964.11	8.	13.	0.002	40.18	1.477E+00		
AC-228	968.97	32.	3.	0.000	279.13	2.746E-01		P
PA-234M	1001.00	76.	-12.	-0.002	108.17	-2.343E+01		
Co-56	1037.84	20.	4.	0.001	250.83	4.861E-01		
Cs-136	1048.07	32.	-14.	-0.002	65.63	-2.923E-01		
BI-207	1063.66	17.	3.	0.000	347.19	6.407E-02		P
Ga-68	1077.40	21.	-5.	-0.001	201.56	-5.002E+00		
FE-59	1099.25	22.	-8.	-0.001	125.63	-2.441E-01		P
EU-152	1112.07	45.	-8.	-0.001	128.46	-1.027E+00		
BI-214	1120.29	60.	-7.	-0.001	149.30	-8.772E-01		P
Ta-182	1121.30	65.	-12.	-0.002	100.76	-6.243E-01		
Ta-182	1189.05	21.	-3.	0.000	319.69	-3.996E-01		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Ta-182	1221.41	11.	5.	0.001	145.77	3.931E-01		
Co-56	1238.28	21.	-10.	-0.001	106.26	-3.152E-01		
NA-22	1274.53	6.	4.	0.001	104.89	7.937E-02		
FE-59	1291.60	7.	3.	0.000	192.84	1.540E-01		P
TL-210	1313.00	6.	2.	0.000	248.05	2.363E-01		
CO-60	1332.50	25.	-9.	-0.001	73.09	-1.954E-01		P
AG-110M	1384.30	6.	7.	0.001	87.14	6.526E-01		
EU-152	1408.00	0.	9.	0.001	33.33	9.719E-01		
K-40	1460.83	19.	-6.	-0.001	125.77	-1.301E+00		P
La-140	1596.21	0.	7.	0.001	37.80	1.871E-01		
BI-214	1764.49	16.	-7.	-0.001	121.24	-1.292E+00		P
Y-88	1836.06	6.	2.	0.000	382.88	4.889E-02		

P - Peakbackground subtraction

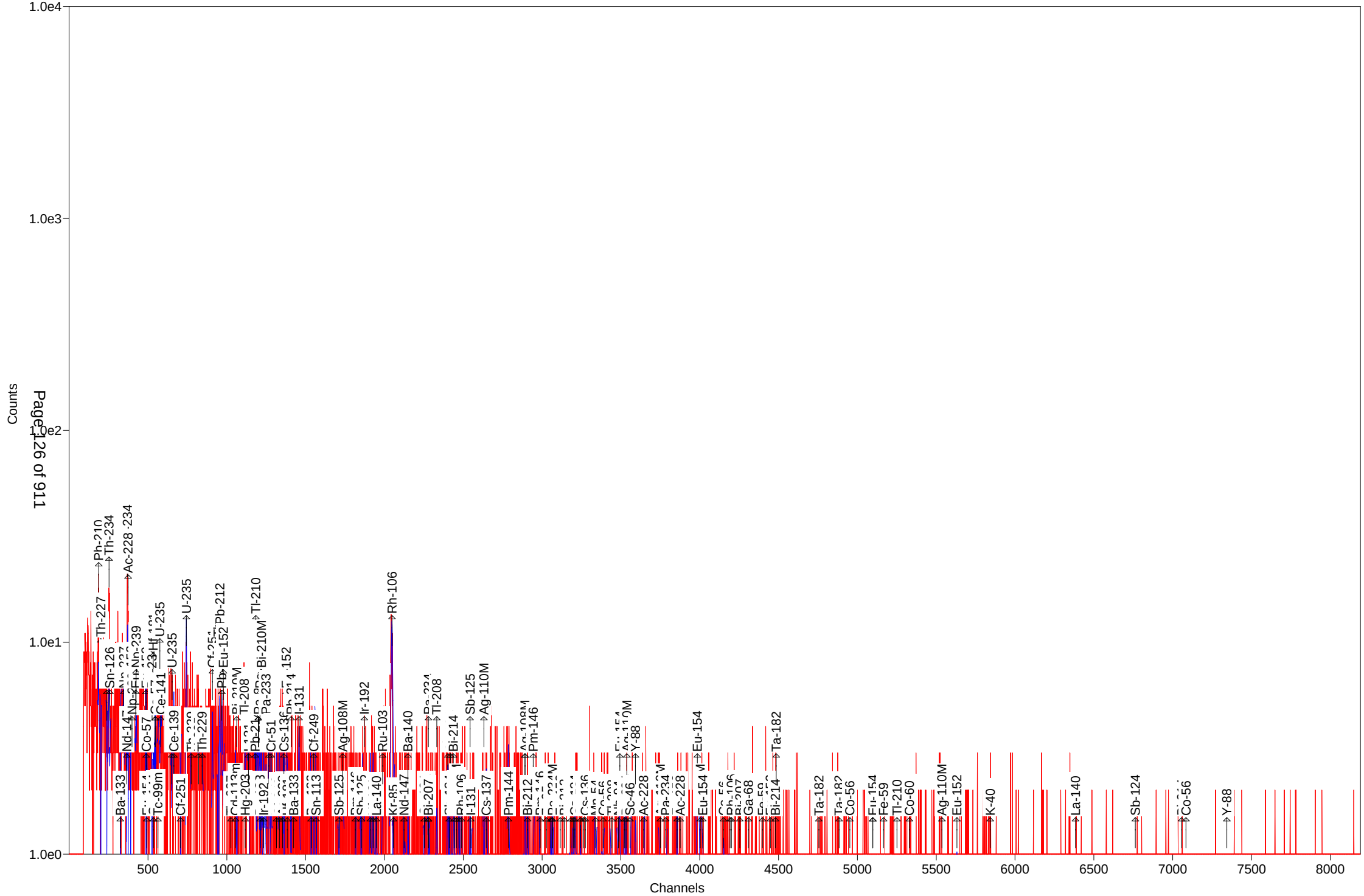
***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	9.1041E-01	9.1041E-01	1.069E+02%	3.30E+00
NA-22	#A	7.9375E-02	7.9375E-02	1.049E+02%	2.96E-01
K-40	#A	-1.3014E+00	-1.3014E+00	1.258E+02%	5.05E+00
Sc-46	#A	-2.2799E-01	-2.2799E-01	8.715E+01%	6.66E-01
CR-51	#A	6.5993E-01	6.5993E-01	2.147E+02%	4.79E+00
MN-54	#A	-2.6003E-01	-2.6003E-01	7.436E+01%	4.74E-01
FE-59	#A	-2.4412E-01	-2.4412E-01	1.256E+02%	7.80E-01
Co-56	#A	2.7194E-02	2.7194E-02	2.508E+02%	4.26E-01
CO-57	#A	-1.9039E-02	-1.9039E-02	1.078E+02%	1.95E-01
CO-58	#A	8.3184E-02	8.3184E-02	1.333E+02%	3.85E-01
CO-60	#A	-1.9543E-01	-1.9543E-01	7.309E+01%	5.61E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.32E+00
NB-94	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.40E-01
ZR-95	#A	-1.9749E-01	-1.9749E-01	1.574E+02%	6.55E-01
NB-95	#A	-1.2269E-01	-1.2269E-01	1.028E+02%	4.29E-01
RU-103	#A	2.9939E-02	2.9939E-02	4.288E+02%	3.17E-01
RH-106	#A	1.0888E+00	1.0888E+00	9.461E+01%	3.50E+00
AG-108M	#A	2.8031E-02	2.8031E-02	4.040E+02%	2.91E-01
AG-110M	#A	4.7988E-02	4.7988E-02	6.163E+01%	7.46E-01
SN-113	#A	-2.2217E-01	-2.2217E-01	1.140E+02%	8.49E-01
SB-124	#A	2.2672E-01	2.2672E-01	7.908E+01%	5.48E-01
SB-125	#A	1.9205E-01	1.9205E-01	6.871E+01%	8.71E-01
I-131	#A	1.7733E-01	1.7734E-01	7.395E+01%	2.78E-01
Gd-153	#A	-1.7861E-01	-1.7861E-01	1.451E+02%	8.70E-01
Ga-68	#A	-4.9886E+00	-5.0022E+00	2.016E+02%	2.27E+01
Tc-99m	#A	-6.5624E-03	-6.5658E-03	1.241E+03%	2.80E-01
BA-133	#A	-2.9657E-02	-2.9657E-02	5.537E+02%	5.68E-01
CS-134	#A	-8.5501E-02	-8.5501E-02	7.971E+01%	6.13E-01

CS-137 #A	1.0330E-01	1.0330E-01	1.631E+02%		5.74E-01
CE-139 #A	6.4319E-02	6.4319E-02	1.070E+02%		2.32E-01
Ba-140 #A	3.2012E-01	3.2012E-01	9.783E+01%		7.75E-01
La-140 #A	1.8237E-01	1.8238E-01	3.780E+01%		1.97E-01
CE-141 #A	9.6967E-02	9.6967E-02	1.092E+02%		3.58E-01
CE-144 #A	1.4657E-08	1.4657E-08	3.704E+09%		1.87E+00
PM-144 #A	1.4398E-01	1.4398E-01	7.922E+01%		3.58E-01
EU-152 #A	4.1754E-01	4.1754E-01	3.233E+01%		4.47E-01
EU-154 A	1.2803E-01	1.2803E-01	1.327E+02%		3.75E-01
EU-155 #A	-5.2934E-02	-5.2934E-02	6.162E+02%		1.11E+00
HF-181 #A	1.2271E-01	1.2271E-01	6.523E+01%		4.67E-01
Ta-182 #A	-6.2431E-01	-6.2431E-01	1.008E+02%		2.13E+00
Hg-203 #A	-6.2866E-02	-6.2866E-02	1.667E+02%		3.57E-01
TL-208 #A	7.5682E-02	7.5682E-02	1.644E+02%		2.97E-01
PM-146 #A	-2.2746E-01	-2.2746E-01	7.359E+01%		4.77E-01
Y-88 #A	8.6484E-02	8.6485E-02	9.725E+01%		4.23E-01
Cd-113m#A	5.2908E+02	5.2908E+02	1.816E+02%		3.33E+03
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		7.32E+00
Cf-251 #A	-2.8320E-01	-2.8320E-01	1.398E+02%		1.03E+00
Cf-249 #A	-9.2321E-02	-9.2321E-02	1.012E+02%		7.23E-01
Sn-126 #A	-1.3988E-01	-1.3988E-01	4.987E+02%		2.38E+00
PB-210 #A	1.2583E+00	1.2583E+00	1.504E+02%		5.31E+00
PB-212 A	2.4837E-01	2.4837E-01	6.422E+01%		4.36E-01
PB-214 A	-2.5893E-01	-2.5893E-01	4.219E+01%		8.04E-01
BI-207 #A	6.4074E-02	6.4074E-02	3.472E+02%		5.20E-01
BI-212 #A	9.1350E-01	9.1350E-01	1.691E+02%		5.38E+00
U-235 #A	-1.4419E-01	-1.4419E-01	4.940E+02%		2.09E+00
BI-214 #A	-6.6877E-02	-6.6877E-02	5.927E+02%		1.35E+00
BI-210M#A	-1.7363E-01	-1.7363E-01	8.892E+01%		4.89E-01
AC-228 #A	-6.4762E-01	-6.4762E-01	6.859E+01%		1.78E+00
TH-227 #A	1.0137E-01	1.0137E-01	9.726E+02%		2.65E+00
TH-229 #A	6.6988E-01	6.6988E-01	1.526E+02%		3.80E+00
TH-234 #A	2.2373E+00	2.2373E+00	4.804E+01%		3.28E+00
PA-231 A	1.9130E+00	1.9130E+00	2.139E+02%		1.81E+01
PA-233 #A	1.2311E-01	1.2311E-01	2.999E+02%		1.25E+00
PA-234 #A	2.8821E-01	2.8821E-01	9.150E+01%		1.19E+00
PA-234M#A	-5.3470E+00	-5.3470E+00	6.715E+01%		8.58E+01
AM-241 #A	-1.5846E-01	-1.5846E-01	1.127E+02%		4.82E-01
Np-237 #A	3.1327E-01	3.1327E-01	1.972E+02%		2.08E+00
Ir-192 #A	1.0760E-01	1.0760E-01	1.463E+02%		5.31E-01
Cs-136 #A	-1.1587E-01	-1.1587E-01	1.277E+02%		3.51E-01
Np-239 #A	1.9903E-01	1.9905E-01	1.406E+02%		9.44E-01
Nd-147 #A	-5.1624E-01	-5.1624E-01	1.860E+02%		2.35E+00
TL-210 #A	-2.2743E-02	-2.2743E-02	1.126E+02%		5.89E-01
Kr-85 #A	-3.4408E+01	-3.4408E+01	1.304E+02%		1.51E+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)     2.486E+00  Bq/Sample
Total Decayed Activity (   37.6 to  2000.1 keV) 2.4857032E+00  Bq/Sample
```

412878_Gamma_MB 160-412878~1-A. 7_Gamma_20190280.spc.



Test America St. Louis Spectrum ID: 7_Gamma_20190281

Sample Description: 412878_Gamma_LCS 160-412878~2-A
Detector: Detector # 7
Batch ID: 412878
Work Order Number: Gamma
Lot Number: LCS 160-412878~2-A

Decay to Time: 2/19/2019 11:48 Live Time: 7200 sec
Acquisition Time: 2/19/2019 11:49:04 Real Time: 7318 sec
Analysis Time: 2/19/2019 13:51 Dead Time: 1.61 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Liquid_Marinelli 1L.Clb
Efficiency Cal Desc: 7_1Lmarn_90062_032612
Efficiency Cal Date: 3/28/2012 09:18
Energy Cal Date: 2/23/2012 08:40
Library: Client_Long_Rev15.lib
Bkgd Correction File: 7_2019-01-20_1017.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	-1.641E+01	103.9	1.705E+01	1.707E+01	5.629E+01
NA-22	0.000E+00	1.#INF	7.936E-01	7.936E-01	2.644E+00
K-40	1.154E+01	59.9	6.909E+00	6.934E+00	1.426E+01
Sc-46	-2.392E+00	92.6	2.215E+00	2.218E+00	7.311E+00
CR-51	1.202E+01	141.8	1.705E+01	1.706E+01	5.627E+01
MN-54	5.940E+00	23.1	1.375E+00	1.406E+00	3.237E+00
FE-59	1.971E+00	137.3	2.706E+00	2.708E+00	9.559E+00
Co-56	-1.605E+00	86.8	1.393E+00	1.395E+00	4.412E+00
CO-57	1.901E+00	346.4	6.586E+00	6.586E+00	2.177E+01
CO-58	-2.259E+00	80.0	1.807E+00	1.810E+00	5.962E+00
CO-60	1.094E+03	0.3	3.682E+00	5.412E+01	2.567E+00
ZN-65	0.000E+00	1.#INF	2.464E+00	2.464E+00	1.496E+01
NB-94	2.337E-01	336.5	7.863E-01	7.864E-01	3.411E+00
ZR-95	-1.342E+00	91.7	1.230E+00	1.232E+00	6.676E+00
NB-95	6.739E-01	190.0	1.280E+00	1.281E+00	4.243E+00
RU-103	1.307E+00	127.9	1.672E+00	1.674E+00	3.836E+00
RH-106	1.647E+01	124.5	2.051E+01	2.053E+01	6.774E+01
AG-108M	1.290E-01	144.2	1.859E-01	1.861E-01	4.028E+00
AG-110M	3.935E+00	60.1	2.367E+00	2.375E+00	9.897E+00
SN-113	-1.340E-01	1789.1	2.397E+00	2.397E+00	7.928E+00
SB-124	-1.630E+00	127.2	2.074E+00	2.076E+00	6.851E+00
SB-125	5.102E+00	64.6	3.294E+00	3.304E+00	1.201E+01
I-131	2.014E+00	92.8	1.869E+00	1.872E+00	3.715E+00
Gd-153	1.661E+00	139.6	2.318E+00	2.321E+00	8.835E+00
Ga-68	-1.730E+02	83.7	1.448E+02	1.451E+02	2.983E+02
Tc-99m	-8.617E-01	119.0	1.025E+00	1.026E+00	3.384E+00
BA-133	-2.096E+00	92.3	1.933E+00	1.936E+00	6.380E+00
CS-134	1.274E+00	146.4	1.865E+00	1.866E+00	6.171E+00
CS-137	1.488E+03	0.3	4.952E+00	7.455E+01	6.904E+00
CE-139	-4.969E-01	184.7	9.178E-01	9.189E-01	3.033E+00
Ba-140	2.871E+00	106.7	3.064E+00	3.068E+00	1.336E+01
La-140	7.216E-01	102.2	7.378E-01	7.388E-01	1.471E+00
CE-141	1.447E+00	147.6	2.136E+00	2.137E+00	7.051E+00

CE-144	-6.071E+00	98.1	5.958E+00	5.967E+00	1.966E+01
PM-144	1.460E+00	101.2	1.477E+00	1.479E+00	3.265E+00
EU-152	1.003E+01	50.2	5.038E+00	5.065E+00	9.332E+00
EU-154	6.348E+00	22.9	1.456E+00	1.497E+00	4.762E+00
EU-155	1.100E+00	121.0	1.331E+00	1.333E+00	1.270E+01
HF-181	-2.169E+00	104.0	2.256E+00	2.259E+00	7.447E+00
Ta-182	-8.494E+00	80.0	6.793E+00	6.805E+00	2.242E+01
Hg-203	-1.371E+00	83.1	1.140E+00	1.143E+00	3.761E+00
TL-208	2.231E+00	91.1	2.033E+00	2.036E+00	3.780E+00
PM-146	3.120E+00	84.5	2.636E+00	2.641E+00	5.813E+00
Y-88	5.416E-01	98.5	5.337E-01	5.346E-01	1.765E+00
Cd-113m	-1.799E+04	89.7	1.613E+04	1.617E+04	5.324E+04
Cd-109	5.293E+02	3.3	1.743E+01	3.494E+01	5.335E+01
Cf-251	4.498E+00	105.8	4.758E+00	4.774E+00	1.189E+01
Cf-249	8.140E-01	285.4	2.323E+00	2.323E+00	7.679E+00
Sn-126	-6.885E+00	95.9	6.601E+00	6.612E+00	2.179E+01
PB-210	1.551E+03	4.3	6.623E+01	1.549E+02	2.147E+02
PB-212	-2.813E+00	88.8	2.497E+00	2.503E+00	9.374E+00
PB-214	2.013E-01	102.2	2.058E-01	2.061E-01	1.031E+01
BI-207	2.444E+00	137.9	3.369E+00	3.371E+00	6.954E+00
BI-212	-8.166E+00	249.7	2.039E+01	2.039E+01	6.752E+01
U-235	-5.314E+00	62.4	3.314E+00	3.326E+00	3.145E+01
BI-214	8.322E-01	79.9	6.649E-01	6.662E-01	1.477E+01
BI-210M	2.110E+00	88.6	1.869E+00	1.873E+00	6.166E+00
AC-228	2.846E+01	30.1	8.557E+00	8.670E+00	1.673E+01
TH-227	-9.580E+00	154.5	1.480E+01	1.481E+01	3.701E+01
TH-229	-3.930E+00	506.4	1.990E+01	1.990E+01	5.334E+01
TH-234	7.559E+00	76.7	5.798E+00	5.814E+00	1.912E+01
PA-231	-3.954E+01	164.8	6.516E+01	6.519E+01	2.151E+02
PA-233	3.174E+00	145.9	4.630E+00	4.633E+00	1.528E+01
PA-234	-1.974E-01	2230.8	4.405E+00	4.405E+00	1.456E+01
PA-234M	3.447E+02	67.7	2.334E+02	2.340E+02	7.695E+02
AM-241	4.877E+03	0.2	8.897E+00	2.817E+02	1.283E+01
Np-237	4.391E+00	125.4	5.508E+00	5.513E+00	1.818E+01
Ir-192	1.962E+00	99.5	1.952E+00	1.955E+00	6.146E+00
Cs-136	2.223E+00	84.8	1.885E+00	1.889E+00	6.051E+00
Np-239	2.609E+00	136.6	3.565E+00	3.569E+00	1.177E+01
Nd-147	-1.237E+01	92.0	1.138E+01	1.140E+01	2.608E+01
TL-210	5.766E-01	179.5	1.035E+00	1.035E+00	5.386E+00
Kr-85	9.401E+00	3270.1	3.074E+02	3.074E+02	1.019E+03
Total	1.005E+04				

Analyst: kody Saulters

Sample description
412878_Gamma_LCS 160-412878~2-A

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20190281.An1

Acquisition information
Start time: 2/19/2019 11:49:04 AM
Live time: 7200
Real time: 7318
Dead time: 1.61 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Liquid_Marinelli 1L.Clb
7_1Lmarn_90062_032612

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: 3/28/2012 9:18:24 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -7.054602E-01 + (-2.848254E-01*Log(E)) + (-4.423998E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.43 %
Log(Eff): -1.484435E+01 + (5.183775E+00*Log(E)) + (-5.730519E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev15.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	2/19/2019 11:48:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2019-01-20_1017.PBC 1/20/2019 10:17:25 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 39 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1544

***** 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
42.50	404.	63.02	1.04	3.130E-02				
46.54	16019.	4.27	0.84	3.376E-02	46.54	4.250	1.551E+03	PB210
49.42	15472.	3.74	1.92	3.531E-02	50.14	8.000	7.530E+02	TH227
59.54	498408.	0.18	1.11	3.954E-02	59.54	35.900	4.877E+03	AM241
86.49	182.	125.44	0.88	4.400E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.873E+00	EU155
86.54	184.	121.00	0.88	4.400E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.897E+00	EU155
87.03	185.	119.99	0.88	4.401E-02	86.94	9.040	PBC<MDA	Sn126
87.99	9308.	2.56	1.16	4.404E-02	87.57	37.500	7.829E+01	Sn126
					88.04	3.790	7.744E+02	Cd109
92.53	180.	85.35	1.06	4.410E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	1.021E+01	AC228
97.50	182.	139.55	0.89	4.402E-02	97.50	30.000	PBC<MDA	Gd153
99.50	183.	139.61	0.89	4.395E-02	99.50	15.000	PBC<MDA	Np239
103.20	90.	284.50	0.90	4.377E-02	103.20	21.800	PBC<MDA	Gd153
106.13	184.	136.64	0.90	4.359E-02	106.13	22.700	PBC<MDA	Np239
122.50	1296.	14.36	1.88	4.209E-02	121.78	28.580	1.494E+01	EU152
					122.06	85.600	4.992E+00	CO57
					123.10	40.790	1.051E+01	EU154
136.22	59.	346.41	0.93	4.036E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.901E+00	CO57

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
145.44	196.	147.63	0.94	3.913E-02	145.44	48.200	PBC<MDA	CE141
162.66	190.	106.72	0.96	3.664E-02	162.66	6.220	PBC<MDA	Ba140
163.38	177.	114.91	0.96	3.653E-02	163.38	5.080	PBC<MDA	U235
176.60	191.	105.79	0.98	3.462E-02	176.60	17.000	PBC<MDA	Cf251
185.72	380.	56.09	0.99	3.334E-02	185.72	54.000	PBC<MDA	U235
205.33	147.	145.36	1.01	3.092E-02	205.33	5.010	PBC<MDA	U235
241.86	173.	73.81	1.59	2.729E-02	242.00	7.430	1.183E+01	PB214
265.83	193.	88.57	1.07	2.536E-02	265.83	50.000	PBC<MDA	BI210M
276.62	88.	193.43	1.08	2.454E-02	277.28	6.310	PBC<MDA	TL208
295.09	180.	171.77	1.10	2.337E-02	295.09	19.300	PBC<MDA	PB214
296.00	172.	179.50	1.10	2.331E-02	296.00	79.000	PBC<MDA	TL210
308.44	186.	144.30	1.11	2.257E-02	308.44	31.750	PBC<MDA	Ir192
310.48	208.	60.73	0.50	2.245E-02				
312.01	184.	145.89	1.12	2.236E-02	312.01	36.000	PBC<MDA	PA233
316.49	188.	136.99	1.12	2.211E-02	316.49	87.040	PBC<MDA	Ir192
320.08	188.	141.85	1.13	2.191E-02	320.08	9.940	PBC<MDA	CR51
338.89	127.	157.38	1.14	2.097E-02	338.32	12.010	PBC<MDA	AC228
344.30	308.	50.21	1.89	2.067E-02	344.29	26.500	PBC<MDA	EU152
364.58	129.	139.41	1.17	1.975E-02	364.48	81.700	PBC<MDA	I131
383.84	189.	109.60	1.19	1.894E-02	383.84	8.940	PBC<MDA	BA133
387.95	73.	285.40	1.19	1.878E-02	387.95	66.000	PBC<MDA	Cf249
394.25	118.	61.17	0.40	1.853E-02				
453.88	139.	135.01	1.26	1.651E-02	453.88	65.000	PBC<MDA	PM146
463.37	203.	83.84	1.27	1.623E-02	463.37	10.470	PBC<MDA	SB125
497.05	131.	127.92	1.30	1.531E-02	497.05	90.900	PBC<MDA	RU103
510.80	300.	45.86	2.56	1.494E-02	511.86	20.000	PBC<MDA	RH106
537.26	16.	895.51	1.34	1.434E-02	537.26	24.390	PBC<MDA	Ba140
582.52	147.	91.15	1.38	1.339E-02	583.02	84.500	PBC<MDA	TL208
614.28	78.	244.99	1.41	1.281E-02	614.28	89.850	PBC<MDA	AG108M
616.87	68.	63.01	0.42	1.276E-02	618.06	99.100	7.481E-01	PM144
621.92	149.	124.55	1.42	1.267E-02	621.92	9.930	PBC<MDA	RH106
634.23	78.	122.48	1.43	1.242E-02	636.97	7.170	PBC<MDA	I131
635.89	135.	64.58	1.43	1.243E-02				
657.74	300.	160.89	1.45	1.208E-02	657.76	94.640	PBC<MDA	AG110M
661.58	119779.	0.32	1.68	1.202E-02	661.66	85.210	1.625E+03	CS137
688.73	154.	54.77	1.52	1.161E-02				
696.54	120.	101.15	1.49	1.150E-02	696.54	99.000	PBC<MDA	PM144
709.35	71.	94.24	1.50	1.132E-02				
710.86	88.	67.73	1.50	1.130E-02				
717.42	150.	39.66	1.00	1.121E-02				
723.10	9.	734.96	1.51	1.113E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.290E-01	AG108M
					723.36	20.220	5.798E-01	EU154
723.63	103.	66.49	1.51	1.113E-02	722.94	90.840	PBC<MDA	AG108M
					723.36	20.220	6.348E+00	EU154
					724.20	44.150	2.910E+00	ZR95
735.72	123.	101.61	1.52	1.096E-02	735.72	22.500	PBC<MDA	PM146
765.79	51.	189.98	1.55	1.059E-02	765.79	99.790	PBC<MDA	NB95

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					766.41	0.294	2.289E+02	PA234M
766.41	29.	343.77	1.55	1.058E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.287E+02	PA234M
778.92	91.	140.79	1.56	1.043E-02	778.92	12.940	PBC<MDA	EU152
785.42	50.	257.42	1.57	1.036E-02	785.42	1.280	PBC<MDA	BI212
795.87	80.	146.37	1.58	1.024E-02	795.87	85.530	PBC<MDA	CS134
818.50	74.	178.14	1.60	9.989E-03	818.50	100.000	PBC<MDA	Cs136
834.49	420.	23.15	0.84	9.817E-03	834.85	99.980	5.940E+00	MN54
871.10	45.	336.51	1.64	9.456E-03	871.10	99.890	PBC<MDA	NB94
883.56	180.	81.31	1.65	9.327E-03	883.24	9.600	2.789E+01	PA234
					884.68	72.680	3.689E+00	AG110M
898.04	112.	137.87	1.66	9.204E-03	898.04	93.700	PBC<MDA	Y88
911.91	540.	30.06	5.31	9.087E-03	911.07	29.000	2.846E+01	AC228
937.49	120.	137.65	1.70	8.859E-03	937.49	34.360	PBC<MDA	AG110M
996.33	169.	65.83	1.75	8.390E-03	996.33	10.600	PBC<MDA	EU154
1001.67	174.	67.70	1.75	8.355E-03	1001.00	0.837	PBC<MDA	PA234M
1004.77	170.	77.72	1.75	8.327E-03	1004.77	18.010	PBC<MDA	EU154
1048.07	172.	84.79	1.79	8.017E-03	1048.07	80.000	PBC<MDA	Cs136
1063.66	104.	137.85	1.80	7.912E-03	1063.66	74.500	PBC<MDA	BI207
1098.44	153.	68.29	0.40	7.685E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	112.	110.81	1.84	7.600E-03	1112.07	13.644	PBC<MDA	EU152
1173.08	56881.	0.49	2.10	7.240E-03	1173.24	99.900	1.092E+03	CO60
1190.67	175.	40.22	0.32	7.143E-03	1189.05	16.200	2.098E+01	Ta182
1238.28	19.	318.25	1.94	6.891E-03	1238.28	66.070	PBC<MDA	Co56
1259.13	63.	51.07	0.49	6.787E-03				
1274.48	108.	23.00	1.97	6.712E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	8.164E+00	EU154
1289.50	27.	201.61	1.98	6.630E-03	1291.60	43.200	PBC<MDA	FE59
1332.29	50814.	0.47	2.20	6.444E-03	1332.50	99.980	1.096E+03	CO60
1385.44	40.	80.23	2.04	6.220E-03	1384.30	24.290	PBC<MDA	AG110M
1407.71	35.	100.71	2.06	6.123E-03	1408.00	21.005	PBC<MDA	EU152
1461.99	52.	59.86	2.10	5.917E-03	1460.83	10.670	PBC<MDA	K40
1596.21	27.	102.24	2.19	5.447E-03	1596.21	95.400	PBC<MDA	La140
1764.49	24.	79.90	2.29	4.957E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	6.	336.18	2.29	4.938E-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	
169.57	42.50	27565.	404.	1.290E+04	63.02	1.044	-	s
197.22	49.42	101068.	15472.	4.382E+05	3.74	1.918	-	s
967.05	241.86	6251.	148.	5.417E+03	76.09	1.045	-	sc
1241.56	310.48	4957.	208.	9.250E+03	60.73	0.497	-	s
1576.68	394.25	2364.	118.	6.386E+03	61.17	0.397	-	s
2467.21	616.87	2725.	94.	7.351E+03	79.38	1.414	-	sc

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
2754.63	688.73	1828.	154.	1.331E+04	54.77	1.521	- s
2837.15	709.35	2234.	71.	6.317E+03	94.24	1.499	- sc
2843.16	710.85	1740.	88.	7.808E+03	67.73	1.500	- sc
2870.49	717.42	1694.	167.	1.488E+04	35.77	1.506	- sD
4762.41	1190.67	956.	175.	2.450E+04	40.22	0.323	- s
5036.26	1259.13	243.	63.	9.283E+03	51.07	0.491	- 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_Rev15.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.71	46.54	226051.	16019.	2.225	4.27	0.836s
TH-227	200.12	50.14	242070.	0.	0.000	1000.00	0.840s
AM-241	237.71	59.54	78806.	498408.	69.223	0.18	1.108s
TH-234	252.71	63.29	14609.	-270.	-0.037	253.52	0.854s
Sn-126	256.68	64.28	17720.	-197.	-0.027	95.88	0.856s
BA-133	323.52	80.99	12497.	-186.	-0.026	107.19	0.874s
Np-237	345.53	86.49	26027.	182.	0.025	125.44	0.880s
EU-155	345.74	86.54	24821.	184.	0.026	121.00	0.880s
Sn-126	347.33	86.94	24420.	185.	0.026	119.99	0.880s
Sn-126	349.85	87.57	22673.	2460.	0.342	7.10	0.881D
Cd-109	351.73	88.04	18771.	6362.	0.884	3.29	0.881A
Nd-147	363.97	91.10	38703.	-185.	-0.026	150.35	0.885
TH-234	369.93	92.59	5205.	134.	0.019	76.71	0.886D
AC-228	372.97	93.35	38034.	-186.	-0.026	148.09	0.887
Gd-153	389.57	97.50	32284.	182.	0.025	139.55	0.892s
Np-239	397.57	99.50	32466.	183.	0.025	139.61	0.894s
Gd-153	412.38	103.20	32649.	90.	0.012	284.50	0.898s
Np-239	414.38	103.70	32739.	0.	0.000	1000.00	0.898s
Np-239	424.10	106.13	31361.	184.	0.025	136.64	0.901
EU-152	486.70	121.78	17278.	195.	0.027	67.23	0.918D
CO-57	487.83	122.06	17137.	454.	0.063	28.88	0.918D
EU-154	491.98	123.10	15759.	783.	0.109	22.94	0.919s
HF-181	531.68	133.02	27416.	0.	0.000	1000.00	0.930s
CE-144	533.74	133.54	18688.	-198.	-0.027	98.14	0.930s
HF-181	544.79	136.30	20631.	-166.	-0.023	122.63	0.933s
CO-57	545.48	136.47	20856.	59.	0.008	346.41	0.933s
Tc-99m	561.63	140.51	27165.	-196.	-0.027	118.98	0.938
U-235	574.73	143.79	43696.	-165.	-0.023	62.37	0.941s
CE-141	581.35	145.44	41968.	196.	0.027	147.63	0.943s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ba-140	650.24	162.66	20488.	190.	0.026	106.72	0.961
U-235	653.11	163.38	20681.	177.	0.025	114.91	0.962s
CE-139	663.01	165.85	18278.	-104.	-0.014	184.69	0.965s
Cf-251	706.00	176.60	11561.	191.	0.026	105.79	0.976
U-235	742.49	185.72	12870.	380.	0.053	56.09	0.986s
TH-229	773.64	193.51	13612.	-40.	-0.006	506.40	0.994s
U-235	820.94	205.33	13091.	147.	0.020	145.36	1.007s
TH-229	843.01	210.85	13512.	-96.	-0.013	227.54	1.012s
TH-227	943.50	235.97	29873.	-211.	-0.029	115.89	1.039s
PB-212	954.15	238.63	29701.	-242.	-0.034	88.77	1.041s
PB-214	967.61	242.00	27093.	206.	0.029	113.17	1.045s
EU-152	978.39	244.69	30804.	-54.	-0.008	455.98	1.048s
TH-227	1024.59	256.24	10791.	-126.	-0.018	154.50	1.060
Cd-113m	1054.43	263.70	15719.	-198.	-0.028	89.67	1.067s
BI-210M	1062.96	265.83	14456.	193.	0.027	88.57	1.070s
TL-208	1108.77	277.28	14443.	88.	0.012	193.43	1.081s
Hg-203	1116.44	279.20	13215.	-196.	-0.027	83.14	1.083s
I-131	1136.83	284.30	9347.	-34.	-0.005	507.56	1.089s
PB-214	1180.00	295.09	47528.	180.	0.025	171.77	1.100s
TL-210	1183.64	296.00	47708.	172.	0.024	179.50	1.101
PA-231	1210.24	302.65	47808.	-188.	-0.026	164.80	1.107s
BA-133	1211.05	302.85	47620.	-188.	-0.026	164.44	1.108s
Ba-140	1219.04	304.85	47768.	-188.	-0.026	164.39	1.110
BI-210M	1219.23	304.90	47956.	-158.	-0.022	196.43	1.110
Ir-192	1233.41	308.44	36103.	186.	0.026	144.30	1.113
PA-233	1247.69	312.01	35919.	184.	0.026	145.89	1.117s
Ir-192	1265.61	316.49	33191.	188.	0.026	136.99	1.122s
CR-51	1279.99	320.08	35637.	188.	0.026	141.85	1.125s
La-140	1314.69	328.76	12433.	-104.	-0.014	259.26	1.134
Cf-249	1333.41	333.44	15784.	-190.	-0.026	93.97	1.139s
AC-228	1352.93	338.32	19789.	127.	0.018	157.38	1.144
Cs-136	1361.93	340.57	19916.	0.	0.000	1000.00	1.146s
EU-152	1376.84	344.30	6149.	308.	0.043	50.21	1.887s
HF-181	1382.97	345.83	19916.	0.	0.000	1000.00	1.151s
PB-214	1407.39	351.93	14673.	-139.	-0.019	110.87	1.157
BA-133	1423.66	356.00	15013.	-188.	-0.026	92.25	1.162
I-131	1457.59	364.48	8404.	129.	0.018	139.41	1.170s
BA-133	1535.03	383.84	21255.	189.	0.026	109.60	1.189s
Cf-249	1551.47	387.95	21443.	73.	0.010	285.40	1.193s
SB-125	1711.18	427.88	8948.	-78.	-0.011	237.71	1.233s
AG-108M	1735.43	433.94	9197.	-76.	-0.011	151.99	1.239s
PM-146	1815.20	453.88	9178.	139.	0.019	135.01	1.258s
SB-125	1853.15	463.37	14382.	203.	0.028	83.84	1.268s
Ir-192	1871.93	468.06	18120.	-221.	-0.031	86.33	1.272s
BE-7	1910.07	477.60	20800.	-197.	-0.027	103.90	1.282s
HF-181	1927.68	482.00	20997.	-197.	-0.027	104.04	1.286s
La-140	1947.77	487.02	20224.	-68.	-0.010	294.00	1.291s
RU-103	1987.91	497.05	6708.	131.	0.018	127.92	1.301

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RH-106	2047.15	511.86	9293.	300.	0.042	45.86	2.565
Nd-147	2123.70	531.00	5672.	-168.	-0.023	92.00	1.333s
Ba-140	2148.74	537.26	5131.	16.	0.002	895.51	1.339s
CS-134	2252.65	563.24	4585.	-141.	-0.020	98.62	1.364s
CS-134	2276.99	569.32	4698.	-47.	-0.007	206.76	1.369s
PA-234	2277.59	569.47	4745.	0.	0.000	1000.00	1.370s
BI-207	2278.51	569.70	4979.	-71.	-0.010	263.97	1.370s
TL-208	2331.79	583.02	4290.	147.	0.020	91.15	1.382s
SB-125	2401.71	600.50	18925.	-151.	-0.021	129.03	1.399s
SB-124	2410.64	602.73	18167.	-150.	-0.021	127.24	1.401s
CS-134	2418.55	604.71	18083.	-132.	-0.018	144.12	1.403s
BI-214	2436.96	609.31	18229.	-14.	-0.002	973.84	1.407s
AG-108M	2456.84	614.28	18293.	78.	0.011	244.99	1.412s
RH-106	2487.38	621.92	17189.	149.	0.021	124.55	1.419s
SB-125	2543.28	635.89	3737.	135.	0.019	64.58	1.432s
I-131	2547.62	636.97	4564.	78.	0.011	122.48	1.433s
AG-110M	2630.77	657.76	116213.	300.	0.042	160.89	1.452s
CS-137	2646.36	661.66	11803.	109670.	15.232	0.33	1.455D
PM-144	2785.90	696.54	3229.	120.	0.017	101.15	1.487
NB-94	2810.25	702.63	3397.	-16.	-0.002	757.42	1.493
SB-124	2890.87	722.79	6819.	-141.	-0.020	83.51	1.511s
AG-108M	2891.48	722.94	6594.	9.	0.001	734.96	1.511D
EU-154	2893.17	723.36	6499.	103.	0.014	66.49	1.511D
ZR-95	2896.52	724.20	6623.	0.	0.000	1000.00	1.512
BI-212	2908.41	727.17	7509.	-49.	-0.007	249.66	1.515s
PM-146	2942.61	735.72	3450.	123.	0.017	101.61	1.523s
PM-146	2988.37	747.16	3535.	-20.	-0.003	621.14	1.533
ZR-95	3026.65	756.73	3542.	-56.	-0.008	91.67	1.541s
AG-110M	3055.51	763.94	3727.	-115.	-0.016	75.80	1.548s
NB-95	3062.89	765.79	4717.	51.	0.007	189.98	1.549s
PA-234M	3065.38	766.41	4898.	29.	0.004	343.77	1.550
EU-152	3115.41	778.92	3633.	91.	0.013	140.79	1.561
BI-212	3141.41	785.42	3621.	50.	0.007	257.42	1.567s
CS-134	3183.22	795.87	6873.	80.	0.011	146.37	1.576s
TL-210	3198.14	799.60	6953.	0.	0.000	1000.00	1.579s
CS-134	3207.54	801.95	7209.	-133.	-0.018	90.81	1.581
CO-58	3242.84	810.78	8410.	-163.	-0.023	79.98	1.589s
La-140	3262.82	815.77	7482.	-53.	-0.007	241.65	1.593s
Cs-136	3273.74	818.50	8613.	74.	0.010	178.14	1.596s
MN-54	3337.69	834.49	2353.	420.	0.058	23.15	0.837s
Co-56	3386.82	846.77	4285.	-112.	-0.016	86.80	1.620s
TL-208	3442.00	860.56	4601.	-61.	-0.008	160.09	1.632
NB-94	3484.13	871.10	4735.	45.	0.006	336.51	1.641s
EU-154	3492.66	873.23	6364.	-133.	-0.018	73.33	1.643
PA-234	3521.86	880.53	10676.	-150.	-0.021	97.54	1.649s
PA-234	3532.70	883.24	10526.	0.	0.000	1000.00	1.652
AG-110M	3538.47	884.68	10625.	180.	0.025	81.31	1.653
Sc-46	3556.86	889.28	10874.	-160.	-0.022	92.58	1.657

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Y-88	3591.90	898.04	4880.	112.	0.016	137.87	1.664s
AC-228	3647.36	911.91	4559.	540.	0.075	30.06	5.311s
AG-110M	3749.71	937.49	5620.	120.	0.017	137.65	1.697
PA-234	3783.82	946.02	6075.	-194.	-0.027	83.65	1.704s
EU-152	3856.18	964.11	9509.	-189.	-0.026	73.50	1.719s
AC-228	3875.62	968.97	8857.	-48.	-0.007	321.55	1.724s
EU-154	3985.06	996.33	6128.	169.	0.024	65.83	1.746
PA-234M	4003.73	1001.00	6817.	174.	0.024	67.70	1.750s
EU-154	4018.84	1004.77	8642.	170.	0.024	77.72	1.753
Co-56	4151.10	1037.84	4160.	-73.	-0.010	194.60	1.780s
Cs-136	4192.02	1048.07	4069.	172.	0.024	84.79	1.788
BI-207	4254.38	1063.66	3937.	104.	0.014	137.85	1.801s
Ga-68	4309.34	1077.40	4443.	-182.	-0.025	83.68	1.812s
FE-59	4396.74	1099.25	4032.	78.	0.011	186.40	1.829s
EU-152	4448.04	1112.07	7645.	112.	0.016	110.81	1.839
ZN-65	4461.92	1115.55	7757.	0.	0.000	1000.00	1.842
Ta-182	4484.94	1121.30	8208.	-161.	-0.022	79.97	1.846s
CO-60	4692.05	1173.08	2467.	56881.	7.900	0.49	2.103s
Ta-182	4755.93	1189.05	2054.	-109.	-0.015	59.33	1.899s
Ta-182	4885.37	1221.41	1008.	-53.	-0.007	136.85	1.923s
Co-56	4952.84	1238.28	704.	19.	0.003	318.25	1.936s
NA-22	5097.84	1274.53	719.	0.	0.000	126.67	1.963A
EU-154	5097.88	1274.54	288.	108.	0.015	23.00	1.974A
FE-59	5166.10	1291.60	528.	27.	0.004	201.61	1.975s
TL-210	5251.71	1313.00	572.	-19.	-0.003	291.09	1.991s
CO-60	5328.88	1332.29	623.	50814.	7.057	0.47	2.202s
AG-110M	5536.89	1384.30	176.	40.	0.005	80.23	2.042s
EU-152	5631.70	1408.00	215.	35.	0.005	100.71	2.059s
K-40	5843.01	1460.83	178.	52.	0.007	59.86	2.095s
La-140	6384.49	1596.21	126.	27.	0.004	102.24	2.185s
SB-124	6763.55	1690.98	150.	-5.	-0.001	583.18	2.245s
BI-214	7057.56	1764.49	164.	24.	0.003	79.90	2.290s
Co-56	7084.99	1771.35	236.	6.	0.001	336.18	2.294s
Y-88	7343.81	1836.06	152.	-22.	-0.003	140.79	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	Peak Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.6413E+01				5.31E+01	
			477.60	-1.641E+01	&(	5.629E+01 1.04E+02 1.05E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	N	1.1542E+01					4.66E+11	
			1460.83	1.154E+01	&(P	1.426E+01	5.99E+01	1.07E+01 G
Sc-46	F	-2.3921E+00					8.38E+01	
			889.28	-2.392E+00	&(	7.311E+00	9.26E+01	1.00E+02 G
			1120.55	-1.325E-01	% P	7.607E+00	2.01E+03	1.00E+02 G
CR-51	F	1.2017E+01					2.77E+01	
			320.08	1.202E+01	&(	5.627E+01	1.42E+02	9.94E+00 G
MN-54	C	5.9399E+00					3.12E+02	
			834.85	5.940E+00	(P	3.237E+00	2.31E+01	1.00E+02 G
FE-59	F	1.9712E+00					4.45E+01	
			1099.25	2.483E+00	?(P	9.559E+00	1.86E+02	5.65E+01 G
			1291.60	1.302E+00	&(P	5.325E+00	2.02E+02	4.32E+01 G
Co-56	C	-1.6050E+00					7.73E+01	
			846.77	-1.605E+00	&(P	4.412E+00	8.68E+01	9.99E+01 G
			1238.28	5.796E-01	+	3.854E+00	3.18E+02	6.61E+01 G
			1037.84	-8.871E+00	&	3.685E+01	1.95E+02	1.41E+01 G
			1771.35	1.181E+00	+	1.349E+01	3.36E+02	1.55E+01 A
CO-57	C	1.9011E+00					2.72E+02	
			122.06	1.749E+00	}	2.359E+00	2.89E+01	8.56E+01 G
			136.47	1.901E+00	?(	2.177E+01	3.46E+02	1.07E+01 G
CO-58	C	-2.2590E+00					7.09E+01	
			810.78	-2.259E+00	&(	5.962E+00	8.00E+01	9.95E+01 G
CO-60	F	1.0940E+03					1.93E+03	
			1332.50	1.096E+03	@(P	2.567E+00	4.67E-01	1.00E+02 G
			1173.24	1.092E+03	@(	4.497E+00	4.85E-01	9.99E+01 G
NB-94	I	2.3367E-01					7.41E+06	
			702.63	-2.031E-01	(	3.411E+00	7.57E+02	9.79E+01 G
			871.10	6.617E-01	?(	4.755E+00	3.37E+02	9.99E+01 G
ZR-95	I	-1.3417E+00					6.40E+01	
			756.73	-1.342E+00	&(P	6.676E+00	9.17E+01	5.45E+01 G
			724.20	0.000E+00	+	1.081E+01	1.00E+03	4.42E+01 G
NB-95	I	6.7389E-01					6.40E+01	
			765.79	6.739E-01	?(	4.243E+00	1.90E+02	9.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RU-103	I	1.3073E+00					3.93E+01	
			497.05	1.307E+00	&(	3.836E+00	1.28E+02	9.09E+01 G
			610.30	5.724E-06	%	1.185E+02	6.25E+08	5.75E+00 GA
RH-106	I	1.6468E+01					3.74E+02	
			621.92	1.647E+01	&(	6.774E+01	1.25E+02	9.93E+00 G
			1050.36	3.850E+00	%	3.850E+02	3.01E+03	1.56E+00 G
			511.86	1.393E+01	?	2.101E+01	4.59E+01	2.00E+01 GA
AG-108M	C	1.2899E-01					1.53E+05	
			433.94	-6.798E-01	&(P	4.028E+00	1.52E+02	9.05E+01 G
			722.94	1.290E-01	}	5.234E+00	7.35E+02	9.08E+01 G
			614.28	9.434E-01	&(	7.641E+00	2.45E+02	8.98E+01 G
AG-110M	F	3.9355E+00					2.50E+02	
			884.68	3.689E+00	&(	9.897E+00	8.13E+01	7.27E+01 G
			657.76	3.643E+00	?(	1.934E+01	1.61E+02	9.46E+01 G
			937.49	5.475E+00	(	1.606E+01	1.38E+02	3.44E+01 G
			1384.30	3.634E+00	&(	5.927E+00	8.02E+01	2.43E+01 G
			763.94	-6.743E+00	+	1.687E+01	7.58E+01	2.23E+01 G
SN-113	F	-1.3396E-01					1.15E+02	
			391.69	-1.340E-01	%(	7.928E+00	1.79E+03	6.40E+01 G
SB-124	F	-1.6304E+00					6.02E+01	
			602.73	-1.630E+00	(	6.851E+00	1.27E+02	9.83E+01 G
			1690.98	-3.037E-01	+ P	3.372E+00	5.83E+02	4.78E+01 G
			722.79	-1.622E+01	&	4.472E+01	8.35E+01	1.08E+01 G
SB-125	I	5.1015E+00					1.01E+03	
			427.88	-2.112E+00	&(	1.201E+01	2.38E+02	2.96E+01 G
			600.50	-8.999E+00	+	3.835E+01	1.29E+02	1.79E+01 G
			635.89	1.334E+01	&(P	2.840E+01	6.46E+01	1.13E+01 G
			463.37	1.659E+01	&(	4.590E+01	8.38E+01	1.05E+01 G
I-131	I	2.0144E+00					8.02E+00	
			364.48	1.115E+00	?(	3.715E+00	1.39E+02	8.17E+01 G
			284.30	-3.172E+00	+ P	4.276E+01	5.08E+02	6.14E+00 G
			636.97	1.227E+01	&(	4.973E+01	1.22E+02	7.17E+00 G
Gd-153	F	1.6613E+00					2.42E+02	
			97.50	1.918E+00	?(	8.835E+00	1.40E+02	3.00E+01 G
			103.20	1.308E+00	&(	1.230E+01	2.85E+02	2.18E+01 G
Ga-68	C	-1.7303E+02					4.71E-02	
			1077.40	-1.730E+02	?(	2.983E+02	8.37E+01	3.30E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Tc-99m	I	-8.6170E-01					2.51E-01	
			140.51	-8.617E-01	&(	3.384E+00	1.19E+02	8.93E+01 G
BA-133	F	-2.0955E+00					3.85E+03	
			356.00	-2.096E+00	(	6.380E+00	9.23E+01	6.20E+01 G
			302.85	-6.217E+00	+	3.374E+01	1.64E+02	1.83E+01 G
			383.84	1.547E+01	?	5.595E+01	1.10E+02	8.94E+00 GA
			80.99	-1.737E+00	+	4.888E+00	1.07E+02	3.41E+01 GA
CS-134	I	1.2742E+00					7.54E+02	
			795.87	1.274E+00	?(	6.171E+00	1.46E+02	8.55E+01 G
			604.71	-1.449E+00	+	6.899E+00	1.44E+02	9.76E+01 G
			569.32	-3.107E+00	+	2.129E+01	2.07E+02	1.54E+01 G
			801.95	-2.088E+01	&	6.261E+01	9.08E+01	8.69E+00 G
			563.24	-1.697E+01	+	3.840E+01	9.86E+01	8.35E+00 G
CS-137	I	1.4876E+03					1.10E+04	
			661.66	1.488E+03	(P	6.904E+00	3.33E-01	8.52E+01 G
CE-139	F	-4.9692E-01					1.38E+02	
			165.85	-4.969E-01	@(	3.033E+00	1.85E+02	7.99E+01 G
Ba-140	I	2.8713E+00					1.28E+01	
			537.26	6.484E-01	&(	1.336E+01	8.96E+02	2.44E+01 G
			162.66	1.159E+01	(	4.082E+01	1.07E+02	6.22E+00 G
			304.85	-2.675E+01	+	1.452E+02	1.64E+02	4.29E+00 G
La-140	I	7.2165E-01					1.28E+01	
			1596.21	7.216E-01	&(	1.471E+00	1.02E+02	9.54E+01 G
			487.02	-1.342E+00	&	1.304E+01	2.94E+02	4.55E+01 G
			328.76	-3.302E+00	+ P	1.666E+01	2.59E+02	2.03E+01 G
			815.77	-3.160E+00	& P	2.417E+01	2.42E+02	2.33E+01 G
CE-141	I	1.4470E+00					3.25E+01	
			145.44	1.447E+00	?(	7.051E+00	1.48E+02	4.82E+01 G
CE-144	I	-6.0712E+00					2.85E+02	
			133.54	-6.071E+00	?(	1.966E+01	9.81E+01	1.11E+01 G
PM-144	C	1.4603E+00					3.63E+02	
			696.54	1.460E+00	&(	3.265E+00	1.01E+02	9.90E+01 G
			618.06	-3.357E-07	%	6.949E+00	6.25E+08	9.91E+01 G
EU-152	F	1.0035E+01					4.94E+03	
			121.78	2.247E+00	}	7.090E+00	6.72E+01	2.86E+01 G
			344.29	7.803E+00	(P	9.332E+00	5.02E+01	2.65E+01 G
			1112.07	1.500E+01	(	5.494E+01	1.11E+02	1.36E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			778.92	9.369E+00	(P	2.918E+01	1.41E+02	1.29E+01 G
			964.11	-2.075E+01	-	5.031E+01	7.35E+01	1.46E+01 G
			244.69	-3.690E+00	&	5.560E+01	4.56E+02	7.58E+00 G
			1408.00	3.744E+00	-	7.677E+00	1.01E+02	2.10E+01 GA
EU-154	I	6.3484E+00					3.14E+03	
			123.10	6.348E+00	?(	4.762E+00	2.29E+01	4.08E+01 G
			1274.54	6.348E+00	}	4.811E+00	2.30E+01	3.52E+01 G
			723.36	6.348E+00	}	2.336E+01	6.65E+01	2.02E+01 G
			873.23	-1.590E+01	- P	4.492E+01	7.33E+01	1.23E+01 G
			1004.77	1.574E+01	+	4.037E+01	7.77E+01	1.80E+01 G
			996.33	2.644E+01	+	5.739E+01	6.58E+01	1.06E+01 G
EU-155	I	1.1004E+00					1.81E+03	
			105.31	-5.293E-02	%(P	1.270E+01	2.92E+03	2.12E+01 G
			86.54	1.897E+00	?(	7.577E+00	1.21E+02	3.07E+01 G
HF-181	F	-2.1687E+00					4.24E+01	
			482.00	-2.169E+00	&(	7.447E+00	1.04E+02	8.05E+01 G
			133.02	0.000E+00	+	6.086E+00	1.00E+03	4.33E+01 G
			345.83	0.000E+00	&	2.954E+01	1.00E+03	1.51E+01 G
			136.30	-9.759E+00	+	3.951E+01	1.23E+02	5.85E+00 G
Ta-182	F	-8.4942E+00					1.14E+02	
			1121.30	-8.494E+00	?(	2.242E+01	8.00E+01	3.49E+01 G
			1221.41	-3.907E+00	+	1.111E+01	1.37E+02	2.70E+01 G
			1189.05	-1.312E+01	&	2.565E+01	5.93E+01	1.62E+01 G
Hg-203	F	-1.3710E+00					4.66E+01	
			279.20	-1.371E+00	(	3.761E+00	8.31E+01	8.15E+01 G
TL-208	N	2.2307E+00					6.98E+02	
			583.02	1.808E+00	?(P	3.780E+00	9.11E+01	8.45E+01 G
			277.28	7.893E+00	&(	5.047E+01	1.93E+02	6.31E+00 G
			860.56	-7.104E+00	+ P	3.730E+01	1.60E+02	1.24E+01 G
PM-146	C	3.1205E+00					2.02E+03	
			453.88	1.802E+00	&(P	5.813E+00	1.35E+02	6.50E+01 G
			747.16	-7.606E-01	& P	1.056E+01	6.21E+02	3.40E+01 G
			735.72	6.931E+00	&(P	1.556E+01	1.02E+02	2.25E+01 G
Y-88	F	5.4163E-01					1.07E+02	
			1836.06	-6.453E-01	?(	1.765E+00	1.41E+02	9.92E+01 G
			898.04	1.798E+00	&(P	5.286E+00	1.38E+02	9.37E+01 G
Cd-113m		-1.7991E+04					5.33E+03	
			263.70	-1.799E+04	&(	5.324E+04	8.97E+01	6.00E-03 K

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cd-109	F	5.2932E+02						4.53E+02
								Derived Ave Activity
			88.04	5.293E+02	}(	5.335E+01	3.29E+00	3.79E+00 G
Cf-251	T	4.4979E+00						3.28E+05
			176.60	4.498E+00	&(	1.189E+01	1.06E+02	1.70E+01 G
			227.00	1.077E+00	%	4.130E+01	1.53E+03	6.30E+00 GA
Cf-249	T	8.1398E-01						1.28E+05
			387.95	8.140E-01	&(	7.679E+00	2.85E+02	6.60E+01 G
			333.44	-8.006E+00	&	2.483E+01	9.40E+01	1.55E+01 G
Sn-126		-6.8853E+00						3.65E+07
			87.57	2.069E+01	}	5.925E+00	7.10E+00	3.75E+01 GA
			64.28	-6.885E+00	?(	2.179E+01	9.59E+01	9.70E+00 G
			86.94	6.442E+00	+	2.551E+01	1.20E+02	9.04E+00 GA
PB-210	N	1.5505E+03						8.14E+03
			46.54	1.551E+03	?(P	2.147E+02	4.27E+00	4.25E+00 G
PB-212	N	-2.8129E+00						6.98E+02
			238.63	-2.813E+00	&(P	9.374E+00	8.88E+01	4.33E+01 G
			300.03	1.120E-05	%	1.877E+02	5.07E+08	3.28E+00 GA
PB-214	N	2.0134E-01						5.84E+05
			351.93	-2.535E+00	(P	1.031E+01	1.11E+02	3.76E+01 G
			295.09	5.532E+00	?(P	3.137E+01	1.72E+02	1.93E+01 G
			242.00	1.412E+01		5.275E+01	1.13E+02	7.43E+00 GA
BI-207	C	2.4440E+00						1.18E+04
			1063.66	2.444E+00	(P	6.954E+00	1.38E+02	7.45E+01 G
			569.70	-7.412E-01	- P	3.451E+00	2.64E+02	9.77E+01 G
BI-212	N	-8.1661E+00						6.98E+02
			727.17	-8.166E+00	?(	6.752E+01	2.50E+02	7.55E+00 G
			785.42	5.204E+01	&	2.966E+02	2.57E+02	1.28E+00 GA
U-235	N	-5.3142E+00						2.57E+11
			143.79	-5.314E+00	*(P	3.145E+01	6.24E+01	1.10E+01 G
			205.33	1.322E+01	& P	4.804E+01	1.45E+02	5.01E+00 G
			163.38	1.328E+01	& P	5.036E+01	1.15E+02	5.08E+00 G
			185.72	2.931E+00	&	4.099E+00	5.61E+01	5.40E+01 GA
BI-214	N	8.3222E-01						5.84E+05
			609.31	-3.225E-01	&(P	1.477E+01	9.74E+02	4.61E+01 G
			1120.29	-8.772E-01	% P	5.036E+01	2.01E+03	1.51E+01 G
			1764.49	4.288E+00	&(P	1.137E+01	7.99E+01	1.54E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-210M	T	2.1098E+00					1.10E+09	
			265.83	2.110E+00	*(P	6.166E+00	8.86E+01	5.00E+01 G
			304.90	-3.437E+00	+	2.229E+01	1.96E+02	2.80E+01 G
AC-228	N	2.8463E+01					2.10E+03	
			911.07	2.846E+01	*(P	1.673E+01	3.01E+01	2.90E+01 G
			968.97	-4.443E+00	& P	4.081E+01	3.22E+02	1.75E+01 G
			338.32	6.984E+00	- P	3.631E+01	1.57E+02	1.20E+01 G
			93.35	-1.056E+01	&	5.163E+01	1.48E+02	5.56E+00 XA
TH-227	N	-9.5796E+00					7.95E+03	
			256.24	-9.580E+00	?(	3.701E+01	1.54E+02	7.00E+00 G
			235.97	-8.579E+00	+	3.281E+01	1.16E+02	1.23E+01 G
			50.14	0.000E+00	&	1.117E+02	1.00E+03	8.00E+00 G
TH-229	N	-3.9297E+00					2.68E+06	
			193.51	-3.930E+00	*(P	5.334E+01	5.06E+02	4.40E+00 G
			210.85	-1.466E+01	+	8.344E+01	2.28E+02	2.99E+00 G
TH-234	N	7.5587E+00					1.63E+12	
			92.59	7.559E+00	(P	1.912E+01	7.67E+01	5.58E+00 G
			63.29	-2.419E+01	& P	5.072E+01	2.54E+02	3.81E+00 G
PA-231	N	-3.9537E+01					1.20E+07	
			302.65	-3.954E+01	*(	2.151E+02	1.65E+02	2.88E+00 G
			300.07	-1.494E-05	%	2.503E+02	5.07E+08	2.46E+00 G
PA-233	C	3.1736E+00					7.82E+08	
			312.01	3.174E+00	?(P	1.528E+01	1.46E+02	3.60E+01 G
			300.18	5.930E-06	%	9.933E+01	5.07E+08	6.20E+00 G
PA-234	N	-1.9745E-01					1.63E+12	
			131.29	-1.974E-01	&(	1.456E+01	2.23E+03	1.80E+01 G
			946.02	-2.289E+01	+ P	4.316E+01	8.36E+01	1.34E+01 G
			569.47	0.000E+00	+	4.015E+01	1.00E+03	8.20E+00 G
			883.24	0.000E+00	+	7.447E+01	1.00E+03	9.60E+00 G
			880.53	-3.716E+01	+	1.197E+02	9.75E+01	6.00E+00 GA
PA-234M	N	3.4471E+02					1.63E+12	
			1001.00	3.447E+02	?(	7.695E+02	6.77E+01	8.37E-01 G
			766.41	1.287E+02	-	1.468E+03	3.44E+02	2.94E-01 G
AM-241	T	4.8768E+03					1.58E+05	
			59.54	4.877E+03	*(	1.283E+01	1.82E-01	3.59E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Np-237   F   4.3906E+00                                      2.14E+06
                           86.49 4.391E+00 ?(  1.818E+01 1.25E+02 1.31E+01 G

Ir-192   F   1.9620E+00                                      7.40E+01
                          316.49 1.359E+00 &(  6.146E+00 1.37E+02 8.70E+01 G
                          468.06-3.688E+00 +   1.051E+01 8.63E+01 5.18E+01 G
                          308.44 3.614E+00 ?(  1.722E+01 1.44E+02 3.18E+01 G

Cs-136   F   2.2229E+00                                      1.30E+01
                          818.50 1.027E+00 &(  6.051E+00 1.78E+02 1.00E+02 G
                         1048.07 3.718E+00 ?(  6.496E+00 8.48E+01 8.00E+01 G
                          340.57 0.000E+00 &   9.377E+00 1.00E+03 4.69E+01 G

Np-239   T   2.6090E+00                                      2.36E+00
                          103.70 0.000E+00 &   1.133E+01 1.00E+03 2.40E+01 X
                          106.13 2.609E+00 &(  1.177E+01 1.37E+02 2.27E+01 G
                           99.50 3.900E+00     1.797E+01 1.40E+02 1.50E+01 X

Nd-147      -1.2368E+01                                      1.11E+01
                          531.00-1.237E+01 &(  2.608E+01 9.20E+01 1.30E+01 G
                           91.10-2.062E+00 +   1.023E+01 1.50E+02 2.83E+01 G

TL-210   N   5.7660E-01                                      5.84E+05
                          799.60 0.000E+00 ?(  5.386E+00 1.00E+03 9.90E+01 G
                          296.00 1.299E+00 ?(  7.696E+00 1.79E+02 7.90E+01 G
                         1313.00-1.958E+00 +   1.156E+01 2.91E+02 2.10E+01 GA

Kr-85    I   9.4006E+00                                      3.92E+03
                          513.98 9.401E+00 &(  1.019E+03 3.27E+03 4.30E-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	
BA-133	80.99	12497.	-186.	-0.026	107.19	-1.737E+00	
Np-237	86.49	26027.	182.	0.025	125.44	4.391E+00	
EU-155	86.54	24821.	184.	0.026	121.00	1.897E+00	
Nd-147	91.10	38703.	-185.	-0.026	150.35	-2.062E+00	
Gd-153	97.50	32284.	182.	0.025	139.55	1.918E+00	
Np-239	99.50	32466.	183.	0.025	139.61	3.900E+00	
Gd-153	103.20	32649.	90.	0.012	284.50	1.308E+00	
Np-239	106.13	31361.	184.	0.025	136.64	2.609E+00	
CE-144	133.54	18688.	-198.	-0.027	98.14	-6.071E+00	
HF-181	136.30	20631.	-166.	-0.023	122.63	-9.759E+00	
Tc-99m	140.51	27165.	-196.	-0.027	118.98	-8.617E-01	
U-235	143.79	43696.	-165.	-0.023	62.37	-5.314E+00	P
CE-141	145.44	41968.	196.	0.027	147.63	1.447E+00	
Ba-140	162.66	20488.	190.	0.026	106.72	1.159E+01	
U-235	163.38	20681.	177.	0.025	114.91	1.328E+01	P
CE-139	165.85	18278.	-104.	-0.014	184.69	-4.969E-01	
Cf-251	176.60	11561.	191.	0.026	105.79	4.498E+00	
U-235	185.72	12870.	380.	0.053	56.09	2.931E+00	
TH-229	193.51	13612.	-40.	-0.006	506.40	-3.930E+00	P
U-235	205.33	13091.	147.	0.020	145.36	1.322E+01	P
TH-229	210.85	13512.	-96.	-0.013	227.54	-1.466E+01	
TH-227	235.97	29873.	-211.	-0.029	115.89	-8.579E+00	
PB-212	238.63	29701.	-242.	-0.034	88.77	-2.813E+00	P
PB-214	242.00	27093.	206.	0.029	113.17	1.412E+01	
TH-227	256.24	10791.	-126.	-0.018	154.50	-9.580E+00	
Cd-113m	263.70	15719.	-198.	-0.028	89.67	-1.799E+04	
BI-210M	265.83	14456.	193.	0.027	88.57	2.110E+00	P
Hg-203	279.20	13215.	-196.	-0.027	83.14	-1.371E+00	
PB-214	295.09	47528.	180.	0.025	171.77	5.532E+00	P
TL-210	296.00	47708.	172.	0.024	179.50	1.299E+00	
PA-231	302.65	47808.	-188.	-0.026	164.80	-3.954E+01	
BA-133	302.85	47620.	-188.	-0.026	164.44	-6.217E+00	
Ba-140	304.85	47768.	-188.	-0.026	164.39	-2.675E+01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
BI-210M	304.90	47956.	-158.	-0.022	196.43	-3.437E+00		
Ir-192	308.44	36103.	186.	0.026	144.30	3.614E+00		
PA-233	312.01	35919.	184.	0.026	145.89	3.174E+00		P
Ir-192	316.49	33191.	188.	0.026	136.99	1.359E+00		
CR-51	320.08	35637.	188.	0.026	141.85	1.202E+01		
La-140	328.76	12433.	-104.	-0.014	259.26	-3.302E+00		P
Cf-249	333.44	15784.	-190.	-0.026	93.97	-8.006E+00		
PB-214	351.93	14673.	-139.	-0.019	110.87	-2.535E+00		P
BA-133	356.00	15013.	-188.	-0.026	92.25	-2.096E+00		
BA-133	383.84	21255.	189.	0.026	109.60	1.547E+01		
Cf-249	387.95	21443.	73.	0.010	285.40	8.140E-01		
SB-125	427.88	8948.	-78.	-0.011	237.71	-2.112E+00		
PM-146	453.88	9178.	139.	0.019	135.01	1.802E+00		P
SB-125	463.37	14382.	203.	0.028	83.84	1.659E+01		
Ir-192	468.06	18120.	-221.	-0.031	86.33	-3.688E+00		
BE-7	477.60	20800.	-197.	-0.027	103.90	-1.641E+01		
HF-181	482.00	20997.	-197.	-0.027	104.04	-2.169E+00		
La-140	487.02	20224.	-68.	-0.010	294.00	-1.342E+00		
RU-103	497.05	6708.	131.	0.018	127.92	1.307E+00		
Nd-147	531.00	5672.	-168.	-0.023	92.00	-1.237E+01		
Ba-140	537.26	5131.	16.	0.002	895.51	6.484E-01		
CS-134	563.24	4585.	-141.	-0.020	98.62	-1.697E+01		
CS-134	569.32	4698.	-47.	-0.007	206.76	-3.107E+00		
BI-207	569.70	4979.	-71.	-0.010	263.97	-7.412E-01		P
SB-125	600.50	18925.	-151.	-0.021	129.03	-8.999E+00		
SB-124	602.73	18167.	-150.	-0.021	127.24	-1.630E+00		
CS-134	604.71	18083.	-132.	-0.018	144.12	-1.449E+00		
BI-214	609.31	18229.	-14.	-0.002	973.84	-3.225E-01		P
SB-125	635.89	3737.	135.	0.019	64.58	1.334E+01		P
PM-144	696.54	3229.	120.	0.017	101.15	1.460E+00		
NB-94	702.63	3397.	-16.	-0.002	757.42	-2.031E-01		
SB-124	722.79	6819.	-141.	-0.020	83.51	-1.622E+01		
BI-212	727.17	7509.	-49.	-0.007	249.66	-8.166E+00		
PM-146	735.72	3450.	123.	0.017	101.61	6.931E+00		P
PM-146	747.16	3535.	-20.	-0.003	621.14	-7.606E-01		P
ZR-95	756.73	3542.	-56.	-0.008	91.67	-1.342E+00		P
BI-212	785.42	3621.	50.	0.007	257.42	5.204E+01		
CS-134	795.87	6873.	80.	0.011	146.37	1.274E+00		
CS-134	801.95	7209.	-133.	-0.018	90.81	-2.088E+01		
CO-58	810.78	8410.	-163.	-0.023	79.98	-2.259E+00		
La-140	815.77	7482.	-53.	-0.007	241.65	-3.160E+00		P
Cs-136	818.50	8613.	74.	0.010	178.14	1.027E+00		
Co-56	846.77	4285.	-112.	-0.016	86.80	-1.605E+00		P
NB-94	871.10	4735.	45.	0.006	336.51	6.617E-01		
PA-234	880.53	10676.	-150.	-0.021	97.54	-3.716E+01		
Sc-46	889.28	10874.	-160.	-0.022	92.58	-2.392E+00		
Y-88	898.04	4880.	112.	0.016	137.87	1.798E+00		P
PA-234	946.02	6075.	-194.	-0.027	83.65	-2.289E+01		P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Co-56	1037.84	4160.	-73.	-0.010	194.60	-8.871E+00		
Cs-136	1048.07	4069.	172.	0.024	84.79	3.718E+00		
BI-207	1063.66	3937.	104.	0.014	137.85	2.444E+00		P
Ga-68	1077.40	4443.	-182.	-0.025	83.68	-1.730E+02		
Ta-182	1121.30	8208.	-161.	-0.022	79.97	-8.494E+00		
Ta-182	1189.05	2054.	-109.	-0.015	59.33	-1.312E+01		
Ta-182	1221.41	1008.	-53.	-0.007	136.85	-3.907E+00		
Co-56	1238.28	704.	19.	0.003	318.25	5.796E-01		
TL-210	1313.00	572.	-19.	-0.003	291.09	-1.958E+00		
La-140	1596.21	126.	27.	0.004	102.24	7.216E-01		
SB-124	1690.98	150.	-5.	-0.001	583.18	-3.037E-01		P
BI-214	1764.49	164.	24.	0.003	79.90	4.288E+00		P
Co-56	1771.35	236.	6.	0.001	336.18	1.181E+00		
Y-88	1836.06	152.	-22.	-0.003	140.79	-6.453E-01		

P - Peakbackground subtraction

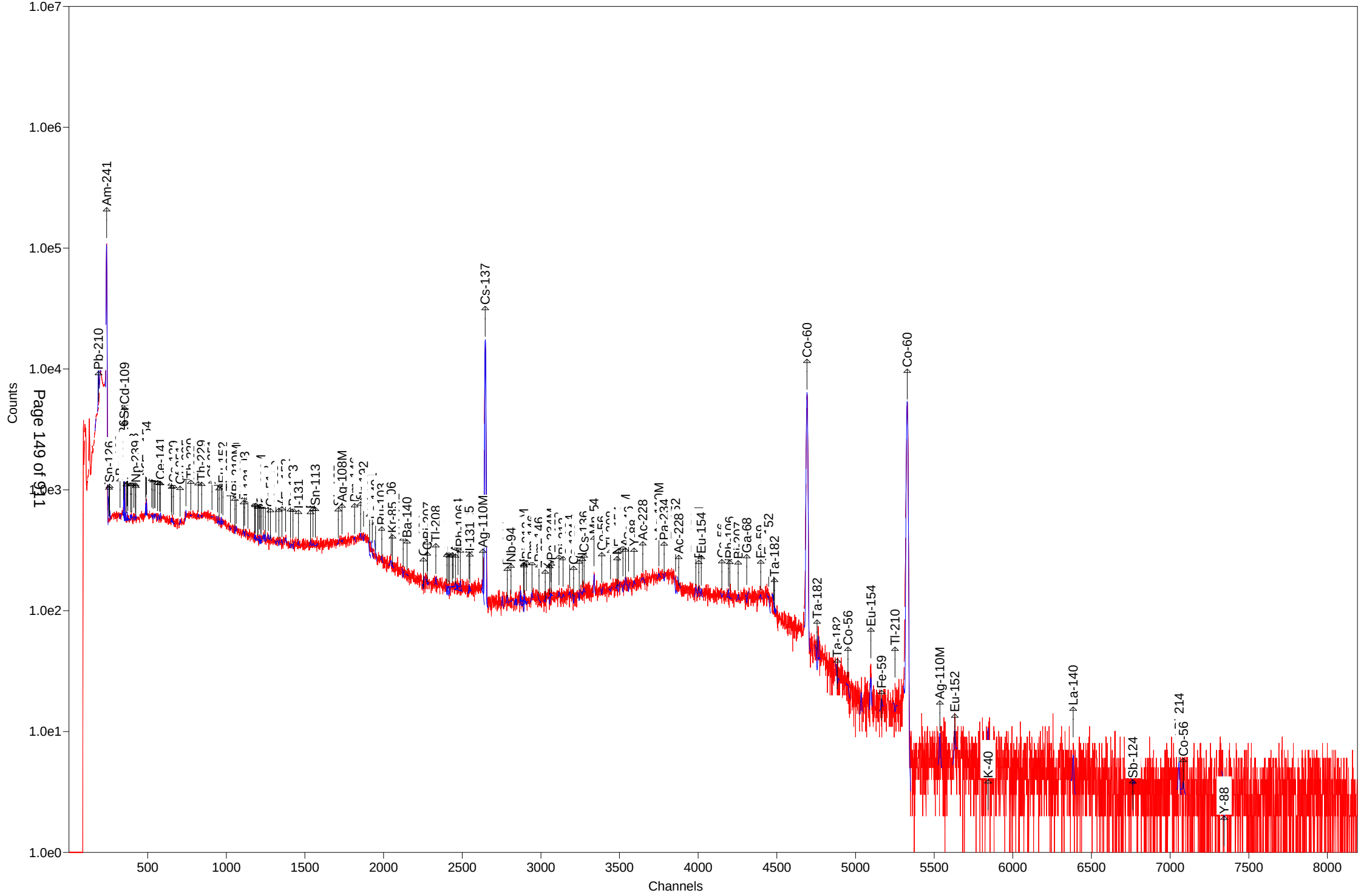
***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-1.6413E+01	-1.6413E+01	1.039E+02%	5.63E+01
NA-22	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.64E+00
K-40	#A	1.1542E+01	1.1542E+01	5.986E+01%	1.43E+01
Sc-46	#A	-2.3921E+00	-2.3921E+00	9.258E+01%	7.31E+00
CR-51	#A	1.2017E+01	1.2017E+01	1.418E+02%	5.63E+01
MN-54		5.9399E+00	5.9399E+00	2.315E+01%	3.24E+00
FE-59	A	1.9712E+00	1.9712E+00	1.373E+02%	9.56E+00
Co-56	#A	-1.6050E+00	-1.6050E+00	8.680E+01%	4.41E+00
CO-57	#A	1.9011E+00	1.9011E+00	3.464E+02%	2.18E+01
CO-58	#A	-2.2590E+00	-2.2590E+00	7.998E+01%	5.96E+00
CO-60	#	1.0940E+03	1.0940E+03	3.366E-01%	2.57E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.50E+01
NB-94	#A	2.3367E-01	2.3367E-01	3.365E+02%	3.41E+00
ZR-95	#A	-1.3417E+00	-1.3417E+00	9.167E+01%	6.68E+00
NB-95	#A	6.7388E-01	6.7389E-01	1.900E+02%	4.24E+00
RU-103	#A	1.3073E+00	1.3073E+00	1.279E+02%	3.84E+00
RH-106	#A	1.6468E+01	1.6468E+01	1.245E+02%	6.77E+01
AG-108M	#A	1.2899E-01	1.2899E-01	1.442E+02%	4.03E+00
AG-110M	A	3.9354E+00	3.9355E+00	6.015E+01%	9.90E+00
SN-113	#A	-1.3396E-01	-1.3396E-01	1.789E+03%	7.93E+00
SB-124	#A	-1.6304E+00	-1.6304E+00	1.272E+02%	6.85E+00
SB-125	#A	5.1015E+00	5.1015E+00	6.458E+01%	1.20E+01
I-131	#A	2.0143E+00	2.0144E+00	9.279E+01%	3.71E+00
Gd-153	#A	1.6613E+00	1.6613E+00	1.396E+02%	8.84E+00
Ga-68	#A	-1.7116E+02	-1.7303E+02	8.368E+01%	2.98E+02
Tc-99m	#A	-8.5993E-01	-8.6170E-01	1.190E+02%	3.38E+00

BA-133 #A	-2.0955E+00	-2.0955E+00	9.225E+01%		6.38E+00
CS-134 #A	1.2742E+00	1.2742E+00	1.464E+02%		6.17E+00
CS-137	1.4876E+03	1.4876E+03	3.329E-01%		6.90E+00
CE-139 #A	-4.9692E-01	-4.9692E-01	1.847E+02%		3.03E+00
Ba-140 #A	2.8712E+00	2.8713E+00	1.067E+02%		1.34E+01
La-140 #A	7.2162E-01	7.2165E-01	1.022E+02%		1.47E+00
CE-141 #A	1.4470E+00	1.4470E+00	1.476E+02%		7.05E+00
CE-144 #A	-6.0712E+00	-6.0712E+00	9.814E+01%		1.97E+01
PM-144 #A	1.4603E+00	1.4603E+00	1.012E+02%		3.26E+00
EU-152 C	1.0035E+01	1.0035E+01	5.021E+01%		9.33E+00
EU-154	6.3484E+00	6.3484E+00	2.294E+01%		4.76E+00
EU-155 #A	1.1004E+00	1.1004E+00	1.210E+02%		1.27E+01
HF-181 #A	-2.1686E+00	-2.1687E+00	1.040E+02%		7.45E+00
Ta-182 #A	-8.4942E+00	-8.4942E+00	7.997E+01%		2.24E+01
Hg-203 #A	-1.3710E+00	-1.3710E+00	8.314E+01%		3.76E+00
TL-208 #A	2.2307E+00	2.2307E+00	9.115E+01%		3.78E+00
PM-146 #A	3.1205E+00	3.1205E+00	8.449E+01%		5.81E+00
Y-88 #A	5.4163E-01	5.4163E-01	9.853E+01%		1.76E+00
Cd-113m#A	-1.7991E+04	-1.7991E+04	8.967E+01%		5.32E+04
Cd-109 #	5.2932E+02	5.2932E+02	3.294E+00%		5.33E+01
Cf-251 #A	4.4979E+00	4.4979E+00	1.058E+02%		1.19E+01
Cf-249 #A	8.1398E-01	8.1398E-01	2.854E+02%		7.68E+00
Sn-126 A	-6.8853E+00	-6.8853E+00	9.588E+01%		2.18E+01
PB-210 #	1.5505E+03	1.5505E+03	4.271E+00%		2.15E+02
PB-212 #A	-2.8129E+00	-2.8129E+00	8.877E+01%		9.37E+00
PB-214 #A	2.0134E-01	2.0134E-01	1.022E+02%		1.03E+01
BI-207 #A	2.4440E+00	2.4440E+00	1.379E+02%		6.95E+00
BI-212 #A	-8.1661E+00	-8.1661E+00	2.497E+02%		6.75E+01
U-235 #A	-5.3142E+00	-5.3142E+00	6.237E+01%		3.15E+01
BI-214 #A	8.3222E-01	8.3222E-01	7.990E+01%		1.48E+01
BI-210M#A	2.1098E+00	2.1098E+00	8.857E+01%		6.17E+00
AC-228 #	2.8463E+01	2.8463E+01	3.006E+01%		1.67E+01
TH-227 #A	-9.5796E+00	-9.5796E+00	1.545E+02%		3.70E+01
TH-229 #A	-3.9297E+00	-3.9297E+00	5.064E+02%		5.33E+01
TH-234 A	7.5587E+00	7.5587E+00	7.671E+01%		1.91E+01
PA-231 #A	-3.9537E+01	-3.9537E+01	1.648E+02%		2.15E+02
PA-233 #A	3.1736E+00	3.1736E+00	1.459E+02%		1.53E+01
PA-234 #A	-1.9745E-01	-1.9745E-01	2.231E+03%		1.46E+01
PA-234M A	3.4471E+02	3.4471E+02	6.770E+01%		7.70E+02
AM-241 #	4.8768E+03	4.8768E+03	1.824E-01%		1.28E+01
Np-237 #A	4.3906E+00	4.3906E+00	1.254E+02%		1.82E+01
Ir-192 #A	1.9619E+00	1.9620E+00	9.948E+01%		6.15E+00
Cs-136 #A	2.2229E+00	2.2229E+00	8.479E+01%		6.05E+00
Np-239 #A	2.6085E+00	2.6090E+00	1.366E+02%		1.18E+01
Nd-147 #A	-1.2367E+01	-1.2368E+01	9.200E+01%		2.61E+01
TL-210 #A	5.7660E-01	5.7660E-01	1.795E+02%		5.39E+00
Kr-85 #A	9.4006E+00	9.4006E+00	3.270E+03%		1.02E+03

```
  # - 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)     8.050E+03  Bq/Sample
Total Decayed Activity (   37.6 to  2000.1 keV) 8.0500908E+03  Bq/Sample
```

412878_Gamma_LCS 160-412878~2-A. 7_Gamma_20190281.spc.



Test America St. Louis Spectrum ID: 17_Gamma_20190308

Sample Description: 412878_Gamma_180-86110-A-6-A
Detector: Detector #17
Batch ID: 412878
Work Order Number: Gamma
Lot Number: 180-86110-A-6-A

Decay to Time: 2/19/2019 07:34 Live Time: 7200 sec
Acquisition Time: 2/19/2019 07:35:08 Real Time: 7289 sec
Analysis Time: 2/19/2019 09:36 Dead Time: 1.22 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 17_Liquid_Marinelli 1L.Clb
Efficiency Cal Desc: 17_1L marn_90062_030512
Efficiency Cal Date: 3/7/2012 11:47
Energy Cal Date: 2/29/2012 10:33
Library: Client_Long_Rev15.lib
Bkgd Correction File: 17_2019-01-20_1043.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	5.685E-01	133.4	7.584E-01	7.590E-01	2.582E+00
NA-22	6.939E-02	96.8	6.718E-02	6.727E-02	2.333E-01
K-40	-3.713E+00	52.2	1.937E+00	1.946E+00	5.329E+00
Sc-46	2.887E-02	390.2	1.126E-01	1.126E-01	3.931E-01
CR-51	-4.564E-02	1740.7	7.944E-01	7.944E-01	2.737E+00
MN-54	1.837E-02	522.5	9.598E-02	9.599E-02	2.335E-01
FE-59	1.180E-01	90.7	1.070E-01	1.071E-01	5.277E-01
Co-56	2.210E-02	46.1	1.019E-02	1.025E-02	3.525E-01
CO-57	0.000E+00	1.#INF	5.204E-02	5.204E-02	2.484E-01
CO-58	6.886E-02	153.4	1.056E-01	1.057E-01	3.626E-01
CO-60	8.070E-02	86.2	6.958E-02	6.969E-02	1.821E-01
ZN-65	4.507E-03	5331.9	2.403E-01	2.403E-01	8.534E-01
NB-94	3.167E-02	162.8	5.156E-02	5.159E-02	1.339E-01
ZR-95	1.323E-01	92.9	1.230E-01	1.231E-01	3.030E-01
NB-95	4.848E-02	224.8	1.090E-01	1.090E-01	3.761E-01
RU-103	3.386E-02	296.4	1.004E-01	1.004E-01	2.545E-01
RH-106	3.535E-01	76.9	2.718E-01	2.724E-01	4.610E+00
AG-108M	8.095E-03	111.9	9.056E-03	9.065E-03	2.631E-01
AG-110M	0.000E+00	1.#INF	2.637E-02	2.637E-02	5.036E-01
SN-113	-1.419E-01	89.1	1.265E-01	1.267E-01	5.451E-01
SB-124	-3.986E-02	127.0	5.064E-02	5.068E-02	5.543E-01
SB-125	-1.216E-01	114.1	1.388E-01	1.389E-01	7.380E-01
I-131	1.709E-01	54.8	9.361E-02	9.402E-02	2.339E-01
Gd-153	-1.901E-01	107.6	2.045E-01	2.049E-01	6.840E-01
Ga-68	0.000E+00	1.#INF	3.816E+00	3.816E+00	1.569E+01
Tc-99m	7.626E-02	128.0	9.763E-02	9.773E-02	3.267E-01
BA-133	-1.241E-01	120.9	1.501E-01	1.502E-01	5.049E-01
CS-134	2.346E-01	79.5	1.866E-01	1.870E-01	3.343E-01
CS-137	-1.600E-01	55.7	8.915E-02	8.950E-02	4.657E-01
CE-139	-1.454E-02	596.2	8.668E-02	8.669E-02	2.952E-01
Ba-140	4.131E-01	89.4	3.694E-01	3.700E-01	8.598E-01
La-140	9.321E-02	114.0	1.063E-01	1.064E-01	2.511E-01
CE-141	1.198E-01	140.3	1.681E-01	1.682E-01	5.628E-01

CE-144	7.445E-01	47.6	3.544E-01	3.566E-01	9.480E-01
PM-144	2.076E-02	162.1	3.364E-02	3.365E-02	2.908E-01
EU-152	4.988E-01	56.8	2.832E-01	2.846E-01	7.191E-01
EU-154	3.299E-01	87.6	2.889E-01	2.894E-01	4.989E-01
EU-155	1.318E-01	171.9	2.266E-01	2.267E-01	6.147E-01
HF-181	-1.222E-01	98.8	1.207E-01	1.208E-01	4.052E-01
Ta-182	2.167E-02	460.1	9.970E-02	9.970E-02	1.037E+00
Hg-203	5.094E-03	1841.2	9.380E-02	9.380E-02	3.224E-01
TL-208	-1.072E-01	123.6	1.325E-01	1.326E-01	3.530E-01
PM-146	5.433E-02	273.8	1.488E-01	1.488E-01	3.124E-01
Y-88	2.322E-01	28.9	6.721E-02	6.851E-02	1.336E-01
Cd-113m	-1.321E+03	86.2	1.139E+03	1.142E+03	3.805E+03
Cd-109	0.000E+00	1.#INF	8.863E-01	8.863E-01	8.794E+00
Cf-251	-4.310E-01	106.3	4.580E-01	4.594E-01	1.226E+00
Cf-249	-1.260E-02	78.7	9.921E-03	9.942E-03	5.350E-01
Sn-126	-2.270E-01	345.2	7.836E-01	7.837E-01	2.645E+00
PB-210	8.045E-01	265.5	2.136E+00	2.137E+00	5.794E+00
PB-212	1.026E-01	180.6	1.853E-01	1.854E-01	4.815E-01
PB-214	3.621E-01	42.7	1.547E-01	1.558E-01	3.984E-01
BI-207	-8.309E-02	157.4	1.307E-01	1.308E-01	4.445E-01
BI-212	1.541E+00	109.7	1.691E+00	1.693E+00	5.668E+00
U-235	3.661E-02	453.7	1.661E-01	1.661E-01	2.532E+00
BI-214	2.262E-01	81.6	1.846E-01	1.850E-01	5.134E-01
BI-210M	-1.688E-01	100.0	1.688E-01	1.691E-01	5.648E-01
AC-228	5.214E-02	636.3	3.317E-01	3.317E-01	1.096E+00
TH-227	7.811E-01	74.3	5.805E-01	5.824E-01	2.540E+00
TH-229	1.308E+00	105.2	1.376E+00	1.380E+00	3.712E+00
TH-234	8.238E+00	16.1	1.322E+00	1.405E+00	2.970E+00
PA-231	0.000E+00	1.#INF	1.116E+00	1.116E+00	1.556E+01
PA-233	2.156E-01	163.1	3.515E-01	3.517E-01	1.179E+00
PA-234	4.181E-01	52.6	2.200E-01	2.211E-01	1.438E+00
PA-234M	-2.802E+00	70.7	1.981E+00	1.985E+00	5.361E+01
AM-241	-8.635E-02	217.4	1.877E-01	1.878E-01	5.360E-01
Np-237	4.366E-01	169.9	7.419E-01	7.423E-01	2.479E+00
Ir-192	3.621E-02	242.0	8.763E-02	8.766E-02	2.992E-01
Cs-136	-4.501E-03	2477.9	1.115E-01	1.115E-01	3.913E-01
Np-239	-2.734E-01	114.1	3.118E-01	3.123E-01	1.042E+00
Nd-147	1.242E+00	43.3	5.375E-01	5.420E-01	1.269E+00
TL-210	-2.017E-02	470.0	9.481E-02	9.482E-02	3.335E-01
Kr-85	1.051E+01	349.3	3.672E+01	3.673E+01	1.243E+02
Total	3.105E+01				

Analyst: kody Saulters

Sample description
412878_Gamma_180-86110-A-6-A

Spectrum Filename: C:\User\SPC\Det17\17_Gamma_20190308.An1

Acquisition information
Start time: 2/19/2019 7:35:08 AM
Live time: 7200
Real time: 7289
Dead time: 1.22 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Liquid_Marinelli 1L.Clb
17_1L marn_90062_030512

Energy Calibration
Created: 2/29/2012 10:33:23 AM
Zero offset: 0.108 keV
Gain: 0.250 keV/channel
Quadratic: -2.584E-08 keV/channel^2

Efficiency Calibration
Created: 3/7/2012 11:47:27 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.09 %
Log(Eff): -2.094103E+00 + (1.788156E-01*Log(E)) +
(-7.283143E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.66 %
Log(Eff): -1.201018E+01 + (4.016685E+00*Log(E)) +
(-4.439774E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev15.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.12keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	2/19/2019 7:34:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2019-01-20_1043.PBC 1/20/2019 10:43:53 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 15 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2835

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.70	137.	18.46	0.83	4.370E-02	46.54	4.250	PBC<MDA	PB210
50.14	17.	110.56	0.78	4.551E-02	50.14	8.000	PBC<MDA	TH227
63.40	13.	209.56	0.62	5.041E-02	63.29	3.810	PBC<MDA	TH234
80.99	17.	131.03	0.81	5.325E-02	80.99	34.060	PBC<MDA	BA133
86.49	22.	169.92	0.81	5.355E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.863E-01	EU155
86.58	22.	171.92	0.81	5.355E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.864E-01	EU155
					86.94	9.040	6.327E-01	Sn126
92.61	15.	217.12	0.95	5.364E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	6.961E-01	AC228
98.98	13.	199.56	0.82	5.350E-02	99.50	15.000	PBC<MDA	Np239
105.31	4.	337.71	0.83	5.322E-02	105.31	21.200	PBC<MDA	EU155
121.78	18.	126.93	0.85	5.183E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	5.639E-02	CO57
123.10	10.	215.13	0.85	5.168E-02	123.10	40.790	PBC<MDA	EU154
133.28	30.	47.61	0.46	5.047E-02	133.54	11.090	PBC<MDA	CE144
140.51	22.	128.02	0.86	4.957E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	-3.	846.04	0.87	4.913E-02	143.79	10.960	PBC<MDA	U235
145.44	20.	140.33	0.87	4.891E-02	145.44	48.200	PBC<MDA	CE141
162.66	16.	143.22	0.88	4.648E-02	162.66	6.220	PBC<MDA	Ba140
163.38	3.	692.20	0.88	4.638E-02	163.38	5.080	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
165.85	-4.	596.17	0.89	4.583E-02	165.85	79.900	PBC<MDA	CE139
185.81	14.	179.96	0.98	4.296E-02	185.72	54.000	PBC<MDA	U235
192.11	17.	105.21	0.91	4.193E-02	193.51	4.400	PBC<MDA	TH229
198.18	59.	28.45	0.79	4.135E-02				
205.33	3.	810.90	0.92	4.048E-02	205.33	5.010	PBC<MDA	U235
210.85	3.	609.58	0.93	3.985E-02	210.85	2.990	PBC<MDA	TH229
227.00	15.	127.93	0.94	3.810E-02	227.00	6.300	PBC<MDA	Cf251
238.60	12.	180.64	0.83	3.695E-02	238.63	43.300	PBC<MDA	PB212
256.24	17.	99.34	0.97	3.534E-02	256.24	7.000	PBC<MDA	TH227
299.73	-3.	971.12	1.01	3.195E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
312.01	17.	163.06	1.02	3.114E-02	312.01	36.000	PBC<MDA	PA233
316.49	7.	242.02	1.03	3.085E-02	316.49	87.040	PBC<MDA	Ir192
328.76	10.	162.49	1.04	3.008E-02	328.76	20.300	PBC<MDA	La140
333.44	17.	101.98	1.04	2.980E-02	333.44	15.510	PBC<MDA	Cf249
338.32	3.	636.28	1.05	2.951E-02	338.32	12.010	PBC<MDA	AC228
351.93	28.	42.72	0.54	2.874E-02	351.93	37.600	PBC<MDA	PB214
364.48	28.	54.76	1.07	2.806E-02	364.48	81.700	PBC<MDA	I131
383.84	15.	118.21	1.09	2.709E-02	383.84	8.940	PBC<MDA	BA133
477.60	10.	133.42	1.17	2.322E-02	477.60	10.520	PBC<MDA	BE7
497.05	5.	296.42	1.19	2.256E-02	497.05	90.900	PBC<MDA	RU103
511.86	248.	7.87	2.45	2.209E-02	511.86	20.000	7.808E+00	RH106
513.98	7.	349.35	1.20	2.202E-02	513.98	0.430	PBC<MDA	Kr85
531.00	25.	43.27	1.22	2.150E-02	531.00	13.000	PBC<MDA	Nd147
537.26	12.	107.15	1.22	2.132E-02	537.26	24.390	PBC<MDA	Ba140
563.24	5.	263.57	1.25	2.058E-02	563.24	8.350	PBC<MDA	CS134
569.32	8.	122.47	1.25	2.042E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.637E-01	PA234
					569.70	97.740	5.570E-02	BI207
569.47	8.	132.33	1.25	2.042E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.222E-01	PA234
					569.70	97.740	5.222E-02	BI207
569.70	2.	700.79	1.25	2.041E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.244E-01	PA234
					569.70	97.740	1.044E-02	BI207
583.02	-13.	123.60	1.26	2.006E-02	583.02	84.500	PBC<MDA	TL208
609.58	15.	81.63	0.97	1.941E-02	609.31	46.090	PBC<MDA	BI214
610.30	10.	152.32	1.29	1.938E-02	610.30	5.750	PBC<MDA	RU103
614.28	10.	158.32	1.29	1.929E-02	614.28	89.850	PBC<MDA	AG108M
618.06	10.	162.06	1.30	1.920E-02	618.06	99.100	PBC<MDA	PM144
635.89	3.	268.04	1.31	1.879E-02	635.89	11.310	PBC<MDA	SB125
702.63	4.	162.81	1.37	1.740E-02	702.63	97.900	PBC<MDA	NB94
727.17	14.	109.71	1.39	1.694E-02	727.17	7.550	PBC<MDA	BI212
735.72	4.	273.78	1.40	1.679E-02	735.72	22.500	PBC<MDA	PM146
747.16	3.	364.63	1.41	1.659E-02	747.16	34.000	PBC<MDA	PM146
756.73	9.	92.92	1.41	1.642E-02	756.73	54.460	PBC<MDA	ZR95
765.79	6.	224.84	1.42	1.627E-02	765.79	99.790	PBC<MDA	NB95

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					766.41	0.294	PBC<MDA	PA234M
766.41	12.	100.93	1.42	1.626E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	2.	678.97	1.43	1.605E-02	778.92	12.940	PBC<MDA	EU152
785.42	5.	245.31	1.44	1.595E-02	785.42	1.280	PBC<MDA	BI212
795.87	11.	85.62	1.45	1.578E-02	795.87	85.530	PBC<MDA	CS134
801.95	10.	96.99	1.45	1.568E-02	801.95	8.690	PBC<MDA	CS134
810.78	8.	153.41	1.46	1.555E-02	810.78	99.460	PBC<MDA	CO58
834.85	2.	522.50	1.48	1.519E-02	834.85	99.980	PBC<MDA	MN54
880.53	7.	163.51	1.52	1.455E-02	880.53	6.000	PBC<MDA	PA234
889.28	3.	390.16	1.53	1.443E-02	889.28	99.984	PBC<MDA	Sc46
946.02	17.	52.61	1.57	1.373E-02	946.02	13.400	PBC<MDA	PA234
964.11	11.	59.65	1.59	1.351E-02	964.11	14.605	PBC<MDA	EU152
968.97	-2.	532.00	1.59	1.346E-02	968.97	17.460	PBC<MDA	AC228
996.33	9.	114.85	1.62	1.315E-02	996.33	10.600	PBC<MDA	EU154
1001.00	-12.	99.02	1.62	1.310E-02	1001.00	0.837	PBC<MDA	PA234M
1004.77	10.	97.64	1.62	1.306E-02	1004.77	18.010	PBC<MDA	EU154
1037.84	15.	54.82	1.65	1.271E-02	1037.84	14.130	PBC<MDA	Co56
1050.36	12.	76.90	1.66	1.259E-02	1050.36	1.560	PBC<MDA	RH106
1112.07	10.	96.72	1.71	1.200E-02	1112.07	13.644	PBC<MDA	EU152
1173.24	6.	147.67	1.76	1.147E-02	1173.24	99.900	PBC<MDA	CO60
1221.41	2.	460.07	1.80	1.108E-02	1221.41	27.000	PBC<MDA	Ta182
1274.53	5.	96.82	1.84	1.068E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.971E-01	EU154
1291.60	9.	90.68	1.85	1.056E-02	1291.60	43.200	PBC<MDA	FE59
1332.50	7.	89.04	1.89	1.028E-02	1332.50	99.980	PBC<MDA	CO60
1408.00	2.	634.67	1.94	9.796E-03	1408.00	21.005	PBC<MDA	EU152
1460.99	-27.	52.16	1.98	9.483E-03	1460.83	10.670	PBC<MDA	K40
1596.21	4.	159.99	2.09	8.765E-03	1596.21	95.400	PBC<MDA	La140
1690.60	3.	205.48	2.16	8.321E-03	1690.98	47.790	PBC<MDA	SB124
1771.35	13.	78.81	2.22	7.978E-03	1771.35	15.480	PBC<MDA	Co56
1836.06	13.	28.95	2.26	7.721E-03	1836.06	99.200	2.322E-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	
253.03	63.40	133.	136.	2.698E+03	17.70	0.625	-	
742.46	185.66	111.	100.	2.332E+03	23.67	0.981	-	
791.91	198.18	68.	59.	1.435E+03	28.45	0.791	-	M

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Long_Rev15.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	186.29	46.70	256.	11.	0.001	265.53	0.828
TH-227	200.03	50.14	114.	17.	0.002	110.56	0.778s
AM-241	237.59	59.54	198.	-11.	-0.002	217.42	0.787s
TH-234	252.59	63.29	505.	-146.	-0.020	23.74	0.791
Sn-126	256.56	64.28	380.	-8.	-0.001	345.21	0.792s
BA-133	323.36	80.99	163.	17.	0.002	131.03	0.807
Np-237	345.35	86.49	691.	22.	0.003	169.92	0.813
EU-155	345.56	86.54	708.	22.	0.003	171.92	0.813
Sn-126	347.15	86.94	742.	-12.	-0.002	328.36	0.813
Sn-126	349.67	87.57	730.	0.	0.000	1000.00	0.814s
Cd-109	351.55	88.04	730.	0.	0.000	1000.00	0.814s
Nd-147	363.79	91.10	730.	0.	0.000	1000.00	0.817
TH-234	369.83	92.61	173.	178.	0.025	16.05	0.952
AC-228	372.78	93.35	730.	0.	0.000	1000.00	0.819s
Gd-153	389.37	97.50	269.	-22.	-0.003	107.57	0.823s
Np-239	397.37	99.50	330.	13.	0.002	199.56	0.825s
Np-239	414.16	103.70	282.	-23.	-0.003	106.07	0.829s
EU-155	420.61	105.31	103.	4.	0.001	337.71	0.830D
Np-239	423.88	106.13	346.	-23.	-0.003	114.05	0.831s
EU-152	486.45	121.78	252.	18.	0.002	126.93	0.846s
CO-57	487.57	122.06	270.	0.	0.000	1000.00	0.846s
EU-154	491.73	123.10	246.	10.	0.001	215.13	0.847
PA-234	524.49	131.29	388.	-21.	-0.003	134.50	0.855s
HF-181	531.41	133.02	339.	-22.	-0.003	119.91	0.856s
CE-144	532.43	133.28	58.	30.	0.004	47.61	0.462s
HF-181	544.50	136.30	396.	-22.	-0.003	127.63	0.859
CO-57	545.20	136.47	418.	-22.	-0.003	131.09	0.859
Tc-99m	561.34	140.51	373.	22.	0.003	128.02	0.863s
U-235	574.43	143.79	419.	-3.	0.000	846.04	0.866s
CE-141	581.05	145.44	397.	20.	0.003	140.33	0.868
Ba-140	649.90	162.66	256.	16.	0.002	143.22	0.884s
U-235	652.78	163.38	206.	3.	0.000	692.20	0.885
CE-139	662.67	165.85	260.	-4.	-0.001	596.17	0.887s
Cf-251	705.64	176.60	187.	-23.	-0.003	106.25	0.897s
U-235	742.10	185.72	369.	-107.	-0.015	25.58	0.905
TH-229	773.25	193.51	100.	17.	0.002	105.21	0.913
U-235	820.52	205.33	130.	3.	0.000	810.90	0.924
TH-229	842.58	210.85	84.	3.	0.000	609.58	0.929
Cf-251	907.16	227.00	117.	15.	0.002	127.93	0.944
TH-227	943.03	235.97	441.	-22.	-0.003	138.54	0.952s
PB-212	953.55	238.60	128.	12.	0.002	180.64	0.827

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	967.13	242.00	419.	-22.	-0.003	134.40	0.958s
EU-152	977.91	244.69	397.	-10.	-0.001	275.01	0.960s
TH-227	1024.08	256.24	83.	17.	0.002	99.34	0.971s
Cd-113m	1053.91	263.70	136.	-20.	-0.003	86.23	0.978s
BI-210M	1062.44	265.83	210.	-21.	-0.003	100.04	0.979s
TL-208	1108.23	277.28	160.	-9.	-0.001	201.54	0.990s
I-131	1136.28	284.30	120.	-23.	-0.003	96.03	0.996s
PB-214	1179.43	295.09	445.	-37.	-0.005	63.51	1.006s
TL-210	1183.07	296.00	441.	-17.	-0.002	171.40	1.007s
PB-212	1199.19	300.03	466.	-3.	0.000	971.12	1.011s
PA-231	1199.35	300.07	458.	0.	0.000	1000.00	1.011s
PA-233	1199.79	300.18	458.	0.	0.000	1000.00	1.011s
PA-231	1209.66	302.65	458.	0.	0.000	1000.00	1.013s
BA-133	1210.47	302.85	458.	0.	0.000	1000.00	1.013s
Ba-140	1218.46	304.85	458.	0.	0.000	1000.00	1.015s
BI-210M	1218.64	304.90	458.	0.	0.000	1000.00	1.015s
Ir-192	1232.82	308.44	458.	0.	0.000	1000.00	1.019s
PA-233	1247.10	312.01	394.	17.	0.002	163.06	1.022s
Ir-192	1265.01	316.49	140.	7.	0.001	242.02	1.026s
La-140	1314.07	328.76	71.	10.	0.001	162.49	1.037s
Cf-249	1332.79	333.44	77.	17.	0.002	101.98	1.041s
AC-228	1352.30	338.32	208.	3.	0.000	636.28	1.046
Cs-136	1361.30	340.57	211.	0.	0.000	1000.00	1.048s
EU-152	1376.16	344.29	231.	-19.	-0.003	113.56	1.051s
PB-214	1406.25	351.81	37.	28.	0.004	42.72	0.537s
BA-133	1423.00	356.00	175.	-16.	-0.002	120.87	1.062s
I-131	1456.93	364.48	59.	28.	0.004	54.76	1.070
BA-133	1534.34	383.84	152.	15.	0.002	118.21	1.087s
Cf-249	1550.77	387.95	198.	-17.	-0.002	119.98	1.091
SN-113	1565.73	391.69	191.	-17.	-0.002	89.11	1.094s
SB-125	1710.44	427.88	62.	-13.	-0.002	114.11	1.127s
AG-108M	1734.69	433.94	73.	-10.	-0.001	158.13	1.132s
SB-125	1852.38	463.37	126.	-18.	-0.003	75.12	1.158s
BE-7	1909.29	477.59	84.	10.	0.001	133.42	1.171s
HF-181	1926.89	482.00	122.	-16.	-0.002	98.75	1.175s
RU-103	1987.11	497.05	56.	5.	0.001	296.42	1.188s
RH-106	2046.35	511.86	67.	248.	0.034	7.87	2.452
Kr-85	2054.81	513.98	310.	7.	0.001	349.35	1.203s
Nd-147	2122.88	531.00	24.	25.	0.003	43.27	1.219
Ba-140	2147.92	537.26	40.	12.	0.002	107.15	1.224
CS-134	2251.82	563.24	44.	5.	0.001	263.57	1.247
CS-134	2276.15	569.32	44.	8.	0.001	122.47	1.252s
PA-234	2276.75	569.47	46.	8.	0.001	132.33	1.253s
BI-207	2277.67	569.70	54.	2.	0.000	700.79	1.253s
TL-208	2330.95	583.02	75.	-13.	-0.002	123.60	1.264
SB-125	2400.86	600.50	277.	-15.	-0.002	106.28	1.280s
SB-124	2409.78	602.73	252.	-15.	-0.002	149.45	1.282s
BI-214	2437.16	609.58	42.	15.	0.002	81.63	0.968s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RU-103	2440.05	610.30	111.	10.	0.001	152.32	1.288s
AG-108M	2455.98	614.28	121.	10.	0.001	158.32	1.292s
PM-144	2471.11	618.06	128.	10.	0.001	162.06	1.295
RH-106	2486.52	621.92	167.	-12.	-0.002	155.85	1.299
SB-125	2542.41	635.89	35.	3.	0.000	268.04	1.311s
I-131	2546.75	636.97	52.	-11.	-0.002	80.73	1.312s
AG-110M	2629.90	657.76	84.	-18.	-0.002	53.74	1.330s
CS-137	2645.49	661.66	112.	-18.	-0.002	55.72	1.333s
PM-144	2785.03	696.54	52.	-4.	-0.001	371.37	1.363s
NB-94	2809.38	702.63	9.	4.	0.001	162.81	1.368s
SB-124	2890.01	722.79	98.	-17.	-0.002	83.89	1.386s
AG-108M	2890.61	722.94	115.	-14.	-0.002	110.54	1.386s
EU-154	2892.30	723.36	129.	0.	0.000	1000.00	1.386s
BI-212	2907.54	727.17	113.	14.	0.002	109.71	1.390s
PM-146	2941.74	735.72	34.	4.	0.001	273.78	1.397s
PM-146	2987.51	747.16	36.	3.	0.000	364.63	1.407s
ZR-95	3025.79	756.73	13.	9.	0.001	92.92	1.415s
AG-110M	3054.64	763.94	70.	-20.	-0.003	62.75	1.421s
NB-95	3062.03	765.79	78.	6.	0.001	224.84	1.423s
PA-234M	3064.52	766.41	61.	12.	0.002	100.93	1.423
EU-152	3114.56	778.92	30.	2.	0.000	678.97	1.434
BI-212	3140.56	785.42	30.	5.	0.001	245.31	1.440s
CS-134	3182.36	795.87	41.	11.	0.002	85.62	1.448s
TL-210	3197.29	799.60	55.	-2.	0.000	470.03	1.451s
CS-134	3206.69	801.95	43.	10.	0.001	96.99	1.454s
CO-58	3241.99	810.78	65.	8.	0.001	153.41	1.461s
La-140	3261.97	815.77	73.	0.	0.000	1000.00	1.465s
MN-54	3338.30	834.85	24.	2.	0.000	522.50	1.481s
Co-56	3385.99	846.77	58.	-15.	-0.002	74.13	1.491s
TL-208	3441.18	860.56	35.	-3.	0.000	377.72	1.503s
NB-94	3483.32	871.10	80.	-19.	-0.003	70.65	1.512
EU-154	3491.85	873.23	99.	-5.	-0.001	273.61	1.514
PA-234	3521.06	880.53	62.	7.	0.001	163.51	1.520s
PA-234	3531.90	883.24	61.	-3.	0.000	372.68	1.522s
AG-110M	3537.67	884.68	58.	0.	0.000	1000.00	1.523s
Sc-46	3556.06	889.28	67.	3.	0.000	390.16	1.527s
AG-110M	3748.95	937.49	23.	-2.	0.000	444.01	1.567s
PA-234	3783.07	946.02	14.	17.	0.002	52.61	1.574s
EU-152	3855.45	964.11	17.	11.	0.002	59.65	1.589s
AC-228	3874.90	968.97	47.	-2.	0.000	532.00	1.593s
EU-154	3984.36	996.33	51.	9.	0.001	114.85	1.616s
PA-234M	4003.04	1001.00	72.	-12.	-0.002	99.02	1.620
EU-154	4018.15	1004.77	41.	10.	0.001	97.64	1.623s
Co-56	4150.45	1037.84	10.	15.	0.002	54.82	1.650s
Cs-136	4191.39	1048.07	35.	-7.	-0.001	125.36	1.658s
RH-106	4200.55	1050.36	34.	12.	0.002	76.90	1.661s
BI-207	4253.77	1063.66	34.	-6.	-0.001	157.36	1.671s
Ga-68	4308.74	1077.40	25.	0.	0.000	1000.00	1.683s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
FE-59	4396.18	1099.25	25.	0.	0.000	1000.00	1.700s
EU-152	4447.49	1112.07	44.	10.	0.001	96.72	1.711s
BI-214	4480.35	1120.29	45.	-16.	-0.002	54.49	1.717s
Sc-46	4481.41	1120.55	35.	0.	0.000	1000.00	1.717s
Ta-182	4484.41	1121.30	37.	-1.	0.000	866.03	1.718s
CO-60	4692.24	1173.24	15.	6.	0.001	147.67	1.760s
Ta-182	4755.52	1189.05	15.	-6.	-0.001	147.67	1.772s
Ta-182	4885.02	1221.41	16.	2.	0.000	460.07	1.798s
Co-56	4952.53	1238.28	35.	-13.	-0.002	72.94	1.812s
NA-22	5097.60	1274.53	11.	5.	0.001	96.82	1.840s
EU-154	5097.64	1274.54	16.	0.	0.000	1000.00	1.840s
FE-59	5165.90	1291.60	11.	9.	0.001	90.68	1.854s
TL-210	5251.56	1313.00	16.	0.	0.000	1000.00	1.870s
CO-60	5329.61	1332.50	5.	7.	0.001	89.04	1.886s
AG-110M	5536.92	1384.30	50.	-22.	-0.003	38.50	1.926s
EU-152	5631.79	1408.00	21.	2.	0.000	634.67	1.944s
K-40	5843.25	1460.83	60.	-27.	-0.004	52.16	1.985s
La-140	6385.15	1596.21	7.	4.	0.001	159.99	2.087s
SB-124	6764.55	1690.98	6.	3.	0.000	205.48	2.157s
BI-214	7058.84	1764.49	61.	-29.	-0.004	19.17	2.211s
Co-56	7086.31	1771.35	49.	13.	0.002	78.81	2.216s
Y-88	7345.39	1836.06	0.	13.	0.002	28.95	2.262s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	5.6846E-01				5.31E+01	
			477.60	5.685E-01	(	2.582E+00 1.33E+02 1.05E+01	G
NA-22	C	6.9386E-02				9.50E+02	
			1274.53	6.939E-02	?(	2.333E-01 9.68E+01 9.99E+01	G
K-40	N	-3.7129E+00				4.66E+11	
			1460.83	-3.713E+00	?(P	5.329E+00 5.22E+01 1.07E+01	G
Sc-46	F	2.8870E-02				8.38E+01	
			889.28	2.887E-02	?(	3.931E-01 3.90E+02 1.00E+02	G
			1120.55	0.000E+00	-	3.528E-01 1.00E+03 1.00E+02	G
CR-51	F	-4.5637E-02				2.77E+01	
			320.08	-4.564E-02	%(	2.737E+00 1.74E+03 9.94E+00	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C	1.8370E-02					3.12E+02	
			834.85	1.837E-02	?(P	2.335E-01	5.22E+02	1.00E+02 G
FE-59	F	1.1796E-01					4.45E+01	
			1099.25	0.000E+00	?(	5.277E-01	1.00E+03	5.65E+01 G
			1291.60	2.722E-01	?(P	5.497E-01	9.07E+01	4.32E+01 G
Co-56	C	2.2100E-02					7.73E+01	
			846.77	-1.355E-01	&(P	3.525E-01	7.41E+01	9.99E+01 G
			1238.28	-2.458E-01	+ P	5.798E-01	7.29E+01	6.61E+01 G
			1037.84	1.137E+00	?(P	1.366E+00	5.48E+01	1.41E+01 G
			1771.35	1.502E+00	?	3.962E+00	7.88E+01	1.55E+01 A
CO-58	C	6.8859E-02					7.09E+01	
			810.78	6.886E-02	?(	3.626E-01	1.53E+02	9.95E+01 G
CO-60	F	8.0702E-02					1.93E+03	
			1332.50	8.865E-02	?(	1.821E-01	8.90E+01	1.00E+02 G
			1173.24	7.274E-02	?(	2.517E-01	1.48E+02	9.99E+01 G
ZN-65	F	4.5074E-03					2.44E+02	
			1115.55	4.507E-03	&(	8.534E-01	5.33E+03	5.06E+01 G
NB-94	I	3.1670E-02					7.41E+06	
			702.63	3.167E-02	?(	1.339E-01	1.63E+02	9.79E+01 G
			871.10	-1.795E-01	+	4.209E-01	7.06E+01	9.99E+01 G
ZR-95	I	1.3234E-01					6.40E+01	
			756.73	1.323E-01	?(	3.030E-01	9.29E+01	5.45E+01 G
			724.20	-3.576E-04	% P	1.030E+00	5.26E+04	4.42E+01 G
NB-95	I	4.8483E-02					6.40E+01	
			765.79	4.848E-02	?(	3.761E-01	2.25E+02	9.98E+01 G
RU-103	I	3.3858E-02					3.93E+01	
			497.05	3.386E-02	?(	2.545E-01	2.96E+02	9.09E+01 G
			610.30	1.248E+00	?	6.465E+00	1.52E+02	5.75E+00 GA
RH-106	I	3.5346E-01					3.74E+02	
			621.92	-8.743E-01	?(	4.610E+00	1.56E+02	9.93E+00 G
			1050.36	8.169E+00	?(	2.104E+01	7.69E+01	1.56E+00 G
			511.86	7.808E+00		1.282E+00	7.87E+00	2.00E+01 GA
AG-108M	C	8.0946E-03					1.53E+05	
			433.94	-6.379E-02	?(	2.631E-01	1.58E+02	9.05E+01 G
			722.94	-1.269E-01	+	4.730E-01	1.11E+02	9.08E+01 G
			614.28	8.048E-02	?(	4.331E-01	1.58E+02	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	-1.4192E-01					1.15E+02	
			391.69	-1.419E-01	(P	5.451E-01	8.91E+01	6.40E+01 G
SB-124	F	-3.9860E-02					6.02E+01	
			602.73	-1.102E-01	?(	5.543E-01	1.49E+02	9.83E+01 G
			1690.98	1.048E-01	?(	4.933E-01	2.05E+02	4.78E+01 G
			722.79	-1.311E+00	+	3.678E+00	8.39E+01	1.08E+01 G
SB-125	I	-1.2164E-01					1.01E+03	
			427.88	-2.491E-01	(	7.380E-01	1.14E+02	2.96E+01 G
			600.50	-6.131E-01	& P	3.183E+00	1.06E+02	1.79E+01 G
			635.89	2.120E-01	?(P	1.973E+00	2.68E+02	1.13E+01 G
			463.37	-1.023E+00	& P	3.079E+00	7.51E+01	1.05E+01 G
I-131	I	1.7094E-01					8.02E+00	
			364.48	1.709E-01	&(P	2.339E-01	5.48E+01	8.17E+01 G
			284.30	-1.549E+00	& P	3.694E+00	9.60E+01	6.14E+00 G
			636.97	-1.181E+00	- P	3.776E+00	8.07E+01	7.17E+00 G
Gd-153	F	-1.9014E-01					2.42E+02	
			97.50	-1.901E-01	(	6.840E-01	1.08E+02	3.00E+01 G
			103.20	2.682E-02	%	9.346E-01	1.02E+03	2.18E+01 G
Tc-99m	I	7.6256E-02					2.51E-01	
			140.51	7.626E-02	(	3.267E-01	1.28E+02	8.93E+01 G
BA-133	F	-1.2415E-01					3.85E+03	
			356.00	-1.241E-01	?(	5.049E-01	1.21E+02	6.20E+01 G
			302.85	0.000E+00	&	2.445E+00	1.00E+03	1.83E+01 G
			383.84	8.668E-01	?	3.451E+00	1.18E+02	8.94E+00 GA
			80.99	1.279E-01	P	4.760E-01	1.31E+02	3.41E+01 GA
CS-134	I	2.3465E-01					7.54E+02	
			795.87	1.159E-01	*(	3.343E-01	8.56E+01	8.55E+01 G
			604.71	-2.781E-08	%	5.427E-01	5.71E+08	9.76E+01 G
			569.32	3.538E-01	?(	1.487E+00	1.22E+02	1.54E+01 G
			801.95	1.030E+00	?(	3.390E+00	9.70E+01	8.69E+00 G
			563.24	4.040E-01	?(	2.717E+00	2.64E+02	8.35E+00 G
CS-137	I	-1.5999E-01					1.10E+04	
			661.66	-1.600E-01	?(P	4.657E-01	5.57E+01	8.52E+01 G
CE-139	F	-1.4540E-02					1.38E+02	
			165.85	-1.454E-02	?(P	2.952E-01	5.96E+02	7.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ba-140	I	4.1309E-01					1.28E+01	
			537.26	3.206E-01	&(	8.598E-01	1.07E+02	2.44E+01 G
			162.66	7.758E-01	&(P	3.710E+00	1.43E+02	6.22E+00 G
			304.85	0.000E+00	&	1.049E+01	1.00E+03	4.29E+00 G
La-140	I	9.3208E-02					1.28E+01	
			1596.21	6.497E-02	?(P	2.511E-01	1.60E+02	9.54E+01 G
			487.02	-4.434E-03	& P	5.065E-01	4.45E+03	4.55E+01 G
			328.76	2.259E-01	?(P	9.552E-01	1.62E+02	2.03E+01 G
			815.77	0.000E+00	&	1.640E+00	1.00E+03	2.33E+01 G
CE-141	I	1.1976E-01					3.25E+01	
			145.44	1.198E-01	?(	5.628E-01	1.40E+02	4.82E+01 G
CE-144	I	7.4449E-01					2.85E+02	
			133.54	7.445E-01	(	9.480E-01	4.76E+01	1.11E+01 G
PM-144	C	2.0757E-02					3.63E+02	
			696.54	-3.203E-02	?(	2.908E-01	3.71E+02	9.90E+01 G
			618.06	7.349E-02	&(	4.047E-01	1.62E+02	9.91E+01 G
EU-152	F	4.9877E-01					4.94E+03	
			121.78	1.688E-01	&(	7.191E-01	1.27E+02	2.86E+01 G
			344.29	-3.474E-01	+	1.322E+00	1.14E+02	2.65E+01 G
			1112.07	8.741E-01	?(	2.867E+00	9.67E+01	1.36E+01 G
			778.92	1.115E-01	&	1.898E+00	6.79E+02	1.29E+01 G
			964.11	7.939E-01	?(	1.543E+00	5.96E+01	1.46E+01 G
			244.69	-5.196E-01	+	4.815E+00	2.75E+02	7.58E+00 G
			1408.00	1.125E-01	-	1.636E+00	6.35E+02	2.10E+01 GA
EU-154	I	3.2988E-01					3.14E+03	
			123.10	6.909E-02	(P	4.989E-01	2.15E+02	4.08E+01 G
			1274.54	0.000E+00	-	7.888E-01	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	2.247E+00	1.00E+03	2.02E+01 G
			873.23	-4.028E-01	&	3.794E+00	2.74E+02	1.23E+01 G
			1004.77	5.772E-01	?(	1.915E+00	9.76E+01	1.80E+01 G
			996.33	9.132E-01	?(	3.580E+00	1.15E+02	1.06E+01 G
EU-155	I	1.3180E-01					1.81E+03	
			105.31	5.279E-02	(	6.147E-01	3.38E+02	2.12E+01 G
			86.54	1.864E-01	?(	1.070E+00	1.72E+02	3.07E+01 G
HF-181	F	-1.2219E-01					4.24E+01	
			482.00	-1.222E-01	&(	4.052E-01	9.88E+01	8.05E+01 G
			133.02	-1.401E-01	+	5.619E-01	1.20E+02	4.33E+01 G
			345.83	2.109E-02	&	2.230E+00	3.09E+03	1.51E+01 G
			136.30	-1.059E+00	+	4.520E+00	1.28E+02	5.85E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ta-182	F	2.1670E-02					1.14E+02	
			1121.30	-3.340E-02	?(	1.037E+00	8.66E+02	3.49E+01 G
			1221.41	9.285E-02	?(	9.912E-01	4.60E+02	2.70E+01 G
			1189.05	-4.537E-01	+	1.570E+00	1.48E+02	1.62E+01 G
Hg-203	F	5.0943E-03					4.66E+01	
			279.20	5.094E-03	%(	3.224E-01	1.84E+03	8.15E+01 G
TL-208	N	-1.0720E-01					6.98E+02	
			583.02	-1.072E-01	(P	3.530E-01	1.24E+02	8.45E+01 G
			277.28	-5.893E-01	+	4.037E+00	2.02E+02	6.31E+00 G
			860.56	-2.246E-01	+ P	2.284E+00	3.78E+02	1.24E+01 G
PM-146	C	5.4333E-02					2.02E+03	
			453.88	3.114E-03	%(P	3.124E-01	3.83E+03	6.50E+01 G
			747.16	8.326E-02	?(P	7.517E-01	3.65E+02	3.40E+01 G
			735.72	1.586E-01	?(P	1.094E+00	2.74E+02	2.25E+01 G
Y-88	F	2.3217E-01					1.07E+02	
			1836.06	2.322E-01	?(P	1.336E-01	2.89E+01	9.92E+01 G
			898.04	8.718E-03	% P	2.885E-01	1.36E+03	9.37E+01 G
Cd-113m		-1.3212E+03					5.33E+03	
			263.70	-1.321E+03	?(	3.805E+03	8.62E+01	6.00E-03 K
Cf-251	T	-4.3101E-01					3.28E+05	
			176.60	-4.310E-01	?(	1.226E+00	1.06E+02	1.70E+01 G
			227.00	8.872E-01		3.069E+00	1.28E+02	6.30E+00 GA
Cf-249	T	-1.2601E-02					1.28E+05	
			387.95	-1.327E-01	&(	5.350E-01	1.20E+02	6.60E+01 G
			333.44	4.985E-01	?(	1.310E+00	1.02E+02	1.55E+01 G
Sn-126		-2.2700E-01					3.65E+07	
			87.57	0.000E+00	+	8.890E-01	1.00E+03	3.75E+01 GA
			64.28	-2.270E-01	?(	2.645E+00	3.45E+02	9.70E+00 G
			86.94	-3.378E-01	+	3.718E+00	3.28E+02	9.04E+00 GA
PB-210	N	8.0446E-01					8.14E+03	
			46.54	8.045E-01	(P	5.794E+00	2.66E+02	4.25E+00 G
PB-212	N	1.0258E-01					6.98E+02	
			238.63	1.026E-01	(P	4.815E-01	1.81E+02	4.33E+01 G
			300.03	-4.170E-01	+ P	1.369E+01	9.71E+02	3.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	3.6205E-01					5.84E+05	
			351.93	3.621E-01	?(P	3.984E-01	4.27E+01	3.76E+01 G
			295.09	-8.235E-01	+ P	2.252E+00	6.35E+01	1.93E+01 G
			242.00	-1.114E+00	+	5.007E+00	1.34E+02	7.43E+00 GA
BI-207	C	-8.3087E-02					1.18E+04	
			1063.66	-8.309E-02	?(P	4.445E-01	1.57E+02	7.45E+01 G
			569.70	1.044E-02	+	2.584E-01	7.01E+02	9.77E+01 G
BI-212	N	1.5414E+00					6.98E+02	
			727.17	1.541E+00	&(P	5.668E+00	1.10E+02	7.55E+00 G
			785.42	3.176E+00	?	1.931E+01	2.45E+02	1.28E+00 GA
U-235	N	3.6607E-02					2.57E+11	
			143.79	-9.006E-02	(P	2.532E+00	8.46E+02	1.10E+01 G
			205.33	1.733E-01	(P	3.831E+00	8.11E+02	5.01E+00 G
			163.38	1.750E-01	&(P	4.103E+00	6.92E+02	5.08E+00 G
			185.72	-6.385E-01	+ P	5.525E-01	2.56E+01	5.40E+01 GA
BI-214	N	2.2619E-01					5.84E+05	
			609.31	2.262E-01	@(P	5.134E-01	8.16E+01	4.61E+01 G
			1120.29	-1.249E+00	+ P	2.625E+00	5.45E+01	1.51E+01 G
			1764.49	-3.278E+00	+ P	4.407E+00	1.92E+01	1.54E+01 G
BI-210M	T	-1.6878E-01					1.10E+09	
			265.83	-1.688E-01	&(	5.648E-01	1.00E+02	5.00E+01 G
			304.90	0.000E+00	&	1.608E+00	1.00E+03	2.80E+01 G
AC-228	N	5.2137E-02					2.10E+03	
			911.07	2.071E-02	%(P	1.096E+00	2.06E+03	2.90E+01 G
			968.97	-1.124E-01	+ P	2.044E+00	5.32E+02	1.75E+01 G
			338.32	1.280E-01	(P	2.738E+00	6.36E+02	1.20E+01 G
			93.35	0.000E+00	-	5.989E+00	1.00E+03	5.56E+00 XA
TH-227	N	7.8107E-01					7.95E+03	
			256.24	9.469E-01	&(	2.540E+00	9.93E+01	7.00E+00 G
			235.97	-6.584E-01	-	3.052E+00	1.39E+02	1.23E+01 G
			50.14	6.360E-01	(	2.002E+00	1.11E+02	8.00E+00 G
TH-229	N	1.3077E+00					2.68E+06	
			193.51	1.308E+00	&(	3.712E+00	1.05E+02	4.40E+00 G
			210.85	3.162E-01	- P	5.292E+00	6.10E+02	2.99E+00 G
TH-234	N	8.2378E+00					1.63E+12	
			92.59	8.238E+00	(P	2.970E+00	1.61E+01	5.58E+00 G
			63.29	-1.059E+01	+ P	7.776E+00	2.37E+01	3.81E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-233	C	2.1555E-01					7.82E+08	
			312.01	2.156E-01	?(	1.179E+00	1.63E+02	3.60E+01 G
			300.18	0.000E+00	-	7.188E+00	1.00E+03	6.20E+00 G
PA-234	N	4.1810E-01					1.63E+12	
			131.29	-3.193E-01	(	1.438E+00	1.34E+02	1.80E+01 G
			946.02	1.284E+00	?(	1.521E+00	5.26E+01	1.34E+01 G
			569.47	6.222E-01	?(	2.833E+00	1.32E+02	8.20E+00 G
			883.24	-2.990E-01	+	3.898E+00	3.73E+02	9.60E+00 G
			880.53	1.114E+00	&	6.268E+00	1.64E+02	6.00E+00 GA
PA-234M	N	-2.8016E+00					1.63E+12	
			1001.00	-1.556E+01	?(P	5.361E+01	9.90E+01	8.37E-01 G
			766.41	3.351E+01	(P	1.135E+02	1.01E+02	2.94E-01 G
AM-241	T	-8.6349E-02					1.58E+05	
			59.54	-8.635E-02	?(	5.360E-01	2.17E+02	3.59E+01 G
Np-237	F	4.3661E-01					2.14E+06	
			86.49	4.366E-01	?(	2.479E+00	1.70E+02	1.31E+01 G
Ir-192	F	3.6210E-02					7.40E+01	
			316.49	3.621E-02	?(	2.992E-01	2.42E+02	8.70E+01 G
			468.06	-7.376E-04	%	6.390E-01	2.50E+04	5.18E+01 G
			308.44	0.000E+00	-	1.429E+00	1.00E+03	3.18E+01 G
Cs-136	F	-4.5006E-03					1.30E+01	
			818.50	-4.501E-03	%(	3.913E-01	2.48E+03	1.00E+02 G
			1048.07	-9.637E-02	+	4.169E-01	1.25E+02	8.00E+01 G
			340.57	0.000E+00	+	7.097E-01	1.00E+03	4.69E+01 G
Np-239	T	-2.7342E-01					2.36E+00	
			103.70	-2.513E-01	+	8.908E-01	1.06E+02	2.40E+01 X
			106.13	-2.734E-01	?(	1.042E+00	1.14E+02	2.27E+01 G
			99.50	2.278E-01	&	1.531E+00	2.00E+02	1.50E+01 X
Nd-147		1.2423E+00					1.11E+01	
			531.00	1.242E+00	(	1.269E+00	4.33E+01	1.30E+01 G
			91.10	0.000E+00	-	1.177E+00	1.00E+03	2.83E+01 G
TL-210	N	-2.0171E-02					5.84E+05	
			799.60	-2.017E-02	?(	3.335E-01	4.70E+02	9.90E+01 G
			296.00	-9.543E-02	+	5.485E-01	1.71E+02	7.90E+01 G
			1313.00	0.000E+00	+	1.356E+00	1.00E+03	2.10E+01 GA

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Kr-85    I   1.0512E+01                                      3.92E+03
                            513.98 1.051E+01 ?(  1.243E+02 3.49E+02 4.30E-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 ***************
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Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	114.	17.	0.002	110.56	6.360E-01	
AM-241	59.54	198.	-11.	-0.002	217.42	-8.635E-02	
Sn-126	64.28	380.	-8.	-0.001	345.21	-2.270E-01	
BA-133	80.99	163.	17.	0.002	131.03	1.279E-01	P
Np-237	86.49	691.	22.	0.003	169.92	4.366E-01	
Sn-126	86.94	742.	-12.	-0.002	328.36	-3.378E-01	
Gd-153	97.50	269.	-22.	-0.003	107.57	-1.901E-01	
EU-152	121.78	252.	18.	0.002	126.93	1.688E-01	
EU-154	123.10	246.	10.	0.001	215.13	6.909E-02	P
PA-234	131.29	388.	-21.	-0.003	134.50	-3.193E-01	
HF-181	133.02	339.	-22.	-0.003	119.91	-1.401E-01	
HF-181	136.30	396.	-22.	-0.003	127.63	-1.059E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-57	136.47	418.	-22.	-0.003	131.09	-5.802E-01	
Tc-99m	140.51	373.	22.	0.003	128.02	7.626E-02	
U-235	143.79	419.	-3.	0.000	846.04	-9.006E-02	P
CE-141	145.44	397.	20.	0.003	140.33	1.198E-01	
Ba-140	162.66	256.	16.	0.002	143.22	7.758E-01	P
U-235	163.38	206.	3.	0.000	692.20	1.750E-01	P
CE-139	165.85	260.	-4.	-0.001	596.17	-1.454E-02	P
U-235	185.72	369.	-107.	-0.015	25.58	-6.385E-01	P
U-235	205.33	130.	3.	0.000	810.90	1.733E-01	P
TH-227	235.97	441.	-22.	-0.003	138.54	-6.584E-01	
EU-152	244.69	397.	-10.	-0.001	275.01	-5.196E-01	
TH-227	256.24	83.	17.	0.002	99.34	9.469E-01	
Cd-113m	263.70	136.	-20.	-0.003	86.23	-1.321E+03	
BI-210M	265.83	210.	-21.	-0.003	100.04	-1.688E-01	
TL-208	277.28	160.	-9.	-0.001	201.54	-5.893E-01	
I-131	284.30	120.	-23.	-0.003	96.03	-1.549E+00	P
TL-210	296.00	441.	-17.	-0.002	171.40	-9.543E-02	
PA-233	312.01	394.	17.	0.002	163.06	2.156E-01	
Ir-192	316.49	140.	7.	0.001	242.02	3.621E-02	
La-140	328.76	71.	10.	0.001	162.49	2.259E-01	P
Cf-249	333.44	77.	17.	0.002	101.98	4.985E-01	
AC-228	338.32	208.	3.	0.000	636.28	1.280E-01	P
EU-152	344.29	231.	-19.	-0.003	113.56	-3.474E-01	
BA-133	356.00	175.	-16.	-0.002	120.87	-1.241E-01	
I-131	364.48	59.	28.	0.004	54.76	1.709E-01	P
BA-133	383.84	152.	15.	0.002	118.21	8.668E-01	
Cf-249	387.95	198.	-17.	-0.002	119.98	-1.327E-01	
SN-113	391.69	191.	-17.	-0.002	89.11	-1.419E-01	P
SB-125	427.88	62.	-13.	-0.002	114.11	-2.491E-01	
AG-108M	433.94	73.	-10.	-0.001	158.13	-6.379E-02	
SB-125	463.37	126.	-18.	-0.003	75.12	-1.023E+00	P
BE-7	477.59	84.	10.	0.001	133.42	5.685E-01	
HF-181	482.00	122.	-16.	-0.002	98.75	-1.222E-01	
RU-103	497.05	56.	5.	0.001	296.42	3.386E-02	
RH-106	511.86	67.	248.	0.034	7.87	7.808E+00	
Kr-85	513.98	310.	7.	0.001	349.35	1.051E+01	
Nd-147	531.00	24.	25.	0.003	43.27	1.242E+00	
Ba-140	537.26	40.	12.	0.002	107.15	3.206E-01	
CS-134	563.24	44.	5.	0.001	263.57	4.040E-01	
CS-134	569.32	44.	8.	0.001	122.47	3.538E-01	
PA-234	569.47	46.	8.	0.001	132.33	6.222E-01	
BI-207	569.70	54.	2.	0.000	700.79	1.044E-02	
TL-208	583.02	75.	-13.	-0.002	123.60	-1.072E-01	P
SB-125	600.50	277.	-15.	-0.002	106.28	-6.131E-01	P
RU-103	610.30	111.	10.	0.001	152.32	1.248E+00	
AG-108M	614.28	121.	10.	0.001	158.32	8.048E-02	
PM-144	618.06	128.	10.	0.001	162.06	7.349E-02	
RH-106	621.92	167.	-12.	-0.002	155.85	-8.743E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	635.89	35.	3.	0.000	268.04	2.120E-01	P
I-131	636.97	52.	-11.	-0.002	80.73	-1.181E+00	P
AG-110M	657.76	84.	-18.	-0.002	53.74	-1.436E-01	P
CS-137	661.66	112.	-18.	-0.002	55.72	-1.600E-01	P
PM-144	696.54	52.	-4.	-0.001	371.37	-3.203E-02	
NB-94	702.63	9.	4.	0.001	162.81	3.167E-02	
AG-108M	722.94	115.	-14.	-0.002	110.54	-1.269E-01	
BI-212	727.17	113.	14.	0.002	109.71	1.541E+00	P
PM-146	735.72	34.	4.	0.001	273.78	1.586E-01	P
PM-146	747.16	36.	3.	0.000	364.63	8.326E-02	P
ZR-95	756.73	13.	9.	0.001	92.92	1.323E-01	
AG-110M	763.94	70.	-20.	-0.003	62.75	-7.824E-01	P
NB-95	765.79	78.	6.	0.001	224.84	4.848E-02	
PA-234M	766.41	61.	12.	0.002	100.93	3.351E+01	P
EU-152	778.92	30.	2.	0.000	678.97	1.115E-01	
BI-212	785.42	30.	5.	0.001	245.31	3.176E+00	
CS-134	795.87	41.	11.	0.002	85.62	1.159E-01	
TL-210	799.60	55.	-2.	0.000	470.03	-2.017E-02	
CS-134	801.95	43.	10.	0.001	96.99	1.030E+00	
CO-58	810.78	65.	8.	0.001	153.41	6.886E-02	
MN-54	834.85	24.	2.	0.000	522.50	1.837E-02	P
Co-56	846.77	58.	-15.	-0.002	74.13	-1.355E-01	P
TL-208	860.56	35.	-3.	0.000	377.72	-2.246E-01	P
NB-94	871.10	80.	-19.	-0.003	70.65	-1.795E-01	
EU-154	873.23	99.	-5.	-0.001	273.61	-4.028E-01	
PA-234	880.53	62.	7.	0.001	163.51	1.114E+00	
PA-234	883.24	61.	-3.	0.000	372.68	-2.990E-01	
Sc-46	889.28	67.	3.	0.000	390.16	2.887E-02	
AG-110M	937.49	23.	-2.	0.000	444.01	-6.821E-02	
PA-234	946.02	14.	17.	0.002	52.61	1.284E+00	
EU-152	964.11	17.	11.	0.002	59.65	7.939E-01	
AC-228	968.97	47.	-2.	0.000	532.00	-1.124E-01	P
EU-154	996.33	51.	9.	0.001	114.85	9.132E-01	
PA-234M	1001.00	72.	-12.	-0.002	99.02	-1.556E+01	P
EU-154	1004.77	41.	10.	0.001	97.64	5.772E-01	
Co-56	1037.84	10.	15.	0.002	54.82	1.137E+00	P
Cs-136	1048.07	35.	-7.	-0.001	125.36	-9.637E-02	
RH-106	1050.36	34.	12.	0.002	76.90	8.169E+00	
BI-207	1063.66	34.	-6.	-0.001	157.36	-8.309E-02	P
EU-152	1112.07	44.	10.	0.001	96.72	8.741E-01	
Ta-182	1121.30	37.	-1.	0.000	866.03	-3.340E-02	
CO-60	1173.24	15.	6.	0.001	147.67	7.274E-02	
Ta-182	1189.05	15.	-6.	-0.001	147.67	-4.537E-01	
Ta-182	1221.41	16.	2.	0.000	460.07	9.285E-02	
Co-56	1238.28	35.	-13.	-0.002	72.94	-2.458E-01	P
NA-22	1274.53	11.	5.	0.001	96.82	6.939E-02	
FE-59	1291.60	11.	9.	0.001	90.68	2.722E-01	P
CO-60	1332.50	5.	7.	0.001	89.04	8.865E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-110M	1384.30	50.	-22.	-0.003	38.50	-1.270E+00	P
EU-152	1408.00	21.	2.	0.000	634.67	1.125E-01	
K-40	1460.83	60.	-27.	-0.004	52.16	-3.713E+00	P
La-140	1596.21	7.	4.	0.001	159.99	6.497E-02	P
Co-56	1771.35	49.	13.	0.002	78.81	1.502E+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 *****

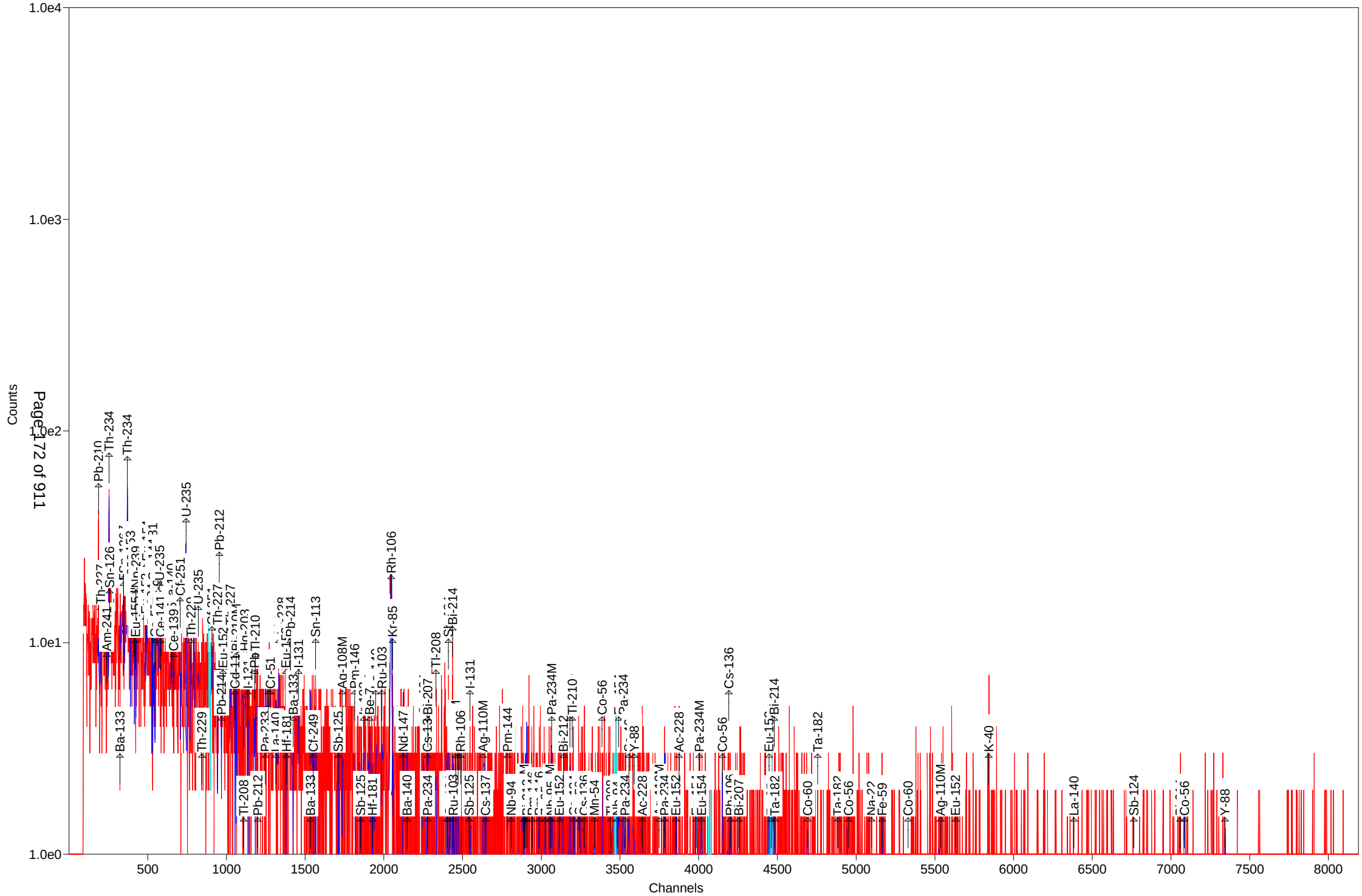
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
BE-7	#A	5.6846E-01	5.6846E-01	1.334E+02%	2.58E+00
NA-22	#A	6.9386E-02	6.9386E-02	9.682E+01%	2.33E-01
K-40	#A	-3.7129E+00	-3.7129E+00	5.216E+01%	5.33E+00
Sc-46	#A	2.8870E-02	2.8870E-02	3.902E+02%	3.93E-01
CR-51	#A	-4.5636E-02	-4.5637E-02	1.741E+03%	2.74E+00
MN-54	#A	1.8370E-02	1.8370E-02	5.225E+02%	2.34E-01
FE-59	#A	1.1795E-01	1.1796E-01	9.068E+01%	5.28E-01
Co-56	#A	2.2100E-02	2.2100E-02	4.610E+01%	3.53E-01
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.48E-01
CO-58	#A	6.8859E-02	6.8859E-02	1.534E+02%	3.63E-01
CO-60	#A	8.0702E-02	8.0702E-02	8.622E+01%	1.82E-01
ZN-65	#A	4.5074E-03	4.5074E-03	5.332E+03%	8.53E-01
NB-94	#A	3.1670E-02	3.1670E-02	1.628E+02%	1.34E-01
ZR-95	#A	1.3234E-01	1.3234E-01	9.292E+01%	3.03E-01
NB-95	#A	4.8483E-02	4.8483E-02	2.248E+02%	3.76E-01
RU-103	#A	3.3857E-02	3.3858E-02	2.964E+02%	2.54E-01
RH-106	#A	3.5345E-01	3.5346E-01	7.690E+01%	4.61E+00
AG-108M	#A	8.0946E-03	8.0946E-03	1.119E+02%	2.63E-01
AG-110M	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.04E-01
SN-113	#A	-1.4192E-01	-1.4192E-01	8.911E+01%	5.45E-01
SB-124	#A	-3.9860E-02	-3.9860E-02	1.270E+02%	5.54E-01
SB-125	#A	-1.2164E-01	-1.2164E-01	1.141E+02%	7.38E-01
I-131	#A	1.7092E-01	1.7094E-01	5.476E+01%	2.34E-01
Gd-153	#A	-1.9013E-01	-1.9014E-01	1.076E+02%	6.84E-01
Ga-68	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.57E+01
Tc-99m	#A	7.6091E-02	7.6256E-02	1.280E+02%	3.27E-01
BA-133	#A	-1.2415E-01	-1.2415E-01	1.209E+02%	5.05E-01
CS-134	#A	2.3465E-01	2.3465E-01	7.953E+01%	3.34E-01
CS-137	#A	-1.5999E-01	-1.5999E-01	5.572E+01%	4.66E-01
CE-139	#A	-1.4540E-02	-1.4540E-02	5.962E+02%	2.95E-01
Ba-140	#A	4.1307E-01	4.1309E-01	8.943E+01%	8.60E-01
La-140	#A	9.3204E-02	9.3208E-02	1.140E+02%	2.51E-01
CE-141	#A	1.1976E-01	1.1976E-01	1.403E+02%	5.63E-01
CE-144	A	7.4449E-01	7.4449E-01	4.761E+01%	9.48E-01
PM-144	#A	2.0757E-02	2.0757E-02	1.621E+02%	2.91E-01

EU-152 #A	4.9877E-01	4.9877E-01	5.679E+01%		7.19E-01
EU-154 #A	3.2988E-01	3.2988E-01	8.756E+01%		4.99E-01
EU-155 A	1.3180E-01	1.3180E-01	1.719E+02%		6.15E-01
HF-181 #A	-1.2218E-01	-1.2219E-01	9.875E+01%		4.05E-01
Ta-182 #A	2.1670E-02	2.1670E-02	4.601E+02%		1.04E+00
Hg-203 #A	5.0943E-03	5.0943E-03	1.841E+03%		3.22E-01
TL-208 #A	-1.0720E-01	-1.0720E-01	1.236E+02%		3.53E-01
PM-146 #A	5.4333E-02	5.4333E-02	2.738E+02%		3.12E-01
Y-88 #	2.3217E-01	2.3217E-01	2.895E+01%		1.34E-01
Cd-113m#A	-1.3212E+03	-1.3212E+03	8.623E+01%		3.80E+03
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		8.79E+00
Cf-251 A	-4.3101E-01	-4.3101E-01	1.063E+02%		1.23E+00
Cf-249 #A	-1.2601E-02	-1.2601E-02	7.873E+01%		5.35E-01
Sn-126 #A	-2.2700E-01	-2.2700E-01	3.452E+02%		2.65E+00
PB-210 A	8.0446E-01	8.0446E-01	2.655E+02%		5.79E+00
PB-212 A	1.0258E-01	1.0258E-01	1.806E+02%		4.82E-01
PB-214 #A	3.6205E-01	3.6205E-01	4.272E+01%		3.98E-01
BI-207 #A	-8.3087E-02	-8.3087E-02	1.574E+02%		4.45E-01
BI-212 #A	1.5414E+00	1.5414E+00	1.097E+02%		5.67E+00
U-235 #A	3.6607E-02	3.6607E-02	4.537E+02%		2.53E+00
BI-214 #A	2.2619E-01	2.2619E-01	8.163E+01%		5.13E-01
BI-210M#A	-1.6878E-01	-1.6878E-01	1.000E+02%		5.65E-01
AC-228 #A	5.2137E-02	5.2137E-02	6.363E+02%		1.10E+00
TH-227 #A	7.8107E-01	7.8107E-01	7.432E+01%		2.54E+00
TH-229 A	1.3077E+00	1.3077E+00	1.052E+02%		3.71E+00
TH-234 #	8.2378E+00	8.2378E+00	1.605E+01%		2.97E+00
PA-231 #A	0.0000E+00	0.0000E+00	7.071E+02%		1.56E+01
PA-233 #A	2.1555E-01	2.1555E-01	1.631E+02%		1.18E+00
PA-234 #A	4.1810E-01	4.1810E-01	5.261E+01%		1.44E+00
PA-234M#A	-2.8016E+00	-2.8016E+00	7.070E+01%		5.36E+01
AM-241 #A	-8.6349E-02	-8.6349E-02	2.174E+02%		5.36E-01
Np-237 #A	4.3661E-01	4.3661E-01	1.699E+02%		2.48E+00
Ir-192 #A	3.6210E-02	3.6210E-02	2.420E+02%		2.99E-01
Cs-136 #A	-4.5004E-03	-4.5006E-03	2.478E+03%		3.91E-01
Np-239 #A	-2.7335E-01	-2.7342E-01	1.141E+02%		1.04E+00
Nd-147 #A	1.2422E+00	1.2423E+00	4.327E+01%		1.27E+00
TL-210 #A	-2.0171E-02	-2.0171E-02	4.700E+02%		3.33E-01
Kr-85 #A	1.0512E+01	1.0512E+01	3.493E+02%		1.24E+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 (   25.1 to  1999.5 keV)     9.344E+00  Bq/Sample
Total Decayed Activity (   25.1 to  1999.5 keV) 9.3443766E+00  Bq/Sample
```

412878_Gamma_180-86110-A-6-A. 17_Gamma_20190308.spc.



Test America St. Louis Spectrum ID: 16_Gamma_20190339

Sample Description: 412878_Gamma_180-86110-A-6-B DU
Detector: Detector #16
Batch ID: 412878
Work Order Number: Gamma
Lot Number: 180-86110-A-6-B DU

Decay to Time: 2/19/2019 09:41 Live Time: 7200 sec
Acquisition Time: 2/19/2019 09:41:22 Real Time: 7218 sec
Analysis Time: 2/19/2019 11:41 Dead Time: 0.25 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 16_Liquid_Marinelli 1L.Clb
Efficiency Cal Desc: 16_1Lmarn_90062_032712
Efficiency Cal Date: 4/2/2012 18:09
Energy Cal Date: 2/28/2012 09:35
Library: Client_Long_Rev15.lib
Bkgd Correction File: 16_2019-01-20_1016.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	-1.114E+00	101.4	1.130E+00	1.131E+00	3.776E+00
NA-22	1.164E-01	58.9	6.849E-02	6.873E-02	2.219E-01
K-40	-1.910E+00	99.0	1.891E+00	1.894E+00	4.864E+00
Sc-46	-1.691E-01	86.7	1.465E-01	1.468E-01	4.894E-01
CR-51	-1.021E+00	124.5	1.270E+00	1.272E+00	3.579E+00
MN-54	1.159E-01	96.2	1.116E-01	1.117E-01	2.491E-01
FE-59	2.059E-01	85.3	1.756E-01	1.759E-01	3.866E-01
Co-56	1.019E-01	46.7	4.763E-02	4.789E-02	3.238E-01
CO-57	3.629E-02	285.8	1.037E-01	1.037E-01	2.423E-01
CO-58	-6.131E-02	174.5	1.070E-01	1.070E-01	3.666E-01
CO-60	-1.514E-01	89.3	1.352E-01	1.354E-01	3.825E-01
ZN-65	1.915E-01	95.8	1.835E-01	1.837E-01	6.238E-01
NB-94	9.571E-02	85.5	8.182E-02	8.196E-02	2.749E-01
ZR-95	3.272E-01	47.9	1.568E-01	1.576E-01	3.486E-01
NB-95	0.000E+00	1.#INF	3.231E-02	3.231E-02	2.909E-01
RU-103	-4.017E-02	265.6	1.067E-01	1.067E-01	2.573E-01
RH-106	1.304E+00	95.8	1.249E+00	1.251E+00	2.351E+00
AG-108M	9.076E-02	66.1	5.998E-02	6.016E-02	1.850E-01
AG-110M	1.016E-01	78.5	7.979E-02	7.995E-02	6.136E-01
SN-113	-1.596E-01	119.0	1.899E-01	1.901E-01	6.353E-01
SB-124	-9.472E-02	68.4	6.483E-02	6.500E-02	6.144E-01
SB-125	6.487E-01	34.0	2.205E-01	2.229E-01	6.518E-01
I-131	-1.857E-03	5302.5	9.846E-02	9.846E-02	2.493E-01
Gd-153	5.950E-02	550.4	3.275E-01	3.275E-01	1.097E+00
Ga-68	6.914E+00	85.4	5.902E+00	5.914E+00	1.288E+01
Tc-99m	0.000E+00	1.#INF	5.621E-02	5.621E-02	4.285E-01
BA-133	-1.569E-01	98.7	1.549E-01	1.551E-01	5.174E-01
CS-134	1.369E-01	82.5	1.129E-01	1.132E-01	3.804E-01
CS-137	1.107E-01	87.9	9.738E-02	9.754E-02	3.272E-01
CE-139	8.034E-02	95.6	7.684E-02	7.718E-02	2.565E-01
Ba-140	1.371E-01	253.2	3.472E-01	3.473E-01	8.493E-01
La-140	-2.708E-02	102.8	2.784E-02	2.787E-02	3.899E-01
CE-141	-1.513E-01	151.0	2.284E-01	2.285E-01	7.611E-01

CE-144	5.792E-01	149.6	8.666E-01	8.671E-01	2.891E+00
PM-144	2.850E-02	367.4	1.047E-01	1.047E-01	3.612E-01
EU-152	3.869E-01	56.2	2.176E-01	2.186E-01	7.173E-01
EU-154	3.793E-01	50.9	1.932E-01	1.943E-01	4.365E-01
EU-155	-4.015E-01	42.4	1.702E-01	1.717E-01	1.983E+00
HF-181	7.667E-02	133.5	1.024E-01	1.024E-01	4.588E-01
Ta-182	9.938E-03	3254.2	3.234E-01	3.234E-01	1.145E+00
Hg-203	6.753E-02	138.0	9.321E-02	9.328E-02	3.140E-01
TL-208	3.231E-02	355.0	1.147E-01	1.147E-01	2.948E-01
PM-146	-8.624E-02	135.1	1.165E-01	1.166E-01	3.644E-01
Y-88	1.350E-01	24.3	3.285E-02	3.375E-02	3.217E-01
Cd-113m	-4.771E+02	258.6	1.234E+03	1.234E+03	4.189E+03
Cd-109	0.000E+00	1.#INF	5.303E-01	5.303E-01	1.048E+01
Cf-251	4.047E-01	101.9	4.124E-01	4.138E-01	1.052E+00
Cf-249	-1.714E-01	103.0	1.766E-01	1.769E-01	5.897E-01
Sn-126	7.003E-01	117.9	8.256E-01	8.265E-01	2.752E+00
PB-210	2.272E+00	83.3	1.893E+00	1.904E+00	5.041E+00
PB-212	1.905E-02	830.9	1.583E-01	1.583E-01	4.286E-01
PB-214	1.459E-01	149.3	2.179E-01	2.180E-01	7.029E-01
BI-207	1.139E-01	116.6	1.328E-01	1.329E-01	3.050E-01
BI-212	-6.442E-01	206.8	1.332E+00	1.332E+00	4.573E+00
U-235	0.000E+00	1.#INF	4.343E-01	4.343E-01	3.149E+00
BI-214	-7.513E-01	36.2	2.719E-01	2.745E-01	1.538E+00
BI-210M	-7.752E-02	235.2	1.823E-01	1.824E-01	5.084E-01
AC-228	-5.849E-01	54.6	3.192E-01	3.205E-01	1.252E+00
TH-227	-2.511E-01	478.5	1.202E+00	1.202E+00	2.983E+00
TH-229	2.481E-01	671.8	1.667E+00	1.667E+00	4.322E+00
TH-234	2.308E-01	477.5	1.102E+00	1.102E+00	3.609E+00
PA-231	-9.695E-08	4628539327.2	4.487E+00	4.487E+00	1.515E+01
PA-233	-4.352E-02	786.6	3.423E-01	3.423E-01	1.158E+00
PA-234	5.616E-01	85.3	4.792E-01	4.801E-01	1.811E+00
PA-234M	3.732E+00	71.2	2.658E+00	2.664E+00	5.599E+01
AM-241	-4.031E-01	51.9	2.093E-01	2.106E-01	9.130E-01
Np-237	-5.110E-01	181.6	9.278E-01	9.283E-01	3.088E+00
Ir-192	3.770E-02	270.3	1.019E-01	1.019E-01	4.813E-01
Cs-136	1.328E-03	139.1	1.848E-03	1.849E-03	4.300E-01
Np-239	6.755E-02	829.6	5.604E-01	5.604E-01	1.872E+00
Nd-147	1.474E-02	4772.9	7.033E-01	7.033E-01	1.724E+00
TL-210	0.000E+00	1.#INF	1.590E-02	1.590E-02	3.380E-01
Kr-85	2.262E+01	135.3	3.061E+01	3.063E+01	1.028E+02
Total	4.364E+01				

Analyst: conrad.reuscher

Sample description
412878_Gamma_180-86110-A-6-B DU

Spectrum Filename: C:\User\SPC\Det16\16_Gamma_20190339.An1

Acquisition information
Start time: 2/19/2019 9:41:22 AM
Live time: 7200
Real time: 7218
Dead time: 0.25 %
Detector ID: 16

Detector system
Ge16 SN/11012217

Calibration
Filename: 16_Liquid_Marinelli 1L.Clb
16_1Lmarn_90062_032712

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: 4/2/2012 6:09:24 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.42 %
Log(Eff): -2.314705E+00 + (2.848008E-01*Log(E)) + (-8.114986E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.26 %
Log(Eff): -1.260350E+01 + (4.382261E+00*Log(E)) + (-4.889120E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev15.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.06keV)
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	2/19/2019 9:41:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	16_2019-01-20_1016.PBC 1/20/2019 10:16:39 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 9 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.3038

***** 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
36.74	40.	43.02	0.50	4.242E-02				
46.59	35.	83.31	0.99	5.059E-02	46.54	4.250	PBC<MDA	PB210
63.21	5.	518.87	1.52	5.853E-02	63.29	3.810	PBC<MDA	TH234
64.28	29.	117.88	0.98	5.882E-02	64.28	9.700	PBC<MDA	Sn126
74.55	70.	38.98	0.82	6.094E-02				
92.94	152.	20.57	0.98	6.174E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	6.171E+00	AC228
97.50	8.	550.38	1.01	6.152E-02	97.50	30.000	PBC<MDA	Gd153
106.13	7.	829.61	1.01	6.081E-02	106.13	22.700	PBC<MDA	Np239
123.10	26.	87.36	1.03	5.858E-02	123.10	40.790	PBC<MDA	EU154
131.68	27.	148.00	1.04	5.726E-02	131.29	18.000	PBC<MDA	PA234
133.02	27.	150.23	1.04	5.696E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	6.004E-01	CE144
133.54	26.	149.62	1.04	5.687E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	5.792E-01	CE144
136.30	26.	151.77	1.04	5.639E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	6.083E-01	CO57
136.47	14.	285.79	1.04	5.636E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	3.271E-01	CO57
165.85	24.	95.64	1.07	5.085E-02	165.85	79.900	PBC<MDA	CE139
176.60	24.	101.89	1.08	4.912E-02	176.60	17.000	PBC<MDA	Cf251
185.72	83.	30.05	1.09	4.776E-02	185.72	54.000	4.470E-01	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
193.51	4.	671.84	1.09	4.666E-02	193.51	4.400	PBC<MDA	TH229
227.00	7.	320.25	1.13	4.251E-02	227.00	6.300	PBC<MDA	Cf251
238.93	2.	830.89	1.41	4.126E-02	238.63	43.300	PBC<MDA	PB212
244.69	21.	121.24	1.14	4.064E-02	244.69	7.580	PBC<MDA	EU152
278.92	15.	138.02	1.17	3.745E-02	279.20	81.460	PBC<MDA	Hg203
308.44	11.	270.33	1.20	3.515E-02	308.44	31.750	PBC<MDA	Ir192
312.01	-4.	786.62	1.20	3.489E-02	312.01	36.000	PBC<MDA	PA233
328.76	21.	136.28	1.22	3.372E-02	328.76	20.300	PBC<MDA	La140
340.44	9.	317.46	1.23	3.294E-02	340.57	46.900	PBC<MDA	Cs136
351.93	13.	149.34	1.24	3.223E-02	351.93	37.600	PBC<MDA	PB214
427.88	11.	141.15	1.31	2.821E-02	427.88	29.600	PBC<MDA	SB125
433.94	14.	103.94	1.31	2.793E-02	433.94	90.480	PBC<MDA	AG108M
463.37	15.	103.25	1.34	2.667E-02	463.37	10.470	PBC<MDA	SB125
511.86	175.	11.75	2.63	2.482E-02	511.86	20.000	4.905E+00	RH106
513.98	17.	135.29	1.38	2.475E-02	513.98	0.430	PBC<MDA	Kr85
537.26	6.	253.23	1.40	2.396E-02	537.26	24.390	PBC<MDA	Ba140
583.02	4.	355.00	1.44	2.255E-02	583.02	84.500	PBC<MDA	TL208
621.92	11.	145.74	1.48	2.148E-02	621.92	9.930	PBC<MDA	RH106
635.89	30.	33.99	1.49	2.112E-02	635.89	11.310	PBC<MDA	SB125
657.76	16.	78.55	1.51	2.058E-02	657.76	94.640	PBC<MDA	AG110M
661.66	14.	87.93	1.51	2.049E-02	661.66	85.210	PBC<MDA	CS137
696.54	4.	367.42	1.54	1.969E-02	696.54	99.000	PBC<MDA	PM144
702.63	13.	85.49	1.55	1.955E-02	702.63	97.900	PBC<MDA	NB94
722.79	7.	148.92	1.57	1.913E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.333E-02	AG108M
					723.36	20.220	2.397E-01	EU154
722.94	13.	81.65	1.57	1.912E-02	722.79	10.810	8.962E-01	SB124
					722.94	90.840	1.067E-01	AG108M
					723.36	20.220	4.794E-01	EU154
723.36	13.	90.35	1.57	1.912E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.067E-01	AG108M
					723.36	20.220	4.795E-01	EU154
724.20	5.	275.23	1.57	1.910E-02	724.20	44.150	PBC<MDA	ZR95
747.16	2.	691.01	1.59	1.863E-02	747.16	34.000	PBC<MDA	PM146
756.73	24.	47.93	1.60	1.845E-02	756.73	54.460	PBC<MDA	ZR95
763.94	2.	426.15	1.60	1.831E-02	763.94	22.280	PBC<MDA	AG110M
766.41	14.	71.21	1.60	1.826E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	3.534E+01	PA234M
795.87	4.	325.37	1.63	1.772E-02	795.87	85.530	PBC<MDA	CS134
801.95	13.	82.52	1.64	1.762E-02	801.95	8.690	PBC<MDA	CS134
834.85	14.	96.21	1.66	1.706E-02	834.85	99.980	PBC<MDA	MN54
873.23	14.	86.88	1.70	1.645E-02	873.23	12.270	PBC<MDA	EU154
898.04	33.	24.33	1.72	1.607E-02	898.04	93.700	3.009E-01	Y88
946.02	12.	85.33	1.76	1.540E-02	946.02	13.400	PBC<MDA	PA234
1001.00	-7.	223.28	1.81	1.469E-02	1001.00	0.837	PBC<MDA	PA234M
1004.77	1.	994.99	1.81	1.465E-02	1004.77	18.010	PBC<MDA	EU154
1037.84	18.	46.75	1.84	1.425E-02	1037.84	14.130	1.264E+00	Co56
1047.95	5.	222.00	1.84	1.414E-02	1048.07	80.000	PBC<MDA	Cs136

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1050.36	8.	124.38	1.85	1.411E-02	1050.36	1.560	PBC<MDA	RH106
1063.66	9.	116.57	1.86	1.396E-02	1063.66	74.500	PBC<MDA	BI207
1077.40	13.	85.36	1.87	1.381E-02	1077.40	3.300	PBC<MDA	Ga68
1099.25	11.	85.27	1.89	1.358E-02	1099.25	56.500	PBC<MDA	FE59
1112.07	13.	56.25	1.90	1.344E-02	1112.07	13.644	PBC<MDA	EU152
1115.55	9.	95.82	1.90	1.341E-02	1115.55	50.600	PBC<MDA	ZN65
1120.29	5.	211.11	1.91	1.336E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	4.	279.01	1.91	1.336E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	3.949E-02	Sc46
					1121.30	34.900	1.132E-01	Ta182
1173.24	6.	173.57	1.95	1.284E-02	1173.24	99.900	PBC<MDA	CO60
1274.53	10.	58.86	2.03	1.195E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	3.305E-01	EU154
1313.00	7.	124.60	2.07	1.164E-02	1313.00	21.000	PBC<MDA	TL210
1384.30	7.	151.19	2.12	1.111E-02	1384.30	24.290	PBC<MDA	AG110M
1408.00	11.	85.14	2.14	1.094E-02	1408.00	21.005	PBC<MDA	EU152
1460.83	-16.	99.02	2.19	1.059E-02	1460.83	10.670	PBC<MDA	K40
1764.49	-10.	71.81	2.43	8.909E-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
146.70	36.74	80.	40.	9.391E+02	43.02	0.498	- s
297.86	74.55	184.	70.	1.149E+03	38.98	0.818	- 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_Rev15.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	46.59	261.	35.	0.005	83.31	0.990s
TH-227	200.26	50.14	475.	-4.	-0.001	805.53	0.963s
AM-241	237.83	59.54	808.	-60.	-0.008	51.92	0.971s
TH-234	252.53	63.21	250.	5.	0.001	518.87	1.519s
Sn-126	256.79	64.28	561.	29.	0.004	117.88	0.976s
BA-133	323.60	80.99	296.	-37.	-0.005	71.77	0.991s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-237	345.59	86.49	1448.	-30.	-0.004	181.58	0.996s
EU-155	345.80	86.54	1418.	-24.	-0.003	225.46	0.996
Sn-126	347.39	86.94	1394.	0.	0.000	1000.00	0.997s
Sn-126	349.91	87.57	1394.	0.	0.000	1000.00	0.997s
Cd-109	351.79	88.04	1394.	0.	0.000	1000.00	0.998s
Nd-147	364.02	91.10	1063.	-34.	-0.005	135.03	1.001s
TH-234	371.36	92.94	348.	4.	0.001	801.86	0.976
AC-228	373.02	93.35	1028.	-34.	-0.005	132.58	1.003
Gd-153	389.61	97.50	943.	8.	0.001	550.38	1.007
Np-239	397.61	99.50	1594.	-33.	-0.005	170.71	1.008
Gd-153	412.40	103.20	1261.	-32.	-0.004	157.83	1.012s
Np-239	414.40	103.70	1292.	-33.	-0.005	156.83	1.012
EU-155	420.85	105.31	1519.	-37.	-0.005	42.38	1.014s
Np-239	424.11	106.13	1510.	7.	0.001	829.61	1.014
EU-152	486.69	121.78	325.	-7.	-0.001	349.79	1.029s
CO-57	487.81	122.06	333.	0.	0.000	1000.00	1.029s
EU-154	491.96	123.10	241.	26.	0.004	87.36	1.030s
PA-234	524.73	131.29	798.	27.	0.004	148.00	1.038s
HF-181	531.64	133.02	825.	27.	0.004	150.23	1.039s
CE-144	533.70	133.54	761.	26.	0.004	149.62	1.040s
HF-181	544.74	136.30	787.	26.	0.004	151.77	1.042s
CO-57	545.43	136.47	814.	14.	0.002	285.79	1.042s
Tc-99m	561.57	140.51	828.	0.	0.000	1000.00	1.046s
U-235	574.67	143.79	828.	0.	0.000	1000.00	1.049s
CE-141	581.29	145.44	927.	-29.	-0.004	150.98	1.050s
Ba-140	650.14	162.66	370.	-8.	-0.001	364.78	1.066s
U-235	653.01	163.38	378.	0.	0.000	1000.00	1.067
CE-139	662.90	165.85	241.	24.	0.003	95.64	1.069s
Cf-251	705.88	176.60	169.	24.	0.003	101.89	1.079s
U-235	742.34	185.72	154.	83.	0.012	30.05	1.087s
TH-229	773.49	193.51	172.	4.	0.001	671.84	1.094s
U-235	820.76	205.33	190.	-20.	-0.003	81.50	1.105s
TH-229	842.82	210.85	147.	-10.	-0.001	236.58	1.110s
Cf-251	907.40	227.00	128.	7.	0.001	320.25	1.125s
TH-227	943.27	235.97	486.	-26.	-0.004	123.70	1.133
PB-212	955.10	238.93	127.	2.	0.000	830.89	1.413s
PB-214	967.37	242.00	460.	-26.	-0.004	119.92	1.139
EU-152	978.14	244.69	302.	21.	0.003	121.24	1.141s
TH-227	1024.32	256.24	148.	-5.	-0.001	478.47	1.152s
Cd-113m	1054.15	263.70	210.	-8.	-0.001	258.60	1.158s
BI-210M	1062.67	265.83	213.	-11.	-0.001	235.15	1.160s
TL-208	1108.46	277.28	162.	-16.	-0.002	118.70	1.171s
Hg-203	1116.13	279.20	202.	15.	0.002	138.02	1.173s
I-131	1136.52	284.30	160.	-26.	-0.004	97.70	1.177s
TL-210	1183.31	296.00	574.	-21.	-0.003	159.38	1.188s
PA-231	1199.58	300.07	552.	-4.	-0.001	804.52	1.192s
Ir-192	1233.05	308.44	464.	11.	0.002	270.33	1.199s
PA-233	1247.34	312.01	479.	-4.	-0.001	786.62	1.202

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ir-192	1265.24	316.49	475.	0.	0.000	1000.00	1.206s
CR-51	1279.62	320.08	334.	-25.	-0.003	124.48	1.210s
La-140	1314.31	328.76	405.	21.	0.003	136.28	1.217s
Cf-249	1333.02	333.44	449.	-21.	-0.003	145.55	1.222s
AC-228	1352.54	338.32	446.	-18.	-0.002	182.47	1.226
Cs-136	1361.54	340.57	419.	9.	0.001	317.46	1.228
EU-152	1376.40	344.29	428.	0.	0.000	1000.00	1.231s
HF-181	1382.56	345.83	428.	0.	0.000	1000.00	1.233
PB-214	1406.97	351.93	158.	13.	0.002	149.34	1.238s
BA-133	1423.24	356.00	234.	-22.	-0.003	98.67	1.242s
BA-133	1534.57	383.84	284.	-25.	-0.003	99.30	1.267s
Cf-249	1551.01	387.95	309.	-25.	-0.003	103.04	1.271s
SN-113	1565.96	391.69	333.	-22.	-0.003	118.97	1.274s
SB-125	1710.67	427.88	61.	11.	0.002	141.15	1.307s
AG-108M	1734.91	433.94	44.	14.	0.002	103.94	1.312s
PM-146	1814.67	453.88	87.	-11.	-0.002	135.07	1.330s
SB-125	1852.61	463.37	107.	15.	0.002	103.25	1.338s
BE-7	1909.51	477.60	238.	-22.	-0.003	101.39	1.351s
HF-181	1927.12	482.00	202.	-6.	-0.001	338.89	1.355
La-140	1947.21	487.02	248.	-4.	0.000	639.20	1.359s
RU-103	1987.33	497.05	74.	-7.	-0.001	265.64	1.368s
RH-106	2046.57	511.86	125.	175.	0.024	11.75	2.631s
Kr-85	2055.03	513.98	266.	17.	0.002	135.29	1.383s
Ba-140	2148.14	537.26	50.	6.	0.001	253.23	1.404s
CS-134	2252.03	563.24	74.	-18.	-0.002	101.98	1.427s
CS-134	2276.36	569.32	87.	-20.	-0.003	69.16	1.432s
BI-207	2277.89	569.70	128.	-16.	-0.002	96.63	1.432s
TL-208	2331.16	583.02	66.	4.	0.001	355.00	1.444s
SB-125	2401.07	600.50	374.	-23.	-0.003	70.21	1.460s
SB-124	2409.99	602.73	397.	-24.	-0.003	68.45	1.462s
CS-134	2417.91	604.71	489.	-25.	-0.003	127.13	1.463s
BI-214	2436.31	609.31	544.	-54.	-0.008	36.19	1.467
RU-103	2440.26	610.30	539.	-25.	-0.003	132.87	1.468s
AG-108M	2456.19	614.28	564.	-9.	-0.001	388.72	1.472s
RH-106	2486.73	621.92	51.	11.	0.001	145.74	1.479s
SB-125	2542.62	635.89	38.	30.	0.004	33.99	1.491s
I-131	2546.96	636.97	94.	-18.	-0.002	80.09	1.492
AG-110M	2630.10	657.76	74.	16.	0.002	78.55	1.510s
CS-137	2645.69	661.66	68.	14.	0.002	87.93	1.513
PM-144	2785.22	696.54	106.	4.	0.001	367.42	1.544s
NB-94	2809.57	702.63	57.	13.	0.002	85.49	1.549s
SB-124	2890.19	722.79	46.	7.	0.001	148.92	1.567s
AG-108M	2890.80	722.94	53.	13.	0.002	81.65	1.567s
EU-154	2892.49	723.36	66.	13.	0.002	90.35	1.567s
ZR-95	2895.84	724.20	79.	5.	0.001	275.23	1.568s
BI-212	2907.73	727.17	92.	-7.	-0.001	206.76	1.570
PM-146	2941.93	735.72	42.	0.	0.000	1000.00	1.578s
PM-146	2987.69	747.16	42.	2.	0.000	691.01	1.588s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZR-95	3025.97	756.73	23.	24.	0.003	47.93	1.596s
AG-110M	3054.82	763.94	56.	2.	0.000	426.15	1.602s
NB-95	3062.21	765.79	58.	0.	0.000	1000.00	1.604s
PA-234M	3064.70	766.41	40.	14.	0.002	71.21	1.605s
EU-152	3114.73	778.92	56.	-3.	0.000	532.29	1.615s
BI-212	3140.74	785.42	47.	-4.	-0.001	350.75	1.621s
CS-134	3182.54	795.87	69.	4.	0.001	325.37	1.630s
TL-210	3197.46	799.60	73.	0.	0.000	1000.00	1.633s
CS-134	3206.86	801.95	49.	13.	0.002	82.52	1.635s
CO-58	3242.16	810.78	86.	-8.	-0.001	174.51	1.643s
La-140	3262.14	815.77	92.	0.	0.000	1000.00	1.647s
Cs-136	3273.06	818.50	120.	-10.	-0.001	155.26	1.649s
MN-54	3338.46	834.85	36.	14.	0.002	96.21	1.663s
Co-56	3386.15	846.77	62.	-8.	-0.001	185.92	1.674s
TL-208	3441.33	860.56	65.	-13.	-0.002	139.14	1.685s
NB-94	3483.47	871.10	64.	-13.	-0.002	90.34	1.695s
EU-154	3492.00	873.23	67.	14.	0.002	86.88	1.696
PA-234	3521.21	880.53	98.	-18.	-0.002	82.13	1.703s
AG-110M	3537.82	884.68	113.	0.	0.000	1000.00	1.706s
Sc-46	3556.21	889.28	136.	-20.	-0.003	86.65	1.710s
Y-88	3591.26	898.04	6.	33.	0.005	24.33	1.718s
AC-228	3643.38	911.07	69.	-19.	-0.003	54.57	1.729s
AG-110M	3749.09	937.49	35.	-2.	0.000	442.46	1.751s
PA-234	3783.21	946.02	20.	12.	0.002	85.33	1.759
EU-152	3855.58	964.11	57.	-12.	-0.002	93.54	1.774s
AC-228	3875.02	968.97	81.	-4.	-0.001	315.99	1.778s
EU-154	3984.48	996.33	107.	-20.	-0.003	77.09	1.801s
PA-234M	4003.15	1001.00	101.	-7.	-0.001	223.28	1.805s
EU-154	4018.27	1004.77	87.	1.	0.000	994.99	1.808s
Co-56	4150.56	1037.84	11.	18.	0.003	46.75	1.836s
Cs-136	4191.49	1048.07	51.	5.	0.001	222.00	1.845s
RH-106	4200.65	1050.36	47.	8.	0.001	124.38	1.847s
BI-207	4253.86	1063.66	19.	9.	0.001	116.57	1.858s
Ga-68	4308.84	1077.40	21.	13.	0.002	85.36	1.870s
FE-59	4396.27	1099.25	16.	11.	0.002	85.27	1.888s
EU-152	4447.58	1112.07	22.	13.	0.002	56.25	1.899s
ZN-65	4461.46	1115.55	35.	9.	0.001	95.82	1.901s
BI-214	4480.43	1120.29	49.	5.	0.001	211.11	1.906s
Sc-46	4481.49	1120.55	54.	4.	0.001	279.01	1.906s
CO-60	4692.30	1173.24	17.	6.	0.001	173.57	1.950s
Ta-182	4755.57	1189.05	51.	-20.	-0.003	84.70	1.963s
Ta-182	4885.06	1221.41	62.	-23.	-0.003	83.33	1.990s
Co-56	4952.57	1238.28	37.	-12.	-0.002	91.48	2.004s
NA-22	5097.62	1274.53	12.	10.	0.001	58.86	2.034s
EU-154	5097.66	1274.54	44.	-17.	-0.002	59.23	2.034s
FE-59	5165.91	1291.60	28.	-5.	-0.001	238.03	2.048s
TL-210	5251.57	1313.00	11.	7.	0.001	124.60	2.066s
CO-60	5329.61	1332.50	39.	-13.	-0.002	89.33	2.081s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-110M	5536.89	1384.30	18.	7.	0.001	151.19	2.124s
EU-152	5631.75	1408.00	12.	11.	0.001	85.14	2.143s
K-40	5843.19	1460.83	63.	-16.	-0.002	99.02	2.186
La-140	6385.02	1596.21	25.	-8.	-0.001	153.94	2.294s
SB-124	6764.37	1690.98	13.	-6.	-0.001	161.52	2.369s
BI-214	7058.61	1764.49	28.	-10.	-0.001	71.81	2.427s
Y-88	7345.12	1836.06	13.	-1.	0.000	703.56	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	-1.1142E+00				5.31E+01	
			477.60	-1.114E+00	?(	3.776E+00 1.01E+02 1.05E+01	G
NA-22	C	1.1636E-01				9.50E+02	
			1274.53	1.164E-01	&(	2.219E-01 5.89E+01 9.99E+01	G
K-40	N	-1.9100E+00				4.66E+11	
			1460.83	-1.910E+00	(P	4.864E+00 9.90E+01 1.07E+01	G
Sc-46	F	-1.6908E-01				8.38E+01	
			889.28	-1.691E-01	?(	4.894E-01 8.67E+01 1.00E+02	G
			1120.55	3.949E-02	+	3.850E-01 2.79E+02 1.00E+02	G
CR-51	F	-1.0207E+00				2.77E+01	
			320.08	-1.021E+00	?(P	3.579E+00 1.24E+02 9.94E+00	G
MN-54	C	1.1595E-01				3.12E+02	
			834.85	1.159E-01	*(P	2.491E-01 9.62E+01 1.00E+02	G
FE-59	F	2.0592E-01				4.45E+01	
			1099.25	2.059E-01	?(	3.866E-01 8.53E+01 5.65E+01	G
			1291.60	-1.452E-01	-	7.491E-01 2.38E+02 4.32E+01	G
Co-56	C	1.0189E-01				7.73E+01	
			846.77	-6.247E-02	&(P	3.238E-01 1.86E+02 9.99E+01	G
			1238.28	-1.976E-01	& P	5.297E-01 9.15E+01 6.61E+01	G
			1037.84	1.264E+00	&(	1.236E+00 4.67E+01 1.41E+01	G
			1771.35	-5.054E-02	%	2.300E+00 1.22E+03 1.55E+01	A

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	C	3.6286E-02					2.72E+02	
			122.06	0.000E+00	*(	2.423E-01	1.00E+03	8.56E+01 G
			136.47	3.271E-01	?(	3.130E+00	2.86E+02	1.07E+01 G
CO-58	C	-6.1311E-02					7.09E+01	
			810.78	-6.131E-02	?(	3.666E-01	1.75E+02	9.95E+01 G
CO-60	F	-1.5137E-01					1.93E+03	
			1332.50	-1.514E-01	?(P	3.825E-01	8.93E+01	1.00E+02 G
			1173.24	6.301E-02	+ P	2.385E-01	1.74E+02	9.99E+01 G
ZN-65	F	1.9148E-01					2.44E+02	
			1115.55	1.915E-01	?(	6.238E-01	9.58E+01	5.06E+01 G
NB-94	I	9.5707E-02					7.41E+06	
			702.63	9.571E-02	?(	2.749E-01	8.55E+01	9.79E+01 G
			871.10	-1.111E-01	-	3.378E-01	9.03E+01	9.99E+01 G
ZR-95	I	3.2717E-01					6.40E+01	
			756.73	3.272E-01	(	3.486E-01	4.79E+01	5.45E+01 G
			724.20	7.649E-02	-	7.284E-01	2.75E+02	4.42E+01 G
RU-103	I	-4.0168E-02					3.93E+01	
			497.05	-4.017E-02	&(	2.573E-01	2.66E+02	9.09E+01 G
			610.30	-2.772E+00	+	1.230E+01	1.33E+02	5.75E+00 GA
RH-106	I	1.3041E+00					3.74E+02	
			621.92	6.946E-01	&(	2.351E+00	1.46E+02	9.93E+00 G
			1050.36	5.184E+00	?(P	2.182E+01	1.24E+02	1.56E+00 G
			511.86	4.905E+00	?	1.531E+00	1.18E+01	2.00E+01 GA
AG-108M	C	9.0759E-02					1.53E+05	
			433.94	7.479E-02	?(P	1.850E-01	1.04E+02	9.05E+01 G
			722.94	1.067E-01	?(	2.921E-01	8.17E+01	9.08E+01 G
			614.28	-6.186E-02	-	8.086E-01	3.89E+02	8.98E+01 G
AG-110M	F	1.0159E-01					2.50E+02	
			884.68	0.000E+00	?(	6.136E-01	1.00E+03	7.27E+01 G
			657.76	1.171E-01	&(P	3.043E-01	7.85E+01	9.46E+01 G
			937.49	-6.409E-02	+ P	7.936E-01	4.42E+02	3.44E+01 G
			1384.30	3.604E-01	?(	1.157E+00	1.51E+02	2.43E+01 G
			763.94	8.511E-02	?(	1.274E+00	4.26E+02	2.23E+01 G
SN-113	F	-1.5962E-01					1.15E+02	
			391.69	-1.596E-01	?(	6.353E-01	1.19E+02	6.40E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-124	F	-9.4716E-02					6.02E+01	
			602.73	-1.544E-01	?(P	6.144E-01	6.84E+01	9.83E+01 G
			1690.98	-1.777E-01	+	6.051E-01	1.62E+02	4.78E+01 G
			722.79	4.481E-01	?(	2.305E+00	1.49E+02	1.08E+01 G
SB-125	I	6.4871E-01					1.01E+03	
			427.88	1.903E-01	?(P	6.518E-01	1.41E+02	2.96E+01 G
			600.50	-8.070E-01	+ P	3.271E+00	7.02E+01	1.79E+01 G
			635.89	1.774E+00	?(	1.839E+00	3.40E+01	1.13E+01 G
			463.37	7.296E-01	?(	2.536E+00	1.03E+02	1.05E+01 G
I-131	I	-1.8568E-03					8.02E+00	
			364.48	-1.857E-03	&(P	2.493E-01	5.30E+03	8.17E+01 G
			284.30	-1.587E+00	+	3.780E+00	9.77E+01	6.14E+00 G
			636.97	-1.656E+00	+	4.426E+00	8.01E+01	7.17E+00 G
Gd-153	F	5.9504E-02					2.42E+02	
			97.50	5.950E-02	?(	1.097E+00	5.50E+02	3.00E+01 G
			103.20	-3.340E-01	&	1.754E+00	1.58E+02	2.18E+01 G
Ga-68	C	6.9139E+00					4.71E-02	
			1077.40	6.914E+00	?(	1.288E+01	8.54E+01	3.30E+00 G
BA-133	F	-1.5694E-01					3.85E+03	
			356.00	-1.569E-01	?(	5.174E-01	9.87E+01	6.20E+01 G
			302.85	2.540E-08	&	2.382E+00	2.78E+09	1.83E+01 G
			383.84	-1.253E+00	+	4.153E+00	9.93E+01	8.94E+00 GA
			80.99	-2.462E-01	+ P	5.490E-01	7.18E+01	3.41E+01 GA
CS-134	I	1.3688E-01					7.54E+02	
			795.87	3.360E-02	?(	3.804E-01	3.25E+02	8.55E+01 G
			604.71	-1.616E-01	+	6.861E-01	1.27E+02	9.76E+01 G
			569.32	-7.934E-01	+	1.818E+00	6.92E+01	1.54E+01 G
			801.95	1.153E+00	&(	3.195E+00	8.25E+01	8.69E+00 G
			563.24	-1.270E+00	+	3.070E+00	1.02E+02	8.35E+00 G
CS-137	I	1.1075E-01					1.10E+04	
			661.66	1.107E-01	&(	3.272E-01	8.79E+01	8.52E+01 G
CE-139	F	8.0345E-02					1.38E+02	
			165.85	8.034E-02	?(	2.565E-01	9.56E+01	7.99E+01 G
Ba-140	I	1.3711E-01					1.28E+01	
			537.26	1.371E-01	?(P	8.493E-01	2.53E+02	2.44E+01 G
			162.66	-3.250E-01	&	4.004E+00	3.65E+02	6.22E+00 G
			304.85	-6.539E-08	%	1.022E+01	4.63E+09	4.29E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
La-140	I	-2.7081E-02					1.28E+01	
			1596.21	-1.242E-01	&(	3.899E-01	1.54E+02	9.54E+01 G
			487.02	-4.152E-02	&	9.035E-01	6.39E+02	4.55E+01 G
			328.76	4.292E-01	?(	1.958E+00	1.36E+02	2.03E+01 G
			815.77	0.000E+00	&	1.628E+00	1.00E+03	2.33E+01 G
CE-141	I	-1.5127E-01					3.25E+01	
			145.44	-1.513E-01	?(	7.611E-01	1.51E+02	4.82E+01 G
CE-144	I	5.7918E-01					2.85E+02	
			133.54	5.792E-01	?(	2.891E+00	1.50E+02	1.11E+01 G
PM-144	C	2.8504E-02					3.63E+02	
			696.54	2.850E-02	&(	3.612E-01	3.67E+02	9.90E+01 G
			618.06	-3.231E-03	& P	7.424E-01	4.00E+03	9.91E+01 G
EU-152	F	3.8685E-01					4.94E+03	
			121.78	-6.062E-02	*(	7.173E-01	3.50E+02	2.86E+01 G
			344.29	0.000E+00	&	1.588E+00	1.00E+03	2.65E+01 G
			1112.07	1.021E+00	?(	1.860E+00	5.62E+01	1.36E+01 G
			778.92	-1.786E-01	+	2.237E+00	5.32E+02	1.29E+01 G
			964.11	-7.528E-01	+	2.377E+00	9.35E+01	1.46E+01 G
			244.69	9.330E-01	?(P	3.771E+00	1.21E+02	7.58E+00 G
			1408.00	6.371E-01	?	1.139E+00	8.51E+01	2.10E+01 GA
EU-154	I	3.7926E-01					3.14E+03	
			123.10	1.500E-01	?(	4.365E-01	8.74E+01	4.08E+01 G
			1274.54	-5.724E-01	&	1.111E+00	5.92E+01	3.52E+01 G
			723.36	4.795E-01	?(	1.458E+00	9.04E+01	2.02E+01 G
			873.23	9.761E-01	?(P	2.815E+00	8.69E+01	1.23E+01 G
			1004.77	7.021E-02	-	2.436E+00	9.95E+02	1.80E+01 G
			996.33	-1.760E+00	+	4.516E+00	7.71E+01	1.06E+01 G
EU-155	I	-4.0154E-01					1.81E+03	
			105.31	-4.015E-01	&(P	1.983E+00	4.24E+01	2.12E+01 G
			86.54	-1.736E-01	+	1.304E+00	2.25E+02	3.07E+01 G
HF-181	F	7.6673E-02					4.24E+01	
			482.00	-3.976E-02	?(	4.588E-01	3.39E+02	8.05E+01 G
			133.02	1.535E-01	&(	7.691E-01	1.50E+02	4.33E+01 G
			345.83	0.000E+00	-	2.801E+00	1.00E+03	1.51E+01 G
			136.30	1.110E+00	?(	5.619E+00	1.52E+02	5.85E+00 G
Ta-182	F	9.9384E-03					1.14E+02	
			1121.30	9.938E-03	%(	1.145E+00	3.25E+03	3.49E+01 G
			1221.41	-9.522E-01	+	1.639E+00	8.33E+01	2.70E+01 G
			1189.05	-1.384E+00	+	2.431E+00	8.47E+01	1.62E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Hg-203	F	6.7528E-02					4.66E+01	
			279.20	6.753E-02	?(	3.140E-01	1.38E+02	8.15E+01 G
TL-208	N	3.2314E-02					6.98E+02	
			583.02	3.231E-02	?(P	2.948E-01	3.55E+02	8.45E+01 G
			277.28	-9.070E-01	&	3.624E+00	1.19E+02	6.31E+00 G
			860.56	-8.736E-01	+	2.707E+00	1.39E+02	1.24E+01 G
PM-146	C	-8.6242E-02					2.02E+03	
			453.88	-8.624E-02	(P	3.644E-01	1.35E+02	6.50E+01 G
			747.16	4.384E-02	+	7.214E-01	6.91E+02	3.40E+01 G
			735.72	0.000E+00	&	1.077E+00	1.00E+03	2.25E+01 G
Y-88	F	1.3499E-01					1.07E+02	
			1836.06	-2.174E-02	?(	3.217E-01	7.04E+02	9.92E+01 G
			898.04	3.009E-01	&(P	1.334E-01	2.43E+01	9.37E+01 G
Cd-113m		-4.7713E+02					5.33E+03	
			263.70	-4.771E+02	?(	4.189E+03	2.59E+02	6.00E-03 K
Cf-251	T	4.0473E-01					3.28E+05	
			176.60	4.047E-01	?(	1.052E+00	1.02E+02	1.70E+01 G
			227.00	3.457E-01	?	2.878E+00	3.20E+02	6.30E+00 GA
Cf-249	T	-1.7144E-01					1.28E+05	
			387.95	-1.714E-01	(	5.897E-01	1.03E+02	6.60E+01 G
			333.44	-5.581E-01	+	2.719E+00	1.46E+02	1.55E+01 G
Sn-126		7.0033E-01					3.65E+07	
			87.57	0.000E+00	&	1.059E+00	1.00E+03	3.75E+01 GA
			64.28	7.003E-01	?(	2.752E+00	1.18E+02	9.70E+00 G
			86.94	0.000E+00	-	4.392E+00	1.00E+03	9.04E+00 GA
PB-210	N	2.2723E+00					8.14E+03	
			46.54	2.272E+00	*(P	5.041E+00	8.33E+01	4.25E+00 G
PB-212	N	1.9047E-02					6.98E+02	
			238.63	1.905E-02	(P	4.286E-01	8.31E+02	4.33E+01 G
			300.03	1.121E-01	% P	1.326E+01	3.53E+03	3.28E+00 GA
PB-214	N	1.4592E-01					5.84E+05	
			351.93	1.459E-01	(P	7.029E-01	1.49E+02	3.76E+01 G
			295.09	-5.900E-02	% P	2.143E+00	1.10E+03	1.93E+01 G
			242.00	-1.172E+00	+	4.691E+00	1.20E+02	7.43E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-207	C	1.1394E-01					1.18E+04	
			1063.66	1.139E-01	?(P	3.050E-01	1.17E+02	7.45E+01 G
			569.70	-9.765E-02	+ P	3.430E-01	9.66E+01	9.77E+01 G
BI-212	N	-6.4423E-01					6.98E+02	
			727.17	-6.442E-01	(	4.573E+00	2.07E+02	7.55E+00 G
			785.42	-2.259E+00	+ P	2.094E+01	3.51E+02	1.28E+00 GA
BI-214	N	-7.5131E-01					5.84E+05	
			609.31	-7.513E-01	(P	1.538E+00	3.62E+01	4.61E+01 G
			1120.29	3.362E-01	+ P	2.440E+00	2.11E+02	1.51E+01 G
			1764.49	-1.026E+00	+ P	2.776E+00	7.18E+01	1.54E+01 G
BI-210M	T	-7.7524E-02					1.10E+09	
			265.83	-7.752E-02	?(P	5.084E-01	2.35E+02	5.00E+01 G
			304.90	-1.002E-08	%	1.566E+00	4.63E+09	2.80E+01 G
AC-228	N	-5.8493E-01					2.10E+03	
			911.07	-5.849E-01	(P	1.252E+00	5.46E+01	2.90E+01 G
			968.97	-1.914E-01	& P	2.348E+00	3.16E+02	1.75E+01 G
			338.32	-6.221E-01	& P	3.533E+00	1.82E+02	1.20E+01 G
			93.35	-1.396E+00	+	6.156E+00	1.33E+02	5.56E+00 XA
TH-227	N	-2.5111E-01					7.95E+03	
			256.24	-2.511E-01	*(	2.983E+00	4.78E+02	7.00E+00 G
			235.97	-6.938E-01	+	2.865E+00	1.24E+02	1.23E+01 G
			50.14	-1.260E-01	+	3.426E+00	8.06E+02	8.00E+00 G
TH-229	N	2.4806E-01					2.68E+06	
			193.51	2.481E-01	&(	4.322E+00	6.72E+02	4.40E+00 G
			210.85	-1.011E+00	+	6.187E+00	2.37E+02	2.99E+00 G
TH-234	N	2.3077E-01					1.63E+12	
			92.59	1.745E-01	(P	3.609E+00	8.02E+02	5.58E+00 G
			63.29	3.132E-01	(P	4.757E+00	5.19E+02	3.81E+00 G
PA-231	N	-9.6945E-08					1.20E+07	
			302.65	-9.695E-08	%(	1.515E+01	4.63E+09	2.88E+00 G
			300.07	-6.654E-01	+ P	1.771E+01	8.05E+02	2.46E+00 G
PA-233	C	-4.3519E-02					7.82E+08	
			312.01	-4.352E-02	?(P	1.158E+00	7.87E+02	3.60E+01 G
			300.18	7.466E-08	%	7.002E+00	2.78E+09	6.20E+00 G
PA-234	N	5.6159E-01					1.63E+12	
			131.29	3.669E-01	?(	1.811E+00	1.48E+02	1.80E+01 G
			946.02	8.232E-01	(	1.585E+00	8.53E+01	1.34E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.47 1.230E-02 %   3.810E+00 8.91E+03 8.20E+00 G
                          883.24 6.753E-02 %   4.654E+00 1.99E+03 9.60E+00 G
                          880.53-2.517E+00 +   6.905E+00 8.21E+01 6.00E+00 GA

PA-234M  N   3.7325E+00                                      1.63E+12
                         1001.00-7.371E+00 ?(P 5.599E+01 2.23E+02 8.37E-01 G
                          766.41 3.534E+01 ?(  8.372E+01 7.12E+01 2.94E-01 G

AM-241   T  -4.0307E-01                                      1.58E+05
                           59.54-4.031E-01 *(P 9.130E-01 5.19E+01 3.59E+01 G

Np-237   F  -5.1097E-01                                      2.14E+06
                           86.49-5.110E-01 &(  3.088E+00 1.82E+02 1.31E+01 G

Ir-192   F   3.7700E-02                                      7.40E+01
                          316.49 0.000E+00 ?(  4.813E-01 1.00E+03 8.70E+01 G
                          468.06-3.379E-03 &   5.391E-01 4.60E+03 5.18E+01 G
                          308.44 1.411E-01 ?(  1.283E+00 2.70E+02 3.18E+01 G

Cs-136   F   1.3283E-03                                      1.30E+01
                          818.50-8.148E-02 ?(  4.300E-01 1.55E+02 1.00E+02 G
                         1048.07 5.732E-02 ?(  4.433E-01 2.22E+02 8.00E+01 G
                          340.57 8.240E-02 ?(  8.816E-01 3.17E+02 4.69E+01 G

Np-239   T   6.7551E-02                                      2.36E+00
                          103.70-3.130E-01 +   1.633E+00 1.57E+02 2.40E+01 X
                          106.13 6.755E-02  (  1.872E+00 8.30E+02 2.27E+01 G
                           99.50-5.076E-01 +   2.882E+00 1.71E+02 1.50E+01 X

Nd-147       1.4736E-02                                      1.11E+01
                          531.00 1.474E-02 %(  1.724E+00 4.77E+03 1.30E+01 G
                           91.10-2.734E-01 +   1.228E+00 1.35E+02 2.83E+01 G

Kr-85    I   2.2623E+01                                      3.92E+03
                          513.98 2.262E+01 &(  1.028E+02 1.35E+02 4.30E-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	475.	-4.	-0.001	805.53	-1.260E-01	
AM-241	59.54	808.	-60.	-0.008	51.92	-4.031E-01	P
Sn-126	64.28	561.	29.	0.004	117.88	7.003E-01	
BA-133	80.99	296.	-37.	-0.005	71.77	-2.462E-01	P
Np-237	86.49	1448.	-30.	-0.004	181.58	-5.110E-01	
EU-155	86.54	1418.	-24.	-0.003	225.46	-1.736E-01	
Nd-147	91.10	1063.	-34.	-0.005	135.03	-2.734E-01	
AC-228	93.35	1028.	-34.	-0.005	132.58	-1.396E+00	
Gd-153	97.50	943.	8.	0.001	550.38	5.950E-02	
Gd-153	103.20	1261.	-32.	-0.004	157.83	-3.340E-01	
EU-155	105.31	1519.	-37.	-0.005	42.38	-4.015E-01	P
EU-152	121.78	325.	-7.	-0.001	349.79	-6.062E-02	
EU-154	123.10	241.	26.	0.004	87.36	1.500E-01	
HF-181	133.02	825.	27.	0.004	150.23	1.535E-01	
CE-144	133.54	761.	26.	0.004	149.62	5.792E-01	
HF-181	136.30	787.	26.	0.004	151.77	1.110E+00	
CO-57	136.47	814.	14.	0.002	285.79	3.271E-01	
CE-141	145.44	927.	-29.	-0.004	150.98	-1.513E-01	
Ba-140	162.66	370.	-8.	-0.001	364.78	-3.250E-01	
CE-139	165.85	241.	24.	0.003	95.64	8.034E-02	
Cf-251	176.60	169.	24.	0.003	101.89	4.047E-01	
U-235	185.72	154.	83.	0.012	30.05	4.470E-01	
TH-229	193.51	172.	4.	0.001	671.84	2.481E-01	
U-235	205.33	190.	-20.	-0.003	81.50	-1.259E+00	P
TH-229	210.85	147.	-10.	-0.001	236.58	-1.011E+00	
Cf-251	227.00	128.	7.	0.001	320.25	3.457E-01	
TH-227	235.97	486.	-26.	-0.004	123.70	-6.938E-01	
PB-214	242.00	460.	-26.	-0.004	119.92	-1.172E+00	
EU-152	244.69	302.	21.	0.003	121.24	9.330E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-227	256.24	148.	-5.	-0.001	478.47	-2.511E-01	
Cd-113m	263.70	210.	-8.	-0.001	258.60	-4.771E+02	
BI-210M	265.83	213.	-11.	-0.001	235.15	-7.752E-02	P
TL-208	277.28	162.	-16.	-0.002	118.70	-9.070E-01	
I-131	284.30	160.	-26.	-0.004	97.70	-1.587E+00	
TL-210	296.00	574.	-21.	-0.003	159.38	-1.045E-01	
PA-231	300.07	552.	-4.	-0.001	804.52	-6.654E-01	P
Ir-192	308.44	464.	11.	0.002	270.33	1.411E-01	
PA-233	312.01	479.	-4.	-0.001	786.62	-4.352E-02	P
CR-51	320.08	334.	-25.	-0.003	124.48	-1.021E+00	P
La-140	328.76	405.	21.	0.003	136.28	4.292E-01	
Cf-249	333.44	449.	-21.	-0.003	145.55	-5.581E-01	
AC-228	338.32	446.	-18.	-0.002	182.47	-6.221E-01	P
PB-214	351.93	158.	13.	0.002	149.34	1.459E-01	P
BA-133	356.00	234.	-22.	-0.003	98.67	-1.569E-01	
BA-133	383.84	284.	-25.	-0.003	99.30	-1.253E+00	
Cf-249	387.95	309.	-25.	-0.003	103.04	-1.714E-01	
SN-113	391.69	333.	-22.	-0.003	118.97	-1.596E-01	
SB-125	427.88	61.	11.	0.002	141.15	1.903E-01	P
AG-108M	433.94	44.	14.	0.002	103.94	7.479E-02	P
PM-146	453.88	87.	-11.	-0.002	135.07	-8.624E-02	P
SB-125	463.37	107.	15.	0.002	103.25	7.296E-01	
BE-7	477.60	238.	-22.	-0.003	101.39	-1.114E+00	
HF-181	482.00	202.	-6.	-0.001	338.89	-3.976E-02	
La-140	487.02	248.	-4.	0.000	639.20	-4.152E-02	
RU-103	497.05	74.	-7.	-0.001	265.64	-4.017E-02	
RH-106	511.86	125.	175.	0.024	11.75	4.905E+00	
Kr-85	513.98	266.	17.	0.002	135.29	2.262E+01	
Ba-140	537.26	50.	6.	0.001	253.23	1.371E-01	P
CS-134	563.24	74.	-18.	-0.002	101.98	-1.270E+00	
CS-134	569.32	87.	-20.	-0.003	69.16	-7.934E-01	
BI-207	569.70	128.	-16.	-0.002	96.63	-9.765E-02	P
TL-208	583.02	66.	4.	0.001	355.00	3.231E-02	P
SB-125	600.50	374.	-23.	-0.003	70.21	-8.070E-01	P
SB-124	602.73	397.	-24.	-0.003	68.45	-1.544E-01	P
CS-134	604.71	489.	-25.	-0.003	127.13	-1.616E-01	
BI-214	609.31	544.	-54.	-0.008	36.19	-7.513E-01	P
RU-103	610.30	539.	-25.	-0.003	132.87	-2.772E+00	
AG-108M	614.28	564.	-9.	-0.001	388.72	-6.186E-02	
RH-106	621.92	51.	11.	0.001	145.74	6.946E-01	
SB-125	635.89	38.	30.	0.004	33.99	1.774E+00	
I-131	636.97	94.	-18.	-0.002	80.09	-1.656E+00	
AG-110M	657.76	74.	16.	0.002	78.55	1.171E-01	P
CS-137	661.66	68.	14.	0.002	87.93	1.107E-01	
PM-144	696.54	106.	4.	0.001	367.42	2.850E-02	
NB-94	702.63	57.	13.	0.002	85.49	9.571E-02	
SB-124	722.79	46.	7.	0.001	148.92	4.481E-01	
AG-108M	722.94	53.	13.	0.002	81.65	1.067E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	723.36	66.	13.	0.002	90.35	4.795E-01	
ZR-95	724.20	79.	5.	0.001	275.23	7.649E-02	
BI-212	727.17	92.	-7.	-0.001	206.76	-6.442E-01	
PM-146	747.16	42.	2.	0.000	691.01	4.384E-02	
ZR-95	756.73	23.	24.	0.003	47.93	3.272E-01	
AG-110M	763.94	56.	2.	0.000	426.15	8.511E-02	
PA-234M	766.41	40.	14.	0.002	71.21	3.534E+01	
EU-152	778.92	56.	-3.	0.000	532.29	-1.786E-01	
BI-212	785.42	47.	-4.	-0.001	350.75	-2.259E+00	P
CS-134	795.87	69.	4.	0.001	325.37	3.360E-02	
CS-134	801.95	49.	13.	0.002	82.52	1.153E+00	
CO-58	810.78	86.	-8.	-0.001	174.51	-6.131E-02	
MN-54	834.85	36.	14.	0.002	96.21	1.159E-01	P
Co-56	846.77	62.	-8.	-0.001	185.92	-6.247E-02	P
TL-208	860.56	65.	-13.	-0.002	139.14	-8.736E-01	
NB-94	871.10	64.	-13.	-0.002	90.34	-1.111E-01	
EU-154	873.23	67.	14.	0.002	86.88	9.761E-01	P
Sc-46	889.28	136.	-20.	-0.003	86.65	-1.691E-01	
Y-88	898.04	6.	33.	0.005	24.33	3.009E-01	P
AC-228	911.07	69.	-19.	-0.003	54.57	-5.849E-01	P
AG-110M	937.49	35.	-2.	0.000	442.46	-6.409E-02	P
EU-152	964.11	57.	-12.	-0.002	93.54	-7.528E-01	
AC-228	968.97	81.	-4.	-0.001	315.99	-1.914E-01	P
EU-154	996.33	107.	-20.	-0.003	77.09	-1.760E+00	
PA-234M	1001.00	101.	-7.	-0.001	223.28	-7.371E+00	P
EU-154	1004.77	87.	1.	0.000	994.99	7.021E-02	
Co-56	1037.84	11.	18.	0.003	46.75	1.264E+00	
RH-106	1050.36	47.	8.	0.001	124.38	5.184E+00	P
BI-207	1063.66	19.	9.	0.001	116.57	1.139E-01	P
Ga-68	1077.40	21.	13.	0.002	85.36	6.914E+00	
FE-59	1099.25	16.	11.	0.002	85.27	2.059E-01	
EU-152	1112.07	22.	13.	0.002	56.25	1.021E+00	
ZN-65	1115.55	35.	9.	0.001	95.82	1.915E-01	
BI-214	1120.29	49.	5.	0.001	211.11	3.362E-01	P
Sc-46	1120.55	54.	4.	0.001	279.01	3.949E-02	
CO-60	1173.24	17.	6.	0.001	173.57	6.301E-02	P
Ta-182	1189.05	51.	-20.	-0.003	84.70	-1.384E+00	
Ta-182	1221.41	62.	-23.	-0.003	83.33	-9.522E-01	
Co-56	1238.28	37.	-12.	-0.002	91.48	-1.976E-01	P
NA-22	1274.53	12.	10.	0.001	58.86	1.164E-01	
EU-154	1274.54	44.	-17.	-0.002	59.23	-5.724E-01	
FE-59	1291.60	28.	-5.	-0.001	238.03	-1.452E-01	
TL-210	1313.00	11.	7.	0.001	124.60	3.788E-01	
CO-60	1332.50	39.	-13.	-0.002	89.33	-1.514E-01	P
AG-110M	1384.30	18.	7.	0.001	151.19	3.604E-01	
EU-152	1408.00	12.	11.	0.001	85.14	6.371E-01	
K-40	1460.83	63.	-16.	-0.002	99.02	-1.910E+00	P
La-140	1596.21	25.	-8.	-0.001	153.94	-1.242E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
SB-124	1690.98	13.	-6.	-0.001	161.52	-1.777E-01		
BI-214	1764.49	28.	-10.	-0.001	71.81	-1.026E+00		P
Y-88	1836.06	13.	-1.	0.000	703.56	-2.174E-02		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
BE-7	#A	-1.1142E+00	-1.1142E+00	1.014E+02%	3.78E+00
NA-22	#A	1.1636E-01	1.1636E-01	5.886E+01%	2.22E-01
K-40	#A	-1.9100E+00	-1.9100E+00	9.902E+01%	4.86E+00
Sc-46	#A	-1.6908E-01	-1.6908E-01	8.665E+01%	4.89E-01
CR-51	#A	-1.0207E+00	-1.0207E+00	1.245E+02%	3.58E+00
MN-54	#A	1.1595E-01	1.1595E-01	9.621E+01%	2.49E-01
FE-59	#A	2.0592E-01	2.0592E-01	8.527E+01%	3.87E-01
Co-56	#A	1.0189E-01	1.0189E-01	4.675E+01%	3.24E-01
CO-57	#A	3.6286E-02	3.6286E-02	2.858E+02%	2.42E-01
CO-58	#A	-6.1311E-02	-6.1311E-02	1.745E+02%	3.67E-01
CO-60	#A	-1.5137E-01	-1.5137E-01	8.933E+01%	3.82E-01
ZN-65	#A	1.9148E-01	1.9148E-01	9.582E+01%	6.24E-01
NB-94	#A	9.5707E-02	9.5707E-02	8.549E+01%	2.75E-01
ZR-95	#A	3.2717E-01	3.2717E-01	4.793E+01%	3.49E-01
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.91E-01
RU-103	#A	-4.0168E-02	-4.0168E-02	2.656E+02%	2.57E-01
RH-106	#A	1.3041E+00	1.3041E+00	9.580E+01%	2.35E+00
AG-108M	#A	9.0759E-02	9.0759E-02	6.609E+01%	1.85E-01
AG-110M	#A	1.0159E-01	1.0159E-01	7.855E+01%	6.14E-01
SN-113	#A	-1.5962E-01	-1.5962E-01	1.190E+02%	6.35E-01
SB-124	#A	-9.4715E-02	-9.4716E-02	6.845E+01%	6.14E-01
SB-125	#A	6.4871E-01	6.4871E-01	3.399E+01%	6.52E-01
I-131	#A	-1.8567E-03	-1.8568E-03	5.303E+03%	2.49E-01
Gd-153	#A	5.9504E-02	5.9504E-02	5.504E+02%	1.10E+00
Ga-68	#A	6.8881E+00	6.9139E+00	8.536E+01%	1.29E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.28E-01
BA-133	#A	-1.5694E-01	-1.5694E-01	9.867E+01%	5.17E-01
CS-134	#A	1.3688E-01	1.3688E-01	8.252E+01%	3.80E-01
CS-137	#A	1.1075E-01	1.1075E-01	8.793E+01%	3.27E-01
CE-139	#A	8.0345E-02	8.0345E-02	9.564E+01%	2.57E-01
Ba-140	#A	1.3710E-01	1.3711E-01	2.532E+02%	8.49E-01
La-140	#A	-2.7081E-02	-2.7081E-02	1.028E+02%	3.90E-01
CE-141	#A	-1.5127E-01	-1.5127E-01	1.510E+02%	7.61E-01
CE-144	#A	5.7918E-01	5.7918E-01	1.496E+02%	2.89E+00
PM-144	#A	2.8504E-02	2.8504E-02	3.674E+02%	3.61E-01
EU-152	#A	3.8685E-01	3.8685E-01	5.625E+01%	7.17E-01
EU-154	#A	3.7926E-01	3.7926E-01	5.093E+01%	4.37E-01

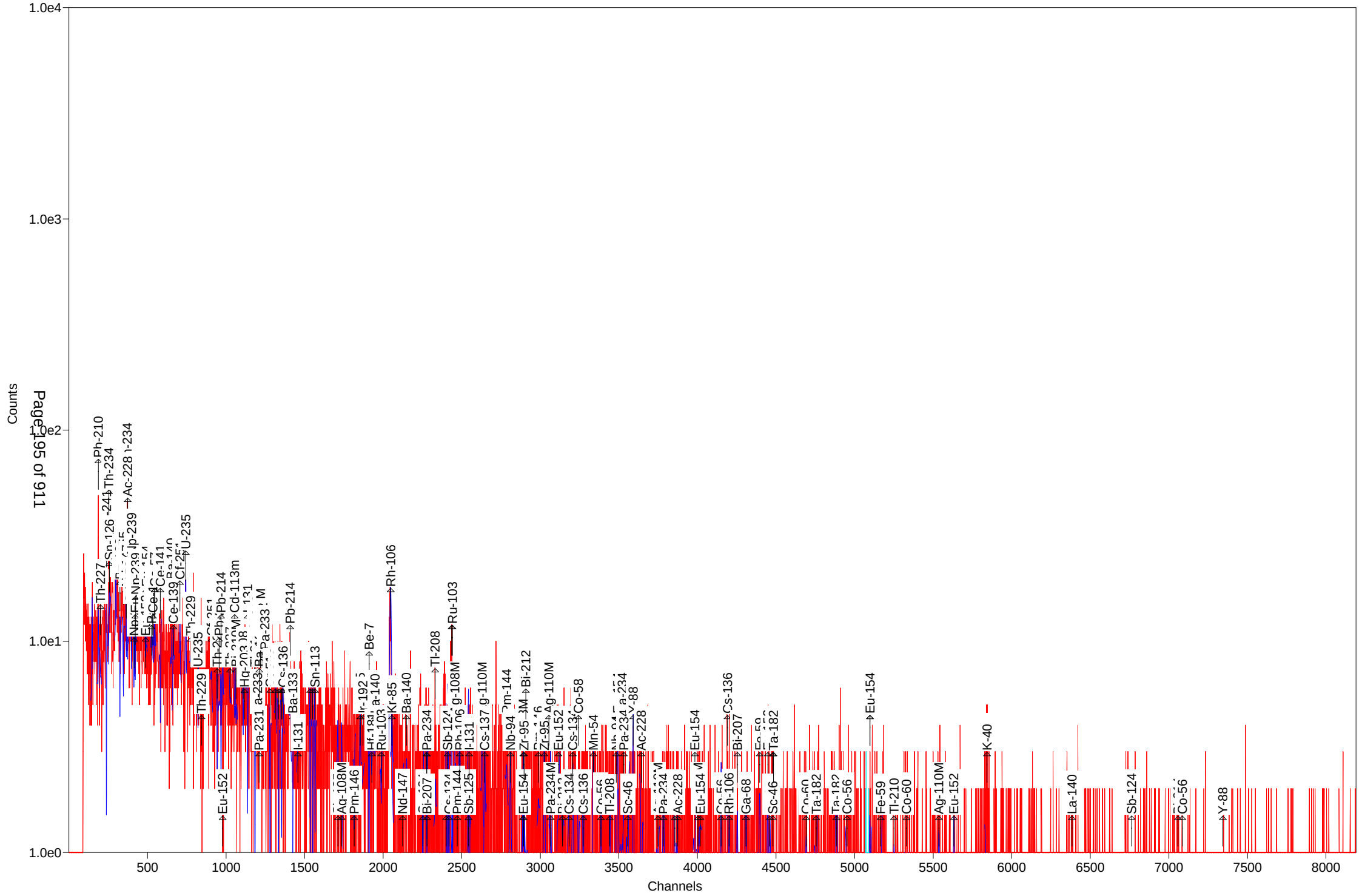
EU-155	#A	-4.0154E-01	-4.0154E-01	4.238E+01%	1.98E+00
HF-181	#A	7.6672E-02	7.6673E-02	1.335E+02%	4.59E-01
Ta-182	#A	9.9384E-03	9.9384E-03	3.254E+03%	1.14E+00
Hg-203	#A	6.7528E-02	6.7528E-02	1.380E+02%	3.14E-01
TL-208	#A	3.2314E-02	3.2314E-02	3.550E+02%	2.95E-01
PM-146	#A	-8.6242E-02	-8.6242E-02	1.351E+02%	3.64E-01
Y-88	#A	1.3499E-01	1.3499E-01	2.433E+01%	3.22E-01
Cd-113m	#A	-4.7713E+02	-4.7713E+02	2.586E+02%	4.19E+03
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.05E+01
Cf-251	#A	4.0473E-01	4.0473E-01	1.019E+02%	1.05E+00
Cf-249	#A	-1.7144E-01	-1.7144E-01	1.030E+02%	5.90E-01
Sn-126	#A	7.0033E-01	7.0033E-01	1.179E+02%	2.75E+00
PB-210	#A	2.2723E+00	2.2723E+00	8.331E+01%	5.04E+00
PB-212	A	1.9047E-02	1.9047E-02	8.309E+02%	4.29E-01
PB-214	#A	1.4592E-01	1.4592E-01	1.493E+02%	7.03E-01
BI-207	#A	1.1394E-01	1.1394E-01	1.166E+02%	3.05E-01
BI-212	#A	-6.4423E-01	-6.4423E-01	2.068E+02%	4.57E+00
U-235	#A	0.0000E+00	0.0000E+00	7.071E+02%	3.15E+00
BI-214	#A	-7.5131E-01	-7.5131E-01	3.619E+01%	1.54E+00
BI-210M	#A	-7.7524E-02	-7.7524E-02	2.352E+02%	5.08E-01
AC-228	#A	-5.8493E-01	-5.8493E-01	5.457E+01%	1.25E+00
TH-227	#A	-2.5111E-01	-2.5111E-01	4.785E+02%	2.98E+00
TH-229	#A	2.4806E-01	2.4806E-01	6.718E+02%	4.32E+00
TH-234	A	2.3077E-01	2.3077E-01	4.775E+02%	3.61E+00
PA-231	#A	-9.6945E-08	-9.6945E-08	4.629E+09%	1.52E+01
PA-233	#A	-4.3519E-02	-4.3519E-02	7.866E+02%	1.16E+00
PA-234	A	5.6159E-01	5.6159E-01	8.533E+01%	1.81E+00
PA-234M	#A	3.7325E+00	3.7325E+00	7.121E+01%	5.60E+01
AM-241	#A	-4.0307E-01	-4.0307E-01	5.192E+01%	9.13E-01
Np-237	#A	-5.1097E-01	-5.1097E-01	1.816E+02%	3.09E+00
Ir-192	#A	3.7700E-02	3.7700E-02	2.703E+02%	4.81E-01
Cs-136	#A	1.3282E-03	1.3283E-03	1.391E+02%	4.30E-01
Np-239	A	6.7546E-02	6.7551E-02	8.296E+02%	1.87E+00
Nd-147	#A	1.4735E-02	1.4736E-02	4.773E+03%	1.72E+00
TL-210	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.38E-01
Kr-85	#A	2.2623E+01	2.2623E+01	1.353E+02%	1.03E+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 (25.1 to 1999.6 keV) 0.000E+00 Bq/Sample
Total Decayed Activity (25.1 to 1999.6 keV) 0.0000000E+00 Bq/Sample

412878_Gamma_180-86110-A-6-B DU. 16_Gamma_20190339.spc.



Test America St. Louis Spectrum ID: 17_Gamma_20190309

Sample Description: 412878_Gamma_180-86110-A-12-A
Detector: Detector #17
Batch ID: 412878
Work Order Number: Gamma
Lot Number: 180-86110-A-12-A

Decay to Time: 2/19/2019 09:40 Live Time: 7200 sec
Acquisition Time: 2/19/2019 09:40:23 Real Time: 7263 sec
Analysis Time: 2/19/2019 11:41 Dead Time: 0.86 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 17_Liquid_Marinelli 1L.Clb
Efficiency Cal Desc: 17_1L marn_90062_030512
Efficiency Cal Date: 3/7/2012 11:47
Energy Cal Date: 2/29/2012 10:33
Library: Client_Long_Rev15.lib
Bkgd Correction File: 17_2019-01-20_1043.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	-5.685E-02	1170.5	6.654E-01	6.654E-01	2.338E+00
NA-22	-1.301E-01	86.0	1.119E-01	1.121E-01	3.782E-01
K-40	-2.798E+00	64.8	1.813E+00	1.819E+00	5.089E+00
Sc-46	-6.416E-02	182.5	1.171E-01	1.171E-01	4.031E-01
CR-51	5.413E-01	115.4	6.249E-01	6.256E-01	2.117E+00
MN-54	-7.004E-02	161.9	1.134E-01	1.134E-01	2.530E-01
FE-59	3.043E-01	53.1	1.615E-01	1.621E-01	3.539E-01
Co-56	-3.331E-03	98.0	3.266E-03	3.270E-03	2.943E-01
CO-57	7.502E-02	124.8	9.363E-02	9.373E-02	2.499E-01
CO-58	8.083E-02	122.2	9.880E-02	9.888E-02	3.375E-01
CO-60	1.269E-01	61.0	7.742E-02	7.767E-02	2.423E-01
ZN-65	0.000E+00	1.#INF	4.587E-02	4.587E-02	9.037E-01
NB-94	4.435E-02	133.5	5.919E-02	5.923E-02	3.073E-01
ZR-95	5.177E-02	364.7	1.888E-01	1.888E-01	4.682E-01
NB-95	1.270E-01	83.6	1.061E-01	1.063E-01	3.555E-01
RU-103	-1.083E-01	112.3	1.216E-01	1.218E-01	3.006E-01
RH-106	-1.402E+00	140.6	1.972E+00	1.973E+00	6.609E+00
AG-108M	3.003E-02	97.1	2.916E-02	2.920E-02	2.631E-01
AG-110M	2.135E-02	190.6	4.069E-02	4.071E-02	4.913E-01
SN-113	5.087E-03	2775.5	1.412E-01	1.412E-01	4.847E-01
SB-124	-1.414E-02	85.8	1.213E-02	1.215E-02	7.051E-01
SB-125	3.335E-01	83.4	2.781E-01	2.786E-01	6.517E-01
I-131	8.620E-02	102.3	8.816E-02	8.827E-02	2.270E-01
Gd-153	-1.946E-01	155.6	3.029E-01	3.031E-01	1.012E+00
Ga-68	-3.586E+00	187.7	6.731E+00	6.734E+00	1.555E+01
Tc-99m	-8.039E-02	127.9	1.028E-01	1.029E-01	3.438E-01
BA-133	-1.387E-01	118.3	1.641E-01	1.643E-01	5.509E-01
CS-134	1.835E-01	72.6	1.333E-01	1.336E-01	4.390E-01
CS-137	9.659E-02	97.1	9.376E-02	9.389E-02	3.134E-01
CE-139	-3.161E-02	299.4	9.462E-02	9.466E-02	3.125E-01
Ba-140	3.986E-01	95.2	3.795E-01	3.800E-01	9.349E-01
La-140	9.299E-02	112.6	1.047E-01	1.048E-01	3.773E-01
CE-141	1.165E-01	123.7	1.441E-01	1.442E-01	4.830E-01

CE-144	4.658E-01	131.9	6.145E-01	6.150E-01	2.061E+00
PM-144	7.168E-02	133.1	9.543E-02	9.550E-02	2.548E-01
EU-152	3.335E-01	64.6	2.155E-01	2.163E-01	7.191E-01
EU-154	1.351E-01	91.7	1.238E-01	1.241E-01	5.571E-01
EU-155	1.491E-01	124.1	1.850E-01	1.852E-01	6.264E-01
HF-181	1.611E-02	117.5	1.893E-02	1.894E-02	2.740E-01
Ta-182	4.837E-01	50.1	2.425E-01	2.436E-01	1.276E+00
Hg-203	2.717E-02	344.7	9.366E-02	9.367E-02	3.200E-01
TL-208	-2.069E-02	278.3	5.759E-02	5.759E-02	3.157E-01
PM-146	-2.185E-01	72.2	1.578E-01	1.582E-01	4.469E-01
Y-88	-3.567E-03	3238.7	1.155E-01	1.155E-01	3.443E-01
Cd-113m	4.446E+01	2201.1	9.786E+02	9.786E+02	3.400E+03
Cd-109	-1.664E+00	158.5	2.638E+00	2.640E+00	8.807E+00
Cf-251	-1.663E-01	259.9	4.322E-01	4.325E-01	1.173E+00
Cf-249	1.345E-01	108.4	1.458E-01	1.460E-01	4.270E-01
Sn-126	3.676E-01	214.1	7.871E-01	7.874E-01	2.649E+00
PB-210	-3.967E+00	52.3	2.076E+00	2.107E+00	6.342E+00
PB-212	-2.516E-01	92.8	2.334E-01	2.340E-01	7.911E-01
PB-214	6.132E-01	32.9	2.015E-01	2.040E-01	6.081E-01
BI-207	6.987E-02	169.0	1.181E-01	1.181E-01	2.973E-01
BI-212	-1.357E-01	461.8	6.268E-01	6.269E-01	4.189E+00
U-235	1.578E-03	362.2	5.715E-03	5.716E-03	2.263E+00
BI-214	1.131E+00	27.6	3.124E-01	3.175E-01	6.326E-01
BI-210M	-1.620E-01	107.8	1.747E-01	1.749E-01	4.475E-01
AC-228	-9.367E-02	236.3	2.214E-01	2.214E-01	1.036E+00
TH-227	6.924E-01	151.7	1.050E+00	1.051E+00	2.854E+00
TH-229	0.000E+00	1.#INF	7.895E-01	7.896E-01	4.355E+00
TH-234	1.157E+00	111.3	1.288E+00	1.289E+00	3.683E+00
PA-231	0.000E+00	1.#INF	1.288E+00	1.288E+00	1.467E+01
PA-233	2.110E-01	155.5	3.281E-01	3.283E-01	1.102E+00
PA-234	3.847E-01	111.6	4.293E-01	4.298E-01	1.461E+00
PA-234M	-1.556E+01	121.6	1.892E+01	1.894E+01	5.532E+01
AM-241	1.491E-01	119.1	1.776E-01	1.778E-01	5.038E-01
Np-237	0.000E+00	1.#INF	8.004E-01	8.004E-01	2.671E+00
Ir-192	1.129E-01	59.7	6.741E-02	6.774E-02	2.214E-01
Cs-136	7.696E-02	113.2	8.715E-02	8.726E-02	3.078E-01
Np-239	-2.577E-01	154.7	3.986E-01	3.989E-01	1.332E+00
Nd-147	-1.491E-01	436.7	6.510E-01	6.511E-01	1.671E+00
TL-210	-9.821E-02	108.7	1.068E-01	1.069E-01	3.622E-01
Kr-85	7.823E+00	432.7	3.385E+01	3.386E+01	1.150E+02
Total	6.178E+01				

Analyst: conrad.reuscher

Sample description
412878_Gamma_180-86110-A-12-A

Spectrum Filename: C:\User\SPC\Det17\17_Gamma_20190309.An1

Acquisition information
Start time: 2/19/2019 9:40:23 AM
Live time: 7200
Real time: 7263
Dead time: 0.86 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Liquid_Marinelli 1L.Clb
17_1L marn_90062_030512

Energy Calibration
Created: 2/29/2012 10:33:23 AM
Zero offset: 0.108 keV
Gain: 0.250 keV/channel
Quadratic: -2.584E-08 keV/channel^2

Efficiency Calibration
Created: 3/7/2012 11:47:27 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.09 %
Log(Eff): -2.094103E+00 + (1.788156E-01*Log(E)) +
(-7.283143E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.66 %
Log(Eff): -1.201018E+01 + (4.016685E+00*Log(E)) +
(-4.439774E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev15.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.12keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	2/19/2019 9:40:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2019-01-20_1043.PBC 1/20/2019 10:43:53 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1265

***** 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
46.38	126.	17.07	0.78	4.351E-02	46.54	4.250	PBC<MDA	PB210
59.54	19.	119.09	0.79	4.928E-02	59.54	35.900	PBC<MDA	AM241
63.34	-17.	185.34	0.79	5.038E-02	63.29	3.810	PBC<MDA	TH234
64.28	13.	214.14	0.79	5.064E-02	64.28	9.700	PBC<MDA	Sn126
75.14	29.	50.66	0.63	5.266E-02				
87.03	18.	124.15	0.50	5.355E-02	86.54	30.700	PBC<MDA	EU155
					86.94	9.040	7.267E-01	Sn126
92.70	25.	111.30	0.89	5.364E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	1.162E+00	AC228
102.02	36.	44.62	0.41	5.340E-02				
103.70	22.	147.03	0.83	5.331E-02	103.70	24.000	PBC<MDA	Np239
105.31	12.	124.11	0.83	5.322E-02	105.31	21.200	PBC<MDA	EU155
121.78	22.	106.16	0.85	5.183E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	6.765E-02	CO57
122.06	7.	318.03	0.85	5.180E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.320E-02	CO57
133.02	20.	117.46	0.86	5.053E-02	133.02	43.300	PBC<MDA	HF181
133.54	19.	131.94	0.86	5.047E-02	133.54	11.090	PBC<MDA	CE144
136.47	19.	124.81	0.86	5.010E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	4.904E-01	CO57
143.79	-5.	527.92	0.87	4.913E-02	143.79	10.960	PBC<MDA	U235
145.44	20.	123.69	0.87	4.891E-02	145.44	48.200	PBC<MDA	CE141

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
162.66	17.	141.91	0.88	4.648E-02	162.66	6.220	PBC<MDA	Ba140
185.72	-23.	113.04	0.91	4.295E-02	185.72	54.000	PBC<MDA	U235
205.33	4.	496.00	0.92	4.048E-02	205.33	5.010	PBC<MDA	U235
238.74	19.	98.73	0.52	3.694E-02	238.63	43.300	PBC<MDA	PB212
242.10	24.	45.14	0.96	3.663E-02	242.00	7.430	PBC<MDA	PB214
256.24	12.	151.71	0.97	3.534E-02	256.24	7.000	PBC<MDA	TH227
279.20	5.	344.71	0.99	3.347E-02	279.20	81.460	PBC<MDA	Hg203
295.08	40.	40.51	0.68	3.229E-02	295.09	19.300	8.962E-01	PB214
					296.00	79.000	2.194E-01	TL210
312.01	17.	155.50	1.02	3.114E-02	312.01	36.000	PBC<MDA	PA233
316.49	22.	59.69	1.03	3.085E-02	316.49	87.040	PBC<MDA	Ir192
320.08	12.	115.44	1.03	3.062E-02	320.08	9.940	PBC<MDA	CR51
328.76	16.	112.55	1.04	3.008E-02	328.76	20.300	PBC<MDA	La140
333.44	13.	128.96	1.04	2.980E-02	333.44	15.510	PBC<MDA	Cf249
338.32	2.	939.57	1.05	2.951E-02	338.32	12.010	PBC<MDA	AC228
340.57	15.	123.54	1.05	2.938E-02	340.57	46.900	PBC<MDA	Cs136
344.29	16.	128.26	1.05	2.917E-02	344.29	26.500	PBC<MDA	EU152
352.07	36.	51.78	0.36	2.874E-02	351.93	37.600	PBC<MDA	PB214
364.48	14.	102.28	1.07	2.806E-02	364.48	81.700	PBC<MDA	I131
383.84	14.	108.09	1.09	2.709E-02	383.84	8.940	PBC<MDA	BA133
387.95	9.	174.24	1.09	2.689E-02	387.95	66.000	PBC<MDA	Cf249
427.88	4.	301.92	1.13	2.512E-02	427.88	29.600	PBC<MDA	SB125
463.37	12.	106.40	1.16	2.373E-02	463.37	10.470	PBC<MDA	SB125
511.86	209.	8.68	2.45	2.209E-02	511.86	20.000	6.571E+00	RH106
513.98	5.	432.74	1.20	2.202E-02	513.98	0.430	PBC<MDA	Kr85
537.26	11.	126.95	1.22	2.132E-02	537.26	24.390	PBC<MDA	Ba140
569.32	12.	72.65	1.25	2.042E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	9.955E-01	PA234
					569.70	97.740	8.355E-02	BI207
583.02	-5.	278.28	1.26	2.006E-02	583.02	84.500	PBC<MDA	TL208
609.19	65.	27.83	1.51	1.941E-02	609.31	46.090	1.016E+00	BI214
618.06	17.	133.13	1.30	1.920E-02	618.06	99.100	PBC<MDA	PM144
635.89	10.	83.40	1.31	1.879E-02	635.89	11.310	PBC<MDA	SB125
636.97	-1.	854.12	1.31	1.876E-02	636.97	7.170	PBC<MDA	I131
657.76	5.	190.62	1.33	1.831E-02	657.76	94.640	PBC<MDA	AG110M
661.66	11.	97.07	1.33	1.823E-02	661.66	85.210	PBC<MDA	CS137
696.54	2.	641.29	1.36	1.752E-02	696.54	99.000	PBC<MDA	PM144
702.63	5.	331.55	1.37	1.740E-02	702.63	97.900	PBC<MDA	NB94
722.79	10.	85.77	1.39	1.702E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	8.657E-02	AG108M
					723.36	20.220	3.891E-01	EU154
722.94	10.	97.10	1.39	1.702E-02	722.79	10.810	7.275E-01	SB124
					722.94	90.840	8.658E-02	AG108M
					723.36	20.220	3.892E-01	EU154
723.36	5.	187.84	1.39	1.701E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.845E-02	AG108M
					723.36	20.220	2.177E-01	EU154
756.73	3.	364.69	1.41	1.642E-02	756.73	54.460	PBC<MDA	ZR95

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
765.79	15.	83.58	1.42	1.627E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
766.41	2.	558.22	1.42	1.626E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	11.	99.31	1.43	1.605E-02	778.92	12.940	PBC<MDA	EU152
785.53	6.	193.88	1.44	1.595E-02	785.42	1.280	PBC<MDA	BI212
795.87	2.	812.40	1.45	1.578E-02	795.87	85.530	PBC<MDA	CS134
801.95	12.	113.04	1.45	1.568E-02	801.95	8.690	PBC<MDA	CS134
810.78	9.	122.22	1.46	1.555E-02	810.78	99.460	PBC<MDA	CO58
815.77	7.	144.22	1.47	1.547E-02	815.77	23.280	PBC<MDA	La140
818.50	9.	113.25	1.47	1.543E-02	818.50	100.000	PBC<MDA	Cs136
860.56	2.	831.50	1.50	1.482E-02	860.56	12.420	PBC<MDA	TL208
871.10	5.	133.46	1.51	1.468E-02	871.10	99.890	PBC<MDA	NB94
883.52	10.	111.61	1.52	1.451E-02	883.24	9.600	PBC<MDA	PA234
911.07	-5.	236.34	1.55	1.415E-02	911.07	29.000	PBC<MDA	AC228
996.33	4.	280.62	1.62	1.315E-02	996.33	10.600	PBC<MDA	EU154
1001.00	-12.	121.64	1.62	1.310E-02	1001.00	0.837	PBC<MDA	PA234M
1004.77	10.	91.94	1.62	1.306E-02	1004.77	18.010	PBC<MDA	EU154
1048.07	2.	441.59	1.66	1.261E-02	1048.07	80.000	PBC<MDA	Cs136
1063.66	5.	168.97	1.67	1.246E-02	1063.66	74.500	PBC<MDA	BI207
1099.25	15.	53.05	1.70	1.212E-02	1099.25	56.500	PBC<MDA	FE59
1121.30	4.	277.80	1.72	1.192E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.317E-01	Ta182
1173.24	11.	85.99	1.76	1.147E-02	1173.24	99.900	PBC<MDA	CO60
1189.05	16.	50.13	1.77	1.134E-02	1189.05	16.200	PBC<MDA	Ta182
1221.41	11.	89.26	1.80	1.108E-02	1221.41	27.000	PBC<MDA	Ta182
1238.28	6.	135.67	1.81	1.095E-02	1238.28	66.070	PBC<MDA	Co56
1332.50	9.	86.50	1.89	1.028E-02	1332.50	99.980	PBC<MDA	CO60
1408.00	7.	86.62	1.94	9.796E-03	1408.00	21.005	PBC<MDA	EU152
1460.02	-20.	64.82	1.98	9.483E-03	1460.83	10.670	PBC<MDA	K40
1690.98	2.	424.26	2.16	8.321E-03	1690.98	47.790	PBC<MDA	SB124
1764.28	13.	47.74	2.44	8.006E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	4.	215.06	2.22	7.978E-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	
299.99	75.14	85.	29.	5.475E+02	50.66	0.628	-	s
407.44	102.02	74.	22.	4.175E+02	58.43	0.827	-	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_Rev15.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.63	46.54	309.	-53.	-0.007	52.34	0.775
TH-227	200.03	50.14	186.	0.	0.000	1000.00	0.778s
AM-241	237.59	59.54	174.	19.	0.003	119.09	0.787s
TH-234	252.59	63.29	354.	-17.	-0.002	185.34	0.791
Sn-126	256.56	64.28	381.	13.	0.002	214.14	0.792
BA-133	323.36	80.99	214.	-11.	-0.001	291.24	0.807s
Np-237	345.35	86.49	805.	0.	0.000	166.44	0.813A
EU-155	345.56	86.54	107.	18.	0.002	124.15	0.501A
Sn-126	347.15	86.94	781.	-24.	-0.003	163.86	0.813
Sn-126	349.67	87.57	756.	-24.	-0.003	161.19	0.814
Cd-109	351.55	88.04	732.	-24.	-0.003	158.53	0.814s
TH-234	370.20	92.70	271.	25.	0.003	111.30	0.895s
AC-228	372.78	93.35	406.	-13.	-0.002	216.86	0.819s
Gd-153	389.37	97.50	603.	-23.	-0.003	155.64	0.823s
Np-239	397.37	99.50	580.	-23.	-0.003	152.41	0.825
Gd-153	412.16	103.20	579.	-6.	-0.001	602.95	0.828
Np-239	414.16	103.70	518.	22.	0.003	147.03	0.829s
EU-155	420.61	105.31	107.	12.	0.002	124.11	0.830D
Np-239	423.88	106.13	574.	-22.	-0.003	154.65	0.831s
EU-152	486.45	121.78	252.	22.	0.003	106.16	0.846s
CO-57	487.57	122.06	274.	7.	0.001	318.03	0.846s
EU-154	491.73	123.10	309.	-26.	-0.004	109.28	0.847s
HF-181	531.41	133.02	277.	20.	0.003	117.46	0.856s
CE-144	533.46	133.54	297.	19.	0.003	131.94	0.857s
HF-181	544.50	136.30	316.	0.	0.000	1000.00	0.859s
CO-57	545.20	136.47	268.	19.	0.003	124.81	0.859s
Tc-99m	561.34	140.51	416.	-23.	-0.003	127.93	0.863s
U-235	574.43	143.79	333.	-5.	-0.001	527.92	0.866s
CE-141	581.05	145.44	289.	20.	0.003	123.69	0.868
Ba-140	649.90	162.66	274.	17.	0.002	141.91	0.884s
U-235	652.78	163.38	282.	-28.	-0.004	88.24	0.885
CE-139	662.67	165.85	292.	-8.	-0.001	299.36	0.887s
Cf-251	705.64	176.60	170.	-9.	-0.001	259.95	0.897s
U-235	742.10	185.72	252.	-23.	-0.003	113.04	0.905s
TH-229	773.25	193.51	140.	0.	0.000	1000.00	0.913s
U-235	820.52	205.33	134.	4.	0.001	496.00	0.924s
Cf-251	907.16	227.00	133.	-19.	-0.003	108.69	0.944s
TH-227	943.03	235.97	396.	-20.	-0.003	145.61	0.952s
PB-212	953.67	238.63	360.	-29.	-0.004	92.76	0.955s
PB-214	967.13	242.00	46.	24.	0.003	45.14	0.958D
TH-227	1024.08	256.24	107.	12.	0.002	151.71	0.971s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	1062.44	265.83	129.	-20.	-0.003	107.85	0.979s
TL-208	1108.23	277.28	149.	-11.	-0.002	155.35	0.990s
Hg-203	1115.89	279.20	166.	5.	0.001	344.71	0.992s
I-131	1136.28	284.30	135.	-16.	-0.002	169.87	0.996s
PB-214	1179.40	295.08	64.	40.	0.006	40.51	0.675s
TL-210	1183.07	296.00	471.	-18.	-0.003	170.31	1.007s
PB-212	1199.19	300.03	451.	-24.	-0.003	33.32	1.011s
PA-231	1199.35	300.07	427.	-18.	-0.003	161.83	1.011s
PA-233	1199.79	300.18	409.	-5.	-0.001	577.24	1.011s
PA-231	1209.66	302.65	406.	0.	0.000	1000.00	1.013s
BA-133	1210.47	302.85	406.	0.	0.000	1000.00	1.013s
Ba-140	1218.46	304.85	406.	0.	0.000	1000.00	1.015
BI-210M	1218.64	304.90	406.	0.	0.000	1000.00	1.015
Ir-192	1232.82	308.44	406.	0.	0.000	1000.00	1.019s
PA-233	1247.10	312.01	342.	17.	0.002	155.50	1.022s
Ir-192	1265.01	316.49	74.	22.	0.003	59.69	1.026s
CR-51	1279.38	320.08	88.	12.	0.002	115.44	1.029
La-140	1314.07	328.76	82.	16.	0.002	112.55	1.037s
Cf-249	1332.79	333.44	81.	13.	0.002	128.96	1.041s
AC-228	1352.30	338.32	172.	2.	0.000	939.57	1.046s
Cs-136	1361.30	340.57	174.	15.	0.002	123.54	1.048s
EU-152	1376.16	344.29	190.	16.	0.002	128.26	1.051s
HF-181	1382.33	345.83	211.	-6.	-0.001	342.77	1.053s
PB-214	1407.28	352.07	92.	36.	0.005	51.78	0.362s
BA-133	1423.00	356.00	210.	-18.	-0.002	118.33	1.062
I-131	1456.93	364.48	55.	14.	0.002	102.28	1.070s
BA-133	1534.34	383.84	110.	14.	0.002	108.09	1.087
Cf-249	1550.77	387.95	124.	9.	0.001	174.24	1.091s
SB-125	1710.44	427.88	48.	4.	0.001	301.92	1.127s
AG-108M	1734.69	433.94	73.	-4.	-0.001	372.82	1.132s
PM-146	1814.44	453.88	105.	-25.	-0.003	72.21	1.150s
SB-125	1852.38	463.37	78.	12.	0.002	106.40	1.158s
Ir-192	1871.15	468.06	136.	-17.	-0.002	101.89	1.163s
HF-181	1926.89	482.00	53.	-6.	-0.001	241.04	1.175s
La-140	1946.98	487.02	65.	-6.	-0.001	209.89	1.180s
RU-103	1987.11	497.05	80.	-16.	-0.002	112.27	1.188s
RH-106	2046.35	511.86	60.	209.	0.029	8.68	2.452
Kr-85	2054.81	513.98	264.	5.	0.001	432.74	1.203s
Nd-147	2122.88	531.00	44.	-3.	0.000	436.74	1.219
Ba-140	2147.92	537.26	48.	11.	0.002	126.95	1.224s
CS-134	2251.82	563.24	44.	-2.	0.000	653.20	1.247s
CS-134	2276.15	569.32	32.	12.	0.002	72.65	1.252s
BI-207	2277.67	569.70	51.	-4.	-0.001	279.46	1.253s
TL-208	2330.95	583.02	59.	-5.	-0.001	278.28	1.264s
SB-125	2400.86	600.50	434.	-19.	-0.003	77.78	1.280s
SB-124	2409.78	602.73	415.	-19.	-0.003	154.05	1.282s
CS-134	2417.70	604.71	396.	-19.	-0.003	150.38	1.284s
BI-214	2435.63	609.19	67.	65.	0.009	27.83	1.513s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RU-103	2440.05	610.30	377.	-19.	-0.003	146.28	1.288s
AG-108M	2455.98	614.28	358.	-19.	-0.003	142.26	1.292s
PM-144	2471.11	618.06	261.	17.	0.002	133.13	1.295s
RH-106	2486.52	621.92	353.	-19.	-0.003	140.63	1.299s
SB-125	2542.41	635.89	30.	10.	0.001	83.40	1.311
I-131	2546.75	636.97	54.	-1.	0.000	854.12	1.312s
AG-110M	2629.90	657.76	37.	5.	0.001	190.62	1.330s
CS-137	2645.49	661.66	48.	11.	0.002	97.07	1.333s
PM-144	2785.03	696.54	39.	2.	0.000	641.29	1.363s
NB-94	2809.38	702.63	56.	5.	0.001	331.55	1.368s
SB-124	2890.01	722.79	29.	10.	0.001	85.77	1.386s
AG-108M	2890.61	722.94	39.	10.	0.001	97.10	1.386s
EU-154	2892.30	723.36	49.	5.	0.001	187.84	1.386s
ZR-95	2895.66	724.20	102.	-17.	-0.002	61.30	1.387s
BI-212	2907.54	727.17	59.	-1.	0.000	461.82	1.390s
PM-146	2941.74	735.72	47.	-7.	-0.001	99.30	1.397s
PM-146	2987.51	747.16	49.	-6.	-0.001	126.31	1.407s
ZR-95	3025.79	756.73	35.	3.	0.000	364.69	1.415s
AG-110M	3054.64	763.94	81.	-23.	-0.003	34.65	1.421
NB-95	3062.03	765.79	69.	15.	0.002	83.58	1.423s
PA-234M	3064.52	766.41	72.	2.	0.000	558.22	1.423s
EU-152	3114.56	778.92	26.	11.	0.002	99.31	1.434s
BI-212	3140.56	785.42	35.	6.	0.001	193.88	1.440s
CS-134	3182.36	795.87	74.	2.	0.000	812.40	1.448s
TL-210	3197.29	799.60	66.	-11.	-0.002	108.71	1.451s
CS-134	3206.69	801.95	86.	12.	0.002	113.04	1.454s
CO-58	3241.99	810.78	56.	9.	0.001	122.22	1.461s
La-140	3261.97	815.77	50.	7.	0.001	144.22	1.465s
Cs-136	3272.90	818.50	46.	9.	0.001	113.25	1.467s
MN-54	3338.30	834.85	29.	-8.	-0.001	161.90	1.481s
Co-56	3385.99	846.77	39.	-9.	-0.001	141.55	1.491s
TL-208	3441.18	860.56	44.	2.	0.000	831.50	1.503s
NB-94	3483.32	871.10	23.	5.	0.001	133.46	1.512
EU-154	3491.85	873.23	42.	-9.	-0.001	103.88	1.514s
PA-234	3531.90	883.24	61.	10.	0.001	111.61	1.522s
AG-110M	3537.67	884.68	55.	0.	0.000	1000.00	1.523s
Sc-46	3556.06	889.28	71.	-7.	-0.001	182.48	1.527s
Y-88	3591.11	898.04	29.	-3.	0.000	451.95	1.534s
AC-228	3643.24	911.07	36.	-5.	-0.001	236.34	1.545s
AG-110M	3748.95	937.49	37.	-4.	-0.001	302.94	1.567s
PA-234	3783.07	946.02	47.	-11.	-0.001	139.26	1.574
EU-152	3855.45	964.11	54.	-5.	-0.001	226.78	1.589s
AC-228	3874.90	968.97	80.	-20.	-0.003	67.21	1.593s
EU-154	3984.36	996.33	61.	4.	0.001	280.62	1.616s
PA-234M	4003.04	1001.00	77.	-12.	-0.002	121.64	1.620s
EU-154	4018.15	1004.77	36.	10.	0.001	91.94	1.623s
Co-56	4150.45	1037.84	40.	-13.	-0.002	113.20	1.650s
Cs-136	4191.39	1048.07	38.	2.	0.000	441.59	1.658s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RH-106	4200.55	1050.36	42.	-2.	0.000	463.68	1.661s
BI-207	4253.77	1063.66	14.	5.	0.001	168.97	1.671s
Ga-68	4308.74	1077.40	25.	-6.	-0.001	187.70	1.683s
FE-59	4396.18	1099.25	10.	15.	0.002	53.05	1.700s
EU-152	4447.49	1112.07	72.	-10.	-0.001	118.76	1.711s
ZN-65	4461.38	1115.55	62.	0.	0.000	1000.00	1.713s
Ta-182	4484.41	1121.30	58.	4.	0.001	277.80	1.718s
CO-60	4692.24	1173.24	15.	11.	0.001	85.99	1.760s
Ta-182	4755.52	1189.05	10.	16.	0.002	50.13	1.772s
Ta-182	4885.02	1221.41	16.	11.	0.002	89.26	1.798s
Co-56	4952.53	1238.28	13.	6.	0.001	135.67	1.812s
NA-22	5097.60	1274.53	32.	-10.	-0.001	86.02	1.840s
EU-154	5097.64	1274.54	42.	0.	0.000	1000.00	1.840s
FE-59	5165.90	1291.60	22.	-4.	0.000	241.20	1.854s
TL-210	5251.56	1313.00	16.	0.	0.000	1000.00	1.870s
CO-60	5329.61	1332.50	11.	9.	0.001	86.50	1.886s
EU-152	5631.79	1408.00	5.	7.	0.001	86.62	1.944s
K-40	5843.25	1460.83	54.	-20.	-0.003	64.82	1.985s
SB-124	6764.55	1690.98	12.	2.	0.000	424.26	2.157s
BI-214	7058.00	1764.28	12.	13.	0.002	47.74	2.435
Co-56	7086.31	1771.35	35.	4.	0.001	215.06	2.216s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-5.6846E-02				5.31E+01	
			477.60	-5.685E-02	%(	2.338E+00 1.17E+03 1.05E+01	G
NA-22	C	-1.3010E-01				9.50E+02	
			1274.53	-1.301E-01	?(	3.782E-01 8.60E+01 9.99E+01	G
K-40	N	-2.7979E+00				4.66E+11	
			1460.83	-2.798E+00	?(P	5.089E+00 6.48E+01 1.07E+01	G
Sc-46	F	-6.4155E-02				8.38E+01	
			889.28	-6.416E-02	?(	4.031E-01 1.82E+02 1.00E+02	G
			1120.55	-1.229E-02	% P	4.490E-01 1.07E+03 1.00E+02	G
CR-51	F	5.4135E-01				2.77E+01	
			320.08	5.413E-01	&(	2.117E+00 1.15E+02 9.94E+00	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C	-7.0043E-02					3.12E+02	
			834.85	-7.004E-02	&(P	2.530E-01	1.62E+02	1.00E+02 G
FE-59	F	3.0431E-01					4.45E+01	
			1099.25	3.043E-01	?(	3.539E-01	5.31E+01	5.65E+01 G
			1291.60	-1.069E-01	- P	7.405E-01	2.41E+02	4.32E+01 G
Co-56	C	-3.3310E-03					7.73E+01	
			846.77	-8.306E-02	?(P	2.943E-01	1.42E+02	9.99E+01 G
			1238.28	1.173E-01	?(P	3.803E-01	1.36E+02	6.61E+01 G
			1037.84	-1.028E+00	+ P	2.496E+00	1.13E+02	1.41E+01 G
			1771.35	4.498E-01	?	3.405E+00	2.15E+02	1.55E+01 A
CO-57	C	7.5019E-02					2.72E+02	
			122.06	2.320E-02	(	2.499E-01	3.18E+02	8.56E+01 G
			136.47	4.904E-01	&(	2.053E+00	1.25E+02	1.07E+01 G
CO-58	C	8.0834E-02					7.09E+01	
			810.78	8.083E-02	&(	3.375E-01	1.22E+02	9.95E+01 G
CO-60	F	1.2695E-01					1.93E+03	
			1332.50	1.254E-01	?(	2.423E-01	8.65E+01	1.00E+02 G
			1173.24	1.285E-01	?(	2.517E-01	8.60E+01	9.99E+01 G
NB-94	I	4.4347E-02					7.41E+06	
			702.63	3.805E-02	&(	3.073E-01	3.32E+02	9.79E+01 G
			871.10	5.052E-02	?(	2.358E-01	1.33E+02	9.99E+01 G
ZR-95	I	5.1770E-02					6.40E+01	
			756.73	5.177E-02	?(	4.682E-01	3.65E+02	5.45E+01 G
			724.20	-3.222E-01	+ P	9.207E-01	6.13E+01	4.42E+01 G
NB-95	I	1.2696E-01					6.40E+01	
			765.79	1.270E-01	?(	3.555E-01	8.36E+01	9.98E+01 G
RU-103	I	-1.0834E-01					3.93E+01	
			497.05	-1.083E-01	?(	3.006E-01	1.12E+02	9.09E+01 G
			610.30	-2.368E+00	+	1.161E+01	1.46E+02	5.75E+00 GA
RH-106	I	-1.4020E+00					3.74E+02	
			621.92	-1.402E+00	?(	6.609E+00	1.41E+02	9.93E+00 G
			1050.36	-1.415E+00	+	2.328E+01	4.64E+02	1.56E+00 G
			511.86	6.571E+00		1.220E+00	8.68E+00	2.00E+01 GA
AG-108M	C	3.0029E-02					1.53E+05	
			433.94	-2.675E-02	?(	2.631E-01	3.73E+02	9.05E+01 G
			722.94	8.658E-02	?(	2.857E-01	9.71E+01	9.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			614.28	-1.527E-01	+	7.282E-01	1.42E+02	8.98E+01 G
AG-110M	F	2.1348E-02					2.50E+02	
			884.68	0.000E+00	&(	4.913E-01	1.00E+03	7.27E+01 G
			657.76	3.774E-02	&(P	2.486E-01	1.91E+02	9.46E+01 G
			937.49	-1.267E-01	+	9.116E-01	3.03E+02	3.44E+01 G
			1384.30	7.996E-04	% P	1.292E+00	6.74E+04	2.43E+01 G
			763.94	-8.775E-01	+ P	1.712E+00	3.47E+01	2.23E+01 G
SN-113	F	5.0867E-03					1.15E+02	
			391.69	5.087E-03	&(P	4.847E-01	2.78E+03	6.40E+01 G
SB-124	F	-1.4144E-02					6.02E+01	
			602.73	-1.366E-01	&(	7.051E-01	1.54E+02	9.83E+01 G
			1690.98	6.985E-02	?(	6.584E-01	4.24E+02	4.78E+01 G
			722.79	7.274E-01	?(	2.110E+00	8.58E+01	1.08E+01 G
SB-125	I	3.3347E-01					1.01E+03	
			427.88	8.096E-02	?(	6.517E-01	3.02E+02	2.96E+01 G
			600.50	-7.503E-01	+ P	3.953E+00	7.78E+01	1.79E+01 G
			635.89	6.691E-01	?(P	1.843E+00	8.34E+01	1.13E+01 G
			463.37	6.848E-01	*(P	2.447E+00	1.06E+02	1.05E+01 G
I-131	I	8.6195E-02					8.02E+00	
			364.48	8.620E-02	?(P	2.270E-01	1.02E+02	8.17E+01 G
			284.30	-1.097E+00	& P	3.902E+00	1.70E+02	6.14E+00 G
			636.97	-1.273E-01	& P	3.836E+00	8.54E+02	7.17E+00 G
Gd-153	F	-1.9459E-01					2.42E+02	
			97.50	-1.946E-01	&(	1.012E+00	1.56E+02	3.00E+01 G
			103.20	-6.758E-02	+	1.372E+00	6.03E+02	2.18E+01 G
Ga-68	C	-3.5862E+00					4.71E-02	
			1077.40	-3.586E+00	?(	1.555E+01	1.88E+02	3.30E+00 G
Tc-99m	I	-8.0387E-02					2.51E-01	
			140.51	-8.039E-02	?(	3.438E-01	1.28E+02	8.93E+01 G
BA-133	F	-1.3868E-01					3.85E+03	
			356.00	-1.387E-01	&(	5.509E-01	1.18E+02	6.20E+01 G
			302.85	0.000E+00	+	2.305E+00	1.00E+03	1.83E+01 G
			383.84	8.108E-01		2.954E+00	1.08E+02	8.94E+00 GA
			80.99	-8.208E-02	+ P	5.425E-01	2.91E+02	3.41E+01 GA
CS-134	I	1.8347E-01					7.54E+02	
			795.87	1.544E-02	?(	4.390E-01	8.12E+02	8.55E+01 G
			604.71	-1.380E-01	+	6.955E-01	1.50E+02	9.76E+01 G
			569.32	5.307E-01	?(	1.286E+00	7.26E+01	1.54E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			801.95	1.223E+00	?(	4.680E+00	1.13E+02	8.69E+00 G
			563.24	-1.616E-01	+	2.717E+00	6.53E+02	8.35E+00 G
CS-137	I	9.6588E-02					1.10E+04	
			661.66	9.659E-02	@(P	3.134E-01	9.71E+01	8.52E+01 G
CE-139	F	-3.1607E-02					1.38E+02	
			165.85	-3.161E-02	?(P	3.125E-01	2.99E+02	7.99E+01 G
Ba-140	I	3.9861E-01					1.28E+01	
			537.26	2.939E-01	*(	9.349E-01	1.27E+02	2.44E+01 G
			162.66	8.094E-01	*(P	3.834E+00	1.42E+02	6.22E+00 G
			304.85	0.000E+00	-	9.893E+00	1.00E+03	4.29E+00 G
La-140	I	9.2989E-02					1.28E+01	
			1596.21	-7.013E-03	&(P	3.773E-01	2.33E+03	9.54E+01 G
			487.02	-8.441E-02	+ P	5.382E-01	2.10E+02	4.55E+01 G
			328.76	3.527E-01	?(P	1.022E+00	1.13E+02	2.03E+01 G
			815.77	2.764E-01	?(	1.373E+00	1.44E+02	2.33E+01 G
CE-141	I	1.1652E-01					3.25E+01	
			145.44	1.165E-01	&(	4.830E-01	1.24E+02	4.82E+01 G
CE-144	I	4.6576E-01					2.85E+02	
			133.54	4.658E-01	?(	2.061E+00	1.32E+02	1.11E+01 G
PM-144	C	7.1684E-02					3.63E+02	
			696.54	1.602E-02	?(	2.548E-01	6.41E+02	9.90E+01 G
			618.06	1.273E-01	?(	5.691E-01	1.33E+02	9.91E+01 G
EU-152	F	3.3354E-01					4.94E+03	
			121.78	2.025E-01	(	7.191E-01	1.06E+02	2.86E+01 G
			344.29	2.785E-01	(	1.203E+00	1.28E+02	2.65E+01 G
			1112.07	-8.908E-01	+	3.596E+00	1.19E+02	1.36E+01 G
			778.92	7.356E-01	?(	1.770E+00	9.93E+01	1.29E+01 G
			964.11	-3.284E-01	+	2.593E+00	2.27E+02	1.46E+01 G
			244.69	-4.803E-08	%	4.407E+00	2.70E+09	7.58E+00 G
			1408.00	4.566E-01	?	9.094E-01	8.66E+01	2.10E+01 GA
EU-154	I	1.3511E-01					3.14E+03	
			123.10	-1.695E-01	&(P	5.571E-01	1.09E+02	4.08E+01 G
			1274.54	0.000E+00	+	1.216E+00	1.00E+03	3.52E+01 G
			723.36	2.177E-01	?(	1.421E+00	1.88E+02	2.02E+01 G
			873.23	-7.212E-01	+	2.552E+00	1.04E+02	1.23E+01 G
			1004.77	5.772E-01	?(	1.799E+00	9.19E+01	1.80E+01 G
			996.33	3.985E-01	&(	3.896E+00	2.81E+02	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	1.4907E-01					1.81E+03	
			105.31	1.491E-01	(	6.264E-01	1.24E+02	2.12E+01 G
			86.54	1.491E-01	}	4.295E-01	1.24E+02	3.07E+01 G
HF-181	F	1.6113E-02					4.24E+01	
			482.00	-4.487E-02	?(	2.740E-01	2.41E+02	8.05E+01 G
			133.02	1.295E-01	?(	5.094E-01	1.17E+02	4.33E+01 G
			345.83	-1.913E-01	+	2.232E+00	3.43E+02	1.51E+01 G
			136.30	0.000E+00	&	4.053E+00	1.00E+03	5.85E+00 G
Ta-182	F	4.8370E-01					1.14E+02	
			1121.30	1.317E-01	?(	1.276E+00	2.78E+02	3.49E+01 G
			1221.41	5.029E-01	?(	9.912E-01	8.93E+01	2.70E+01 G
			1189.05	1.210E+00	?(	1.319E+00	5.01E+01	1.62E+01 G
Hg-203	F	2.7170E-02					4.66E+01	
			279.20	2.717E-02	(	3.200E-01	3.45E+02	8.15E+01 G
TL-208	N	-2.0693E-02					6.98E+02	
			583.02	-4.247E-02	(P	3.157E-01	2.78E+02	8.45E+01 G
			277.28	-7.421E-01	+	3.906E+00	1.55E+02	6.31E+00 G
			860.56	1.275E-01	&(P	2.545E+00	8.32E+02	1.24E+01 G
PM-146	C	-2.1852E-01					2.02E+03	
			453.88	-2.185E-01	&(P	4.469E-01	7.22E+01	6.50E+01 G
			747.16	-1.384E-01	+ P	8.670E-01	1.26E+02	3.40E+01 G
			735.72	-2.459E-01	+ P	1.270E+00	9.93E+01	2.25E+01 G
Y-88	F	-3.5671E-03					1.07E+02	
			1836.06	-3.567E-03	%(P	3.443E-01	3.24E+03	9.92E+01 G
			898.04	-3.268E-02	+ P	2.885E-01	4.52E+02	9.37E+01 G
Cd-113m		4.4461E+01					5.33E+03	
			263.70	4.446E+01	%(	3.400E+03	2.20E+03	6.00E-03 K
Cd-109	F	-1.6641E+00					4.53E+02	
			88.04	-1.664E+00	&(	8.807E+00	1.59E+02	3.79E+00 G
Cf-251	T	-1.6628E-01					3.28E+05	
			176.60	-1.663E-01	?(	1.173E+00	2.60E+02	1.70E+01 G
			227.00	-1.119E+00	+	3.270E+00	1.09E+02	6.30E+00 GA
Cf-249	T	1.3453E-01					1.28E+05	
			387.95	7.198E-02	?(	4.270E-01	1.74E+02	6.60E+01 G
			333.44	4.007E-01	&(	1.339E+00	1.29E+02	1.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sn-126		3.6758E-01					3.65E+07	
			87.57	-1.681E-01	+	9.046E-01	1.61E+02	3.75E+01 GA
			64.28	3.676E-01	(	2.649E+00	2.14E+02	9.70E+00 G
			86.94	-6.971E-01	+	3.813E+00	1.64E+02	9.04E+00 GA
PB-210	N	-3.9673E+00					8.14E+03	
			46.54	-3.967E+00	(P	6.342E+00	5.23E+01	4.25E+00 G
PB-212	N	-2.5161E-01					6.98E+02	
			238.63	-2.516E-01	?(P	7.911E-01	9.28E+01	4.33E+01 G
			300.03	-3.146E+00	+ P	1.348E+01	3.33E+01	3.28E+00 GA
PB-214	N	6.1316E-01					5.84E+05	
			351.93	4.679E-01	(P	6.081E-01	5.18E+01	3.76E+01 G
			295.09	8.962E-01	@(P	8.897E-01	4.05E+01	1.93E+01 G
			242.00	1.218E+00		1.753E+00	4.51E+01	7.43E+00 GA
BI-207	C	6.9868E-02					1.18E+04	
			1063.66	6.987E-02	?(P	2.973E-01	1.69E+02	7.45E+01 G
			569.70	-2.553E-02	-	2.498E-01	2.79E+02	9.77E+01 G
BI-212	N	-1.3573E-01					6.98E+02	
			727.17	-1.357E-01	?(P	4.189E+00	4.62E+02	7.55E+00 G
			785.42	4.310E+00	?	2.052E+01	1.94E+02	1.28E+00 GA
U-235	N	1.5779E-03					2.57E+11	
			143.79	-1.291E-01	(P	2.263E+00	5.28E+02	1.10E+01 G
			205.33	2.875E-01	*(P	3.877E+00	4.96E+02	5.01E+00 G
			163.38	-1.635E+00	& P	4.771E+00	8.82E+01	5.08E+00 G
			185.72	-1.402E-01	+ P	4.596E-01	1.13E+02	5.40E+01 GA
BI-214	N	1.1308E+00					5.84E+05	
			609.31	1.016E+00	(P	6.326E-01	2.78E+01	4.61E+01 G
			1120.29	-8.146E-02	% P	3.177E+00	1.15E+03	1.51E+01 G
			1764.49	1.476E+00	(P	2.116E+00	4.77E+01	1.54E+01 G
BI-210M	T	-1.6198E-01					1.10E+09	
			265.83	-1.620E-01	&(	4.475E-01	1.08E+02	5.00E+01 G
			304.90	0.000E+00	+	1.516E+00	1.00E+03	2.80E+01 G
AC-228	N	-9.3668E-02					2.10E+03	
			911.07	-1.652E-01	(P	1.036E+00	2.36E+02	2.90E+01 G
			968.97	-1.172E+00	+ P	2.626E+00	6.72E+01	1.75E+01 G
			338.32	7.915E-02	?(P	2.504E+00	9.40E+02	1.20E+01 G
			93.35	-6.170E-01	+	4.499E+00	2.17E+02	5.56E+00 XA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	N	6.9236E-01					7.95E+03	
			256.24	6.924E-01	?(	2.854E+00	1.52E+02	7.00E+00 G
			235.97	-5.940E-01	&	2.898E+00	1.46E+02	1.23E+01 G
			50.14	0.000E+00	-	2.528E+00	1.00E+03	8.00E+00 G
TH-234	N	1.1569E+00					1.63E+12	
			92.59	1.157E+00	*(P	3.683E+00	1.11E+02	5.58E+00 G
			63.29	-1.208E+00	+ P	6.537E+00	1.85E+02	3.81E+00 G
PA-233	C	2.1101E-01					7.82E+08	
			312.01	2.110E-01	?(	1.102E+00	1.56E+02	3.60E+01 G
			300.18	-3.486E-01	+	6.800E+00	5.77E+02	6.20E+00 G
PA-234	N	3.8470E-01					1.63E+12	
			131.29	4.055E-02	%(	1.461E+00	1.06E+03	1.80E+01 G
			946.02	-8.055E-01	+	2.609E+00	1.39E+02	1.34E+01 G
			569.47	-2.765E-02	%	2.828E+00	2.86E+03	8.20E+00 G
			883.24	1.030E+00	?(	3.908E+00	1.12E+02	9.60E+00 G
			880.53	-5.303E-02	%	6.736E+00	3.61E+03	6.00E+00 GA
PA-234M	N	-1.5557E+01					1.63E+12	
			1001.00	-1.556E+01	(P	5.532E+01	1.22E+02	8.37E-01 G
			766.41	6.350E+00	+ P	1.229E+02	5.58E+02	2.94E-01 G
AM-241	T	1.4915E-01					1.58E+05	
			59.54	1.491E-01	*(	5.038E-01	1.19E+02	3.59E+01 G
Ir-192	F	1.1295E-01					7.40E+01	
			316.49	1.129E-01	*(	2.214E-01	5.97E+01	8.70E+01 G
			468.06	-1.898E-01	-	6.493E-01	1.02E+02	5.18E+01 G
			308.44	0.000E+00	-	1.347E+00	1.00E+03	3.18E+01 G
Cs-136	F	7.6958E-02					1.30E+01	
			818.50	7.955E-02	?(	3.078E-01	1.13E+02	1.00E+02 G
			1048.07	2.753E-02	?(	4.328E-01	4.42E+02	8.00E+01 G
			340.57	1.557E-01	&(	6.477E-01	1.24E+02	4.69E+01 G
Np-239	T	-2.5773E-01					2.36E+00	
			103.70	2.431E-01	?	1.195E+00	1.47E+02	2.40E+01 X
			106.13	-2.577E-01	?(	1.332E+00	1.55E+02	2.27E+01 G
			99.50	-3.954E-01	&	2.014E+00	1.52E+02	1.50E+01 X
Nd-147		-1.4907E-01					1.11E+01	
			531.00	-1.491E-01	?(	1.671E+00	4.37E+02	1.30E+01 G
			91.10	-3.430E-02	%	1.159E+00	1.00E+03	2.83E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TL-210   N  -9.8206E-02                                      5.84E+05
                          799.60-9.821E-02 ?(  3.622E-01 1.09E+02 9.90E+01 G
                          296.00-9.922E-02 &   5.663E-01 1.70E+02 7.90E+01 G
                         1313.00 0.000E+00 +   1.356E+00 1.00E+03 2.10E+01 GA

Kr-85    I   7.8228E+00                                      3.92E+03
                          513.98 7.823E+00 ?(  1.150E+02 4.33E+02 4.30E-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	309.	-53.	-0.007	52.34	-3.967E+00	P
AM-241	59.54	174.	19.	0.003	119.09	1.491E-01	
BA-133	80.99	214.	-11.	-0.001	291.24	-8.208E-02	P
Cd-109	88.04	732.	-24.	-0.003	158.53	-1.664E+00	
AC-228	93.35	406.	-13.	-0.002	216.86	-6.170E-01	
Gd-153	97.50	603.	-23.	-0.003	155.64	-1.946E-01	
Np-239	99.50	580.	-23.	-0.003	152.41	-3.954E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Gd-153	103.20	579.	-6.	-0.001	602.95	-6.758E-02	
Np-239	103.70	518.	22.	0.003	147.03	2.431E-01	
Np-239	106.13	574.	-22.	-0.003	154.65	-2.577E-01	
EU-152	121.78	252.	22.	0.003	106.16	2.025E-01	
CO-57	122.06	274.	7.	0.001	318.03	2.320E-02	
EU-154	123.10	309.	-26.	-0.004	109.28	-1.695E-01	P
HF-181	133.02	277.	20.	0.003	117.46	1.295E-01	
CE-144	133.54	297.	19.	0.003	131.94	4.658E-01	
CO-57	136.47	268.	19.	0.003	124.81	4.904E-01	
Tc-99m	140.51	416.	-23.	-0.003	127.93	-8.039E-02	
U-235	143.79	333.	-5.	-0.001	527.92	-1.291E-01	P
CE-141	145.44	289.	20.	0.003	123.69	1.165E-01	
Ba-140	162.66	274.	17.	0.002	141.91	8.094E-01	P
U-235	163.38	282.	-28.	-0.004	88.24	-1.635E+00	P
CE-139	165.85	292.	-8.	-0.001	299.36	-3.161E-02	P
Cf-251	176.60	170.	-9.	-0.001	259.95	-1.663E-01	
U-235	185.72	252.	-23.	-0.003	113.04	-1.402E-01	P
U-235	205.33	134.	4.	0.001	496.00	2.875E-01	P
Cf-251	227.00	133.	-19.	-0.003	108.69	-1.119E+00	
TH-227	235.97	396.	-20.	-0.003	145.61	-5.940E-01	
PB-212	238.63	360.	-29.	-0.004	92.76	-2.516E-01	P
TH-227	256.24	107.	12.	0.002	151.71	6.924E-01	
BI-210M	265.83	129.	-20.	-0.003	107.85	-1.620E-01	
TL-208	277.28	149.	-11.	-0.002	155.35	-7.421E-01	
Hg-203	279.20	166.	5.	0.001	344.71	2.717E-02	
I-131	284.30	135.	-16.	-0.002	169.87	-1.097E+00	P
TL-210	296.00	471.	-18.	-0.003	170.31	-9.922E-02	
PB-212	300.03	451.	-24.	-0.003	33.32	-3.146E+00	P
PA-231	300.07	427.	-18.	-0.003	161.83	-3.226E+00	
PA-233	300.18	409.	-5.	-0.001	577.24	-3.486E-01	
PA-233	312.01	342.	17.	0.002	155.50	2.110E-01	
Ir-192	316.49	74.	22.	0.003	59.69	1.129E-01	
CR-51	320.08	88.	12.	0.002	115.44	5.413E-01	
La-140	328.76	82.	16.	0.002	112.55	3.527E-01	P
Cf-249	333.44	81.	13.	0.002	128.96	4.007E-01	
AC-228	338.32	172.	2.	0.000	939.57	7.915E-02	P
Cs-136	340.57	174.	15.	0.002	123.54	1.557E-01	
EU-152	344.29	190.	16.	0.002	128.26	2.785E-01	
HF-181	345.83	211.	-6.	-0.001	342.77	-1.913E-01	
BA-133	356.00	210.	-18.	-0.002	118.33	-1.387E-01	
I-131	364.48	55.	14.	0.002	102.28	8.620E-02	P
BA-133	383.84	110.	14.	0.002	108.09	8.108E-01	
Cf-249	387.95	124.	9.	0.001	174.24	7.198E-02	
SB-125	427.88	48.	4.	0.001	301.92	8.096E-02	
AG-108M	433.94	73.	-4.	-0.001	372.82	-2.675E-02	
PM-146	453.88	105.	-25.	-0.003	72.21	-2.185E-01	P
SB-125	463.37	78.	12.	0.002	106.40	6.848E-01	P
Ir-192	468.06	136.	-17.	-0.002	101.89	-1.898E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	482.00	53.	-6.	-0.001	241.04	-4.487E-02	
La-140	487.02	65.	-6.	-0.001	209.89	-8.441E-02	P
RU-103	497.05	80.	-16.	-0.002	112.27	-1.083E-01	
RH-106	511.86	60.	209.	0.029	8.68	6.571E+00	
Kr-85	513.98	264.	5.	0.001	432.74	7.823E+00	
Nd-147	531.00	44.	-3.	0.000	436.74	-1.491E-01	
Ba-140	537.26	48.	11.	0.002	126.95	2.939E-01	
CS-134	563.24	44.	-2.	0.000	653.20	-1.616E-01	
CS-134	569.32	32.	12.	0.002	72.65	5.307E-01	
BI-207	569.70	51.	-4.	-0.001	279.46	-2.553E-02	
TL-208	583.02	59.	-5.	-0.001	278.28	-4.247E-02	P
SB-125	600.50	434.	-19.	-0.003	77.78	-7.503E-01	P
SB-124	602.73	415.	-19.	-0.003	154.05	-1.366E-01	
CS-134	604.71	396.	-19.	-0.003	150.38	-1.380E-01	
RU-103	610.30	377.	-19.	-0.003	146.28	-2.368E+00	
AG-108M	614.28	358.	-19.	-0.003	142.26	-1.527E-01	
PM-144	618.06	261.	17.	0.002	133.13	1.273E-01	
RH-106	621.92	353.	-19.	-0.003	140.63	-1.402E+00	
SB-125	635.89	30.	10.	0.001	83.40	6.691E-01	P
I-131	636.97	54.	-1.	0.000	854.12	-1.273E-01	P
AG-110M	657.76	37.	5.	0.001	190.62	3.774E-02	P
CS-137	661.66	48.	11.	0.002	97.07	9.659E-02	P
PM-144	696.54	39.	2.	0.000	641.29	1.602E-02	
NB-94	702.63	56.	5.	0.001	331.55	3.805E-02	
SB-124	722.79	29.	10.	0.001	85.77	7.274E-01	
AG-108M	722.94	39.	10.	0.001	97.10	8.658E-02	
EU-154	723.36	49.	5.	0.001	187.84	2.177E-01	
ZR-95	724.20	102.	-17.	-0.002	61.30	-3.222E-01	P
PM-146	735.72	47.	-7.	-0.001	99.30	-2.459E-01	P
PM-146	747.16	49.	-6.	-0.001	126.31	-1.384E-01	P
ZR-95	756.73	35.	3.	0.000	364.69	5.177E-02	
AG-110M	763.94	81.	-23.	-0.003	34.65	-8.775E-01	P
NB-95	765.79	69.	15.	0.002	83.58	1.270E-01	
PA-234M	766.41	72.	2.	0.000	558.22	6.350E+00	P
EU-152	778.92	26.	11.	0.002	99.31	7.356E-01	
CS-134	795.87	74.	2.	0.000	812.40	1.544E-02	
TL-210	799.60	66.	-11.	-0.002	108.71	-9.821E-02	
CS-134	801.95	86.	12.	0.002	113.04	1.223E+00	
CO-58	810.78	56.	9.	0.001	122.22	8.083E-02	
La-140	815.77	50.	7.	0.001	144.22	2.764E-01	
Cs-136	818.50	46.	9.	0.001	113.25	7.955E-02	
MN-54	834.85	29.	-8.	-0.001	161.90	-7.004E-02	P
Co-56	846.77	39.	-9.	-0.001	141.55	-8.306E-02	P
TL-208	860.56	44.	2.	0.000	831.50	1.275E-01	P
NB-94	871.10	23.	5.	0.001	133.46	5.052E-02	
EU-154	873.23	42.	-9.	-0.001	103.88	-7.212E-01	
Sc-46	889.28	71.	-7.	-0.001	182.48	-6.416E-02	
Y-88	898.04	29.	-3.	0.000	451.95	-3.268E-02	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
AC-228	911.07	36.	-5.	-0.001	236.34	-1.652E-01		P
AG-110M	937.49	37.	-4.	-0.001	302.94	-1.267E-01		
EU-152	964.11	54.	-5.	-0.001	226.78	-3.284E-01		
AC-228	968.97	80.	-20.	-0.003	67.21	-1.172E+00		P
EU-154	996.33	61.	4.	0.001	280.62	3.985E-01		
PA-234M	1001.00	77.	-12.	-0.002	121.64	-1.556E+01		P
EU-154	1004.77	36.	10.	0.001	91.94	5.772E-01		
Co-56	1037.84	40.	-13.	-0.002	113.20	-1.028E+00		P
Cs-136	1048.07	38.	2.	0.000	441.59	2.753E-02		
RH-106	1050.36	42.	-2.	0.000	463.68	-1.415E+00		
BI-207	1063.66	14.	5.	0.001	168.97	6.987E-02		P
Ga-68	1077.40	25.	-6.	-0.001	187.70	-3.586E+00		
FE-59	1099.25	10.	15.	0.002	53.05	3.043E-01		
EU-152	1112.07	72.	-10.	-0.001	118.76	-8.908E-01		
Ta-182	1121.30	58.	4.	0.001	277.80	1.317E-01		
CO-60	1173.24	15.	11.	0.001	85.99	1.285E-01		
Ta-182	1189.05	10.	16.	0.002	50.13	1.210E+00		
Ta-182	1221.41	16.	11.	0.002	89.26	5.029E-01		
Co-56	1238.28	13.	6.	0.001	135.67	1.173E-01		P
NA-22	1274.53	32.	-10.	-0.001	86.02	-1.301E-01		
FE-59	1291.60	22.	-4.	0.000	241.20	-1.069E-01		P
CO-60	1332.50	11.	9.	0.001	86.50	1.254E-01		
EU-152	1408.00	5.	7.	0.001	86.62	4.566E-01		
K-40	1460.83	54.	-20.	-0.003	64.82	-2.798E+00		P
SB-124	1690.98	12.	2.	0.000	424.26	6.985E-02		
Co-56	1771.35	35.	4.	0.001	215.06	4.498E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-5.6846E-02	-5.6846E-02	1.170E+03%	2.34E+00
NA-22	#A	-1.3010E-01	-1.3010E-01	8.602E+01%	3.78E-01
K-40	#A	-2.7979E+00	-2.7979E+00	6.482E+01%	5.09E+00
Sc-46	#A	-6.4155E-02	-6.4155E-02	1.825E+02%	4.03E-01
CR-51	#A	5.4134E-01	5.4135E-01	1.154E+02%	2.12E+00
MN-54	#A	-7.0043E-02	-7.0043E-02	1.619E+02%	2.53E-01
FE-59	#A	3.0431E-01	3.0431E-01	5.305E+01%	3.54E-01
Co-56	#A	-3.3310E-03	-3.3310E-03	9.804E+01%	2.94E-01
CO-57	#A	7.5019E-02	7.5019E-02	1.248E+02%	2.50E-01
CO-58	#A	8.0834E-02	8.0834E-02	1.222E+02%	3.38E-01
CO-60	#A	1.2695E-01	1.2695E-01	6.099E+01%	2.42E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	9.04E-01
NB-94	#A	4.4347E-02	4.4347E-02	1.335E+02%	3.07E-01
ZR-95	#A	5.1770E-02	5.1770E-02	3.647E+02%	4.68E-01

NB-95	#A	1.2696E-01	1.2696E-01	8.358E+01%	3.56E-01
RU-103	#A	-1.0834E-01	-1.0834E-01	1.123E+02%	3.01E-01
RH-106	#A	-1.4020E+00	-1.4020E+00	1.406E+02%	6.61E+00
AG-108M	#A	3.0029E-02	3.0029E-02	9.710E+01%	2.63E-01
AG-110M	#A	2.1348E-02	2.1348E-02	1.906E+02%	4.91E-01
SN-113	#A	5.0867E-03	5.0867E-03	2.776E+03%	4.85E-01
SB-124	#A	-1.4144E-02	-1.4144E-02	8.577E+01%	7.05E-01
SB-125	#A	3.3347E-01	3.3347E-01	8.340E+01%	6.52E-01
I-131	#A	8.6193E-02	8.6195E-02	1.023E+02%	2.27E-01
Gd-153	#A	-1.9459E-01	-1.9459E-01	1.556E+02%	1.01E+00
Ga-68	#A	-3.5722E+00	-3.5862E+00	1.877E+02%	1.55E+01
Tc-99m	#A	-8.0328E-02	-8.0387E-02	1.279E+02%	3.44E-01
BA-133	#A	-1.3868E-01	-1.3868E-01	1.183E+02%	5.51E-01
CS-134	#A	1.8347E-01	1.8347E-01	7.265E+01%	4.39E-01
CS-137	#A	9.6588E-02	9.6588E-02	9.707E+01%	3.13E-01
CE-139	#A	-3.1607E-02	-3.1607E-02	2.994E+02%	3.12E-01
Ba-140	#A	3.9861E-01	3.9861E-01	9.520E+01%	9.35E-01
La-140	#A	9.2988E-02	9.2989E-02	1.126E+02%	3.77E-01
CE-141	#A	1.1652E-01	1.1652E-01	1.237E+02%	4.83E-01
CE-144	#A	4.6576E-01	4.6576E-01	1.319E+02%	2.06E+00
PM-144	#A	7.1684E-02	7.1684E-02	1.331E+02%	2.55E-01
EU-152	#A	3.3354E-01	3.3354E-01	6.462E+01%	7.19E-01
EU-154	#A	1.3511E-01	1.3511E-01	9.166E+01%	5.57E-01
EU-155	A	1.4907E-01	1.4907E-01	1.241E+02%	6.26E-01
HF-181	#A	1.6113E-02	1.6113E-02	1.175E+02%	2.74E-01
Ta-182	#A	4.8370E-01	4.8370E-01	5.013E+01%	1.28E+00
Hg-203	#A	2.7169E-02	2.7170E-02	3.447E+02%	3.20E-01
TL-208	#A	-2.0693E-02	-2.0693E-02	2.783E+02%	3.16E-01
PM-146	#A	-2.1852E-01	-2.1852E-01	7.221E+01%	4.47E-01
Y-88	#A	-3.5671E-03	-3.5671E-03	3.239E+03%	3.44E-01
Cd-113m	#B	4.4461E+01	4.4461E+01	2.201E+03%	3.40E+03
Cd-109	#A	-1.6641E+00	-1.6641E+00	1.585E+02%	8.81E+00
Cf-251	#A	-1.6628E-01	-1.6628E-01	2.599E+02%	1.17E+00
Cf-249	#A	1.3453E-01	1.3453E-01	1.084E+02%	4.27E-01
Sn-126	A	3.6758E-01	3.6758E-01	2.141E+02%	2.65E+00
PB-210	#A	-3.9673E+00	-3.9673E+00	5.234E+01%	6.34E+00
PB-212	#A	-2.5161E-01	-2.5161E-01	9.276E+01%	7.91E-01
PB-214		6.1316E-01	6.1316E-01	3.287E+01%	6.08E-01
BI-207	#A	6.9868E-02	6.9868E-02	1.690E+02%	2.97E-01
BI-212	#A	-1.3573E-01	-1.3573E-01	4.618E+02%	4.19E+00
U-235	#A	1.5779E-03	1.5779E-03	3.622E+02%	2.26E+00
BI-214		1.1308E+00	1.1308E+00	2.763E+01%	6.33E-01
BI-210M	#A	-1.6198E-01	-1.6198E-01	1.078E+02%	4.48E-01
AC-228	#A	-9.3668E-02	-9.3668E-02	2.363E+02%	1.04E+00
TH-227	#A	6.9236E-01	6.9236E-01	1.517E+02%	2.85E+00
TH-229	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.35E+00
TH-234	#A	1.1569E+00	1.1569E+00	1.113E+02%	3.68E+00
PA-231	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.47E+01
PA-233	#A	2.1101E-01	2.1101E-01	1.555E+02%	1.10E+00

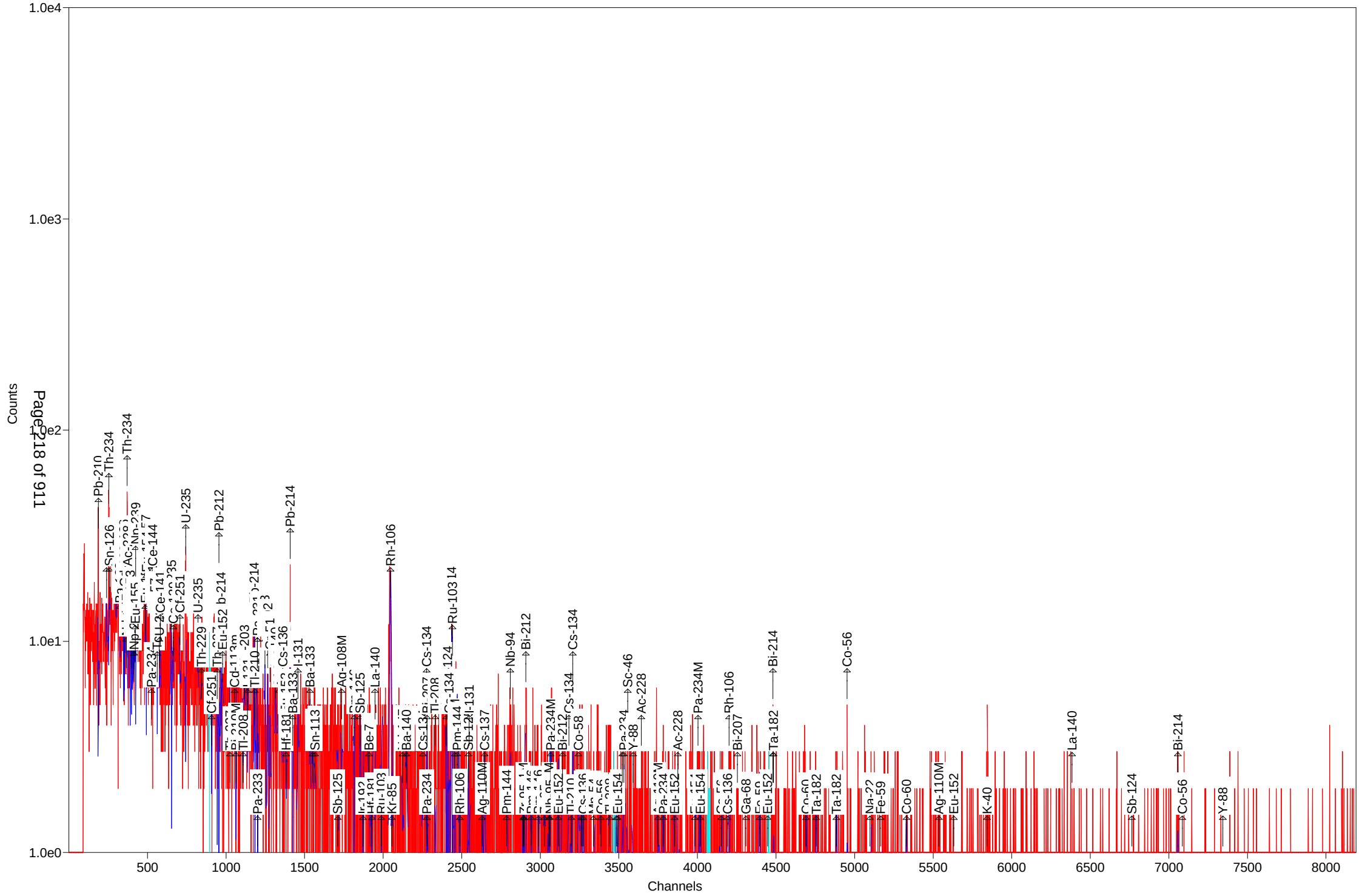
PA-234 #A	3.8470E-01	3.8470E-01	1.116E+02%		1.46E+00
PA-234M#A	-1.5557E+01	-1.5557E+01	1.216E+02%		5.53E+01
AM-241 #A	1.4915E-01	1.4915E-01	1.191E+02%		5.04E-01
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		2.67E+00
Ir-192 #A	1.1295E-01	1.1295E-01	5.969E+01%		2.21E-01
Cs-136 #A	7.6957E-02	7.6958E-02	1.132E+02%		3.08E-01
Np-239 #A	-2.5771E-01	-2.5773E-01	1.547E+02%		1.33E+00
Nd-147 #A	-1.4907E-01	-1.4907E-01	4.367E+02%		1.67E+00
TL-210 #A	-9.8206E-02	-9.8206E-02	1.087E+02%		3.62E-01
Kr-85 #A	7.8228E+00	7.8228E+00	4.327E+02%		1.15E+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 (25.1 to 1999.5 keV) 1.744E+00 Bq/Sample
Total Decayed Activity (25.1 to 1999.5 keV) 1.7439281E+00 Bq/Sample

412878_Gamma_180-86110-A-12-A. 17_Gamma_20190309.spc.



Test America St. Louis Spectrum ID: 14_Gamma_20190308

Sample Description: 412878_Gamma_180-86110-A-13-A
Detector: Detector #14
Batch ID: 412878
Work Order Number: Gamma
Lot Number: 180-86110-A-13-A

Decay to Time: 2/19/2019 09:39 Live Time: 7200 sec
Acquisition Time: 2/19/2019 09:39:32 Real Time: 7202 sec
Analysis Time: 2/19/2019 11:39 Dead Time: 0.03 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 14_Liquid_Marinelli 1L.Clb
Efficiency Cal Desc: 14_1LMarinelli_90062_030612
Efficiency Cal Date: 3/14/2012 16:58
Energy Cal Date: 2/28/2012 10:48
Library: Client_Long_Rev15.lib
Bkgd Correction File: 14_2019-01-20_1009.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	2.833E-01	284.0	8.047E-01	8.048E-01	2.780E+00
NA-22	-2.021E-01	60.1	1.215E-01	1.219E-01	3.971E-01
K-40	1.273E-01	1141.9	1.453E+00	1.454E+00	4.287E+00
Sc-46	-2.394E-02	583.1	1.396E-01	1.396E-01	4.889E-01
CR-51	7.661E-01	110.2	8.445E-01	8.455E-01	2.847E+00
MN-54	-5.673E-02	184.8	1.048E-01	1.049E-01	3.154E-01
FE-59	1.930E-01	90.0	1.736E-01	1.739E-01	4.437E-01
Co-56	6.509E-02	185.6	1.208E-01	1.209E-01	2.897E-01
CO-57	5.334E-02	138.7	7.400E-02	7.406E-02	2.623E-01
CO-58	-1.708E-01	88.9	1.519E-01	1.521E-01	5.096E-01
CO-60	-2.894E-02	571.2	1.653E-01	1.653E-01	4.246E-01
ZN-65	0.000E+00	1.#INF	9.964E-02	9.964E-02	5.001E-01
NB-94	4.951E-02	71.7	3.549E-02	3.558E-02	3.193E-01
ZR-95	6.394E-02	290.3	1.856E-01	1.856E-01	4.681E-01
NB-95	1.456E-02	627.4	9.134E-02	9.134E-02	3.268E-01
RU-103	-1.424E-01	70.5	1.004E-01	1.006E-01	3.375E-01
RH-106	9.108E-01	178.6	1.627E+00	1.628E+00	5.521E+00
AG-108M	2.547E-02	111.4	2.837E-02	2.840E-02	2.777E-01
AG-110M	1.816E-01	79.9	1.451E-01	1.454E-01	6.602E-01
SN-113	-1.475E-01	115.1	1.698E-01	1.700E-01	5.717E-01
SB-124	7.585E-02	212.6	1.613E-01	1.613E-01	5.460E-01
SB-125	1.283E-01	235.1	3.015E-01	3.016E-01	7.060E-01
I-131	2.756E-02	75.6	2.083E-02	2.088E-02	3.141E-01
Gd-153	-2.426E-02	86.5	2.098E-02	2.104E-02	7.862E-01
Ga-68	0.000E+00	1.#INF	7.468E-01	7.468E-01	1.759E+01
Tc-99m	1.436E-01	46.3	6.645E-02	6.697E-02	1.732E-01
BA-133	1.138E-01	124.4	1.415E-01	1.416E-01	4.790E-01
CS-134	7.941E-02	108.1	8.587E-02	8.596E-02	3.867E-01
CS-137	4.901E-03	2931.6	1.437E-01	1.437E-01	5.026E-01
CE-139	1.834E-02	490.0	8.986E-02	8.987E-02	3.062E-01
Ba-140	-1.600E-01	75.6	1.210E-01	1.212E-01	1.044E+00
La-140	4.925E-02	256.9	1.265E-01	1.266E-01	3.103E-01
CE-141	1.177E-01	136.8	1.611E-01	1.612E-01	5.405E-01

CE-144	-5.646E-01	132.2	7.464E-01	7.470E-01	2.499E+00
PM-144	-1.024E-03	134.8	1.381E-03	1.382E-03	3.290E-01
EU-152	3.329E-01	78.9	2.627E-01	2.633E-01	7.538E-01
EU-154	5.790E-02	66.8	3.867E-02	3.880E-02	5.746E-01
EU-155	-4.359E-02	716.5	3.123E-01	3.123E-01	9.977E-01
HF-181	-2.612E-02	77.5	2.023E-02	2.027E-02	4.374E-01
Ta-182	0.000E+00	1.#INF	8.379E-02	8.379E-02	1.051E+00
Hg-203	-2.178E-02	421.6	9.184E-02	9.184E-02	3.164E-01
TL-208	1.580E-02	183.7	2.903E-02	2.904E-02	2.929E-01
PM-146	9.033E-03	55.1	4.974E-03	4.994E-03	4.738E-01
Y-88	-2.431E-01	52.6	1.278E-01	1.286E-01	5.252E-01
Cd-113m	-1.430E+03	98.1	1.404E+03	1.407E+03	4.703E+03
Cd-109	0.000E+00	1.#INF	4.947E-01	4.947E-01	8.614E+00
Cf-251	2.704E-01	152.5	4.123E-01	4.129E-01	1.118E+00
Cf-249	1.226E-01	119.0	1.459E-01	1.460E-01	4.929E-01
Sn-126	-1.386E-02	5230.5	7.248E-01	7.248E-01	2.472E+00
PB-210	1.902E+00	92.7	1.764E+00	1.772E+00	5.005E+00
PB-212	1.144E-01	113.4	1.298E-01	1.300E-01	4.076E-01
PB-214	2.774E-01	88.4	2.453E-01	2.457E-01	5.669E-01
BI-207	-9.808E-03	1919.7	1.883E-01	1.883E-01	4.559E-01
BI-212	-1.339E-01	1245.0	1.667E+00	1.667E+00	5.837E+00
U-235	2.272E-01	83.8	1.903E-01	1.907E-01	2.559E+00
BI-214	1.330E-01	48.9	6.508E-02	6.542E-02	1.161E+00
BI-210M	1.290E-01	126.0	1.624E-01	1.626E-01	5.482E-01
AC-228	1.623E-01	114.3	1.855E-01	1.856E-01	1.236E+00
TH-227	2.064E-01	153.8	3.176E-01	3.179E-01	2.888E+00
TH-229	4.995E-01	123.2	6.153E-01	6.165E-01	4.590E+00
TH-234	1.635E-01	709.5	1.160E+00	1.160E+00	3.409E+00
PA-231	-2.374E-01	1958.6	4.649E+00	4.649E+00	1.579E+01
PA-233	2.303E-01	162.4	3.740E-01	3.743E-01	1.257E+00
PA-234	2.650E-01	70.7	1.873E-01	1.879E-01	1.572E+00
PA-234M	-1.925E+00	745.3	1.434E+01	1.434E+01	5.891E+01
AM-241	-2.366E-01	54.0	1.277E-01	1.284E-01	6.369E-01
Np-237	-4.813E-01	163.4	7.865E-01	7.870E-01	2.628E+00
Ir-192	7.099E-03	68.3	4.847E-03	4.865E-03	3.335E-01
Cs-136	9.923E-02	96.8	9.610E-02	9.625E-02	5.427E-01
Np-239	-2.682E-01	117.7	3.156E-01	3.160E-01	1.056E+00
Nd-147	-6.635E-01	131.8	8.747E-01	8.755E-01	2.190E+00
TL-210	1.067E-01	95.3	1.016E-01	1.018E-01	3.696E-01
Kr-85	3.357E+01	89.5	3.006E+01	3.012E+01	1.005E+02
Total	4.239E+01				

Analyst: conrad.reuscher

Sample description
412878_Gamma_180-86110-A-13-A

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20190308.An1

Acquisition information
Start time: 2/19/2019 9:39:32 AM
Live time: 7200
Real time: 7202
Dead time: 0.03 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Liquid_Marinelli 1L.Clb
14_1LMarinelli_90062_030612

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: 3/14/2012 4:58:47 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.64 %
Log(Eff): -1.428037E+00 + (-4.136370E-02*Log(E)) +
(-5.958012E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.07 %
Log(Eff): -1.383299E+01 + (4.786779E+00*Log(E)) +
(-5.293738E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev15.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.14keV)
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	2/19/2019 9:39:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2019-01-20_1009.PBC 1/20/2019 10:10:00 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2631

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.68	22.	92.73	0.88	3.857E-02	46.54	4.250	PBC<MDA	PB210
59.87	20.	70.71	0.42	4.462E-02	59.54	35.900	PBC<MDA	AM241
63.45	-40.	57.43	0.77	4.569E-02	63.29	3.810	PBC<MDA	TH234
80.99	18.	110.94	0.78	4.877E-02	80.99	34.060	PBC<MDA	BA133
92.81	102.	19.21	1.28	4.919E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	5.180E+00	AC228
103.20	17.	126.90	0.81	4.884E-02	103.20	21.800	PBC<MDA	Gd153
105.31	-3.	716.53	0.81	4.871E-02	105.31	21.200	PBC<MDA	EU155
133.07	16.	75.95	0.84	4.576E-02	133.02	43.300	PBC<MDA	HF181
136.47	17.	138.73	0.84	4.529E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	4.966E-01	CO57
140.11	37.	46.29	0.67	4.472E-02	140.51	89.300	PBC<MDA	Tc99m
145.44	18.	136.80	0.85	4.401E-02	145.44	48.200	PBC<MDA	CE141
162.66	17.	117.29	0.87	4.140E-02	162.66	6.220	PBC<MDA	Ba140
163.38	17.	122.01	0.87	4.129E-02	163.38	5.080	PBC<MDA	U235
165.85	4.	489.97	0.87	4.093E-02	165.85	79.900	PBC<MDA	CE139
176.60	13.	152.49	0.88	3.928E-02	176.60	17.000	PBC<MDA	Cf251
185.72	-35.	61.42	0.89	3.800E-02	185.72	54.000	PBC<MDA	U235
205.33	11.	166.48	0.91	3.553E-02	205.33	5.010	PBC<MDA	U235
210.85	14.	123.20	0.92	3.489E-02	210.85	2.990	PBC<MDA	TH229
227.00	16.	103.26	0.93	3.318E-02	227.00	6.300	PBC<MDA	Cf251
235.97	14.	153.85	0.94	3.230E-02	235.97	12.300	PBC<MDA	TH227

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
238.40	38.	31.11	0.63	3.207E-02	238.63	43.300	PBC<MDA	PB212
242.00	14.	153.54	0.95	3.174E-02	242.00	7.430	PBC<MDA	PB214
244.69	6.	364.03	0.95	3.150E-02	244.69	7.580	PBC<MDA	EU152
265.83	14.	125.95	0.97	2.972E-02	265.83	50.000	PBC<MDA	BI210M
277.28	8.	183.69	0.98	2.884E-02	277.28	6.310	PBC<MDA	TL208
294.59	13.	192.65	1.00	2.759E-02	295.09	19.300	PBC<MDA	PB214
296.00	16.	164.14	1.00	2.753E-02	296.00	79.000	PBC<MDA	TL210
299.95	10.	264.69	1.01	2.726E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
312.01	16.	162.42	1.02	2.650E-02	312.01	36.000	PBC<MDA	PA233
320.08	14.	110.24	1.03	2.601E-02	320.08	9.940	PBC<MDA	CR51
338.32	8.	225.55	1.04	2.498E-02	338.32	12.010	PBC<MDA	AC228
345.13	15.	120.49	1.05	2.458E-02	345.83	15.070	PBC<MDA	HF181
351.80	16.	88.45	0.57	2.426E-02	351.93	37.600	PBC<MDA	PB214
356.00	12.	124.39	1.06	2.405E-02	356.00	62.050	PBC<MDA	BA133
387.95	13.	119.02	1.09	2.256E-02	387.95	66.000	PBC<MDA	Cf249
427.88	-1.	945.90	1.13	2.095E-02	427.88	29.600	PBC<MDA	SB125
468.06	15.	100.78	1.17	1.955E-02	468.06	51.750	PBC<MDA	Ir192
477.60	4.	284.04	1.18	1.925E-02	477.60	10.520	PBC<MDA	BE7
487.02	-3.	449.36	1.18	1.896E-02	487.02	45.500	PBC<MDA	La140
511.86	63.	24.17	2.46	1.823E-02	511.86	20.000	2.397E+00	RH106
513.98	19.	89.55	1.21	1.817E-02	513.98	0.430	PBC<MDA	Kr85
569.47	11.	79.45	1.26	1.676E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.085E+00	PA234
					569.70	97.740	9.106E-02	BI207
583.02	-3.	387.16	1.27	1.645E-02	583.02	84.500	PBC<MDA	TL208
600.50	8.	235.11	1.29	1.606E-02	600.50	17.860	PBC<MDA	SB125
602.73	9.	212.63	1.29	1.601E-02	602.73	98.260	PBC<MDA	SB124
604.71	6.	293.12	1.29	1.597E-02	604.71	97.620	PBC<MDA	CS134
608.46	-11.	162.62	1.30	1.587E-02	609.31	46.090	PBC<MDA	BI214
610.30	11.	157.77	1.30	1.585E-02	610.30	5.750	PBC<MDA	RU103
614.28	11.	162.96	1.30	1.577E-02	614.28	89.850	PBC<MDA	AG108M
618.06	8.	194.29	1.30	1.569E-02	618.06	99.100	PBC<MDA	PM144
621.92	10.	178.64	1.31	1.561E-02	621.92	9.930	PBC<MDA	RH106
636.97	10.	84.66	1.32	1.531E-02	636.97	7.170	PBC<MDA	I131
735.72	1.	834.38	1.41	1.361E-02	735.72	22.500	PBC<MDA	PM146
747.16	11.	55.06	1.42	1.344E-02	747.16	34.000	PBC<MDA	PM146
756.73	3.	290.26	1.43	1.329E-02	756.73	54.460	PBC<MDA	ZR95
763.94	10.	79.90	1.43	1.319E-02	763.94	22.280	PBC<MDA	AG110M
765.79	1.	627.39	1.43	1.316E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	4.945E+00	PA234M
785.42	4.	224.47	1.45	1.289E-02	785.42	1.280	PBC<MDA	BI212
795.87	8.	108.14	1.46	1.275E-02	795.87	85.530	PBC<MDA	CS134
799.60	10.	96.93	1.46	1.270E-02	799.60	98.960	PBC<MDA	TL210
818.50	10.	145.31	1.48	1.245E-02	818.50	100.000	PBC<MDA	Cs136
846.77	6.	185.64	1.50	1.210E-02	846.77	99.935	PBC<MDA	Co56
871.10	9.	71.69	1.52	1.181E-02	871.10	99.890	PBC<MDA	NB94

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
880.53	4.	280.62	1.53	1.171E-02	880.53	6.000	PBC<MDA	PA234
898.04	20.	39.93	1.54	1.151E-02	898.04	93.700	2.533E-01	Y88
946.17	6.	141.85	1.58	1.101E-02	946.02	13.400	PBC<MDA	PA234
964.11	10.	78.92	1.60	1.083E-02	964.11	14.605	PBC<MDA	EU152
968.97	6.	114.29	1.60	1.079E-02	968.97	17.460	PBC<MDA	AC228
1001.00	-1.	745.29	1.63	1.049E-02	1001.00	0.837	PBC<MDA	PA234M
1004.77	8.	93.13	1.63	1.045E-02	1004.77	18.010	PBC<MDA	EU154
1048.07	5.	128.06	1.66	1.008E-02	1048.07	80.000	PBC<MDA	Cs136
1099.25	8.	89.95	1.70	9.666E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	8.	85.72	1.71	9.569E-03	1112.07	13.644	PBC<MDA	EU152
1120.36	12.	48.95	1.72	9.507E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1291.60	4.	217.14	1.84	8.380E-03	1291.60	43.200	PBC<MDA	FE59
1384.30	6.	123.77	1.91	7.874E-03	1384.30	24.290	PBC<MDA	AG110M
1596.21	2.	256.93	2.04	6.915E-03	1596.21	95.400	PBC<MDA	La140
1771.35	11.	85.60	2.15	6.279E-03	1771.35	15.480	PBC<MDA	Co56

No unknown peaks passed sensitivity test.

This section based on library: Client_Long_Rev15.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.13	46.68	146.	22.	0.003	92.73	0.879s
TH-227	199.98	50.14	156.	-17.	-0.002	122.46	0.751s
AM-241	237.55	59.54	229.	-27.	-0.004	53.96	0.761s
TH-234	252.55	63.29	260.	-40.	-0.006	57.43	0.765s
BA-133	323.33	80.99	129.	18.	0.002	110.94	0.784
Np-237	345.33	86.49	652.	-22.	-0.003	163.40	0.789s
EU-155	345.54	86.54	630.	-22.	-0.003	160.57	0.790s
Sn-126	347.13	86.94	607.	-21.	-0.003	164.18	0.790s
Sn-126	349.65	87.57	586.	0.	0.000	1000.00	0.791s
Cd-109	351.53	88.04	586.	0.	0.000	1000.00	0.791s
Nd-147	363.77	91.10	561.	-9.	-0.001	380.64	0.794s
TH-234	370.60	92.81	193.	3.	0.000	709.54	1.283s
AC-228	372.76	93.35	533.	9.	0.001	371.20	0.797s
Gd-153	389.36	97.50	300.	-21.	-0.003	117.52	0.801s
Np-239	397.36	99.50	290.	-22.	-0.003	111.63	0.803s
Gd-153	412.15	103.20	215.	17.	0.002	126.90	0.807s
Np-239	414.15	103.70	232.	0.	0.000	1000.00	0.807s
EU-155	420.60	105.31	235.	-3.	0.000	716.53	0.809
Np-239	423.87	106.13	297.	-21.	-0.003	117.67	0.810
EU-152	486.45	121.78	229.	-20.	-0.003	108.73	0.826
EU-154	491.73	123.10	270.	-25.	-0.003	95.76	0.828s
PA-234	524.50	131.29	381.	-21.	-0.003	136.16	0.836

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	531.42	133.02	65.	16.	0.002	75.95	0.838D
CE-144	533.47	133.54	361.	-21.	-0.003	132.22	0.838s
HF-181	544.52	136.30	384.	-21.	-0.003	135.77	0.841s
CO-57	545.21	136.47	279.	17.	0.002	138.73	0.841s
Tc-99m	559.74	140.11	80.	37.	0.005	46.29	0.669
U-235	574.45	143.79	346.	-17.	-0.002	143.41	0.849s
CE-141	581.07	145.44	294.	18.	0.002	136.80	0.850s
Ba-140	649.93	162.66	198.	17.	0.002	117.29	0.868s
U-235	652.81	163.38	215.	17.	0.002	122.01	0.869s
CE-139	662.70	165.85	222.	4.	0.001	489.97	0.871s
Cf-251	705.68	176.60	120.	13.	0.002	152.49	0.882s
U-235	742.15	185.72	166.	-35.	-0.005	61.42	0.892s
TH-229	773.30	193.51	120.	-5.	-0.001	392.43	0.899s
U-235	820.58	205.33	99.	11.	0.001	166.48	0.912
TH-229	842.65	210.85	89.	14.	0.002	123.20	0.917
Cf-251	907.23	227.00	80.	16.	0.002	103.26	0.933s
TH-227	943.11	235.97	209.	14.	0.002	153.85	0.942s
PB-212	953.75	238.63	67.	11.	0.002	113.40	0.945D
PB-214	967.21	242.00	211.	14.	0.002	153.54	0.948s
EU-152	977.99	244.69	265.	6.	0.001	364.03	0.951
TH-227	1024.17	256.24	80.	-4.	-0.001	401.04	0.962
Cd-113m	1054.01	263.70	155.	-18.	-0.003	98.15	0.970s
BI-210M	1062.53	265.83	144.	14.	0.002	125.95	0.972
TL-208	1108.33	277.28	95.	8.	0.001	183.69	0.983s
Hg-203	1115.99	279.20	118.	-4.	-0.001	421.63	0.985s
PB-214	1179.54	295.09	306.	13.	0.002	192.65	1.001s
TL-210	1183.18	296.00	319.	16.	0.002	164.14	1.002s
PB-212	1199.30	300.03	337.	10.	0.001	264.69	1.006s
PA-231	1199.46	300.07	347.	0.	0.000	1000.00	1.006s
PA-233	1199.90	300.18	347.	0.	0.000	1000.00	1.006
BA-133	1210.59	302.85	339.	0.	0.000	1000.00	1.009
Ba-140	1218.57	304.85	339.	0.	0.000	1000.00	1.011
BI-210M	1218.76	304.90	339.	0.	0.000	1000.00	1.011
Ir-192	1232.94	308.44	357.	-17.	-0.002	159.85	1.014s
PA-233	1247.22	312.01	322.	16.	0.002	162.42	1.018s
Ir-192	1265.13	316.49	125.	-18.	-0.002	92.13	1.022s
CR-51	1279.51	320.08	116.	14.	0.002	110.24	1.026s
La-140	1314.21	328.76	114.	-20.	-0.003	102.16	1.034s
Cf-249	1332.92	333.44	92.	-18.	-0.002	104.14	1.039s
AC-228	1352.44	338.32	152.	8.	0.001	225.55	1.043s
Cs-136	1361.44	340.57	160.	0.	0.000	1000.00	1.045s
EU-152	1376.30	344.29	171.	-17.	-0.002	113.29	1.049s
HF-181	1382.47	345.83	148.	15.	0.002	120.49	1.050s
PB-214	1406.36	351.80	55.	16.	0.002	88.45	0.575s
BA-133	1423.15	356.00	110.	12.	0.002	124.39	1.060
I-131	1457.08	364.48	77.	-12.	-0.002	125.27	1.069s
BA-133	1534.50	383.84	198.	-18.	-0.003	82.15	1.087
Cf-249	1550.94	387.95	116.	13.	0.002	119.02	1.091s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SN-113	1565.90	391.69	146.	-15.	-0.002	115.11	1.095
SB-125	1710.63	427.88	38.	-1.	0.000	945.90	1.129s
AG-108M	1734.87	433.94	56.	-8.	-0.001	151.91	1.135
PM-146	1814.64	453.88	80.	-16.	-0.002	112.27	1.154s
SB-125	1852.59	463.37	117.	-10.	-0.001	151.48	1.163s
Ir-192	1871.36	468.06	101.	15.	0.002	100.78	1.167s
BE-7	1909.50	477.60	66.	4.	0.001	284.04	1.176s
HF-181	1927.10	482.00	96.	-15.	-0.002	97.38	1.180s
La-140	1947.19	487.02	47.	-3.	0.000	449.36	1.185
RU-103	1987.33	497.05	68.	-17.	-0.002	70.48	1.194s
RH-106	2046.57	511.86	71.	63.	0.009	24.17	2.458s
Kr-85	2055.03	513.98	134.	19.	0.003	89.55	1.210s
Nd-147	2123.11	531.00	52.	-11.	-0.002	131.84	1.225s
Ba-140	2148.15	537.26	40.	-14.	-0.002	95.44	1.231s
CS-134	2252.06	563.24	64.	-17.	-0.002	92.89	1.255s
CS-134	2276.40	569.32	36.	-6.	-0.001	147.20	1.260s
PA-234	2276.99	569.47	31.	11.	0.001	79.45	1.261
TL-208	2331.20	583.02	33.	-3.	0.000	387.16	1.273s
SB-125	2401.12	600.50	170.	8.	0.001	235.11	1.289s
SB-124	2410.04	602.73	161.	9.	0.001	212.63	1.291s
CS-134	2417.96	604.71	170.	6.	0.001	293.12	1.292s
BI-214	2436.36	609.31	157.	-11.	-0.002	162.62	1.296
RU-103	2440.31	610.30	146.	11.	0.002	157.77	1.297s
AG-108M	2456.25	614.28	157.	11.	0.002	162.96	1.301s
PM-144	2471.37	618.06	112.	8.	0.001	194.29	1.304
RH-106	2486.79	621.92	160.	10.	0.001	178.64	1.308s
SB-125	2542.69	635.89	35.	-8.	-0.001	215.08	1.320s
I-131	2547.03	636.97	33.	10.	0.001	84.66	1.321s
AG-110M	2630.18	657.76	62.	-16.	-0.002	110.72	1.339s
PM-144	2785.32	696.54	43.	-7.	-0.001	186.92	1.374s
SB-124	2890.31	722.79	63.	-11.	-0.002	106.41	1.396s
AG-108M	2890.91	722.94	74.	0.	0.000	1000.00	1.397s
EU-154	2892.60	723.36	74.	0.	0.000	1000.00	1.397s
ZR-95	2895.96	724.20	74.	0.	0.000	1000.00	1.398s
PM-146	2942.05	735.72	22.	1.	0.000	834.38	1.408s
PM-146	2987.81	747.16	6.	11.	0.001	55.06	1.417s
ZR-95	3026.09	756.73	22.	3.	0.000	290.26	1.426s
AG-110M	3054.96	763.94	27.	10.	0.001	79.90	1.432s
NB-95	3062.34	765.79	37.	1.	0.000	627.39	1.433s
PA-234M	3064.83	766.41	53.	-13.	-0.002	83.00	1.434s
BI-212	3140.88	785.42	22.	4.	0.001	224.47	1.450
CS-134	3182.68	795.87	35.	8.	0.001	108.14	1.459s
TL-210	3197.61	799.60	43.	10.	0.001	96.93	1.462s
CS-134	3207.01	801.95	80.	-9.	-0.001	147.27	1.464s
CO-58	3242.31	810.77	86.	-15.	-0.002	88.94	1.471s
La-140	3262.30	815.77	101.	-3.	0.000	454.05	1.475s
Cs-136	3273.22	818.50	97.	10.	0.001	145.31	1.478
MN-54	3338.63	834.85	29.	-5.	-0.001	184.81	1.492s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Co-56	3386.32	846.77	23.	6.	0.001	185.64	1.501s
TL-208	3441.51	860.56	28.	-5.	-0.001	228.91	1.513s
NB-94	3483.65	871.10	17.	9.	0.001	71.69	1.522s
EU-154	3492.19	873.23	39.	-9.	-0.001	102.07	1.523s
PA-234	3521.39	880.53	61.	4.	0.001	280.62	1.529
PA-234	3532.24	883.24	65.	0.	0.000	1000.00	1.531
AG-110M	3538.01	884.68	65.	0.	0.000	1000.00	1.533s
Sc-46	3556.40	889.28	67.	-2.	0.000	583.10	1.536
Y-88	3591.45	898.04	9.	20.	0.003	39.93	1.543s
AC-228	3643.58	911.07	33.	-2.	0.000	731.57	1.554
AG-110M	3749.30	937.49	23.	-5.	-0.001	196.95	1.576s
PA-234	3783.42	946.02	17.	6.	0.001	141.85	1.582s
EU-152	3855.80	964.11	24.	10.	0.001	78.92	1.597s
AC-228	3875.25	968.97	17.	6.	0.001	114.29	1.601s
EU-154	3984.71	996.33	51.	-3.	0.000	360.80	1.622s
PA-234M	4003.39	1001.00	55.	-1.	0.000	745.29	1.626s
EU-154	4018.51	1004.77	24.	8.	0.001	93.13	1.629s
Co-56	4150.81	1037.84	30.	-2.	0.000	606.22	1.655
Cs-136	4191.74	1048.07	18.	5.	0.001	128.06	1.663s
RH-106	4200.91	1050.36	31.	-6.	-0.001	137.44	1.665s
Ga-68	4309.10	1077.40	20.	0.	0.000	1000.00	1.685s
FE-59	4396.54	1099.25	10.	8.	0.001	89.95	1.702s
EU-152	4447.85	1112.07	22.	8.	0.001	85.72	1.712s
ZN-65	4461.74	1115.55	10.	0.	0.000	1000.00	1.714s
BI-214	4480.72	1120.29	11.	12.	0.002	48.95	1.718s
Sc-46	4481.77	1120.55	23.	0.	0.000	1000.00	1.718s
Ta-182	4484.77	1121.30	23.	0.	0.000	1000.00	1.719s
CO-60	4692.60	1173.24	22.	-7.	-0.001	97.25	1.757s
Ta-182	4755.88	1189.05	25.	-4.	-0.001	279.32	1.769s
Ta-182	4885.38	1221.41	32.	-15.	-0.002	88.00	1.792s
NA-22	5097.96	1274.53	21.	-12.	-0.002	60.13	1.831s
EU-154	5098.00	1274.54	34.	0.	0.000	1000.00	1.831s
FE-59	5166.25	1291.60	17.	4.	0.001	217.14	1.843s
TL-210	5251.92	1313.00	21.	-4.	-0.001	246.99	1.858s
CO-60	5329.96	1332.50	23.	-2.	0.000	571.23	1.871s
AG-110M	5537.26	1384.30	11.	6.	0.001	123.77	1.907s
EU-152	5632.13	1408.00	21.	-8.	-0.001	130.66	1.923s
La-140	6385.44	1596.21	7.	2.	0.000	256.93	2.044
SB-124	6764.81	1690.98	23.	-10.	-0.001	119.90	2.102s
BI-214	7059.07	1764.49	41.	-22.	-0.003	24.55	2.145s
Co-56	7086.53	1771.35	36.	11.	0.001	85.60	2.149s
Y-88	7345.59	1836.06	19.	-11.	-0.001	52.59	2.185s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

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*****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
_____________________________________________________________________________

BE-7     C   2.8329E-01                                     5.31E+01
                          477.60 2.833E-01 ?(P 2.780E+00 2.84E+02 1.05E+01 G

NA-22    C  -2.0211E-01                                     9.50E+02
                         1274.53-2.021E-01 ?(  3.971E-01 6.01E+01 9.99E+01 G

K-40     N   1.2729E-01                                     4.66E+11
                         1460.83 1.273E-01 &(P 4.287E+00 1.14E+03 1.07E+01 G

Sc-46    F  -2.3936E-02                                     8.38E+01
                          889.28-2.394E-02 ?(  4.889E-01 5.83E+02 1.00E+02 G
                         1120.55 0.000E+00 +   3.666E-01 1.00E+03 1.00E+02 G

CR-51    F   7.6606E-01                                     2.77E+01
                          320.08 7.661E-01 &(  2.847E+00 1.10E+02 9.94E+00 G

MN-54    C  -5.6732E-02                                     3.12E+02
                          834.85-5.673E-02 ?(P 3.154E-01 1.85E+02 1.00E+02 G

FE-59    F   1.9299E-01                                     4.45E+01
                         1099.25 2.129E-01 &(  4.437E-01 9.00E+01 5.65E+01 G
                         1291.60 1.670E-01 &(P 8.334E-01 2.17E+02 4.32E+01 G

Co-56    C   6.5091E-02                                     7.73E+01
                          846.77 6.509E-02 &(  2.897E-01 1.86E+02 9.99E+01 G
                         1238.28-8.053E-03 %   5.854E-01 3.15E+03 6.61E+01 G
                         1037.84-1.934E-01 +   2.731E+00 6.06E+02 1.41E+01 G
                         1771.35 1.511E+00 ?   4.364E+00 8.56E+01 1.55E+01  A

CO-57    C   5.3344E-02                                     2.72E+02
                          122.06-1.966E-03 %(  2.623E-01 3.91E+03 8.56E+01 G
                          136.47 4.966E-01 ?(  2.314E+00 1.39E+02 1.07E+01 G

CO-58    C  -1.7078E-01                                     7.09E+01
                          810.78-1.708E-01 ?(  5.096E-01 8.89E+01 9.95E+01 G

CO-60    F  -2.8939E-02                                     1.93E+03
                         1332.50-2.894E-02 ?(P 4.246E-01 5.71E+02 1.00E+02 G
                         1173.24-1.007E-01 + P 3.712E-01 9.73E+01 9.99E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	I	4.9510E-02					7.41E+06	
			702.63	-1.004E-02	%(	3.193E-01	1.28E+03	9.79E+01 G
			871.10	1.079E-01	&(	2.581E-01	7.17E+01	9.99E+01 G
ZR-95	I	6.3944E-02					6.40E+01	
			756.73	6.394E-02	?(	4.681E-01	2.90E+02	5.45E+01 G
			724.20	0.000E+00	-	9.765E-01	1.00E+03	4.42E+01 G
NB-95	I	1.4558E-02					6.40E+01	
			765.79	1.456E-02	?(	3.268E-01	6.27E+02	9.98E+01 G
RU-103	I	-1.4243E-01					3.93E+01	
			497.05	-1.424E-01	?(P	3.375E-01	7.05E+01	9.09E+01 G
			610.30	1.683E+00	&	9.003E+00	1.58E+02	5.75E+00 GA
RH-106	I	9.1077E-01					3.74E+02	
			621.92	9.108E-01	?(	5.521E+00	1.79E+02	9.93E+00 G
			1050.36	-5.311E+00	+	2.537E+01	1.37E+02	1.56E+00 G
			511.86	2.397E+00	? P	1.595E+00	2.42E+01	2.00E+01 GA
AG-108M	C	2.5473E-02					1.53E+05	
			433.94	-5.707E-02	?(P	2.777E-01	1.52E+02	9.05E+01 G
			722.94	0.000E+00	+	4.739E-01	1.00E+03	9.08E+01 G
			614.28	1.086E-01	&(	5.997E-01	1.63E+02	8.98E+01 G
AG-110M	F	1.8160E-01					2.50E+02	
			884.68	0.000E+00	&(	6.602E-01	1.00E+03	7.27E+01 G
			657.76	-1.622E-01	+ P	3.863E-01	1.11E+02	9.46E+01 G
			937.49	-1.943E-01	+	9.188E-01	1.97E+02	3.44E+01 G
			1384.30	4.599E-01	?(	1.302E+00	1.24E+02	2.43E+01 G
			763.94	4.706E-01	?(	1.265E+00	7.99E+01	2.23E+01 G
SN-113	F	-1.4750E-01					1.15E+02	
			391.69	-1.475E-01	?(	5.717E-01	1.15E+02	6.40E+01 G
SB-124	F	7.5847E-02					6.02E+01	
			602.73	7.585E-02	&(P	5.460E-01	2.13E+02	9.83E+01 G
			1690.98	-4.285E-01	+	1.104E+00	1.20E+02	4.78E+01 G
			722.79	-1.023E+00	+	3.693E+00	1.06E+02	1.08E+01 G
SB-125	I	1.2826E-01					1.01E+03	
			427.88	-2.721E-02	?(P	7.060E-01	9.46E+02	2.96E+01 G
			600.50	3.859E-01	?(P	3.073E+00	2.35E+02	1.79E+01 G
			635.89	-6.745E-01	+ P	2.438E+00	2.15E+02	1.13E+01 G
			463.37	-6.957E-01	+	3.581E+00	1.51E+02	1.05E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	I 2.7557E-02					8.02E+00	
		364.48	-8.445E-02	?(P	3.141E-01	1.25E+02	8.17E+01 G
		284.30	-1.335E-01	%	3.792E+00	1.08E+03	6.14E+00 G
		636.97	1.304E+00	?(	3.725E+00	8.47E+01	7.17E+00 G
Gd-153	F -2.4263E-02					2.42E+02	
		97.50	-1.999E-01	?(	7.862E-01	1.18E+02	3.00E+01 G
		103.20	2.174E-01	&(	9.273E-01	1.27E+02	2.18E+01 G
Tc-99m	I 1.4356E-01					2.51E-01	
		140.51	1.436E-01	(	1.732E-01	4.63E+01	8.93E+01 G
BA-133	F 1.1376E-01					3.85E+03	
		356.00	1.138E-01	(	4.790E-01	1.24E+02	6.20E+01 G
		302.85	0.000E+00	-	2.477E+00	1.00E+03	1.83E+01 G
		383.84	-1.232E+00	+ P	4.668E+00	8.21E+01	8.94E+00 GA
		80.99	1.482E-01	P	4.654E-01	1.11E+02	3.41E+01 GA
CS-134	I 7.9407E-02					7.54E+02	
		795.87	1.055E-01	?(P	3.867E-01	1.08E+02	8.55E+01 G
		604.71	5.650E-02	?(	5.649E-01	2.93E+02	9.76E+01 G
		569.32	-3.233E-01	+	1.652E+00	1.47E+02	1.54E+01 G
		801.95	-1.112E+00	+	5.595E+00	1.47E+02	8.69E+00 G
		563.24	-1.717E+00	+	3.935E+00	9.29E+01	8.35E+00 G
CS-137	I 4.9015E-03					1.10E+04	
		661.66	4.901E-03	%(	5.026E-01	2.93E+03	8.52E+01 G
CE-139	F 1.8339E-02					1.38E+02	
		165.85	1.834E-02	?(	3.062E-01	4.90E+02	7.99E+01 G
Ba-140	I -1.5997E-01					1.28E+01	
		537.26	-4.392E-01	(	1.044E+00	9.54E+01	2.44E+01 G
		162.66	9.348E-01	@(	3.682E+00	1.17E+02	6.22E+00 G
		304.85	0.000E+00	+	1.063E+01	1.00E+03	4.29E+00 G
La-140	I 4.9247E-02					1.28E+01	
		1596.21	4.925E-02	?(P	3.103E-01	2.57E+02	9.54E+01 G
		487.02	-4.337E-02	& P	5.564E-01	4.49E+02	4.55E+01 G
		328.76	-5.367E-01	+	1.405E+00	1.02E+02	2.03E+01 G
		815.77	-1.506E-01	+	2.366E+00	4.54E+02	2.33E+01 G
CE-141	I 1.1773E-01					3.25E+01	
		145.44	1.177E-01	*(	5.405E-01	1.37E+02	4.82E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-144	I	-5.6455E-01					2.85E+02	
			133.54	-5.646E-01	*(	2.499E+00	1.32E+02	1.11E+01 G
PM-144	C	-1.0241E-03					3.63E+02	
			696.54	-7.226E-02	?(	3.290E-01	1.87E+02	9.90E+01 G
			618.06	7.014E-02	?(	4.656E-01	1.94E+02	9.91E+01 G
EU-152	F	3.3287E-01					4.94E+03	
			121.78	-2.070E-01	(	7.538E-01	1.09E+02	2.86E+01 G
			344.29	-3.552E-01	+	1.352E+00	1.13E+02	2.65E+01 G
			1112.07	8.956E-01	&(	2.605E+00	8.57E+01	1.36E+01 G
			778.92	-8.270E-02	%	2.189E+00	1.05E+03	1.29E+01 G
			964.11	8.444E-01	&(	2.242E+00	7.89E+01	1.46E+01 G
			244.69	3.698E-01	&(	4.568E+00	3.64E+02	7.58E+00 G
			1408.00	-7.106E-01	+	2.066E+00	1.31E+02	2.10E+01 GA
EU-154	I	5.7904E-02					3.14E+03	
			123.10	-1.775E-01	&(P	5.746E-01	9.58E+01	4.08E+01 G
			1274.54	0.000E+00	+	1.384E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	2.130E+00	1.00E+03	2.02E+01 G
			873.23	-8.800E-01	+	3.061E+00	1.02E+02	1.23E+01 G
			1004.77	5.911E-01	?(	1.878E+00	9.31E+01	1.80E+01 G
			996.33	-3.526E-01	+	4.472E+00	3.61E+02	1.06E+01 G
EU-155	I	-4.3589E-02					1.81E+03	
			105.31	-4.359E-02	?(P	9.977E-01	7.17E+02	2.12E+01 G
			86.54	-2.055E-01	+	1.103E+00	1.61E+02	3.07E+01 G
HF-181	F	-2.6116E-02					4.24E+01	
			482.00	-1.335E-01	?(	4.374E-01	9.74E+01	8.05E+01 G
			133.02	1.115E-01	+	2.825E-01	7.59E+01	4.33E+01 G
			345.83	5.477E-01	&(	2.224E+00	1.20E+02	1.51E+01 G
			136.30	-1.083E+00	&	4.924E+00	1.36E+02	5.85E+00 G
Hg-203	F	-2.1781E-02					4.66E+01	
			279.20	-2.178E-02	&(	3.164E-01	4.22E+02	8.15E+01 G
TL-208	N	1.5802E-02					6.98E+02	
			583.02	-2.671E-02	(P	2.929E-01	3.87E+02	8.45E+01 G
			277.28	5.851E-01	?(	3.679E+00	1.84E+02	6.31E+00 G
			860.56	-4.685E-01	+	2.564E+00	2.29E+02	1.24E+01 G
PM-146	C	9.0334E-03					2.02E+03	
			453.88	-1.708E-01	&(	4.738E-01	1.12E+02	6.50E+01 G
			747.16	3.240E-01	&(P	4.392E-01	5.51E+01	3.40E+01 G
			735.72	5.254E-02	?(P	1.111E+00	8.34E+02	2.25E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Y-88	F	-2.4307E-01					1.07E+02	
			1836.06	-2.431E-01	?(P	5.252E-01	5.26E+01	9.92E+01 G
			898.04	2.533E-01	+	2.182E-01	3.99E+01	9.37E+01 G
Cd-113m		-1.4301E+03					5.33E+03	
			263.70	-1.430E+03	(	4.703E+03	9.81E+01	6.00E-03 K
Cf-251	T	2.7037E-01					3.28E+05	
			176.60	2.704E-01	*(	1.118E+00	1.52E+02	1.70E+01 G
			227.00	1.056E+00	?	2.950E+00	1.03E+02	6.30E+00 GA
Cf-249	T	1.2257E-01					1.28E+05	
			387.95	1.226E-01	?(	4.929E-01	1.19E+02	6.60E+01 G
			333.44	-6.267E-01	+	1.679E+00	1.04E+02	1.55E+01 G
Sn-126		-1.3857E-02					3.65E+07	
			87.57	0.000E+00	+	8.709E-01	1.00E+03	3.75E+01 GA
			64.28	-1.386E-02	%(	2.472E+00	5.23E+03	9.70E+00 G
			86.94	-6.700E-01	+	3.678E+00	1.64E+02	9.04E+00 GA
PB-210	N	1.9021E+00					8.14E+03	
			46.54	1.902E+00	*(P	5.005E+00	9.27E+01	4.25E+00 G
PB-212	N	1.1441E-01					6.98E+02	
			238.63	1.144E-01	(P	4.076E-01	1.13E+02	4.33E+01 G
			300.03	1.539E+00	? P	1.371E+01	2.65E+02	3.28E+00 GA
PB-214	N	2.7735E-01					5.84E+05	
			351.93	2.454E-01	(P	5.669E-01	8.84E+01	3.76E+01 G
			295.09	3.396E-01	&(P	2.197E+00	1.93E+02	1.93E+01 G
			242.00	8.003E-01	?	4.145E+00	1.54E+02	7.43E+00 GA
BI-207	C	-9.8081E-03					1.18E+04	
			1063.66	-9.808E-03	%(P	4.559E-01	1.92E+03	7.45E+01 G
			569.70	2.251E-03	&	2.421E-01	2.96E+03	9.77E+01 G
BI-212	N	-1.3388E-01					6.98E+02	
			727.17	-1.339E-01	%(	5.837E+00	1.24E+03	7.55E+00 G
			785.42	3.648E+00	?	2.054E+01	2.24E+02	1.28E+00 GA
U-235	N	2.2716E-01					2.57E+11	
			143.79	-4.813E-01	?(P	2.559E+00	1.43E+02	1.10E+01 G
			205.33	8.426E-01	&(P	3.835E+00	1.66E+02	5.01E+00 G
			163.38	1.149E+00	?(	4.707E+00	1.22E+02	5.08E+00 G
			185.72	-2.371E-01	+ P	4.253E-01	6.14E+01	5.40E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-214	N	1.3296E-01					5.84E+05	
			609.31	-2.096E-01	&(P	1.161E+00	1.63E+02	4.61E+01 G
			1120.29	1.179E+00	?(P	1.749E+00	4.89E+01	1.51E+01 G
			1764.49	-3.113E+00	& P	4.645E+00	2.45E+01	1.54E+01 G
BI-210M	T	1.2898E-01					1.10E+09	
			265.83	1.290E-01	&(	5.482E-01	1.26E+02	5.00E+01 G
			304.90	0.000E+00	-	1.629E+00	1.00E+03	2.80E+01 G
AC-228	N	1.6228E-01					2.10E+03	
			911.07	-7.020E-02	?(	1.236E+00	7.32E+02	2.90E+01 G
			968.97	4.105E-01	?(	1.636E+00	1.14E+02	1.75E+01 G
			338.32	3.627E-01	(	2.787E+00	2.26E+02	1.20E+01 G
			93.35	4.486E-01	?	5.602E+00	3.71E+02	5.56E+00 XA
TH-227	N	2.0645E-01					7.95E+03	
			256.24	-2.602E-01	(	2.888E+00	4.01E+02	7.00E+00 G
			235.97	4.720E-01	&(	2.450E+00	1.54E+02	1.23E+01 G
			50.14	-7.317E-01	+ P	2.612E+00	1.22E+02	8.00E+00 G
TH-229	N	4.9945E-01					2.68E+06	
			193.51	-4.269E-01	?(	4.590E+00	3.92E+02	4.40E+00 G
			210.85	1.863E+00	?(P	6.211E+00	1.23E+02	2.99E+00 G
TH-234	N	1.6350E-01					1.63E+12	
			92.59	1.635E-01	*(P	3.409E+00	7.10E+02	5.58E+00 G
			63.29	-3.172E+00	+ P	6.216E+00	5.74E+01	3.81E+00 G
PA-231	N	-2.3737E-01					1.20E+07	
			302.65	-2.374E-01	%(	1.579E+01	1.96E+03	2.88E+00 G
			300.07	0.000E+00	+	1.854E+01	1.00E+03	2.46E+00 G
PA-233	C	2.3030E-01					7.82E+08	
			312.01	2.303E-01	?(	1.257E+00	1.62E+02	3.60E+01 G
			300.18	0.000E+00	&	7.359E+00	1.00E+03	6.20E+00 G
PA-234	N	2.6501E-01					1.63E+12	
			131.29	-3.447E-01	?(	1.572E+00	1.36E+02	1.80E+01 G
			946.02	5.822E-01	?(P	2.082E+00	1.42E+02	1.34E+01 G
			569.47	1.085E+00	(	2.896E+00	7.94E+01	8.20E+00 G
			883.24	0.000E+00	-	4.992E+00	1.00E+03	9.60E+00 G
			880.53	7.910E-01		7.734E+00	2.81E+02	6.00E+00 GA
PA-234M	N	-1.9245E+00					1.63E+12	
			1001.00	-1.925E+00	&(P	5.891E+01	7.45E+02	8.37E-01 G
			766.41	-4.737E+01	+	1.319E+02	8.30E+01	2.94E-01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AM-241   T  -2.3664E-01                                      1.58E+05
                          59.54-2.366E-01 ?(P 6.369E-01 5.40E+01 3.59E+01 G

Np-237   F  -4.8135E-01                                      2.14E+06
                          86.49-4.813E-01 ?(  2.628E+00 1.63E+02 1.31E+01 G

Ir-192   F   7.0994E-03                                      7.40E+01
                         316.49-1.081E-01 &(  3.335E-01 9.21E+01 8.70E+01 G
                         468.06 2.008E-01 ?(  6.812E-01 1.01E+02 5.18E+01 G
                         308.44-2.768E-01 &   1.485E+00 1.60E+02 3.18E+01 G

Cs-136   F   9.9228E-02                                      1.30E+01
                         818.50 1.097E-01 ?(  5.427E-01 1.45E+02 1.00E+02 G
                        1048.07 8.614E-02 ?(  3.873E-01 1.28E+02 8.00E+01 G
                         340.57 0.000E+00 -   7.346E-01 1.00E+03 4.69E+01 G

Np-239   T  -2.6818E-01                                      2.36E+00
                         103.70 0.000E+00 +   8.845E-01 1.00E+03 2.40E+01 X
                         106.13-2.682E-01 &(  1.056E+00 1.18E+02 2.27E+01 G
                          99.50-4.201E-01 &   1.569E+00 1.12E+02 1.50E+01 X

Nd-147      -6.6346E-01                                      1.11E+01
                         531.00-6.635E-01 @(  2.190E+00 1.32E+02 1.30E+01 G
                          91.10-8.814E-02 &   1.128E+00 3.81E+02 2.83E+01 G

TL-210   N   1.0665E-01                                      5.84E+05
                         799.60 1.124E-01 ?(  3.696E-01 9.69E+01 9.90E+01 G
                         296.00 9.947E-02 ?(  5.488E-01 1.64E+02 7.90E+01 G
                        1313.00-3.471E-01 +   1.941E+00 2.47E+02 2.10E+01 GA

Kr-85    I   3.3566E+01                                      3.92E+03
                         513.98 3.357E+01 ?(  1.005E+02 8.95E+01 4.30E-01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
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library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	156.	-17.	-0.002	122.46	-7.317E-01	P
AM-241	59.54	229.	-27.	-0.004	53.96	-2.366E-01	P
Np-237	86.49	652.	-22.	-0.003	163.40	-4.813E-01	
EU-155	86.54	630.	-22.	-0.003	160.57	-2.055E-01	
Sn-126	86.94	607.	-21.	-0.003	164.18	-6.700E-01	
Nd-147	91.10	561.	-9.	-0.001	380.64	-8.814E-02	
AC-228	93.35	533.	9.	0.001	371.20	4.486E-01	
Gd-153	97.50	300.	-21.	-0.003	117.52	-1.999E-01	
Np-239	99.50	290.	-22.	-0.003	111.63	-4.201E-01	
Gd-153	103.20	215.	17.	0.002	126.90	2.174E-01	
EU-155	105.31	235.	-3.	0.000	716.53	-4.359E-02	P
Np-239	106.13	297.	-21.	-0.003	117.67	-2.682E-01	
EU-152	121.78	229.	-20.	-0.003	108.73	-2.070E-01	
EU-154	123.10	270.	-25.	-0.003	95.76	-1.775E-01	P
CE-144	133.54	361.	-21.	-0.003	132.22	-5.646E-01	
CO-57	136.47	279.	17.	0.002	138.73	4.966E-01	
U-235	143.79	346.	-17.	-0.002	143.41	-4.813E-01	P
CE-141	145.44	294.	18.	0.002	136.80	1.177E-01	
Ba-140	162.66	198.	17.	0.002	117.29	9.348E-01	
U-235	163.38	215.	17.	0.002	122.01	1.149E+00	
CE-139	165.85	222.	4.	0.001	489.97	1.834E-02	
Cf-251	176.60	120.	13.	0.002	152.49	2.704E-01	
U-235	185.72	166.	-35.	-0.005	61.42	-2.371E-01	P
TH-229	193.51	120.	-5.	-0.001	392.43	-4.269E-01	
U-235	205.33	99.	11.	0.001	166.48	8.426E-01	P
TH-229	210.85	89.	14.	0.002	123.20	1.863E+00	P
Cf-251	227.00	80.	16.	0.002	103.26	1.056E+00	
TH-227	235.97	209.	14.	0.002	153.85	4.720E-01	
EU-152	244.69	265.	6.	0.001	364.03	3.698E-01	
TH-227	256.24	80.	-4.	-0.001	401.04	-2.602E-01	
Cd-113m	263.70	155.	-18.	-0.003	98.15	-1.430E+03	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	265.83	144.	14.	0.002	125.95	1.290E-01	
TL-208	277.28	95.	8.	0.001	183.69	5.851E-01	
Hg-203	279.20	118.	-4.	-0.001	421.63	-2.178E-02	
TL-210	296.00	319.	16.	0.002	164.14	9.947E-02	
Ir-192	308.44	357.	-17.	-0.002	159.85	-2.768E-01	
PA-233	312.01	322.	16.	0.002	162.42	2.303E-01	
Ir-192	316.49	125.	-18.	-0.002	92.13	-1.081E-01	
CR-51	320.08	116.	14.	0.002	110.24	7.661E-01	
La-140	328.76	114.	-20.	-0.003	102.16	-5.367E-01	
Cf-249	333.44	92.	-18.	-0.002	104.14	-6.267E-01	
AC-228	338.32	152.	8.	0.001	225.55	3.627E-01	
EU-152	344.29	171.	-17.	-0.002	113.29	-3.552E-01	
I-131	364.48	77.	-12.	-0.002	125.27	-8.445E-02	P
Cf-249	387.95	116.	13.	0.002	119.02	1.226E-01	
SN-113	391.69	146.	-15.	-0.002	115.11	-1.475E-01	
SB-125	427.88	38.	-1.	0.000	945.90	-2.721E-02	P
AG-108M	433.94	56.	-8.	-0.001	151.91	-5.707E-02	P
PM-146	453.88	80.	-16.	-0.002	112.27	-1.708E-01	
SB-125	463.37	117.	-10.	-0.001	151.48	-6.957E-01	
Ir-192	468.06	101.	15.	0.002	100.78	2.008E-01	
BE-7	477.60	66.	4.	0.001	284.04	2.833E-01	P
La-140	487.02	47.	-3.	0.000	449.36	-4.337E-02	P
RU-103	497.05	68.	-17.	-0.002	70.48	-1.424E-01	P
RH-106	511.86	71.	63.	0.009	24.17	2.397E+00	P
Kr-85	513.98	134.	19.	0.003	89.55	3.357E+01	
Nd-147	531.00	52.	-11.	-0.002	131.84	-6.635E-01	
Ba-140	537.26	40.	-14.	-0.002	95.44	-4.392E-01	
CS-134	563.24	64.	-17.	-0.002	92.89	-1.717E+00	
CS-134	569.32	36.	-6.	-0.001	147.20	-3.233E-01	
TL-208	583.02	33.	-3.	0.000	387.16	-2.671E-02	P
SB-125	600.50	170.	8.	0.001	235.11	3.859E-01	P
SB-124	602.73	161.	9.	0.001	212.63	7.585E-02	P
CS-134	604.71	170.	6.	0.001	293.12	5.650E-02	
RU-103	610.30	146.	11.	0.002	157.77	1.683E+00	
AG-108M	614.28	157.	11.	0.002	162.96	1.086E-01	
PM-144	618.06	112.	8.	0.001	194.29	7.014E-02	
RH-106	621.92	160.	10.	0.001	178.64	9.108E-01	
SB-125	635.89	35.	-8.	-0.001	215.08	-6.745E-01	P
I-131	636.97	33.	10.	0.001	84.66	1.304E+00	
AG-110M	657.76	62.	-16.	-0.002	110.72	-1.622E-01	P
PM-144	696.54	43.	-7.	-0.001	186.92	-7.226E-02	
SB-124	722.79	63.	-11.	-0.002	106.41	-1.023E+00	
PM-146	735.72	22.	1.	0.000	834.38	5.254E-02	P
PM-146	747.16	6.	11.	0.001	55.06	3.240E-01	P
ZR-95	756.73	22.	3.	0.000	290.26	6.394E-02	
AG-110M	763.94	27.	10.	0.001	79.90	4.706E-01	
NB-95	765.79	37.	1.	0.000	627.39	1.456E-02	
PA-234M	766.41	53.	-13.	-0.002	83.00	-4.737E+01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
BI-212	785.42	22.	4.	0.001	224.47	3.648E+00		
CS-134	795.87	35.	8.	0.001	108.14	1.055E-01		P
TL-210	799.60	43.	10.	0.001	96.93	1.124E-01		
CS-134	801.95	80.	-9.	-0.001	147.27	-1.112E+00		
CO-58	810.77	86.	-15.	-0.002	88.94	-1.708E-01		
La-140	815.77	101.	-3.	0.000	454.05	-1.506E-01		
Cs-136	818.50	97.	10.	0.001	145.31	1.097E-01		
MN-54	834.85	29.	-5.	-0.001	184.81	-5.673E-02		P
Co-56	846.77	23.	6.	0.001	185.64	6.509E-02		
TL-208	860.56	28.	-5.	-0.001	228.91	-4.685E-01		
NB-94	871.10	17.	9.	0.001	71.69	1.079E-01		
EU-154	873.23	39.	-9.	-0.001	102.07	-8.800E-01		
Sc-46	889.28	67.	-2.	0.000	583.10	-2.394E-02		
Y-88	898.04	9.	20.	0.003	39.93	2.533E-01		
AC-228	911.07	33.	-2.	0.000	731.57	-7.020E-02		
AG-110M	937.49	23.	-5.	-0.001	196.95	-1.943E-01		
EU-152	964.11	24.	10.	0.001	78.92	8.444E-01		
AC-228	968.97	17.	6.	0.001	114.29	4.105E-01		
EU-154	996.33	51.	-3.	0.000	360.80	-3.526E-01		
PA-234M	1001.00	55.	-1.	0.000	745.29	-1.925E+00		P
EU-154	1004.77	24.	8.	0.001	93.13	5.911E-01		
Co-56	1037.84	30.	-2.	0.000	606.22	-1.934E-01		
Cs-136	1048.07	18.	5.	0.001	128.06	8.614E-02		
RH-106	1050.36	31.	-6.	-0.001	137.44	-5.311E+00		
FE-59	1099.25	10.	8.	0.001	89.95	2.129E-01		
EU-152	1112.07	22.	8.	0.001	85.72	8.956E-01		
CO-60	1173.24	22.	-7.	-0.001	97.25	-1.007E-01		P
Ta-182	1189.05	25.	-4.	-0.001	279.32	-3.802E-01		
Ta-182	1221.41	32.	-15.	-0.002	88.00	-8.918E-01		
NA-22	1274.53	21.	-12.	-0.002	60.13	-2.021E-01		
FE-59	1291.60	17.	4.	0.001	217.14	1.670E-01		P
TL-210	1313.00	21.	-4.	-0.001	246.99	-3.471E-01		
CO-60	1332.50	23.	-2.	0.000	571.23	-2.894E-02		P
AG-110M	1384.30	11.	6.	0.001	123.77	4.599E-01		
EU-152	1408.00	21.	-8.	-0.001	130.66	-7.106E-01		
La-140	1596.21	7.	2.	0.000	256.93	4.925E-02		P
SB-124	1690.98	23.	-10.	-0.001	119.90	-4.285E-01		
Co-56	1771.35	36.	11.	0.001	85.60	1.511E+00		
Y-88	1836.06	19.	-11.	-0.001	52.59	-2.431E-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	2.8329E-01	2.8329E-01	2.840E+02%	2.78E+00
NA-22	#A	-2.0211E-01	-2.0211E-01	6.013E+01%	3.97E-01
K-40	#A	1.2729E-01	1.2729E-01	1.142E+03%	4.29E+00
Sc-46	#A	-2.3935E-02	-2.3936E-02	5.831E+02%	4.89E-01
CR-51	#A	7.6605E-01	7.6606E-01	1.102E+02%	2.85E+00
MN-54	#A	-5.6732E-02	-5.6732E-02	1.848E+02%	3.15E-01
FE-59	#A	1.9299E-01	1.9299E-01	8.995E+01%	4.44E-01
Co-56	#A	6.5091E-02	6.5091E-02	1.856E+02%	2.90E-01
CO-57	#A	5.3344E-02	5.3344E-02	1.387E+02%	2.62E-01
CO-58	#A	-1.7077E-01	-1.7078E-01	8.894E+01%	5.10E-01
CO-60	#A	-2.8939E-02	-2.8939E-02	5.712E+02%	4.25E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.00E-01
NB-94	#A	4.9510E-02	4.9510E-02	7.169E+01%	3.19E-01
ZR-95	#A	6.3944E-02	6.3944E-02	2.903E+02%	4.68E-01
NB-95	#A	1.4558E-02	1.4558E-02	6.274E+02%	3.27E-01
RU-103	#A	-1.4243E-01	-1.4243E-01	7.048E+01%	3.38E-01
RH-106	#A	9.1077E-01	9.1077E-01	1.786E+02%	5.52E+00
AG-108M	#A	2.5473E-02	2.5473E-02	1.114E+02%	2.78E-01
AG-110M	#A	1.8160E-01	1.8160E-01	7.990E+01%	6.60E-01
SN-113	#A	-1.4750E-01	-1.4750E-01	1.151E+02%	5.72E-01
SB-124	#A	7.5846E-02	7.5847E-02	2.126E+02%	5.46E-01
SB-125	#A	1.2826E-01	1.2826E-01	2.351E+02%	7.06E-01
I-131	#A	2.7556E-02	2.7557E-02	7.560E+01%	3.14E-01
Gd-153	#A	-2.4263E-02	-2.4263E-02	8.648E+01%	7.86E-01
Ga-68	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.76E+01
Tc-99m	A	1.4342E-01	1.4356E-01	4.629E+01%	1.73E-01
BA-133	A	1.1376E-01	1.1376E-01	1.244E+02%	4.79E-01
CS-134	#A	7.9407E-02	7.9407E-02	1.081E+02%	3.87E-01
CS-137	#A	4.9015E-03	4.9015E-03	2.932E+03%	5.03E-01
CE-139	#A	1.8339E-02	1.8339E-02	4.900E+02%	3.06E-01
Ba-140	#A	-1.5997E-01	-1.5997E-01	7.561E+01%	1.04E+00
La-140	#A	4.9246E-02	4.9247E-02	2.569E+02%	3.10E-01
CE-141	#A	1.1773E-01	1.1773E-01	1.368E+02%	5.40E-01
CE-144	#A	-5.6455E-01	-5.6455E-01	1.322E+02%	2.50E+00
PM-144	#A	-1.0241E-03	-1.0241E-03	1.348E+02%	3.29E-01
EU-152	#A	3.3287E-01	3.3287E-01	7.892E+01%	7.54E-01
EU-154	#A	5.7904E-02	5.7904E-02	6.679E+01%	5.75E-01
EU-155	#A	-4.3589E-02	-4.3589E-02	7.165E+02%	9.98E-01
HF-181	#A	-2.6116E-02	-2.6116E-02	7.746E+01%	4.37E-01
Ta-182	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.05E+00
Hg-203	#A	-2.1781E-02	-2.1781E-02	4.216E+02%	3.16E-01
TL-208	#A	1.5802E-02	1.5802E-02	1.837E+02%	2.93E-01
PM-146	#A	9.0334E-03	9.0334E-03	5.506E+01%	4.74E-01

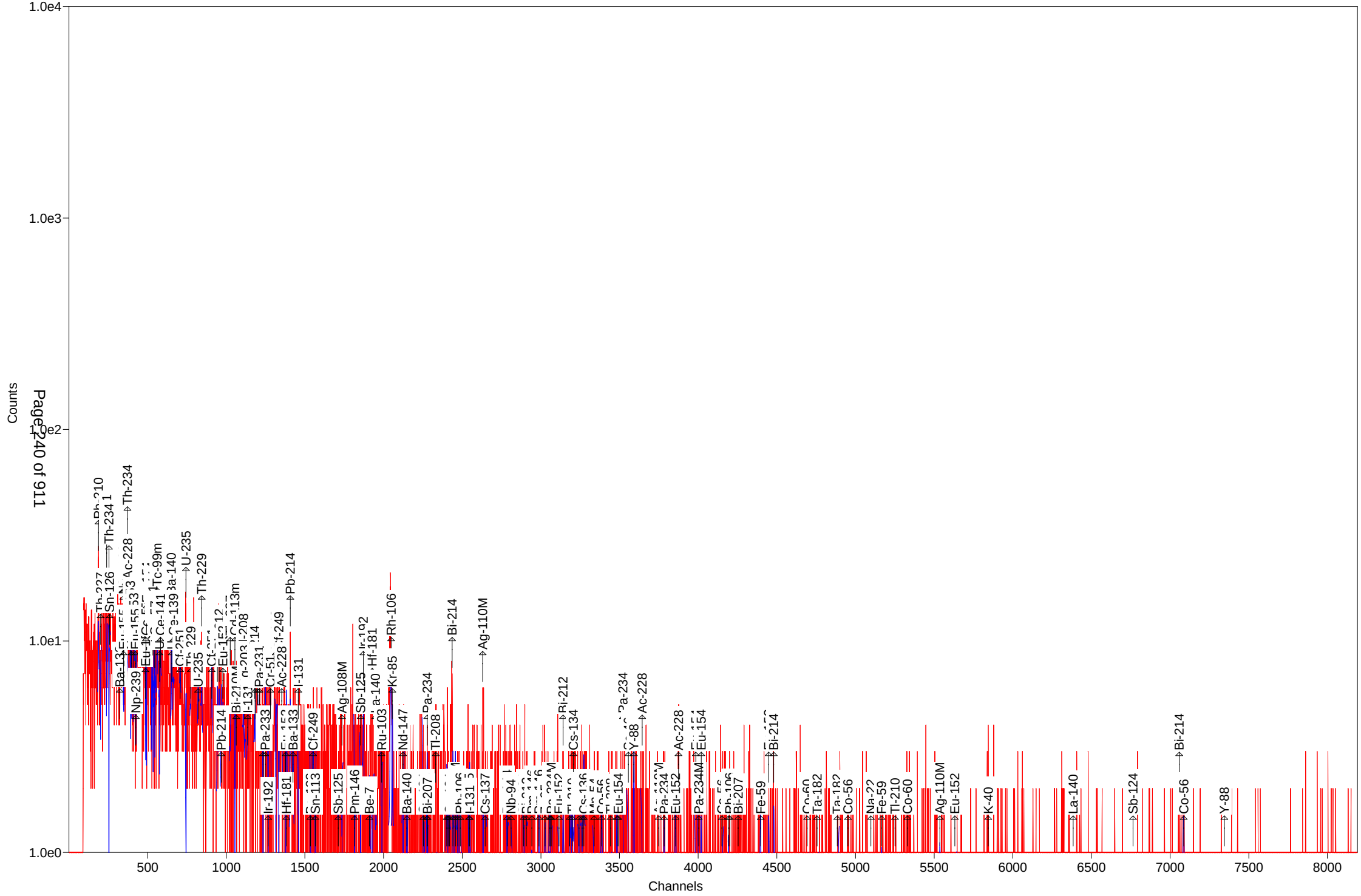
Y-88	#A	-2.4307E-01	-2.4307E-01	5.259E+01%	5.25E-01
Cd-113m	#A	-1.4301E+03	-1.4301E+03	9.815E+01%	4.70E+03
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.61E+00
Cf-251	#A	2.7037E-01	2.7037E-01	1.525E+02%	1.12E+00
Cf-249	#A	1.2257E-01	1.2257E-01	1.190E+02%	4.93E-01
Sn-126	#A	-1.3857E-02	-1.3857E-02	5.230E+03%	2.47E+00
PB-210	#A	1.9021E+00	1.9021E+00	9.273E+01%	5.00E+00
PB-212	A	1.1441E-01	1.1441E-01	1.134E+02%	4.08E-01
PB-214	A	2.7735E-01	2.7735E-01	8.845E+01%	5.67E-01
BI-207	#A	-9.8081E-03	-9.8081E-03	1.920E+03%	4.56E-01
BI-212	#A	-1.3388E-01	-1.3388E-01	1.245E+03%	5.84E+00
U-235	#A	2.2716E-01	2.2716E-01	8.378E+01%	2.56E+00
BI-214	#A	1.3296E-01	1.3296E-01	4.895E+01%	1.16E+00
BI-210M	#A	1.2898E-01	1.2898E-01	1.260E+02%	5.48E-01
AC-228	#A	1.6228E-01	1.6228E-01	1.143E+02%	1.24E+00
TH-227	#A	2.0645E-01	2.0645E-01	1.538E+02%	2.89E+00
TH-229	#A	4.9945E-01	4.9945E-01	1.232E+02%	4.59E+00
TH-234	#A	1.6350E-01	1.6350E-01	7.095E+02%	3.41E+00
PA-231	#A	-2.3737E-01	-2.3737E-01	1.959E+03%	1.58E+01
PA-233	#A	2.3030E-01	2.3030E-01	1.624E+02%	1.26E+00
PA-234	A	2.6501E-01	2.6501E-01	7.069E+01%	1.57E+00
PA-234M	#A	-1.9245E+00	-1.9245E+00	7.453E+02%	5.89E+01
AM-241	#A	-2.3664E-01	-2.3664E-01	5.396E+01%	6.37E-01
Np-237	#A	-4.8135E-01	-4.8135E-01	1.634E+02%	2.63E+00
Ir-192	#A	7.0993E-03	7.0994E-03	6.827E+01%	3.34E-01
Cs-136	#A	9.9226E-02	9.9228E-02	9.684E+01%	5.43E-01
Np-239	#A	-2.6815E-01	-2.6818E-01	1.177E+02%	1.06E+00
Nd-147	#A	-6.6345E-01	-6.6346E-01	1.318E+02%	2.19E+00
TL-210	#A	1.0665E-01	1.0665E-01	9.531E+01%	3.70E-01
Kr-85	#A	3.3566E+01	3.3566E+01	8.955E+01%	1.01E+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 (25.1 to 1999.5 keV) 1.434E-01 Bq/Sample
Total Decayed Activity (25.1 to 1999.5 keV) 1.4356339E-01 Bq/Sample

412878_Gamma_180-86110-A-13-A. 14_Gamma_20190308.spc.



Prep Batch: 412881

Fill Geometry, 21-Day In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 412881

Lab Id: MB 160-412881/1-A | Analyzed: 02/20/19 07:58 | Ts: 30 | Sigma: 2
Client ID: | Detector: GV9 | Decay Corrected: No | Ingrowth:

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	-0.04047	0.138	0.138	U	pCi/g	1.00	0.259	415646
Radium-228	-0.05015	0.181	0.181	U	pCi/g		0.219	415646
Radium 226 and Radium 228	0.0000	0.00000	0.00000	U	pCi/g		0.259	415646

Lab Id: LCS 160-412881/2-A | Analyzed: 02/20/19 07:59 | Ts: 30 | Sigma: 2
Client ID: | Detector: GV12 | Decay Corrected: No | Ingrowth:

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	95.72	1.45	11.2		pCi/g		1.12	415647
Cesium-137	30.39	0.787	3.20		pCi/g		0.332	415647
Cobalt-60	12.66	0.408	1.33		pCi/g		0.168	415647

Lab Id: 180-86110-1 | Analyzed: 02/20/19 08:13 | Ts: 30 | Sigma: 2
Client ID: JSF-BS-BG12-0.8/2.8-20190123 | Detector: GV5 | Decay Corrected: No | Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	1.08	0.282	0.304		pCi/g	1.00	0.222	415651
Radium-228	1.60	0.385	0.418		pCi/g		0.230	415651
Radium 226 and Radium 228	2.68	0.477	0.517		pCi/g		0.230	415651

Lab Id: 180-86110-1 DU | Analyzed: 02/20/19 09:33 | Ts: 30 | Sigma: 2
Client ID: JSF-BS-BG12-0.8/2.8-20190123 | Detector: GV9 | Decay Corrected: No | Ingrowth:

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.8629	0.187	0.207		pCi/g	1.00	0.140	415646
Radium-228	1.497	0.305	0.341		pCi/g		0.123	415646
Radium 226 and Radium 228	2.360	0.358	0.399		pCi/g		0.140	415646

Lab Id: 180-86110-2 | Analyzed: 02/21/19 01:55 | Ts: 30 | Sigma: 2
Client ID: JSF-BS-BG12-5.0/10.0-20190123 | Detector: GV2 | Decay Corrected: No | Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.603	0.225	0.233		pCi/g	1.00	0.219	415891

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 412881

Lab Id: 180-86110-2 Analyzed: 02/21/19 01:55 Ts: 30 Sigma: 2
Client ID: JSF-BS-BG12-5.0/10.0-20190123 Detector: GV2 Decay Corrected: No Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-228	1.57	0.287	0.328		pCi/g		0.230	415891
Radium 226 and Radium 228	2.17	0.365	0.402		pCi/g		0.230	415891

Lab Id: 180-86110-3 Analyzed: 02/20/19 08:11 Ts: 30 Sigma: 2
Client ID: JSF-BS-BG12-10.75/12.75-20190123 Detector: GV7 Decay Corrected: No Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.779	0.196	0.213		pCi/g	1.00	0.163	415652
Radium-228	1.26	0.232	0.265		pCi/g		0.107	415652
Radium 226 and Radium 228	2.04	0.304	0.340		pCi/g		0.163	415652

Lab Id: 180-86110-4 Analyzed: 02/20/19 08:14 Ts: 30 Sigma: 2
Client ID: JSF-BS-BG12-13.5/15.0-20190123 Detector: GV2 Decay Corrected: No Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.752	0.209	0.223		pCi/g	1.00	0.174	415654
Radium-228	1.04	0.252	0.273		pCi/g		0.460	415654
Radium 226 and Radium 228	1.79	0.327	0.353		pCi/g		0.460	415654

Lab Id: 180-86110-5 Analyzed: 02/20/19 09:34 Ts: 30 Sigma: 2
Client ID: JSF-BS-BG12-0.0/0.5-20190123 Detector: GV12 Decay Corrected: No Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.254	0.147	0.149	U	pCi/g	1.00	0.482	415647
Radium-228	0.744	0.238	0.250		pCi/g		0.141	415647
Radium 226 and Radium 228	0.998	0.280	0.291		pCi/g		0.482	415647

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 412881

Lab Id: 180-86110-7 Analyzed: 02/20/19 09:36 Ts: 30 Sigma: 2
Client ID: JSF-BS-BG11-1.1/3.1-20190124 Detector: GV8 Decay Corrected: No Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.829	0.209	0.226		pCi/g	1.00	0.174	415653
Radium-228	1.53	0.273	0.314		pCi/g		0.145	415653
Radium 226 and Radium 228	2.36	0.344	0.387		pCi/g		0.174	415653

Lab Id: 180-86110-8 Analyzed: 02/20/19 09:37 Ts: 30 Sigma: 2
Client ID: JSF-BS-BG11-5.5/8.5-20190124 Detector: GV7 Decay Corrected: No Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.897	0.175	0.198		pCi/g	1.00	0.118	415652
Radium-228	1.43	0.242	0.283		pCi/g		0.111	415652
Radium 226 and Radium 228	2.33	0.299	0.345		pCi/g		0.118	415652

Lab Id: 180-86110-9 Analyzed: 02/21/19 01:54 Ts: 30 Sigma: 2
Client ID: JSF-BS-FD01-20190124 Detector: GV5 Decay Corrected: No Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.872	0.215	0.234		pCi/g	1.00	0.163	415889
Radium-228	1.22	0.325	0.348		pCi/g		0.289	415889
Radium 226 and Radium 228	2.09	0.390	0.419		pCi/g		0.289	415889

Lab Id: 180-86110-10 Analyzed: 02/20/19 10:46 Ts: 30 Sigma: 2
Client ID: JSF-BS-BG11-11.3/13.3-20190124 Detector: GV7 Decay Corrected: No Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.820	0.164	0.185		pCi/g	1.00	0.103	415652
Radium-228	1.37	0.240	0.278		pCi/g		0.182	415652
Radium 226 and Radium 228	2.19	0.291	0.334		pCi/g		0.182	415652

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 412881

Lab Id: 180-86110-11 Analyzed: 02/21/19 01:56 Ts: 30 Sigma: 2
Client ID: JSF-BS-BG11-0.0/0.5-20190124 Detector: GV8 Decay Corrected: No Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.737	0.189	0.204		pCi/g	1.00	0.153	415892
Radium-228	1.30	0.415	0.436		pCi/g		0.282	415892
Radium 226 and Radium 228	2.04	0.456	0.481		pCi/g		0.282	415892

Lab Id: 180-86110-14 Analyzed: 02/20/19 10:47 Ts: 30 Sigma: 2
Client ID: JSF-BS-BG10-1.4/3.4-20190124 Detector: GV9 Decay Corrected: No Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.647	0.194	0.205		pCi/g	1.00	0.176	415646
Radium-228	1.56	0.266	0.310		pCi/g		0.110	415646
Radium 226 and Radium 228	2.21	0.329	0.372		pCi/g		0.176	415646

Lab Id: 180-86110-15 Analyzed: 02/20/19 10:47 Ts: 30 Sigma: 2
Client ID: JSF-BS-BG10-6.5/8.5-20190124 Detector: GV12 Decay Corrected: No Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	1.35	0.267	0.300		pCi/g	1.00	0.139	415647
Radium-228	2.37	0.442	0.503		pCi/g		0.170	415647
Radium 226 and Radium 228	3.72	0.516	0.586		pCi/g		0.170	415647

Lab Id: 180-86110-16 Analyzed: 02/20/19 11:48 Ts: 30 Sigma: 2
Client ID: JSF-BS-BG10-10.5/12.5-20190124 Detector: GV2 Decay Corrected: No Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.780	0.243	0.256		pCi/g	1.00	0.218	415654
Radium-228	1.75	0.342	0.385		pCi/g		0.348	415654
Radium 226 and Radium 228	2.53	0.420	0.462		pCi/g		0.348	415654

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 412881

Lab Id:	180-86110-17	Analyzed:	02/20/19 11:51	Ts:	30	Sigma:	2
Client ID:	JSF-BS-BG10-0.0/0.5-20190124	Detector:	GV5	Decay Corrected:	No	Ingrowth:	

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.927	0.219	0.239		pCi/g	1.00	0.151	415651
Radium-228	0.538	0.278	0.284	U	pCi/g		0.597	415651
Radium 226 and Radium 228	1.47	0.354	0.371		pCi/g		0.597	415651

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 160-412881/1-A	Radium-226			-0.04047	U	pCi/g							-.58638157
MB 160-412881/1-A	Radium-228			-0.05015	U	pCi/g							-.55271095
MB 160-412881/1-A	Radium 226 and Radium 228			0.0000	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-412881/2-A	Americium-241		96.7	95.72		pCi/g	99	87 - 116					-.1688779145
LCS 160-412881/2-A	Cesium-137		27.9	30.39		pCi/g	109	87 - 120					1.5141043609
LCS 160-412881/2-A	Cobalt-60		12.0	12.66		pCi/g	105	87 - 115					.9265755607

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
180-86110-1	Radium-226	1.08		0.8629		pCi/g			23	0.43	1.20	1	1.1974
180-86110-1	Radium-228	1.60		1.497		pCi/g			7	0.14	0.40	1	.3959
180-86110-1	Radium 226 and Radium 228	2.68		2.360		pCi/g			13	0.35	0.98		

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: Eurofins TestAmerica, St. Loui Job No.: 180-86110-1

SDG No.:

Batch Number: 412881 Batch Start Date: 01/30/19 00:23 Batch Analyst: Tucker, Michael P

Batch Method: Fill_Geo-21 Batch End Date: 01/30/19 01:33

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-412881/1		Fill_Geo-21, 901.1				291.18 g	1/30/19	2/20/19	Tuna Can
LCS 160-412881/2		Fill_Geo-21, 901.1				341.9 g	1/30/19	2/20/19	Tuna Can
180-86110-A-1	JSF-BS-BG12-0.8/2.8-20190123	Fill_Geo-21, 901.1	T	46.8 g	307.1 g	260.3 g	1/30/19 1:28	2/20/19	Tuna Can
180-86110-A-1 DU	JSF-BS-BG12-0.8/2.8-20190123	Fill_Geo-21, 901.1	T	46.8 g	307.1 g	260.3 g	1/30/19 1:28	2/20/19	Tuna Can
180-86110-A-2	JSF-BS-BG12-5.0/10.0-20190123	Fill_Geo-21, 901.1	T	46.6 g	427.7 g	381.1 g	1/30/19 1:28	2/20/19	Tuna Can
180-86110-A-3	JSF-BS-BG12-10.75/12.75-20190123	Fill_Geo-21, 901.1	T	46.7 g	479.3 g	432.6 g	1/30/19 1:28	2/20/19	Tuna Can
180-86110-A-4	JSF-BS-BG12-13.5/15.0-20190123	Fill_Geo-21, 901.1	T	46.6 g	422.2 g	375.6 g	1/30/19 1:28	2/20/19	Tuna Can
180-86110-B-5	JSF-BS-BG12-0.0/0.5-20190123	Fill_Geo-21, 901.1	T	46.8 g	431.6 g	384.8 g	1/30/19 1:28	2/20/19	Tuna Can
180-86110-A-7	JSF-BS-BG11-1.1/3.1-20190124	Fill_Geo-21, 901.1	T	46.7 g	389.8 g	343.1 g	1/30/19 1:28	2/20/19	Tuna Can
180-86110-A-8	JSF-BS-BG11-5.5/8.5-20190124	Fill_Geo-21, 901.1	T	47.0 g	437.2 g	390.2 g	1/30/19 1:28	2/20/19	Tuna Can
180-86110-A-9	JSF-BS-FD01-20190124	Fill_Geo-21, 901.1	T	46.5 g	422.1 g	375.6 g	1/30/19 1:28	2/20/19	Tuna Can
180-86110-A-10	JSF-BS-BG11-11.3/13.3-20190124	Fill_Geo-21, 901.1	T	46.6 g	419.5 g	372.9 g	1/30/19 1:28	2/20/19	Tuna Can
180-86110-A-11	JSF-BS-BG11-0.0/0.5-20190124	Fill_Geo-21, 901.1	T	46.9 g	439.8 g	392.9 g	1/30/19 1:28	2/20/19	Tuna Can
180-86110-A-14	JSF-BS-BG10-1.4/3.4-20190124	Fill_Geo-21, 901.1	T	46.9 g	369.9 g	323 g	1/30/19 1:28	2/20/19	Tuna Can
180-86110-A-15	JSF-BS-BG10-6.5/8.5-20190124	Fill_Geo-21, 901.1	T	46.7 g	350.2 g	303.5 g	1/30/19 1:28	2/20/19	Tuna Can
180-86110-A-16	JSF-BS-BG10-10.5/12.5-20190124	Fill_Geo-21, 901.1	T	46.9 g	375.9 g	329 g	1/30/19 1:28	2/20/19	Tuna Can
180-86110-A-17	JSF-BS-BG10-0.0/0.5-20190124	Fill_Geo-21, 901.1	T	46.5 g	399.1 g	352.6 g	1/30/19 1:28	2/20/19	Tuna Can

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00008					
MB 160-412881/1		Fill_Geo-21, 901.1							
LCS 160-412881/2		Fill_Geo-21, 901.1		# g					

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: Eurofins TestAmerica, St. Loui Job No.: 180-86110-1

SDG No.:

Batch Number: 412881 Batch Start Date: 01/30/19 00:23 Batch Analyst: Tucker, Michael P

Batch Method: Fill_Geo-21 Batch End Date: 01/30/19 01:33

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00008					
180-86110-A-1	JSF-BS-BG12-0.8/2.8-20190123	Fill_Geo-21, 901.1	T						
180-86110-A-1 DU	JSF-BS-BG12-0.8/2.8-20190123	Fill_Geo-21, 901.1	T						
180-86110-A-2	JSF-BS-BG12-5.0/10.0-20190123	Fill_Geo-21, 901.1	T						
180-86110-A-3	JSF-BS-BG12-10.75/12.75-20190123	Fill_Geo-21, 901.1	T						
180-86110-A-4	JSF-BS-BG12-13.5/15.0-20190123	Fill_Geo-21, 901.1	T						
180-86110-B-5	JSF-BS-BG12-0.0/0.5-20190123	Fill_Geo-21, 901.1	T						
180-86110-A-7	JSF-BS-BG11-1.1/3.1-20190124	Fill_Geo-21, 901.1	T						
180-86110-A-8	JSF-BS-BG11-5.5/8.5-20190124	Fill_Geo-21, 901.1	T						
180-86110-A-9	JSF-BS-FD01-20190124	Fill_Geo-21, 901.1	T						
180-86110-A-10	JSF-BS-BG11-11.3/13.3-20190124	Fill_Geo-21, 901.1	T						
180-86110-A-11	JSF-BS-BG11-0.0/0.5-20190124	Fill_Geo-21, 901.1	T						
180-86110-A-14	JSF-BS-BG10-1.4/3.4-20190124	Fill_Geo-21, 901.1	T						
180-86110-A-15	JSF-BS-BG10-6.5/8.5-20190124	Fill_Geo-21, 901.1	T						
180-86110-A-16	JSF-BS-BG10-10.5/12.5-20190124	Fill_Geo-21, 901.1	T						
180-86110-A-17	JSF-BS-BG10-0.0/0.5-20190124	Fill_Geo-21, 901.1	T						

Batch Notes	
Balance ID	1121432711
SOP Number	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: 9_Gamma_20190339

Sample Description: 412881_Gamma_MB 160-412881~1-A
Detector: Detector # 9
Batch ID: 412881
Work Order Number: Gamma
Lot Number: MB 160-412881~1-A

Decay to Time: 2/20/2019 07:58 Live Time: 1800 sec
Acquisition Time: 2/20/2019 07:58:26 Real Time: 1803 sec
Analysis Time: 2/20/2019 08:28 Dead Time: 0.16 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 9_Soil_TunaCan.Clb
Efficiency Cal Desc: 9_Soil_TunaCan_90099_050312
Efficiency Cal Date: 6/14/2012 10:19
Energy Cal Date: 3/1/2012 13:57
Library: Client_Long_Rev15.lib
Bkgd Correction File: 9_2019-01-20_1010.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	-1.759E+00	128.5	2.260E+00	2.262E+00	7.768E+00
NA-22	1.703E-02	1024.7	1.745E-01	1.745E-01	7.050E-01
K-40	-4.119E+00	68.4	2.817E+00	2.825E+00	1.221E+01
Sc-46	-1.465E-02	1225.2	1.796E-01	1.796E-01	8.295E-01
CR-51	1.826E+00	151.0	2.757E+00	2.759E+00	9.372E+00
MN-54	-1.099E-01	238.8	2.624E-01	2.625E-01	6.390E-01
FE-59	-4.948E-02	514.3	2.545E-01	2.545E-01	1.105E+00
Co-56	3.849E-01	37.8	1.455E-01	1.468E-01	4.864E-01
CO-57	-1.361E-01	115.5	1.571E-01	1.573E-01	5.332E-01
CO-58	-1.440E-01	165.8	2.388E-01	2.389E-01	8.479E-01
CO-60	0.000E+00	1.#INF	7.483E-02	7.483E-02	3.900E-01
ZN-65	0.000E+00	1.#INF	1.283E-01	1.283E-01	2.229E+00
NB-94	-1.346E-02	2366.3	3.185E-01	3.185E-01	1.136E+00
ZR-95	-6.238E-02	501.7	3.129E-01	3.129E-01	8.190E-01
NB-95	-1.833E-01	121.5	2.227E-01	2.229E-01	7.786E-01
RU-103	-3.924E-02	349.4	1.371E-01	1.371E-01	4.654E-01
RH-106	-1.265E-01	2780.6	3.518E+00	3.518E+00	1.267E+01
AG-108M	1.021E-01	109.2	1.115E-01	1.117E-01	3.170E-01
AG-110M	2.502E-01	78.7	1.970E-01	1.974E-01	1.142E+00
SN-113	-3.670E-01	108.5	3.984E-01	3.988E-01	1.351E+00
SB-124	3.767E-01	82.9	3.124E-01	3.130E-01	1.182E+00
SB-125	8.443E-01	90.3	7.624E-01	7.636E-01	1.470E+00
I-131	-2.631E-02	767.8	2.020E-01	2.020E-01	5.748E-01
Gd-153	0.000E+00	1.#INF	1.999E-01	1.999E-01	2.419E+00
Ga-68	-1.263E+01	119.0	1.503E+01	1.505E+01	3.371E+01
Tc-99m	0.000E+00	1.#INF	3.980E-02	3.980E-02	7.753E-01
BA-133	-4.230E-01	86.7	3.667E-01	3.674E-01	1.232E+00
CS-134	-1.576E-01	69.6	1.096E-01	1.099E-01	1.266E+00
CS-137	1.085E-02	2633.7	2.857E-01	2.857E-01	1.037E+00
CE-139	1.604E-01	115.7	1.856E-01	1.862E-01	6.301E-01
Ba-140	1.024E+00	34.4	3.526E-01	3.565E-01	7.948E-01
La-140	-2.547E-02	107.1	2.728E-02	2.731E-02	9.150E-01
CE-141	3.067E-02	1329.0	4.075E-01	4.075E-01	1.402E+00

CE-144	-2.508E-01	685.0	1.718E+00	1.718E+00	5.900E+00
PM-144	-3.950E-01	74.0	2.923E-01	2.930E-01	9.758E-01
EU-152	2.280E+00	21.3	4.861E-01	5.007E-01	1.465E+00
EU-154	6.352E-01	96.8	6.150E-01	6.159E-01	1.032E+00
EU-155	0.000E+00	1.#INF	2.787E-01	2.788E-01	3.373E+00
HF-181	2.072E-01	111.1	2.303E-01	2.305E-01	7.945E-01
Ta-182	1.063E-01	427.6	4.544E-01	4.544E-01	3.245E+00
Hg-203	-1.964E-01	91.9	1.806E-01	1.810E-01	6.126E-01
TL-208	-4.681E-01	48.4	2.263E-01	2.276E-01	9.767E-01
PM-146	1.193E-01	188.4	2.248E-01	2.249E-01	5.881E-01
Y-88	9.740E-02	49.2	4.793E-02	4.826E-02	5.109E-01
Cd-113m	-5.307E+02	424.3	2.252E+03	2.252E+03	8.035E+03
Cd-109	0.000E+00	1.#INF	7.109E-01	7.109E-01	2.017E+01
Cf-251	-4.071E-01	204.3	8.317E-01	8.324E-01	2.222E+00
Cf-249	1.587E-01	235.7	3.740E-01	3.741E-01	9.467E-01
Sn-126	-8.380E-01	185.8	1.557E+00	1.558E+00	5.392E+00
PB-210	-4.309E+00	15.4	6.616E-01	7.083E-01	2.122E+01
PB-212	-1.155E-01	313.5	3.619E-01	3.620E-01	1.456E+00
PB-214	-3.353E-01	127.0	4.260E-01	4.263E-01	1.594E+00
BI-207	-1.978E-02	1584.3	3.134E-01	3.134E-01	7.995E-01
BI-212	-3.129E+00	102.1	3.193E+00	3.197E+00	1.097E+01
U-235	7.945E-01	107.5	8.538E-01	8.548E-01	6.196E+00
BI-214	-4.360E-01	170.5	7.432E-01	7.436E-01	2.796E+00
BI-210M	-5.141E-03	6580.0	3.383E-01	3.383E-01	9.715E-01
AC-228	-5.403E-01	180.9	9.772E-01	9.776E-01	2.357E+00
TH-227	1.062E+00	63.1	6.697E-01	6.728E-01	4.763E+00
TH-229	2.613E+00	121.8	3.183E+00	3.190E+00	8.078E+00
TH-234	-6.432E-02	5982.3	3.848E+00	3.848E+00	1.320E+01
PA-231	-2.317E-06	556914586.3	1.290E+01	1.290E+01	4.416E+01
PA-233	-6.463E-01	60.6	3.916E-01	3.931E-01	3.257E+00
PA-234	-7.017E-01	140.7	9.875E-01	9.881E-01	3.344E+00
PA-234M	-1.545E+00	905.4	1.399E+01	1.399E+01	1.084E+02
AM-241	2.945E-01	128.0	3.769E-01	3.772E-01	1.298E+00
Np-237	-9.645E-01	167.7	1.617E+00	1.618E+00	5.474E+00
Ir-192	-2.547E-01	162.7	4.145E-01	4.147E-01	1.401E+00
Cs-136	2.099E-01	99.9	2.098E-01	2.101E-01	7.267E-01
Np-239	6.131E-02	1486.2	9.112E-01	9.112E-01	3.122E+00
Nd-147	1.270E+00	102.9	1.307E+00	1.309E+00	3.296E+00
TL-210	-3.216E-01	115.2	3.704E-01	3.708E-01	1.265E+00
Kr-85	0.000E+00	1.#INF	2.216E+01	2.216E+01	2.351E+02
Total	1.494E+01				

Analyst: kody Saulters

Sample description
412881_Gamma_MB 160-412881~1-A

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20190339.An1

Acquisition information
Start time: 2/20/2019 7:58:26 AM
Live time: 1800
Real time: 1803
Dead time: 0.16 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/14/2012 10:19:51 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.30 %
Log(Eff): -8.079856E-01 + (-2.367265E-01*Log(E)) + (-3.950640E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -2.387916E+01 + (8.875647E+00*Log(E)) + (-9.401100E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev15.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.08keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	2/20/2019 7:58:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2019-01-20_1010.PBC 1/20/2019 10:10:08 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 5.00E+01 %

***** 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	11.	63.06	1.00	2.900E-02	50.14	8.000	PBC<MDA	TH227
59.54	7.	127.98	1.01	3.659E-02	59.54	35.900	PBC<MDA	AM241
123.10	11.	106.01	1.07	5.296E-02	123.10	40.790	PBC<MDA	EU154
165.85	11.	115.71	1.11	4.736E-02	165.85	79.900	PBC<MDA	CE139
193.51	9.	121.82	1.14	4.287E-02	193.51	4.400	PBC<MDA	TH229
205.33	9.	107.46	1.15	4.123E-02	205.33	5.010	PBC<MDA	U235
227.00	9.	101.99	1.17	3.858E-02	227.00	6.300	PBC<MDA	Cf251
235.97	7.	163.51	1.18	3.760E-02	235.97	12.300	PBC<MDA	TH227
277.28	3.	260.19	1.21	3.372E-02	277.28	6.310	PBC<MDA	TL208
320.08	10.	151.01	1.25	3.056E-02	320.08	9.940	PBC<MDA	CR51
328.76	9.	130.77	1.26	2.999E-02	328.76	20.300	PBC<MDA	La140
333.44	3.	412.48	1.27	2.970E-02	333.44	15.510	PBC<MDA	Cf249
351.93	-6.	127.03	1.28	2.860E-02	351.93	37.600	PBC<MDA	PB214
383.84	8.	104.12	1.31	2.691E-02	383.84	8.940	PBC<MDA	BA133
387.95	4.	235.66	1.31	2.671E-02	387.95	66.000	PBC<MDA	Cf249
427.88	2.	374.72	1.35	2.491E-02	427.88	29.600	PBC<MDA	SB125
433.94	4.	109.21	1.35	2.466E-02	433.94	90.480	PBC<MDA	AG108M
453.88	3.	188.41	1.37	2.388E-02	453.88	65.000	PBC<MDA	PM146
463.37	8.	90.30	1.38	2.352E-02	463.37	10.470	PBC<MDA	SB125
482.00	7.	111.14	1.40	2.286E-02	482.00	80.500	PBC<MDA	HF181
511.86	49.	17.91	2.67	2.188E-02	511.86	20.000	6.220E+00	RH106
531.00	6.	102.87	1.44	2.130E-02	531.00	13.000	PBC<MDA	Nd147
537.26	9.	34.44	1.44	2.112E-02	537.26	24.390	1.024E+00	Ba140

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
563.24	3.	172.34	1.47	2.040E-02	563.24	8.350	PBC<MDA	CS134
569.32	6.	87.05	1.47	2.024E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.897E+00	PA234
					569.70	97.740	PBC<MDA	BI207
600.50	9.	127.88	1.50	1.946E-02	600.50	17.860	PBC<MDA	SB125
602.73	8.	148.18	1.50	1.940E-02	602.73	98.260	PBC<MDA	SB124
722.79	6.	82.92	1.60	1.693E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.007E-01	AG108M
					723.36	20.220	9.020E-01	EU154
722.94	3.	207.60	1.60	1.693E-02	722.79	10.810	7.925E-01	SB124
					722.94	90.840	9.433E-02	AG108M
					723.36	20.220	4.240E-01	EU154
763.94	5.	78.74	1.63	1.624E-02	763.94	22.280	PBC<MDA	AG110M
778.92	3.	238.82	1.64	1.600E-02	778.92	12.940	PBC<MDA	EU152
785.42	6.	96.22	1.65	1.590E-02	785.42	1.280	PBC<MDA	BI212
818.50	6.	99.91	1.67	1.540E-02	818.50	100.000	PBC<MDA	Cs136
846.77	5.	108.01	1.70	1.501E-02	846.77	99.935	PBC<MDA	Co56
873.23	2.	314.32	1.72	1.465E-02	873.23	12.270	PBC<MDA	EU154
880.53	5.	96.82	1.72	1.456E-02	880.53	6.000	PBC<MDA	PA234
884.68	-1.	824.21	1.73	1.451E-02	884.68	72.680	PBC<MDA	AG110M
898.04	5.	49.21	1.74	1.434E-02	898.04	93.700	PBC<MDA	Y88
937.49	4.	132.68	1.77	1.387E-02	937.49	34.360	PBC<MDA	AG110M
964.11	15.	25.82	1.79	1.357E-02	964.11	14.605	4.204E+00	EU152
996.33	5.	96.82	1.81	1.323E-02	996.33	10.600	PBC<MDA	EU154
1001.00	0.	905.40	1.81	1.318E-02	1001.00	0.837	PBC<MDA	PA234M
1037.84	4.	152.39	1.84	1.281E-02	1037.84	14.130	PBC<MDA	Co56
1112.07	22.	21.32	1.89	1.213E-02	1112.07	13.644	7.384E+00	EU152
1120.29	-1.	477.95	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1221.41	1.	427.57	1.97	1.126E-02	1221.41	27.000	PBC<MDA	Ta182
1238.28	7.	37.80	1.98	1.114E-02	1238.28	66.070	PBC<MDA	Co56
1313.00	8.	35.36	2.03	1.063E-02	1313.00	21.000	1.992E+00	TL210

No unknown peaks passed sensitivity test.

This section based on library: Client_Long_Rev15.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	70.	-8.	-0.005	15.35	0.998s
TH-227	200.20	50.14	20.	11.	0.006	63.06	1.001s
AM-241	237.77	59.54	36.	7.	0.004	127.98	1.010s
TH-234	252.77	63.29	45.	0.	0.000	1000.00	1.014s
Sn-126	256.74	64.28	56.	-6.	-0.003	185.82	1.015s
BA-133	323.56	80.99	44.	-12.	-0.007	103.92	1.031

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-237	345.55	86.49	177.	-11.	-0.006	167.67	1.036s
EU-155	345.76	86.54	188.	-11.	-0.006	172.82	1.036s
Sn-126	347.35	86.94	199.	-6.	-0.003	341.82	1.037s
Sn-126	349.87	87.57	205.	0.	0.000	1000.00	1.037s
Cd-109	351.75	88.04	205.	0.	0.000	1000.00	1.038s
Nd-147	363.99	91.10	205.	0.	0.000	1000.00	1.041s
AC-228	372.98	93.35	199.	0.	0.000	1000.00	1.043s
Gd-153	389.58	97.50	199.	0.	0.000	1000.00	1.047
Np-239	397.58	99.50	199.	0.	0.000	1000.00	1.049s
Gd-153	412.37	103.20	199.	0.	0.000	1000.00	1.052s
Np-239	414.37	103.70	199.	0.	0.000	1000.00	1.053s
EU-155	420.82	105.31	199.	0.	0.000	1000.00	1.054
EU-152	486.67	121.78	64.	-13.	-0.007	92.14	1.070s
CO-57	487.80	122.06	77.	-11.	-0.006	115.49	1.070s
EU-154	491.95	123.10	64.	11.	0.006	106.01	1.071s
PA-234	524.72	131.29	133.	-12.	-0.007	140.74	1.079s
HF-181	531.64	133.02	145.	-12.	-0.007	146.38	1.081s
CE-144	533.69	133.54	157.	-3.	-0.001	684.98	1.081
HF-181	544.74	136.30	160.	0.	0.000	1000.00	1.084s
CO-57	545.43	136.47	160.	0.	0.000	1000.00	1.084s
Tc-99m	561.57	140.51	160.	0.	0.000	1000.00	1.088s
U-235	574.67	143.79	160.	0.	0.000	1000.00	1.091s
Ba-140	650.15	162.66	84.	-14.	-0.008	97.36	1.108s
U-235	653.03	163.38	98.	-14.	-0.008	104.43	1.109s
CE-139	662.92	165.85	74.	11.	0.006	115.71	1.111s
Cf-251	705.90	176.60	37.	-6.	-0.003	204.28	1.122s
U-235	742.37	185.72	33.	-5.	-0.003	219.54	1.130
TH-229	773.52	193.51	28.	9.	0.005	121.82	1.137s
U-235	820.80	205.33	24.	9.	0.005	107.46	1.148s
TH-229	842.87	210.85	36.	-6.	-0.003	200.00	1.153s
Cf-251	907.45	227.00	20.	9.	0.005	101.99	1.168s
TH-227	943.33	235.97	62.	7.	0.004	163.51	1.176s
PB-212	953.97	238.63	72.	-3.	-0.002	313.46	1.179s
PB-214	967.43	242.00	69.	0.	0.000	1000.00	1.182s
EU-152	978.21	244.69	96.	-12.	-0.007	115.45	1.185s
TH-227	1024.39	256.24	16.	-2.	-0.001	397.91	1.195s
Cd-113m	1054.23	263.70	35.	-2.	-0.001	424.26	1.202s
TL-208	1108.55	277.28	24.	3.	0.002	260.19	1.215s
Hg-203	1116.22	279.20	35.	-10.	-0.005	91.95	1.216s
I-131	1136.61	284.30	20.	-4.	-0.002	168.46	1.221s
PB-214	1179.77	295.09	173.	-15.	-0.009	50.46	1.231s
TL-210	1183.41	296.00	181.	-12.	-0.007	159.95	1.231s
PB-212	1199.52	300.03	194.	-12.	-0.007	164.52	1.235s
PA-231	1199.68	300.07	206.	-12.	-0.007	169.46	1.235s
PA-233	1200.12	300.18	218.	-8.	-0.004	268.67	1.235s
Ir-192	1233.16	308.44	169.	-12.	-0.007	153.31	1.243s
PA-233	1247.44	312.01	182.	-13.	-0.007	60.59	1.246s
Ir-192	1265.35	316.49	194.	-12.	-0.007	162.72	1.250s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CR-51	1279.73	320.08	108.	10.	0.006	151.01	1.253s
La-140	1314.43	328.76	61.	9.	0.005	130.77	1.261s
Cf-249	1333.15	333.44	70.	3.	0.002	412.48	1.265s
AC-228	1352.66	338.32	73.	0.	0.000	1000.00	1.270s
Cs-136	1361.66	340.57	73.	0.	0.000	1000.00	1.272s
EU-152	1376.53	344.29	73.	0.	0.000	1000.00	1.275s
HF-181	1382.70	345.83	120.	-12.	-0.007	135.24	1.276
PB-214	1407.11	351.93	36.	-6.	-0.004	127.03	1.282
BA-133	1423.37	356.00	61.	-13.	-0.007	86.70	1.285s
I-131	1457.31	364.48	20.	-1.	-0.001	767.79	1.293s
BA-133	1534.73	383.84	27.	8.	0.004	104.12	1.310s
Cf-249	1551.17	387.95	34.	4.	0.002	235.66	1.314s
SN-113	1566.12	391.69	68.	-11.	-0.006	108.54	1.317s
SB-125	1710.86	427.88	13.	2.	0.001	374.72	1.349s
AG-108M	1735.10	433.94	5.	4.	0.002	109.21	1.354s
PM-146	1814.87	453.88	9.	3.	0.002	188.41	1.372s
SB-125	1852.82	463.37	24.	8.	0.005	90.30	1.380s
Ir-192	1871.59	468.06	53.	-12.	-0.007	92.31	1.384s
BE-7	1909.73	477.60	45.	-8.	-0.004	128.46	1.392s
HF-181	1927.34	482.00	26.	7.	0.004	111.14	1.396
La-140	1947.43	487.02	53.	-11.	-0.006	99.56	1.400s
RU-103	1987.56	497.05	9.	-1.	-0.001	349.44	1.409s
RH-106	2046.81	511.86	14.	49.	0.027	17.91	2.672s
Kr-85	2055.27	513.98	63.	0.	0.000	1000.00	1.424s
Nd-147	2123.35	531.00	9.	6.	0.004	102.87	1.438s
Ba-140	2148.39	537.26	1.	9.	0.005	34.44	1.444s
CS-134	2252.30	563.24	5.	3.	0.002	172.34	1.466s
CS-134	2276.64	569.32	9.	6.	0.003	87.05	1.471s
PA-234	2277.24	569.47	15.	0.	0.000	1000.00	1.471s
BI-207	2278.16	569.70	19.	-4.	-0.002	150.30	1.471s
TL-208	2331.45	583.02	33.	-14.	-0.008	48.35	1.482s
SB-125	2401.36	600.50	57.	9.	0.005	127.88	1.497s
SB-124	2410.29	602.73	66.	8.	0.004	148.18	1.499s
CS-134	2418.21	604.71	74.	0.	0.000	1000.00	1.500s
BI-214	2436.61	609.31	81.	-7.	-0.004	170.46	1.505
RU-103	2440.56	610.30	74.	0.	0.000	1000.00	1.505s
AG-108M	2456.49	614.28	74.	0.	0.000	1000.00	1.508s
PM-144	2471.62	618.06	74.	0.	0.000	1000.00	1.512s
SB-125	2542.94	635.89	23.	-11.	-0.006	70.47	1.526s
AG-110M	2630.43	657.76	23.	-9.	-0.005	126.71	1.544s
PM-144	2785.58	696.54	35.	-12.	-0.007	74.00	1.576s
SB-124	2890.57	722.79	8.	6.	0.003	82.92	1.598
AG-108M	2891.17	722.94	13.	3.	0.001	207.60	1.598
EU-154	2892.86	723.36	16.	0.	0.000	1000.00	1.598s
ZR-95	2896.22	724.20	16.	0.	0.000	1000.00	1.599s
BI-212	2908.11	727.17	23.	-7.	-0.004	102.06	1.601s
PM-146	2942.31	735.72	14.	-2.	-0.001	403.11	1.608s
PM-146	2988.08	747.16	9.	-3.	-0.002	201.99	1.617s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZR-95	3026.36	756.73	5.	-1.	-0.001	501.66	1.625s
AG-110M	3055.23	763.94	6.	5.	0.003	78.74	1.631s
NB-95	3062.61	765.79	18.	-5.	-0.003	121.45	1.632s
EU-152	3115.14	778.92	10.	3.	0.002	238.82	1.643s
BI-212	3141.15	785.42	12.	6.	0.003	96.22	1.648s
CS-134	3182.96	795.87	36.	-12.	-0.006	79.35	1.656s
TL-210	3197.88	799.60	49.	-9.	-0.005	115.17	1.659s
CO-58	3242.59	810.78	20.	-4.	-0.002	165.83	1.668s
La-140	3262.58	815.77	24.	0.	0.000	1000.00	1.672s
Cs-136	3273.50	818.50	14.	6.	0.003	99.91	1.674
MN-54	3338.91	834.85	10.	-3.	-0.002	238.82	1.687s
Co-56	3386.61	846.77	5.	5.	0.003	108.01	1.696s
TL-208	3441.80	860.56	16.	-5.	-0.003	94.59	1.707s
EU-154	3492.47	873.23	5.	2.	0.001	314.32	1.717s
PA-234	3521.68	880.53	11.	5.	0.003	96.82	1.722s
PA-234	3532.53	883.24	16.	0.	0.000	1000.00	1.724s
AG-110M	3538.30	884.68	17.	-1.	0.000	824.21	1.725s
Y-88	3591.74	898.04	1.	5.	0.003	49.21	1.736s
AC-228	3643.88	911.07	10.	-4.	-0.002	180.85	1.746s
AG-110M	3749.60	937.49	5.	4.	0.002	132.68	1.766s
PA-234	3783.72	946.02	15.	-8.	-0.004	112.15	1.772s
EU-152	3856.11	964.11	0.	15.	0.008	25.82	1.786s
AC-228	3875.56	968.97	15.	0.	0.000	1000.00	1.790s
EU-154	3985.03	996.33	11.	5.	0.003	96.82	1.810s
PA-234M	4003.71	1001.00	16.	0.	0.000	905.40	1.814s
Co-56	4151.13	1037.84	5.	4.	0.002	152.39	1.841s
Cs-136	4192.07	1048.07	20.	-11.	-0.006	64.22	1.848s
RH-106	4201.23	1050.36	32.	-3.	-0.002	101.09	1.850s
Ga-68	4309.44	1077.40	16.	-8.	-0.004	119.02	1.870s
FE-59	4396.88	1099.25	6.	-1.	0.000	514.27	1.886s
EU-152	4448.20	1112.07	0.	22.	0.012	21.32	1.895s
ZN-65	4462.09	1115.55	22.	0.	0.000	1000.00	1.897s
BI-214	4481.06	1120.29	23.	-1.	0.000	477.95	1.901s
Sc-46	4482.12	1120.55	22.	0.	0.000	1000.00	1.901s
Ta-182	4485.12	1121.30	22.	0.	0.000	1000.00	1.901s
Ta-182	4756.25	1189.05	0.	0.	0.000	1000.00	1.949s
Ta-182	4885.75	1221.41	6.	1.	0.001	427.57	1.972s
Co-56	4953.27	1238.28	0.	7.	0.004	37.80	1.984s
EU-154	5098.39	1274.54	6.	0.	0.000	1000.00	2.008s
FE-59	5166.65	1291.60	6.	-2.	-0.001	343.80	2.020s
TL-210	5252.32	1313.00	0.	8.	0.004	35.36	2.034s
CO-60	5330.37	1332.50	0.	0.	0.000	1000.00	2.047s
AG-110M	5537.69	1384.30	6.	-3.	-0.001	218.12	2.082s
EU-152	5632.56	1408.00	0.	0.	0.000	904.64	2.097s
K-40	5844.03	1460.83	19.	-8.	-0.004	68.40	2.131s
La-140	6385.95	1596.21	6.	-3.	-0.002	169.68	2.215s
BI-214	7059.65	1764.49	4.	-4.	-0.002	154.85	2.314s
Co-56	7087.11	1771.35	0.	0.	0.000	1000.00	2.318s

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	-1.7593E+00					5.31E+01	
			477.60	-1.759E+00	?(	7.768E+00	1.28E+02 1.05E+01	G
NA-22	C	1.7026E-02					9.50E+02	
			1274.53	1.703E-02	%(	7.050E-01	1.02E+03 9.99E+01	G
K-40	N	-4.1192E+00					4.66E+11	
			1460.83	-4.119E+00	?(P	1.221E+01	6.84E+01 1.07E+01	G
Sc-46	F	-1.4655E-02					8.38E+01	
			889.28	-1.465E-02	%(P	8.295E-01	1.23E+03 1.00E+02	G
			1120.55	0.000E+00	+	1.132E+00	1.00E+03 1.00E+02	G
CR-51	F	1.8258E+00					2.77E+01	
			320.08	1.826E+00	?(P	9.372E+00	1.51E+02 9.94E+00	G
MN-54	C	-1.0988E-01					3.12E+02	
			834.85	-1.099E-01	?(	6.390E-01	2.39E+02 1.00E+02	G
FE-59	F	-4.9483E-02					4.45E+01	
			1099.25	-4.948E-02	?(P	1.105E+00	5.14E+02 5.65E+01	G
			1291.60	-1.991E-01	+	1.648E+00	3.44E+02 4.32E+01	G
Co-56	C	3.8487E-01					7.73E+01	
			846.77	1.852E-01	?(	4.864E-01	1.08E+02 9.99E+01	G
			1238.28	5.285E-01	?(	5.564E-01	3.78E+01 6.61E+01	G
			1037.84	1.125E+00	?(	4.135E+00	1.52E+02 1.41E+01	G
			1771.35	0.000E+00	-	3.178E+00	1.00E+03 1.55E+01	A
CO-57	C	-1.3607E-01					2.72E+02	
			122.06	-1.361E-01	?(	5.332E-01	1.15E+02 8.56E+01	G
			136.47	0.000E+00	+	6.222E+00	1.00E+03 1.07E+01	G
CO-58	C	-1.4401E-01					7.09E+01	
			810.78	-1.440E-01	?(	8.479E-01	1.66E+02 9.95E+01	G
NB-94	I	-1.3459E-02					7.41E+06	
			702.63	-1.346E-02	%(	1.136E+00	2.37E+03 9.79E+01	G
			871.10	1.263E-02	%	7.309E-01	1.52E+03 9.99E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZR-95	I	-6.2379E-02					6.40E+01	
			756.73	-6.238E-02	?(	8.190E-01	5.02E+02	5.45E+01 G
			724.20	0.000E+00	+	1.589E+00	1.00E+03	4.42E+01 G
NB-95	I	-1.8333E-01					6.40E+01	
			765.79	-1.833E-01	?(	7.786E-01	1.21E+02	9.98E+01 G
RU-103	I	-3.9243E-02					3.93E+01	
			497.05	-3.924E-02	?(P	4.654E-01	3.49E+02	9.09E+01 G
			610.30	0.000E+00	+	2.151E+01	1.00E+03	5.75E+00 GA
RH-106	I	-1.2652E-01					3.74E+02	
			621.92	-1.265E-01	%(P	1.267E+01	2.78E+03	9.93E+00 G
			1050.36	-8.460E+00	+ P	8.191E+01	1.01E+02	1.56E+00 G
			511.86	6.220E+00	?	2.557E+00	1.79E+01	2.00E+01 GA
AG-108M	C	1.0214E-01					1.53E+05	
			433.94	1.100E-01	?(P	3.170E-01	1.09E+02	9.05E+01 G
			722.94	9.433E-02	?(	7.138E-01	2.08E+02	9.08E+01 G
			614.28	0.000E+00	-	1.383E+00	1.00E+03	8.98E+01 G
AG-110M	F	2.5020E-01					2.50E+02	
			884.68	-2.935E-02	?(P	1.142E+00	8.24E+02	7.27E+01 G
			657.76	-3.043E-01	+ P	8.032E-01	1.27E+02	9.46E+01 G
			937.49	4.663E-01	?(	1.531E+00	1.33E+02	3.44E+01 G
			1384.30	-5.989E-01	+	3.100E+00	2.18E+02	2.43E+01 G
			763.94	8.289E-01	?(P	2.209E+00	7.87E+01	2.23E+01 G
SN-113	F	-3.6704E-01					1.15E+02	
			391.69	-3.670E-01	?(	1.351E+00	1.09E+02	6.40E+01 G
SB-124	F	3.7674E-01					6.02E+01	
			602.73	2.327E-01	?(	1.182E+00	1.48E+02	9.83E+01 G
			1690.98	-2.716E-02	% P	9.906E-01	2.65E+03	4.78E+01 G
			722.79	1.686E+00	?(	4.781E+00	8.29E+01	1.08E+01 G
SB-125	I	8.4432E-01					1.01E+03	
			427.88	1.507E-01	&(	1.470E+00	3.75E+02	2.96E+01 G
			600.50	1.390E+00	?(P	6.074E+00	1.28E+02	1.79E+01 G
			635.89	-2.797E+00	+	6.559E+00	7.05E+01	1.13E+01 G
			463.37	1.875E+00	?(	5.761E+00	9.03E+01	1.05E+01 G
I-131	I	-2.6307E-02					8.02E+00	
			364.48	-2.631E-02	?(P	5.748E-01	7.68E+02	8.17E+01 G
			284.30	-1.174E+00	& P	6.470E+00	1.68E+02	6.14E+00 G
			636.97	1.172E-01	%	1.209E+01	2.84E+03	7.17E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ga-68	C	-1.2631E+01					4.71E-02	
			1077.40	-1.263E+01	?(	3.371E+01	1.19E+02	3.30E+00 G
BA-133	F	-4.2299E-01					3.85E+03	
			356.00	-4.230E-01	?(	1.232E+00	8.67E+01	6.20E+01 G
			302.85	3.642E-07	%	6.942E+00	5.57E+08	1.83E+01 G
			383.84	1.739E+00	? P	6.203E+00	1.04E+02	8.94E+00 GA
			80.99	-4.192E-01	+	1.135E+00	1.04E+02	3.41E+01 GA
CS-134	I	-1.5758E-01					7.54E+02	
			795.87	-4.754E-01	?(	1.266E+00	7.93E+01	8.55E+01 G
			604.71	0.000E+00	+	1.258E+00	1.00E+03	9.76E+01 G
			569.32	1.011E+00	&(	3.024E+00	8.71E+01	1.54E+01 G
			801.95	2.043E-01	&	1.652E+01	2.29E+03	8.69E+00 G
			563.24	9.448E-01	?(P	4.317E+00	1.72E+02	8.35E+00 G
CS-137	I	1.0848E-02					1.10E+04	
			661.66	1.085E-02	%(	1.037E+00	2.63E+03	8.52E+01 G
CE-139	F	1.6041E-01					1.38E+02	
			165.85	1.604E-01	?(	6.301E-01	1.16E+02	7.99E+01 G
Ba-140	I	1.0238E+00					1.28E+01	
			537.26	1.024E+00	?(P	7.948E-01	3.44E+01	2.44E+01 G
			162.66	-2.645E+00	-	8.674E+00	9.74E+01	6.22E+00 G
			304.85	-1.563E-06	%	2.980E+01	5.57E+08	4.29E+00 G
La-140	I	-2.5466E-02					1.28E+01	
			1596.21	-2.011E-01	?(P	9.150E-01	1.70E+02	9.54E+01 G
			487.02	-5.859E-01	+	1.977E+00	9.96E+01	4.55E+01 G
			328.76	7.999E-01	&(	3.577E+00	1.31E+02	2.03E+01 G
			815.77	0.000E+00	+	3.947E+00	1.00E+03	2.33E+01 G
CE-141	I	3.0665E-02					3.25E+01	
			145.44	3.067E-02	%(	1.402E+00	1.33E+03	4.82E+01 G
CE-144	I	-2.5084E-01					2.85E+02	
			133.54	-2.508E-01	?(	5.900E+00	6.85E+02	1.11E+01 G
PM-144	C	-3.9499E-01					3.63E+02	
			696.54	-3.950E-01	?(	9.758E-01	7.40E+01	9.90E+01 G
			618.06	0.000E+00	+	1.260E+00	1.00E+03	9.91E+01 G
EU-152	F	2.2801E+00					4.94E+03	
			121.78	-4.720E-01	?(	1.465E+00	9.21E+01	2.86E+01 G
			344.29	0.000E+00	+	3.069E+00	1.00E+03	2.65E+01 G
			1112.07	7.384E+00	?(	2.474E+00	2.13E+01	1.36E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			778.92	8.051E-01	?(	4.682E+00	2.39E+02	1.29E+01 G
			964.11	4.204E+00	?(	2.066E+00	2.58E+01	1.46E+01 G
			244.69	-2.467E+00	-	9.636E+00	1.15E+02	7.58E+00 G
			1408.00	-1.051E-01	- P	1.941E+00	9.05E+02	2.10E+01 GA
EU-154	I	6.3518E-01					3.14E+03	
			123.10	2.872E-01	?(	1.032E+00	1.06E+02	4.08E+01 G
			1274.54	0.000E+00	-	2.049E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	&	3.466E+00	1.00E+03	2.02E+01 G
			873.23	5.149E-01	?(	4.162E+00	3.14E+02	1.23E+01 G
			1004.77	-7.825E-02	%	5.057E+00	1.72E+03	1.80E+01 G
			996.33	2.113E+00	?(	7.104E+00	9.68E+01	1.06E+01 G
HF-181	F	2.0721E-01					4.24E+01	
			482.00	2.072E-01	&(	7.945E-01	1.11E+02	8.05E+01 G
			133.02	-2.933E-01	+	1.454E+00	1.46E+02	4.33E+01 G
			345.83	-1.495E+00	+	6.849E+00	1.35E+02	1.51E+01 G
			136.30	0.000E+00	-	1.135E+01	1.00E+03	5.85E+00 G
Ta-182	F	1.0627E-01					1.14E+02	
			1121.30	0.000E+00	?(	3.245E+00	1.00E+03	3.49E+01 G
			1221.41	2.436E-01	?(	2.522E+00	4.28E+02	2.70E+01 G
			1189.05	0.000E+00	-	2.197E+00	1.00E+03	1.62E+01 G
Hg-203	F	-1.9642E-01					4.66E+01	
			279.20	-1.964E-01	?(	6.126E-01	9.19E+01	8.15E+01 G
TL-208	N	-4.6806E-01					6.98E+02	
			583.02	-4.681E-01	?(P	9.767E-01	4.84E+01	8.45E+01 G
			277.28	7.199E-01	& P	6.698E+00	2.60E+02	6.31E+00 G
			860.56	-1.418E+00	+ P	6.390E+00	9.46E+01	1.24E+01 G
PM-146	C	1.1932E-01					2.02E+03	
			453.88	1.193E-01	?(	5.881E-01	1.88E+02	6.50E+01 G
			747.16	-3.298E-01	+	1.677E+00	2.02E+02	3.40E+01 G
			735.72	-2.956E-01	+	2.977E+00	4.03E+02	2.25E+01 G
Y-88	F	9.7397E-02					1.07E+02	
			1836.06	-1.808E-02	%(P	5.109E-01	2.36E+03	9.92E+01 G
			898.04	2.197E-01	?(P	3.047E-01	4.92E+01	9.37E+01 G
Cd-113m		-5.3074E+02					5.33E+03	
			263.70	-5.307E+02	?(	8.035E+03	4.24E+02	6.00E-03 K
Cf-251	T	-4.0712E-01					3.28E+05	
			176.60	-4.071E-01	&(	2.222E+00	2.04E+02	1.70E+01 G
			227.00	2.075E+00	?	5.382E+00	1.02E+02	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	1.5869E-01					1.28E+05	
			387.95	1.138E-01	?(	9.467E-01	2.36E+02	6.60E+01 G
			333.44	3.498E-01	?(	5.032E+00	4.12E+02	1.55E+01 G
Sn-126		-8.3804E-01					3.65E+07	
			87.57	0.000E+00	+	2.043E+00	1.00E+03	3.75E+01 GA
			64.28	-8.380E-01	?(	5.392E+00	1.86E+02	9.70E+00 G
			86.94	-7.204E-01	+	8.387E+00	3.42E+02	9.04E+00 GA
PB-210	N	-4.3093E+00					8.14E+03	
			46.54	-4.309E+00	&(P	2.122E+01	1.54E+01	4.25E+00 G
PB-212	N	-1.1546E-01					6.98E+02	
			238.63	-1.155E-01	?(P	1.456E+00	3.13E+02	4.33E+01 G
			300.03	-6.438E+00	+	3.580E+01	1.65E+02	3.28E+00 GA
PB-214	N	-3.3534E-01					5.84E+05	
			351.93	-3.353E-01	?(P	1.594E+00	1.27E+02	3.76E+01 G
			295.09	-1.371E+00	& P	5.695E+00	5.05E+01	1.93E+01 G
			242.00	0.000E+00	+	8.377E+00	1.00E+03	7.43E+00 GA
BI-207	C	-1.9782E-02					1.18E+04	
			1063.66	-1.978E-02	%(	7.995E-01	1.58E+03	7.45E+01 G
			569.70	-1.091E-01	+ P	6.451E-01	1.50E+02	9.77E+01 G
BI-212	N	-3.1286E+00					6.98E+02	
			727.17	-3.129E+00	?(	1.097E+01	1.02E+02	7.55E+00 G
			785.42	1.564E+01	?	5.208E+01	9.62E+01	1.28E+00 GA
U-235	N	7.9453E-01					2.57E+11	
			143.79	0.000E+00	?(	6.196E+00	1.00E+03	1.10E+01 G
			205.33	2.533E+00	&(P	6.914E+00	1.07E+02	5.01E+00 G
			163.38	-3.251E+00	&	1.145E+01	1.04E+02	5.08E+00 G
			185.72	-1.168E-01	&	6.889E-01	2.20E+02	5.40E+01 GA
BI-214	N	-4.3603E-01					5.84E+05	
			609.31	-4.360E-01	?(P	2.796E+00	1.70E+02	4.61E+01 G
			1120.29	-2.188E-01	+ P	7.602E+00	4.78E+02	1.51E+01 G
			1764.49	-1.707E+00	+ P	5.172E+00	1.55E+02	1.54E+01 G
BI-210M	T	-5.1409E-03					1.10E+09	
			265.83	-5.141E-03	%(P	9.715E-01	6.58E+03	5.00E+01 G
			304.90	2.395E-07	%	4.566E+00	5.57E+08	2.80E+01 G
AC-228	N	-5.4035E-01					2.10E+03	
			911.07	-5.403E-01	?(	2.357E+00	1.81E+02	2.90E+01 G
			968.97	0.000E+00	+	4.886E+00	1.00E+03	1.75E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			338.32	0.000E+00	+	6.690E+00	1.00E+03	1.20E+01 G
			93.35	0.000E+00	&	1.322E+01	1.00E+03	5.56E+00 XA
TH-227	N	1.0621E+00					7.95E+03	
			256.24	-4.462E-01	?(	4.763E+00	3.98E+02	7.00E+00 G
			235.97	8.409E-01	?(	4.733E+00	1.64E+02	1.23E+01 G
			50.14	2.722E+00	?(	5.640E+00	6.31E+01	8.00E+00 G
TH-229	N	2.6129E+00					2.68E+06	
			193.51	2.613E+00	&(P	8.078E+00	1.22E+02	4.40E+00 G
			210.85	-2.751E+00	&	1.406E+01	2.00E+02	2.99E+00 G
TH-234	N	-6.4324E-02					1.63E+12	
			92.59	-6.432E-02	&(	1.320E+01	5.98E+03	5.58E+00 G
			63.29	0.000E+00	&	1.263E+01	1.00E+03	3.81E+00 G
PA-231	N	-2.3169E-06					1.20E+07	
			302.65	-2.317E-06	%(	4.416E+01	5.57E+08	2.88E+00 G
			300.07	-8.585E+00	+	4.916E+01	1.69E+02	2.46E+00 G
PA-233	C	-6.4630E-01					7.82E+08	
			312.01	-6.463E-01	?(P	3.257E+00	6.06E+01	3.60E+01 G
			300.18	-2.199E+00	+	2.006E+01	2.69E+02	6.20E+00 G
PA-234	N	-7.0166E-01					1.63E+12	
			131.29	-7.017E-01	(	3.344E+00	1.41E+02	1.80E+01 G
			946.02	-2.408E+00	+	6.249E+00	1.12E+02	1.34E+01 G
			569.47	0.000E+00	&	6.950E+00	1.00E+03	8.20E+00 G
			883.24	0.000E+00	+	8.506E+00	1.00E+03	9.60E+00 G
			880.53	3.392E+00	?	1.140E+01	9.68E+01	6.00E+00 GA
PA-234M	N	-1.5449E+00					1.63E+12	
			1001.00	-1.545E+00	?(P	1.084E+02	9.05E+02	8.37E-01 G
			766.41	3.889E+00	%	2.326E+02	1.58E+03	2.94E-01 G
AM-241	T	2.9447E-01					1.58E+05	
			59.54	2.945E-01	&(P	1.298E+00	1.28E+02	3.59E+01 G
Np-237	F	-9.6448E-01					2.14E+06	
			86.49	-9.645E-01	?(	5.474E+00	1.68E+02	1.31E+01 G
Ir-192	F	-2.5471E-01					7.40E+01	
			316.49	-2.547E-01	?(	1.401E+00	1.63E+02	8.70E+01 G
			468.06	-5.419E-01	+	1.689E+00	9.23E+01	5.18E+01 G
			308.44	-6.820E-01	+	3.536E+00	1.53E+02	3.18E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Cs-136   F   2.0994E-01                                      1.30E+01
                          818.50 2.099E-01 ?(  7.267E-01 9.99E+01 1.00E+02 G
                         1048.07-6.083E-01 +   1.287E+00 6.42E+01 8.00E+01 G
                          340.57 0.000E+00 -   1.721E+00 1.00E+03 4.69E+01 G

Np-239   T   6.1312E-02                                      2.36E+00
                          103.70 0.000E+00 -   2.986E+00 1.00E+03 2.40E+01 X
                          106.13 6.131E-02 %(  3.122E+00 1.49E+03 2.27E+01 G
                           99.50 0.000E+00 -   4.814E+00 1.00E+03 1.50E+01 X

Nd-147       1.2705E+00                                      1.11E+01
                          531.00 1.270E+00 ?(  3.296E+00 1.03E+02 1.30E+01 G
                           91.10 0.000E+00 -   2.662E+00 1.00E+03 2.83E+01 G

TL-210   N  -3.2159E-01                                      5.84E+05
                          799.60-3.216E-01 ?(  1.265E+00 1.15E+02 9.90E+01 G
                          296.00-2.640E-01 +   1.428E+00 1.60E+02 7.90E+01 G
                         1313.00 1.992E+00 ?   1.835E+00 3.54E+01 2.10E+01 GA
   ( - 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	70.	-8.	-0.005	15.35	-4.309E+00	P
TH-227	50.14	20.	11.	0.006	63.06	2.722E+00	
AM-241	59.54	36.	7.	0.004	127.98	2.945E-01	P
Sn-126	64.28	56.	-6.	-0.003	185.82	-8.380E-01	
BA-133	80.99	44.	-12.	-0.007	103.92	-4.192E-01	
Np-237	86.49	177.	-11.	-0.006	167.67	-9.645E-01	
EU-155	86.54	188.	-11.	-0.006	172.82	-4.114E-01	
Sn-126	86.94	199.	-6.	-0.003	341.82	-7.204E-01	
CO-57	122.06	77.	-11.	-0.006	115.49	-1.361E-01	
EU-154	123.10	64.	11.	0.006	106.01	2.872E-01	
PA-234	131.29	133.	-12.	-0.007	140.74	-7.017E-01	
HF-181	133.02	145.	-12.	-0.007	146.38	-2.933E-01	
CE-144	133.54	157.	-3.	-0.001	684.98	-2.508E-01	
U-235	163.38	98.	-14.	-0.008	104.43	-3.251E+00	
CE-139	165.85	74.	11.	0.006	115.71	1.604E-01	
Cf-251	176.60	37.	-6.	-0.003	204.28	-4.071E-01	
U-235	185.72	33.	-5.	-0.003	219.54	-1.168E-01	
TH-229	193.51	28.	9.	0.005	121.82	2.613E+00	P
U-235	205.33	24.	9.	0.005	107.46	2.533E+00	P
TH-229	210.85	36.	-6.	-0.003	200.00	-2.751E+00	
Cf-251	227.00	20.	9.	0.005	101.99	2.075E+00	
TH-227	235.97	62.	7.	0.004	163.51	8.409E-01	
PB-212	238.63	72.	-3.	-0.002	313.46	-1.155E-01	P
TH-227	256.24	16.	-2.	-0.001	397.91	-4.462E-01	
Cd-113m	263.70	35.	-2.	-0.001	424.26	-5.307E+02	
TL-208	277.28	24.	3.	0.002	260.19	7.199E-01	P
Hg-203	279.20	35.	-10.	-0.005	91.95	-1.964E-01	
I-131	284.30	20.	-4.	-0.002	168.46	-1.174E+00	P
PB-214	295.09	173.	-15.	-0.009	50.46	-1.371E+00	P
TL-210	296.00	181.	-12.	-0.007	159.95	-2.640E-01	
PB-212	300.03	194.	-12.	-0.007	164.52	-6.438E+00	
PA-231	300.07	206.	-12.	-0.007	169.46	-8.585E+00	
PA-233	300.18	218.	-8.	-0.004	268.67	-2.199E+00	
Ir-192	308.44	169.	-12.	-0.007	153.31	-6.820E-01	
PA-233	312.01	182.	-13.	-0.007	60.59	-6.463E-01	P
Ir-192	316.49	194.	-12.	-0.007	162.72	-2.547E-01	
CR-51	320.08	108.	10.	0.006	151.01	1.826E+00	P
La-140	328.76	61.	9.	0.005	130.77	7.999E-01	
Cf-249	333.44	70.	3.	0.002	412.48	3.498E-01	
HF-181	345.83	120.	-12.	-0.007	135.24	-1.495E+00	
PB-214	351.93	36.	-6.	-0.004	127.03	-3.353E-01	P
BA-133	356.00	61.	-13.	-0.007	86.70	-4.230E-01	
I-131	364.48	20.	-1.	-0.001	767.79	-2.631E-02	P
BA-133	383.84	27.	8.	0.004	104.12	1.739E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-249	387.95	34.	4.	0.002	235.66	1.138E-01	
SN-113	391.69	68.	-11.	-0.006	108.54	-3.670E-01	
SB-125	427.88	13.	2.	0.001	374.72	1.507E-01	
AG-108M	433.94	5.	4.	0.002	109.21	1.100E-01	P
PM-146	453.88	9.	3.	0.002	188.41	1.193E-01	
SB-125	463.37	24.	8.	0.005	90.30	1.875E+00	
Ir-192	468.06	53.	-12.	-0.007	92.31	-5.419E-01	
BE-7	477.60	45.	-8.	-0.004	128.46	-1.759E+00	
HF-181	482.00	26.	7.	0.004	111.14	2.072E-01	
La-140	487.02	53.	-11.	-0.006	99.56	-5.859E-01	
RU-103	497.05	9.	-1.	-0.001	349.44	-3.924E-02	P
RH-106	511.86	14.	49.	0.027	17.91	6.220E+00	
Nd-147	531.00	9.	6.	0.004	102.87	1.270E+00	
CS-134	563.24	5.	3.	0.002	172.34	9.448E-01	P
CS-134	569.32	9.	6.	0.003	87.05	1.011E+00	
BI-207	569.70	19.	-4.	-0.002	150.30	-1.091E-01	P
TL-208	583.02	33.	-14.	-0.008	48.35	-4.681E-01	P
SB-125	600.50	57.	9.	0.005	127.88	1.390E+00	P
SB-124	602.73	66.	8.	0.004	148.18	2.327E-01	
BI-214	609.31	81.	-7.	-0.004	170.46	-4.360E-01	P
SB-125	635.89	23.	-11.	-0.006	70.47	-2.797E+00	
AG-110M	657.76	23.	-9.	-0.005	126.71	-3.043E-01	P
PM-144	696.54	35.	-12.	-0.007	74.00	-3.950E-01	
SB-124	722.79	8.	6.	0.003	82.92	1.686E+00	
AG-108M	722.94	13.	3.	0.001	207.60	9.433E-02	
BI-212	727.17	23.	-7.	-0.004	102.06	-3.129E+00	
PM-146	735.72	14.	-2.	-0.001	403.11	-2.956E-01	
PM-146	747.16	9.	-3.	-0.002	201.99	-3.298E-01	
ZR-95	756.73	5.	-1.	-0.001	501.66	-6.238E-02	
AG-110M	763.94	6.	5.	0.003	78.74	8.289E-01	P
NB-95	765.79	18.	-5.	-0.003	121.45	-1.833E-01	
BI-212	785.42	12.	6.	0.003	96.22	1.564E+01	
CS-134	795.87	36.	-12.	-0.006	79.35	-4.754E-01	
TL-210	799.60	49.	-9.	-0.005	115.17	-3.216E-01	
CO-58	810.78	20.	-4.	-0.002	165.83	-1.440E-01	
Cs-136	818.50	14.	6.	0.003	99.91	2.099E-01	
MN-54	834.85	10.	-3.	-0.002	238.82	-1.099E-01	
Co-56	846.77	5.	5.	0.003	108.01	1.852E-01	
TL-208	860.56	16.	-5.	-0.003	94.59	-1.418E+00	P
EU-154	873.23	5.	2.	0.001	314.32	5.149E-01	
PA-234	880.53	11.	5.	0.003	96.82	3.392E+00	
AG-110M	884.68	17.	-1.	0.000	824.21	-2.935E-02	P
Y-88	898.04	1.	5.	0.003	49.21	2.197E-01	P
AC-228	911.07	10.	-4.	-0.002	180.85	-5.403E-01	
AG-110M	937.49	5.	4.	0.002	132.68	4.663E-01	
PA-234	946.02	15.	-8.	-0.004	112.15	-2.408E+00	
EU-154	996.33	11.	5.	0.003	96.82	2.113E+00	
PA-234M	1001.00	16.	0.	0.000	905.40	-1.545E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Co-56	1037.84	5.	4.	0.002	152.39	1.125E+00		
Cs-136	1048.07	20.	-11.	-0.006	64.22	-6.083E-01		
RH-106	1050.36	32.	-3.	-0.002	101.09	-8.460E+00		P
Ga-68	1077.40	16.	-8.	-0.004	119.02	-1.263E+01		
FE-59	1099.25	6.	-1.	0.000	514.27	-4.948E-02		P
BI-214	1120.29	23.	-1.	0.000	477.95	-2.188E-01		P
Ta-182	1221.41	6.	1.	0.001	427.57	2.436E-01		
Co-56	1238.28	0.	7.	0.004	37.80	5.285E-01		
FE-59	1291.60	6.	-2.	-0.001	343.80	-1.991E-01		
TL-210	1313.00	0.	8.	0.004	35.36	1.992E+00		
AG-110M	1384.30	6.	-3.	-0.001	218.12	-5.989E-01		
K-40	1460.83	19.	-8.	-0.004	68.40	-4.119E+00		P
La-140	1596.21	6.	-3.	-0.002	169.68	-2.011E-01		P
BI-214	1764.49	4.	-4.	-0.002	154.85	-1.707E+00		P

P - Peakbackground subtraction

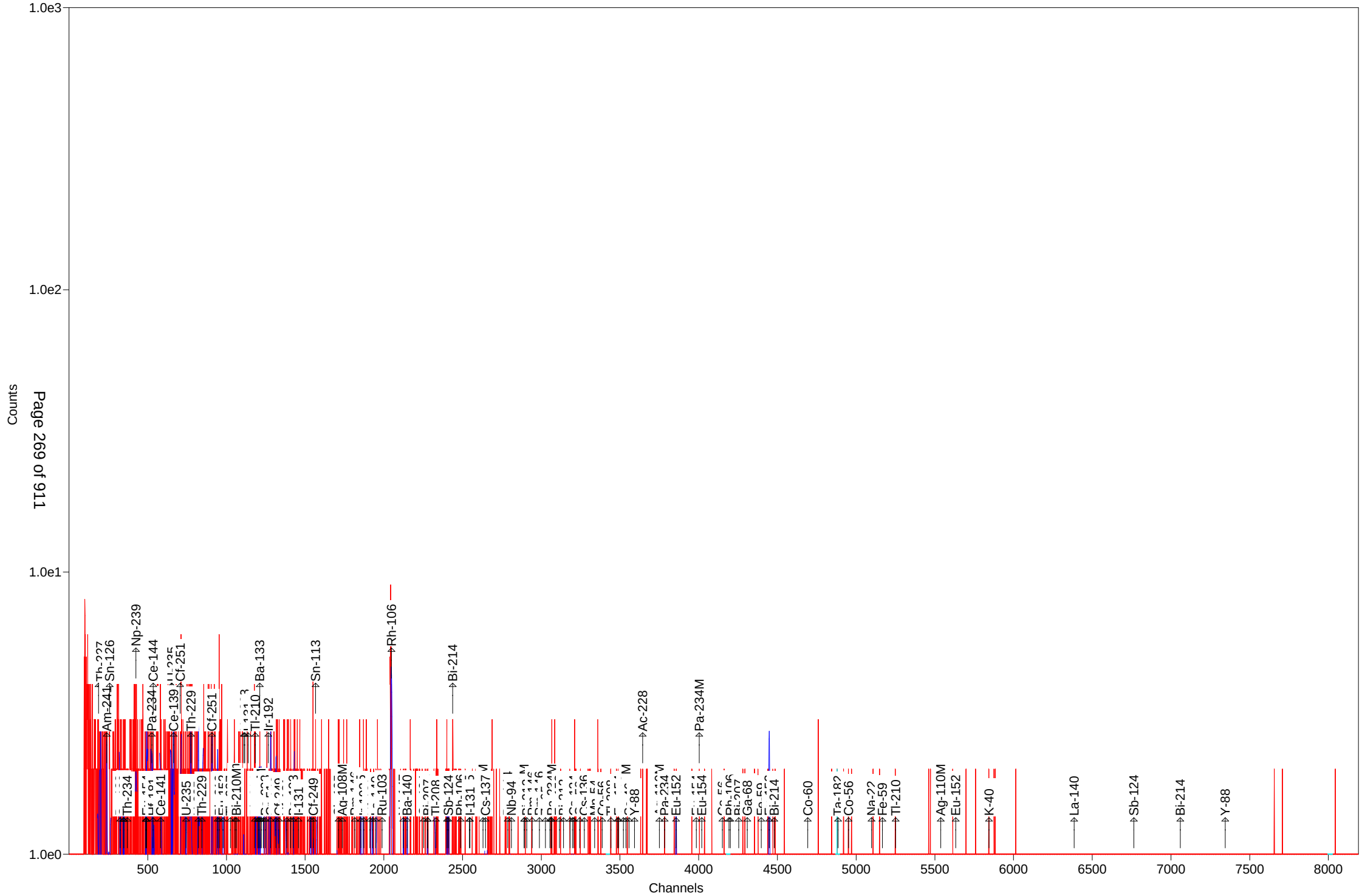
***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-1.7593E+00	-1.7593E+00	1.285E+02%	7.77E+00
NA-22	#A	1.7026E-02	1.7026E-02	1.025E+03%	7.05E-01
K-40	#A	-4.1192E+00	-4.1192E+00	6.840E+01%	1.22E+01
Sc-46	#A	-1.4655E-02	-1.4655E-02	1.225E+03%	8.29E-01
CR-51	#A	1.8258E+00	1.8258E+00	1.510E+02%	9.37E+00
MN-54	#A	-1.0988E-01	-1.0988E-01	2.388E+02%	6.39E-01
FE-59	#A	-4.9483E-02	-4.9483E-02	5.143E+02%	1.10E+00
Co-56	#A	3.8487E-01	3.8487E-01	3.780E+01%	4.86E-01
CO-57	#A	-1.3607E-01	-1.3607E-01	1.155E+02%	5.33E-01
CO-58	#A	-1.4401E-01	-1.4401E-01	1.658E+02%	8.48E-01
CO-60	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.90E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.23E+00
NB-94	#A	-1.3459E-02	-1.3459E-02	2.366E+03%	1.14E+00
ZR-95	#A	-6.2379E-02	-6.2379E-02	5.017E+02%	8.19E-01
NB-95	#A	-1.8333E-01	-1.8333E-01	1.215E+02%	7.79E-01
RU-103	#A	-3.9243E-02	-3.9243E-02	3.494E+02%	4.65E-01
RH-106	#A	-1.2652E-01	-1.2652E-01	2.781E+03%	1.27E+01
AG-108M	#A	1.0214E-01	1.0214E-01	1.092E+02%	3.17E-01
AG-110M	#A	2.5020E-01	2.5020E-01	7.874E+01%	1.14E+00
SN-113	#A	-3.6704E-01	-3.6704E-01	1.085E+02%	1.35E+00
SB-124	#A	3.7673E-01	3.7674E-01	8.292E+01%	1.18E+00
SB-125	#A	8.4432E-01	8.4432E-01	9.030E+01%	1.47E+00
I-131	#A	-2.6306E-02	-2.6307E-02	7.678E+02%	5.75E-01
Gd-153	#A	0.0000E+00	0.0000E+00	7.071E+02%	2.42E+00
Ga-68	#A	-1.2575E+01	-1.2631E+01	1.190E+02%	3.37E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.75E-01

BA-133	#A	-4.2299E-01	-4.2299E-01	8.670E+01%	1.23E+00
CS-134	#A	-1.5758E-01	-1.5758E-01	6.958E+01%	1.27E+00
CS-137	#A	1.0848E-02	1.0848E-02	2.634E+03%	1.04E+00
CE-139	#A	1.6041E-01	1.6041E-01	1.157E+02%	6.30E-01
Ba-140	#	1.0237E+00	1.0238E+00	3.444E+01%	7.95E-01
La-140	#A	-2.5465E-02	-2.5466E-02	1.071E+02%	9.15E-01
CE-141	#A	3.0665E-02	3.0665E-02	1.329E+03%	1.40E+00
CE-144	#A	-2.5084E-01	-2.5084E-01	6.850E+02%	5.90E+00
PM-144	#A	-3.9499E-01	-3.9499E-01	7.400E+01%	9.76E-01
EU-152	#C	2.2801E+00	2.2801E+00	2.132E+01%	1.47E+00
EU-154	#A	6.3518E-01	6.3518E-01	9.682E+01%	1.03E+00
EU-155	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.37E+00
HF-181	#A	2.0721E-01	2.0721E-01	1.111E+02%	7.94E-01
Ta-182	#A	1.0627E-01	1.0627E-01	4.276E+02%	3.24E+00
Hg-203	#A	-1.9642E-01	-1.9642E-01	9.195E+01%	6.13E-01
TL-208	#A	-4.6806E-01	-4.6806E-01	4.835E+01%	9.77E-01
PM-146	#A	1.1932E-01	1.1932E-01	1.884E+02%	5.88E-01
Y-88	#A	9.7396E-02	9.7397E-02	4.921E+01%	5.11E-01
Cd-113m	#A	-5.3074E+02	-5.3074E+02	4.243E+02%	8.04E+03
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.02E+01
Cf-251	#A	-4.0712E-01	-4.0712E-01	2.043E+02%	2.22E+00
Cf-249	#A	1.5869E-01	1.5869E-01	2.357E+02%	9.47E-01
Sn-126	#A	-8.3804E-01	-8.3804E-01	1.858E+02%	5.39E+00
PB-210	#A	-4.3093E+00	-4.3093E+00	1.535E+01%	2.12E+01
PB-212	#A	-1.1546E-01	-1.1546E-01	3.135E+02%	1.46E+00
PB-214	#A	-3.3534E-01	-3.3534E-01	1.270E+02%	1.59E+00
BI-207	#A	-1.9782E-02	-1.9782E-02	1.584E+03%	8.00E-01
BI-212	#A	-3.1286E+00	-3.1286E+00	1.021E+02%	1.10E+01
U-235	#A	7.9453E-01	7.9453E-01	1.075E+02%	6.20E+00
BI-214	#A	-4.3603E-01	-4.3603E-01	1.705E+02%	2.80E+00
BI-210M	#A	-5.1409E-03	-5.1409E-03	6.580E+03%	9.72E-01
AC-228	#A	-5.4035E-01	-5.4035E-01	1.809E+02%	2.36E+00
TH-227	#A	1.0621E+00	1.0621E+00	6.306E+01%	4.76E+00
TH-229	#A	2.6129E+00	2.6129E+00	1.218E+02%	8.08E+00
TH-234	#A	-6.4324E-02	-6.4324E-02	5.982E+03%	1.32E+01
PA-231	#A	-2.3169E-06	-2.3169E-06	5.569E+08%	4.42E+01
PA-233	#A	-6.4630E-01	-6.4630E-01	6.059E+01%	3.26E+00
PA-234	#A	-7.0166E-01	-7.0166E-01	1.407E+02%	3.34E+00
PA-234M	#A	-1.5449E+00	-1.5449E+00	9.054E+02%	1.08E+02
AM-241	#A	2.9447E-01	2.9447E-01	1.280E+02%	1.30E+00
Np-237	#A	-9.6448E-01	-9.6448E-01	1.677E+02%	5.47E+00
Ir-192	#A	-2.5471E-01	-2.5471E-01	1.627E+02%	1.40E+00
Cs-136	#A	2.0994E-01	2.0994E-01	9.991E+01%	7.27E-01
Np-239	#A	6.1307E-02	6.1312E-02	1.486E+03%	3.12E+00
Nd-147	#A	1.2704E+00	1.2705E+00	1.029E+02%	3.30E+00
TL-210	#A	-3.2159E-01	-3.2159E-01	1.152E+02%	1.27E+00
Kr-85	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.35E+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 (   25.1 to  1999.3 keV)     0.000E+00  Bq/Sample
Total Decayed Activity (   25.1 to  1999.3 keV) 0.0000000E+00  Bq/Sample
```

412881_Gamma_MB 160-412881~1-A. 9_Gamma_20190339.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20190305

Sample Description: 412881_Gamma_LCS 160-412881~2-A
Detector: Detector #12
Batch ID: 412881
Work Order Number: Gamma
Lot Number: LCS 160-412881~2-A

Decay to Time: 2/20/2019 07:59 Live Time: 1800 sec
Acquisition Time: 2/20/2019 07:59:42 Real Time: 1806 sec
Analysis Time: 2/20/2019 08:29 Dead Time: 0.35 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: Client_Long_Rev15.lib
Bkgd Correction File: 12_2019-01-20_1010.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	-1.353E+01	108.8	1.472E+01	1.473E+01	4.888E+01
NA-22	4.917E-01	91.5	4.498E-01	4.504E-01	1.540E+00
K-40	7.321E+00	89.4	6.548E+00	6.558E+00	1.380E+01
Sc-46	1.325E+00	116.0	1.537E+00	1.538E+00	5.132E+00
CR-51	-1.137E+01	168.8	1.919E+01	1.920E+01	6.368E+01
MN-54	8.055E-01	167.4	1.348E+00	1.349E+00	3.067E+00
FE-59	1.742E+00	169.4	2.951E+00	2.952E+00	6.283E+00
Co-56	1.895E+00	90.6	1.717E+00	1.719E+00	3.156E+00
CO-57	3.137E-01	238.2	7.472E-01	7.473E-01	2.497E+00
CO-58	1.181E+00	106.0	1.251E+00	1.253E+00	2.833E+00
CO-60	1.601E+02	1.6	2.583E+00	8.384E+00	2.127E+00
ZN-65	3.550E+00	79.3	2.814E+00	2.819E+00	9.347E+00
NB-94	4.944E-01	208.3	1.030E+00	1.030E+00	2.363E+00
ZR-95	-2.052E-01	1112.9	2.283E+00	2.283E+00	5.245E+00
NB-95	0.000E+00	1.#INF	7.683E-01	7.683E-01	3.593E+00
RU-103	-6.963E-01	194.8	1.356E+00	1.357E+00	3.309E+00
RH-106	1.436E+01	134.4	1.930E+01	1.932E+01	5.977E+01
AG-108M	-2.455E-01	598.5	1.469E+00	1.469E+00	3.585E+00
AG-110M	-2.693E+00	80.7	2.175E+00	2.179E+00	7.214E+00
SN-113	5.655E-01	373.3	2.111E+00	2.111E+00	7.059E+00
SB-124	-3.154E-01	94.7	2.986E-01	2.991E-01	6.123E+00
SB-125	-2.651E+00	171.3	4.542E+00	4.544E+00	1.102E+01
I-131	-8.497E-01	167.7	1.425E+00	1.426E+00	3.459E+00
Gd-153	-2.622E+00	138.3	3.628E+00	3.631E+00	1.203E+01
Ga-68	2.926E+00	2009.4	5.879E+01	5.879E+01	1.264E+02
Tc-99m	-3.986E-01	332.2	1.324E+00	1.324E+00	4.402E+00
BA-133	-1.818E+00	101.4	1.843E+00	1.845E+00	6.119E+00
CS-134	8.403E-01	184.1	1.547E+00	1.547E+00	4.331E+00
CS-137	3.845E+02	1.3	4.978E+00	2.025E+01	4.195E+00
CE-139	6.694E-01	134.7	9.020E-01	9.026E-01	3.002E+00
Ba-140	2.103E+00	84.0	1.767E+00	1.770E+00	1.190E+01
La-140	1.438E+00	86.9	1.249E+00	1.251E+00	1.659E+00
CE-141	1.533E+00	153.0	2.345E+00	2.347E+00	7.781E+00

CE-144	1.878E+00	553.9	1.040E+01	1.040E+01	3.460E+01
PM-144	-7.440E-01	174.7	1.300E+00	1.300E+00	2.950E+00
EU-152	4.308E+00	74.8	3.222E+00	3.230E+00	8.316E+00
EU-154	0.000E+00	1.#INF	1.110E+00	1.110E+00	5.296E+00
EU-155	0.000E+00	1.#INF	2.286E+00	2.286E+00	1.721E+01
HF-181	-5.682E-02	126.4	7.183E-02	7.189E-02	6.322E+00
Ta-182	4.115E+00	91.4	3.763E+00	3.769E+00	1.441E+01
Hg-203	-1.239E+00	87.6	1.085E+00	1.087E+00	3.599E+00
TL-208	5.387E+00	42.5	2.287E+00	2.304E+00	3.309E+00
PM-146	6.084E-01	54.9	3.343E-01	3.357E-01	5.586E+00
Y-88	-5.728E-01	194.4	1.113E+00	1.114E+00	2.248E+00
Cd-113m	9.606E+03	137.7	1.323E+04	1.324E+04	4.413E+04
Cd-109	2.342E-06	1228321664.6	2.877E+01	2.877E+01	9.590E+01
Cf-251	6.300E+00	50.3	3.167E+00	3.184E+00	8.299E+00
Cf-249	7.643E-01	98.7	7.545E-01	7.555E-01	6.787E+00
Sn-126	-2.004E+01	232.6	4.662E+01	4.664E+01	1.540E+02
PB-210	1.073E+04	1.0	1.085E+02	6.787E+02	2.105E+02
PB-212	8.220E+00	16.8	1.384E+00	1.449E+00	4.201E+00
PB-214	1.046E+01	23.8	2.490E+00	2.546E+00	6.098E+00
BI-207	-3.211E+00	84.4	2.712E+00	2.716E+00	5.681E+00
BI-212	-8.421E+00	154.4	1.300E+01	1.301E+01	4.384E+01
U-235	4.253E+00	109.5	4.657E+00	4.662E+00	3.494E+01
BI-214	1.215E+00	64.3	7.814E-01	7.839E-01	1.361E+01
BI-210M	-1.947E+00	88.1	1.716E+00	1.719E+00	5.690E+00
AC-228	-5.664E-01	1112.9	6.303E+00	6.304E+00	1.385E+01
TH-227	1.011E+00	98.2	9.930E-01	9.944E-01	3.474E+01
TH-229	-4.021E+00	512.6	2.061E+01	2.061E+01	5.233E+01
TH-234	1.705E+01	53.6	9.133E+00	9.182E+00	2.707E+01
PA-231	-6.383E-06	957513721.6	6.112E+01	6.112E+01	2.037E+02
PA-233	-2.627E+00	189.8	4.986E+00	4.987E+00	1.655E+01
PA-234	5.493E+00	108.3	5.948E+00	5.954E+00	1.620E+01
PA-234M	-3.924E+01	501.6	1.968E+02	1.969E+02	6.653E+02
AM-241	1.211E+03	0.8	9.199E+00	7.109E+01	1.417E+01
Np-237	-6.374E+00	137.5	8.765E+00	8.772E+00	2.906E+01
Ir-192	1.838E+00	46.0	8.458E-01	8.522E-01	1.910E+00
Cs-136	-1.692E+00	83.7	1.416E+00	1.419E+00	4.701E+00
Np-239	3.399E+00	137.9	4.686E+00	4.690E+00	1.554E+01
Nd-147	1.137E+00	803.6	9.134E+00	9.135E+00	2.158E+01
TL-210	0.000E+00	1.#INF	7.085E-01	7.085E-01	3.846E+00
Kr-85	2.968E+02	87.8	2.605E+02	2.611E+02	8.653E+02
Total	2.251E+04				

Analyst: kody Saulters

Sample description
412881_Gamma_LCS 160-412881~2-A

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20190305.An1

Acquisition information

Start time:	2/20/2019 7:59:42 AM
Live time:	1800
Real time:	1806
Dead time:	0.35 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration

Filename:	12_Soil_TunaCan.Clb

12_TunaCan_108513

Energy Calibration

Created:	4/20/2018 11:13:27 AM
Zero offset:	0.059 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/20/2018 11:53:09 AM
Type:	Polynomial
Uncertainty:	1.020 %
Coefficients:	-0.363508 -4.707999 0.462125
	-0.051256 0.002384 -0.000043

Library Files

Main analysis library:	Client_Long_Rev15.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	100 (25.08keV)
Stop channel:	8000 (1999.13keV)
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	2/20/2019 7:59:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2019-01-20_1010.PBC 1/20/2019 10:10:35 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 20 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0971

***** 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
27.94	22.	68.17	0.49	3.988E-03				
32.04	157.	23.58	1.06	7.091E-03				
36.49	323.	17.35	0.86	1.045E-02				
46.59	14818.	1.01	0.85	1.802E-02	46.54	4.250	1.073E+04	PB210
49.63	66.	110.38	0.85	2.141E-02	50.14	8.000	2.093E+01	TH227
59.54	22064.	0.83	0.85	2.817E-02	59.54	35.900	1.212E+03	AM241
92.89	62.	53.55	1.27	3.637E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	PBC<MDA	AC228
106.13	52.	137.87	0.91	3.729E-02	106.13	22.700	PBC<MDA	Np239
122.06	18.	238.18	0.93	3.724E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.137E-01	CO57
131.55	6.	890.65	0.94	3.683E-02	131.29	18.000	PBC<MDA	PA234
133.02	47.	161.01	0.94	3.673E-02	133.02	43.300	PBC<MDA	HF181
133.54	14.	553.86	0.94	3.670E-02	133.54	11.090	PBC<MDA	CE144
145.44	48.	152.96	0.95	3.586E-02	145.44	48.200	PBC<MDA	CE141
162.66	54.	84.02	0.97	3.435E-02	162.66	6.220	PBC<MDA	Ba140
163.38	42.	109.51	0.97	3.428E-02	163.38	5.080	PBC<MDA	U235
165.85	33.	134.75	0.97	3.405E-02	165.85	79.900	PBC<MDA	CE139
176.40	64.	50.27	1.58	3.303E-02	176.60	17.000	PBC<MDA	Cf251
185.72	27.	179.79	0.99	3.215E-02	185.72	54.000	PBC<MDA	U235
235.97	43.	132.05	1.04	2.764E-02	235.97	12.300	PBC<MDA	TH227
238.57	176.	16.84	1.05	2.743E-02	238.63	43.300	8.220E+00	PB212
241.94	43.	132.45	1.05	2.716E-02	242.00	7.430	PBC<MDA	PB214
263.70	26.	137.70	1.07	2.554E-02	263.70	0.006	PBC<MDA	Cd113m
277.28	42.	88.06	1.08	2.462E-02	277.28	6.310	PBC<MDA	TL208
295.12	99.	38.05	2.65	2.350E-02	295.09	19.300	1.213E+01	PB214
					296.00	79.000	2.969E+00	TL210

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
304.90	5.	629.06	1.11	2.293E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	4.474E-01	BI210M
316.62	56.	46.02	0.86	2.229E-02	316.49	87.040	PBC<MDA	Ir192
328.76	39.	86.86	1.13	2.165E-02	328.76	20.300	PBC<MDA	La140
333.44	38.	98.72	1.14	2.142E-02	333.44	15.510	PBC<MDA	Cf249
342.24	32.	68.26	0.42	2.100E-02				
352.06	134.	28.65	0.60	2.055E-02	351.93	37.600	9.601E+00	PB214
391.69	12.	373.29	1.20	1.893E-02	391.69	64.000	PBC<MDA	SN113
468.06	35.	125.09	1.27	1.653E-02	468.06	51.750	PBC<MDA	Ir192
478.52	26.	55.47	0.54	1.626E-02	477.60	10.520	8.595E+00	BE7
488.08	41.	104.91	1.29	1.604E-02	487.02	45.500	PBC<MDA	La140
511.86	45.	67.59	2.56	1.546E-02	511.86	20.000	PBC<MDA	RH106
513.98	35.	87.77	1.31	1.541E-02	513.98	0.430	PBC<MDA	Kr85
531.00	4.	803.57	1.33	1.504E-02	531.00	13.000	PBC<MDA	Nd147
563.24	5.	626.10	1.36	1.439E-02	563.24	8.350	PBC<MDA	CS134
568.85	21.	108.27	1.37	1.428E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	9.965E+00	PA234
569.70	17.	127.18	1.37	1.427E-02	569.70	97.740	PBC<MDA	BI207
583.02	33.	92.72	1.38	1.403E-02	583.02	84.500	PBC<MDA	TL208
621.92	32.	134.43	1.42	1.338E-02	621.92	9.930	PBC<MDA	RH106
657.76	32.	388.77	1.45	1.284E-02	657.76	94.640	PBC<MDA	AG110M
661.54	7542.	1.29	1.48	1.279E-02	661.66	85.210	3.845E+02	CS137
702.63	11.	208.30	1.49	1.224E-02	702.63	97.900	PBC<MDA	NB94
722.79	9.	223.54	1.51	1.199E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.420E-01	AG108M
					723.36	20.220	1.986E+00	EU154
735.72	25.	88.73	1.52	1.184E-02	735.72	22.500	PBC<MDA	PM146
747.16	24.	100.85	1.53	1.171E-02	747.16	34.000	PBC<MDA	PM146
785.42	24.	86.42	1.57	1.129E-02	785.42	1.280	PBC<MDA	BI212
795.87	12.	184.09	1.58	1.119E-02	795.87	85.530	PBC<MDA	CS134
810.78	23.	105.96	1.59	1.104E-02	810.78	99.460	PBC<MDA	CO58
834.75	16.	167.38	1.61	1.081E-02	834.85	99.980	PBC<MDA	MN54
846.77	8.	343.96	1.63	1.070E-02	846.77	99.935	PBC<MDA	Co56
860.56	63.	42.46	1.64	1.057E-02	860.56	12.420	2.665E+01	TL208
880.53	33.	82.20	1.66	1.040E-02	880.53	6.000	PBC<MDA	PA234
883.24	20.	142.79	1.66	1.038E-02	883.24	9.600	PBC<MDA	PA234
889.28	25.	115.98	1.66	1.033E-02	889.28	99.984	PBC<MDA	Sc46
1037.84	29.	90.60	1.80	9.228E-03	1037.84	14.130	PBC<MDA	Co56
1048.07	18.	110.55	1.81	9.162E-03	1048.07	80.000	PBC<MDA	Cs136
1050.36	5.	373.43	1.81	9.147E-03	1050.36	1.560	PBC<MDA	RH106
1099.25	16.	169.43	1.85	8.846E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	28.	74.79	1.86	8.770E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	28.	79.25	1.87	8.750E-03	1115.55	50.600	PBC<MDA	ZN65
1120.29	15.	151.20	1.87	8.722E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	9.851E-01	Sc46
1121.30	22.	109.72	1.87	8.716E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	3.927E+00	Ta182
1172.97	2423.	2.32	1.89	8.428E-03	1173.24	99.900	1.599E+02	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1189.05	11.	146.30	1.93	8.342E-03	1189.05	16.200	PBC<MDA	Ta182
1274.53	7.	91.47	2.00	7.914E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.396E+00	EU154
1332.15	2204.	2.23	1.89	7.649E-03	1332.50	99.980	1.602E+02	CO60
1408.00	5.	173.21	2.12	7.324E-03	1408.00	21.005	PBC<MDA	EU152
1460.83	10.	89.44	2.16	7.112E-03	1460.83	10.670	PBC<MDA	K40
1690.98	6.	118.01	2.35	6.302E-03	1690.98	47.790	PBC<MDA	SB124
1764.49	8.	64.34	2.40	6.075E-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
111.42	27.94	92.	22.	5.474E+03	68.17	0.488	- c
127.83	32.04	427.	157.	2.212E+04	23.58	1.063	- s
145.61	36.49	888.	323.	3.087E+04	17.35	0.856	- s
198.22	49.59	2629.	70.	3.252E+03	104.83	0.854	- sc
1368.00	342.24	163.	32.	1.508E+03	68.26	0.425	- s
1912.97	478.52	88.	26.	1.630E+03	55.47	0.542	- 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_Rev15.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.79	46.54	3819.	14818.	8.232	1.01	0.851D
TH-227	200.18	50.14	26071.	-126.	-0.070	181.03	0.855s
AM-241	237.74	59.54	2999.	22042.	12.246	0.76	0.865D
TH-234	252.74	63.29	29422.	-130.	-0.072	32.01	0.868s
Sn-126	256.71	64.28	30070.	-106.	-0.059	232.63	0.869s
BA-133	323.50	80.99	1113.	-56.	-0.031	106.32	0.887s
Np-237	345.49	86.49	2679.	-53.	-0.030	137.51	0.892s
Sn-126	347.29	86.94	2477.	-7.	-0.004	982.87	0.892
Nd-147	363.92	91.10	1571.	-54.	-0.030	105.63	0.897s
TH-234	371.06	92.89	427.	62.	0.035	53.55	1.273s
AC-228	372.91	93.35	1473.	-15.	-0.008	359.14	0.899s
Gd-153	389.50	97.50	2576.	-52.	-0.029	138.35	0.903s
Np-239	397.50	99.50	2628.	-52.	-0.029	139.45	0.905s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Gd-153	412.29	103.20	2680.	-15.	-0.008	501.88	0.909s
Np-239	414.29	103.70	2695.	0.	0.000	1000.00	0.909s
EU-155	420.73	105.31	2695.	0.	0.000	1000.00	0.911s
Np-239	424.00	106.13	2522.	52.	0.029	137.87	0.912s
CO-57	487.69	122.06	910.	18.	0.010	238.18	0.928s
EU-154	491.84	123.10	928.	0.	0.000	1000.00	0.929s
PA-234	524.60	131.29	1672.	6.	0.004	890.65	0.938
HF-181	531.51	133.02	2849.	47.	0.026	161.01	0.939s
CE-144	533.57	133.54	2896.	14.	0.008	553.86	0.940s
HF-181	544.61	136.30	2910.	0.	0.000	1000.00	0.943s
CO-57	545.30	136.47	2836.	-48.	-0.027	158.21	0.943s
Tc-99m	561.44	140.51	2789.	-23.	-0.013	332.16	0.947s
U-235	574.53	143.79	2772.	0.	0.000	1000.00	0.950s
CE-141	581.15	145.44	2638.	48.	0.026	152.96	0.952s
Ba-140	649.99	162.66	988.	54.	0.030	84.02	0.969
U-235	652.87	163.38	1042.	42.	0.023	109.51	0.970s
CE-139	662.76	165.85	959.	33.	0.018	134.75	0.973s
Cf-251	704.93	176.40	303.	64.	0.035	50.27	1.583s
U-235	742.18	185.72	698.	27.	0.015	179.79	0.992s
TH-229	773.32	193.51	748.	-10.	-0.006	512.64	1.000s
U-235	820.59	205.33	664.	-29.	-0.016	169.16	1.012s
TH-229	842.65	210.85	678.	-19.	-0.011	253.05	1.018
Cf-251	907.22	227.00	653.	-10.	-0.005	495.47	1.034s
TH-227	943.09	235.97	1558.	43.	0.024	132.05	1.043s
PB-212	953.73	238.63	349.	176.	0.098	16.84	1.045D
PB-214	967.18	242.00	1586.	43.	0.024	132.45	1.049s
EU-152	977.96	244.69	1659.	-8.	-0.004	720.30	1.051s
TH-227	1024.13	256.24	572.	-31.	-0.017	145.45	1.063s
Cd-113m	1053.96	263.70	652.	26.	0.015	137.70	1.070s
BI-210M	1062.48	265.83	746.	-44.	-0.025	88.11	1.072s
TL-208	1108.27	277.28	677.	42.	0.024	88.06	1.084
Hg-203	1115.93	279.20	737.	-44.	-0.025	87.62	1.086
I-131	1136.32	284.30	528.	-41.	-0.023	106.01	1.091s
PB-214	1179.59	295.12	330.	99.	0.055	38.05	2.647s
TL-210	1183.11	296.00	2703.	-43.	-0.024	172.34	1.102s
PB-212	1199.22	300.03	2660.	-43.	-0.024	170.37	1.106
PA-231	1199.38	300.07	2617.	-43.	-0.024	169.00	1.106s
PA-233	1199.82	300.18	2634.	-34.	-0.019	211.92	1.107s
Ba-140	1218.49	304.85	2604.	-43.	-0.024	167.87	1.111s
BI-210M	1218.68	304.90	526.	5.	0.003	629.06	1.111s
Ir-192	1232.85	308.44	2622.	-43.	-0.024	167.87	1.115
PA-233	1247.13	312.01	2630.	-38.	-0.021	189.79	1.118s
Ir-192	1265.56	316.62	188.	56.	0.031	46.02	0.860
CR-51	1279.41	320.08	2856.	-45.	-0.025	168.76	1.126s
La-140	1314.10	328.76	550.	39.	0.022	86.86	1.135
Cf-249	1332.81	333.44	669.	38.	0.021	98.72	1.139s
AC-228	1352.33	338.32	1086.	-43.	-0.024	110.36	1.144s
Cs-136	1361.32	340.57	1065.	-38.	-0.021	121.92	1.146s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	1376.18	344.29	1103.	0.	0.000	1000.00	1.150s
HF-181	1382.35	345.83	1147.	-44.	-0.025	109.40	1.151s
PB-214	1407.28	352.06	310.	134.	0.074	28.65	0.599s
BA-133	1423.02	356.00	858.	-41.	-0.023	101.35	1.162s
I-131	1456.95	364.48	452.	-25.	-0.014	167.70	1.170s
BA-133	1534.35	383.84	1008.	-43.	-0.024	105.68	1.189
Cf-249	1550.79	387.95	1051.	-12.	-0.007	381.08	1.193
SN-113	1565.74	391.69	1054.	12.	0.007	373.29	1.196s
SB-125	1710.45	427.88	472.	-25.	-0.014	171.32	1.232
AG-108M	1734.69	433.94	456.	-7.	-0.004	598.47	1.238
PM-146	1814.45	453.88	536.	-48.	-0.027	95.53	1.257s
SB-125	1852.39	463.37	560.	-52.	-0.029	90.06	1.266s
Ir-192	1871.16	468.06	926.	35.	0.019	125.09	1.271
BE-7	1909.29	477.60	1009.	-42.	-0.023	108.75	1.280
HF-181	1926.90	482.00	974.	-23.	-0.013	194.92	1.284
La-140	1946.98	487.02	885.	41.	0.023	104.91	1.289s
RU-103	1987.11	497.05	316.	-18.	-0.010	194.79	1.298s
RH-106	2046.35	511.86	440.	45.	0.025	67.59	2.563s
Kr-85	2054.81	513.98	465.	35.	0.020	87.77	1.315s
Nd-147	2122.88	531.00	247.	4.	0.002	803.57	1.331s
Ba-140	2147.92	537.26	260.	-6.	-0.003	550.08	1.337s
CS-134	2251.82	563.24	234.	5.	0.003	626.10	1.362
CS-134	2276.15	569.32	233.	-32.	-0.018	69.74	1.367s
PA-234	2276.75	569.47	248.	21.	0.012	108.27	1.368s
BI-207	2277.68	569.70	216.	17.	0.009	127.18	1.368s
TL-208	2330.96	583.02	212.	33.	0.018	92.72	1.381
SB-125	2400.87	600.50	942.	-34.	-0.019	127.50	1.397s
SB-124	2409.79	602.73	976.	-34.	-0.019	129.57	1.399s
CS-134	2417.71	604.71	1010.	-34.	-0.019	131.62	1.401s
BI-214	2436.11	609.31	1045.	-18.	-0.010	248.48	1.405
RU-103	2440.06	610.30	1063.	0.	0.000	1000.00	1.406
AG-108M	2455.99	614.28	1063.	0.	0.000	1000.00	1.410
PM-144	2471.12	618.06	1063.	0.	0.000	1000.00	1.414s
RH-106	2486.54	621.92	906.	32.	0.018	134.43	1.417s
SB-125	2542.43	635.89	182.	-8.	-0.004	241.09	1.430s
I-131	2546.77	636.97	235.	-4.	-0.002	502.95	1.432s
AG-110M	2629.92	657.76	7870.	32.	0.018	388.77	1.451s
CS-137	2645.05	661.54	292.	7542.	4.190	1.29	1.485
PM-144	2785.05	696.54	177.	-16.	-0.009	174.71	1.487
NB-94	2809.41	702.63	107.	11.	0.006	208.30	1.493s
SB-124	2890.04	722.79	183.	9.	0.005	223.54	1.512
AG-108M	2890.65	722.94	192.	0.	0.000	1000.00	1.512
EU-154	2892.34	723.36	192.	0.	0.000	1000.00	1.512s
ZR-95	2895.69	724.20	192.	0.	0.000	1000.00	1.513s
BI-212	2907.58	727.17	216.	-14.	-0.008	154.35	1.516s
PM-146	2941.78	735.72	107.	25.	0.014	88.73	1.524
PM-146	2987.55	747.16	121.	24.	0.013	100.85	1.535s
AG-110M	3054.69	763.94	216.	-20.	-0.011	107.14	1.550s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
NB-95	3062.08	765.79	236.	0.	0.000	1000.00	1.552s
PA-234M	3064.57	766.41	248.	-6.	-0.003	363.27	1.552
BI-212	3140.62	785.42	89.	24.	0.013	86.42	1.570s
CS-134	3182.43	795.87	238.	12.	0.007	184.09	1.579
TL-210	3197.35	799.60	250.	0.	0.000	1000.00	1.583s
CO-58	3242.06	810.78	131.	23.	0.013	105.96	1.593s
La-140	3262.05	815.77	318.	-4.	-0.002	659.70	1.598
Cs-136	3272.97	818.50	374.	-33.	-0.019	83.68	1.600s
MN-54	3338.38	834.85	149.	16.	0.009	167.38	1.615s
Co-56	3386.08	846.77	155.	8.	0.004	343.96	1.626s
TL-208	3441.27	860.56	135.	63.	0.035	42.46	1.638s
NB-94	3483.41	871.10	216.	-27.	-0.015	79.35	1.648s
EU-154	3491.95	873.23	268.	-8.	-0.004	310.56	1.650s
PA-234	3521.16	880.53	353.	33.	0.018	82.20	1.657s
PA-234	3532.00	883.24	383.	20.	0.011	142.79	1.659s
AG-110M	3537.78	884.68	416.	-37.	-0.020	80.74	1.660s
Sc-46	3556.17	889.28	395.	25.	0.014	115.98	1.664s
Y-88	3591.22	898.04	185.	-18.	-0.010	167.79	1.672s
AG-110M	3749.09	937.49	275.	-44.	-0.024	84.12	1.708s
PA-234	3783.21	946.02	215.	-28.	-0.016	116.67	1.716
EU-152	3855.60	964.11	375.	-43.	-0.024	66.09	1.732s
AC-228	3875.05	968.97	426.	-23.	-0.013	127.37	1.736s
EU-154	3984.54	996.33	356.	-36.	-0.020	75.48	1.761s
PA-234M	4003.22	1001.00	392.	-6.	-0.003	501.62	1.765s
EU-154	4018.33	1004.77	451.	-38.	-0.021	79.88	1.768s
Co-56	4150.66	1037.84	128.	29.	0.016	90.60	1.798s
Cs-136	4191.60	1048.07	189.	18.	0.010	110.55	1.807s
RH-106	4200.76	1050.36	196.	5.	0.003	373.43	1.809s
BI-207	4253.99	1063.66	203.	-39.	-0.022	84.44	1.820s
FE-59	4396.44	1099.25	133.	16.	0.009	169.43	1.852s
EU-152	4447.76	1112.07	209.	28.	0.016	74.79	1.863s
ZN-65	4461.66	1115.55	237.	28.	0.016	79.25	1.866s
BI-214	4480.63	1120.29	266.	15.	0.009	151.20	1.870
Sc-46	4481.68	1120.55	281.	0.	0.000	1000.00	1.870
Ta-182	4484.69	1121.30	268.	22.	0.012	109.72	1.871
CO-60	4691.50	1172.97	84.	2423.	1.346	2.32	1.887
Ta-182	4755.86	1189.05	48.	11.	0.006	146.30	1.930
Ta-182	4885.39	1221.41	34.	0.	0.000	1000.00	1.957
Co-56	4952.92	1238.28	40.	-11.	-0.006	141.82	1.972
NA-22	5098.03	1274.53	17.	7.	0.004	91.47	2.003s
EU-154	5098.08	1274.54	24.	0.	0.000	1000.00	2.003s
FE-59	5166.35	1291.60	28.	-2.	-0.001	538.99	2.017s
TL-210	5252.04	1313.00	34.	-6.	-0.003	231.54	2.036s
CO-60	5329.44	1332.33	32.	2208.	1.226	2.24	1.886
AG-110M	5537.48	1384.30	17.	-2.	-0.001	488.62	2.096s
EU-152	5632.39	1408.00	12.	5.	0.003	173.21	2.115s
K-40	5843.92	1460.83	12.	10.	0.006	89.44	2.159s
La-140	6386.02	1596.21	12.	-1.	-0.001	842.61	2.269s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-124	6765.58	1690.98	6.	6.	0.003	118.01	2.345s
BI-214	7060.00	1764.49	8.	8.	0.004	64.34	2.403s
Y-88	7346.69	1836.06	20.	-6.	-0.003	194.37	2.459s

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	-1.3534E+01				5.31E+01	
			477.60	-1.353E+01	(	4.888E+01 1.09E+02 1.05E+01	G
NA-22	C	4.9169E-01				9.50E+02	
			1274.53	4.917E-01	&(	1.540E+00 9.15E+01 9.99E+01	G
K-40	N	7.3208E+00				4.66E+11	
			1460.83	7.321E+00	?(	1.380E+01 8.94E+01 1.07E+01	G
Sc-46	F	1.3249E+00				8.38E+01	
			889.28	1.325E+00	?(	5.132E+00 1.16E+02 1.00E+02	G
			1120.55	0.000E+00	-	5.150E+00 1.00E+03 1.00E+02	G
CR-51	F	-1.1373E+01				2.77E+01	
			320.08	-1.137E+01	&(	6.368E+01 1.69E+02 9.94E+00	G
MN-54	C	8.0546E-01				3.12E+02	
			834.85	8.055E-01	?(	3.067E+00 1.67E+02 1.00E+02	G
FE-59	F	1.7415E+00				4.45E+01	
			1099.25	1.742E+00	?(	6.283E+00 1.69E+02 5.65E+01	G
			1291.60	-3.831E-01	&	4.517E+00 5.39E+02 4.32E+01	G
Co-56	C	1.8948E+00				7.73E+01	
			846.77	4.157E-01	?(	3.156E+00 3.44E+02 9.99E+01	G
			1238.28	-1.109E+00	+	3.332E+00 1.42E+02 6.61E+01	G
			1037.84	1.236E+01	?(	2.362E+01 9.06E+01 1.41E+01	G
			1771.35	-2.964E-01	%	1.349E+01 1.22E+03 1.55E+01	A
CO-57	C	3.1370E-01				2.72E+02	
			122.06	3.137E-01	?(	2.497E+00 2.38E+02 8.56E+01	G
			136.47	-6.811E+00	+	3.574E+01 1.58E+02 1.07E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-58	C	1.1807E+00					7.09E+01	
			810.78	1.181E+00	?(	2.833E+00	1.06E+02	9.95E+01 G
CO-60	F	1.6015E+02					1.93E+03	
			1332.50	1.604E+02	(	2.127E+00	2.24E+00	1.00E+02 G
			1173.24	1.599E+02	(	3.003E+00	2.32E+00	9.99E+01 G
ZN-65	F	3.5503E+00					2.44E+02	
			1115.55	3.550E+00	?(	9.347E+00	7.93E+01	5.06E+01 G
NB-94	I	4.9442E-01					7.41E+06	
			702.63	4.944E-01	?(	2.363E+00	2.08E+02	9.79E+01 G
			871.10	-1.433E+00	&	3.778E+00	7.93E+01	9.99E+01 G
ZR-95	I	-2.0515E-01					6.40E+01	
			756.73	-2.052E-01	%(	5.245E+00	1.11E+03	5.45E+01 G
			724.20	0.000E+00	+	7.069E+00	1.00E+03	4.42E+01 G
RU-103	I	-6.9625E-01					3.93E+01	
			497.05	-6.963E-01	&(	3.309E+00	1.95E+02	9.09E+01 G
			610.30	0.000E+00	+	1.101E+02	1.00E+03	5.75E+00 GA
RH-106	I	1.4359E+01					3.74E+02	
			621.92	1.335E+01	?(	5.977E+01	1.34E+02	9.93E+00 G
			1050.36	2.076E+01	?(	2.643E+02	3.73E+02	1.56E+00 G
			511.86	8.087E+00		1.805E+01	6.76E+01	2.00E+01 GA
AG-108M	C	-2.4547E-01					1.53E+05	
			433.94	-2.455E-01	&(	3.585E+00	5.98E+02	9.05E+01 G
			722.94	0.000E+00	+	3.431E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	&	7.082E+00	1.00E+03	8.98E+01 G
AG-110M	F	-2.6933E+00					2.50E+02	
			884.68	-2.693E+00	?(	7.214E+00	8.07E+01	7.27E+01 G
			657.76	1.476E+00	+	1.902E+01	3.89E+02	9.46E+01 G
			937.49	-7.167E+00	+	1.301E+01	8.41E+01	3.44E+01 G
			1384.30	-6.163E-01	+	6.756E+00	4.89E+02	2.43E+01 G
			763.94	-4.292E+00	+	1.540E+01	1.07E+02	2.23E+01 G
SN-113	F	5.6545E-01					1.15E+02	
			391.69	5.655E-01	?(	7.059E+00	3.73E+02	6.40E+01 G
SB-124	F	-3.1539E-01					6.02E+01	
			602.73	-1.420E+00	?(	6.123E+00	1.30E+02	9.83E+01 G
			1690.98	1.045E+00	?(	2.663E+00	1.18E+02	4.78E+01 G
			722.79	3.714E+00	?(	2.820E+01	2.24E+02	1.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	I	-2.6513E+00					1.01E+03	
			427.88	-2.651E+00	(	1.102E+01	1.71E+02	2.96E+01 G
			600.50	-7.781E+00	+	3.301E+01	1.28E+02	1.79E+01 G
			635.89	-2.985E+00	+	2.447E+01	2.41E+02	1.13E+01 G
			463.37	-1.658E+01	&	3.599E+01	9.01E+01	1.05E+01 G
I-131	I	-8.4970E-01					8.02E+00	
			364.48	-8.497E-01	?(	3.459E+00	1.68E+02	8.17E+01 G
			284.30	-1.535E+01	+	4.111E+01	1.06E+02	6.14E+00 G
			636.97	-2.554E+00	+	4.372E+01	5.03E+02	7.17E+00 G
Gd-153	F	-2.6221E+00					2.42E+02	
			97.50	-2.622E+00	?(	1.203E+01	1.38E+02	3.00E+01 G
			103.20	-1.001E+00	&	1.672E+01	5.02E+02	2.18E+01 G
Ga-68	C	2.9256E+00					4.71E-02	
			1077.40	2.926E+00	%(	1.264E+02	2.01E+03	3.30E+00 G
Tc-99m	I	-3.9864E-01					2.51E-01	
			140.51	-3.986E-01	?(	4.402E+00	3.32E+02	8.93E+01 G
BA-133	F	-1.8180E+00					3.85E+03	
			356.00	-1.818E+00	?(	6.119E+00	1.01E+02	6.20E+01 G
			302.85	1.003E-06	%	3.202E+01	9.58E+08	1.83E+01 G
			383.84	-1.387E+01	&	4.869E+01	1.06E+02	8.94E+00 GA
			80.99	-2.649E+00	+	7.445E+00	1.06E+02	3.41E+01 GA
CS-134	I	8.4030E-01					7.54E+02	
			795.87	6.967E-01	&(	4.331E+00	1.84E+02	8.55E+01 G
			604.71	-1.435E+00	&	6.284E+00	1.32E+02	9.76E+01 G
			569.32	-8.094E+00	+	1.868E+01	6.97E+01	1.54E+01 G
			801.95	-1.915E-01	&	4.468E+01	6.83E+03	8.69E+00 G
			563.24	2.311E+00	?(	3.420E+01	6.26E+02	8.35E+00 G
CS-137	I	3.8450E+02					1.10E+04	
			661.66	3.845E+02	(	4.195E+00	1.29E+00	8.52E+01 G
CE-139	F	6.6937E-01					1.38E+02	
			165.85	6.694E-01	&(	3.002E+00	1.35E+02	7.99E+01 G
Ba-140	I	2.1027E+00					1.28E+01	
			537.26	-9.168E-01	(	1.190E+01	5.50E+02	2.44E+01 G
			162.66	1.394E+01	(	3.879E+01	8.40E+01	6.22E+00 G
			304.85	-2.438E+01	+	1.358E+02	1.68E+02	4.29E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
La-140	I	1.4376E+00					1.28E+01	
			1596.21	-8.802E-02	&(	1.659E+00	8.43E+02	9.54E+01 G
			487.02	3.087E+00	&(	1.076E+01	1.05E+02	4.55E+01 G
			328.76	4.909E+00	(	1.415E+01	8.69E+01	2.03E+01 G
			815.77	-8.324E-01	+	1.863E+01	6.60E+02	2.33E+01 G
CE-141	I	1.5333E+00					3.25E+01	
			145.44	1.533E+00	(	7.781E+00	1.53E+02	4.82E+01 G
CE-144	I	1.8780E+00					2.85E+02	
			133.54	1.878E+00	&(	3.460E+01	5.54E+02	1.11E+01 G
PM-144	C	-7.4396E-01					3.63E+02	
			696.54	-7.440E-01	(	2.950E+00	1.75E+02	9.90E+01 G
			618.06	0.000E+00	+	6.450E+00	1.00E+03	9.91E+01 G
EU-152	F	4.3084E+00					4.94E+03	
			121.78	1.044E-01	&(	8.316E+00	2.38E+03	2.86E+01 G
			344.29	0.000E+00	-	1.580E+01	1.00E+03	2.65E+01 G
			1112.07	1.311E+01	(	3.254E+01	7.48E+01	1.36E+01 G
			778.92	-8.816E-01	%	2.151E+01	1.06E+03	1.29E+01 G
			964.11	-1.664E+01	&	3.631E+01	6.61E+01	1.46E+01 G
			244.69	-2.177E+00	+	5.235E+01	7.20E+02	7.58E+00 G
			1408.00	1.806E+00	&	6.808E+00	1.73E+02	2.10E+01 GA
HF-181	F	-5.6824E-02					4.24E+01	
			482.00	-9.719E-01	&(	6.322E+00	1.95E+02	8.05E+01 G
			133.02	1.644E+00	?(	8.784E+00	1.61E+02	4.33E+01 G
			345.83	-7.823E+00	+	2.841E+01	1.09E+02	1.51E+01 G
			136.30	0.000E+00	&	6.607E+01	1.00E+03	5.85E+00 G
Ta-182	F	4.1153E+00					1.14E+02	
			1121.30	3.927E+00	(	1.441E+01	1.10E+02	3.49E+01 G
			1221.41	0.000E+00	-	7.521E+00	1.00E+03	2.70E+01 G
			1189.05	4.522E+00	(	1.439E+01	1.46E+02	1.62E+01 G
Hg-203	F	-1.2388E+00					4.66E+01	
			279.20	-1.239E+00	&(	3.599E+00	8.76E+01	8.15E+01 G
TL-208	N	5.3873E+00					6.98E+02	
			583.02	1.531E+00	(	3.309E+00	9.27E+01	8.45E+01 G
			277.28	1.518E+01	?(	4.435E+01	8.81E+01	6.31E+00 G
			860.56	2.665E+01	&(	2.405E+01	4.25E+01	1.24E+01 G
PM-146	C	6.0836E-01					2.02E+03	
			453.88	-2.424E+00	?(	5.586E+00	9.55E+01	6.50E+01 G
			747.16	3.302E+00	?(	7.541E+00	1.01E+02	3.40E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			735.72	5.299E+00	&(	1.063E+01	8.87E+01	2.25E+01 G
Y-88	F	-5.7281E-01					1.07E+02	
			1836.06	-5.728E-01	?(	2.248E+00	1.94E+02	9.92E+01 G
			898.04	-1.041E+00	+	3.822E+00	1.68E+02	9.37E+01 G
Cd-113m		9.6064E+03					5.33E+03	
			263.70	9.606E+03	&(	4.413E+04	1.38E+02	6.00E-03 K
Cd-109	F	2.3419E-06					4.53E+02	
			88.04	2.342E-06	&(	9.590E+01	1.23E+09	3.79E+00 G
Cf-251	T	6.3000E+00					3.28E+05	
			176.60	6.300E+00	*(	8.299E+00	5.03E+01	1.70E+01 G
			227.00	-3.003E+00	-	3.783E+01	4.95E+02	6.30E+00 GA
Cf-249	T	7.6428E-01					1.28E+05	
			387.95	-5.325E-01	?(	6.787E+00	3.81E+02	6.60E+01 G
			333.44	6.282E+00	?(	2.061E+01	9.87E+01	1.55E+01 G
Sn-126		-2.0042E+01					3.65E+07	
			87.57	-7.904E-08	&	9.710E+00	3.68E+09	3.75E+01 GA
			64.28	-2.004E+01	?(	1.540E+02	2.33E+02	9.70E+00 G
			86.94	-1.235E+00	+	4.044E+01	9.83E+02	9.04E+00 GA
PB-210	N	1.0731E+04					8.14E+03	
			46.54	1.073E+04	(P	2.105E+02	1.01E+00	4.25E+00 G
PB-212	N	8.2197E+00					6.98E+02	
			238.63	8.220E+00	(P	4.201E+00	1.68E+01	4.33E+01 G
			300.03	-3.137E+01	-	1.774E+02	1.70E+02	3.28E+00 GA
PB-214	N	1.0457E+01					5.84E+05	
			351.93	9.601E+00	*(P	6.098E+00	2.86E+01	3.76E+01 G
			295.09	1.213E+01	*(	1.070E+01	3.81E+01	1.93E+01 G
			242.00	1.179E+01	?	5.184E+01	1.32E+02	7.43E+00 GA
BI-207	C	-3.2115E+00					1.18E+04	
			1063.66	-3.211E+00	?(	5.681E+00	8.44E+01	7.45E+01 G
			569.70	6.637E-01	&	2.837E+00	1.27E+02	9.77E+01 G
BI-212	N	-8.4212E+00					6.98E+02	
			727.17	-8.421E+00	?(	4.384E+01	1.54E+02	7.55E+00 G
			785.42	9.143E+01	&	1.790E+02	8.64E+01	1.28E+00 GA
U-235	N	4.2529E+00					2.57E+11	
			143.79	0.000E+00	?(	3.494E+01	1.00E+03	1.10E+01 G
			205.33	-1.049E+01	+	4.493E+01	1.69E+02	5.01E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			163.38	1.343E+01	*(	4.884E+01	1.10E+02	5.08E+00 G
			185.72	8.799E-01	* P	4.026E+00	1.80E+02	5.40E+01 GA
BI-214	N	1.2145E+00					5.84E+05	
			609.31	-1.640E+00	(	1.361E+01	2.48E+02	4.61E+01 G
			1120.29	6.522E+00	?(	3.317E+01	1.51E+02	1.51E+01 G
			1764.49	4.553E+00	?(	9.597E+00	6.43E+01	1.54E+01 G
BI-210M	T	-1.9472E+00					1.10E+09	
			265.83	-1.947E+00	&(	5.690E+00	8.81E+01	5.00E+01 G
			304.90	4.474E-01	+	9.485E+00	6.29E+02	2.80E+01 G
AC-228	N	-5.6640E-01					2.10E+03	
			911.07	-5.664E-01	%(	1.385E+01	1.11E+03	2.90E+01 G
			968.97	-7.621E+00	+	3.245E+01	1.27E+02	1.75E+01 G
			338.32	-9.312E+00	+	3.413E+01	1.10E+02	1.20E+01 G
			93.35	-4.153E+00	+	4.976E+01	3.59E+02	5.56E+00 XA
TH-227	N	1.0109E+00					7.95E+03	
			256.24	-9.434E+00	(	3.474E+01	1.45E+02	7.00E+00 G
			235.97	6.955E+00	&(	3.050E+01	1.32E+02	1.23E+01 G
			50.14	-3.998E+01	&	2.391E+02	1.81E+02	8.00E+00 G
TH-229	N	-4.0207E+00					2.68E+06	
			193.51	-4.021E+00	&(	5.233E+01	5.13E+02	4.40E+00 G
			210.85	-1.206E+01	+	7.737E+01	2.53E+02	2.99E+00 G
TH-234	N	1.7054E+01					1.63E+12	
			92.59	1.705E+01	(P	2.707E+01	5.36E+01	5.58E+00 G
			63.29	-6.365E+01	& P	3.928E+02	3.20E+01	3.81E+00 G
PA-231	N	-6.3832E-06					1.20E+07	
			302.65	-6.383E-06	%(	2.037E+02	9.58E+08	2.88E+00 G
			300.07	-4.183E+01	+	2.347E+02	1.69E+02	2.46E+00 G
PA-233	C	-2.6270E+00					7.82E+08	
			312.01	-2.627E+00	&(	1.655E+01	1.90E+02	3.60E+01 G
			300.18	-1.327E+01	+	9.342E+01	2.12E+02	6.20E+00 G
PA-234	N	5.4932E+00					1.63E+12	
			131.29	5.447E-01	?(	1.620E+01	8.91E+02	1.80E+01 G
			946.02	-1.176E+01	+	2.983E+01	1.17E+02	1.34E+01 G
			569.47	9.965E+00	?(	3.611E+01	1.08E+02	8.20E+00 G
			883.24	1.095E+01	?(	5.239E+01	1.43E+02	9.60E+00 G
			880.53	2.946E+01	?	8.041E+01	8.22E+01	6.00E+00 GA

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234M  N  -3.9242E+01                                     1.63E+12
                        1001.00-3.924E+01 &(  6.653E+02 5.02E+02 8.37E-01 G
                         766.41-1.014E+02 &   1.250E+03 3.63E+02 2.94E-01 G

AM-241   T   1.2108E+03                                     1.58E+05
                          59.54 1.211E+03  (  1.417E+01 7.60E-01 3.59E+01 G

Np-237   F  -6.3739E+00                                     2.14E+06
                          86.49-6.374E+00 ?(  2.906E+01 1.38E+02 1.31E+01 G

Ir-192   F   1.8377E+00                                     7.40E+01
                         316.49 1.589E+00  (  1.910E+00 4.60E+01 8.70E+01 G
                         468.06 2.255E+00  (  9.386E+00 1.25E+02 5.18E+01 G
                         308.44-3.335E+00 -   1.858E+01 1.68E+02 3.18E+01 G

Cs-136   F  -1.6918E+00                                     1.30E+01
                         818.50-1.692E+00 ?(  4.701E+00 8.37E+01 1.00E+02 G
                        1048.07 1.364E+00 +   5.061E+00 1.11E+02 8.00E+01 G
                         340.57-2.147E+00 +   8.701E+00 1.22E+02 4.69E+01 G

Np-239   T   3.3991E+00                                     2.36E+00
                         103.70 0.000E+00 -   1.523E+01 1.00E+03 2.40E+01 X
                         106.13 3.399E+00 ?(  1.554E+01 1.38E+02 2.27E+01 G
                          99.50-5.235E+00 +   2.421E+01 1.39E+02 1.50E+01 X

Nd-147       1.1367E+00                                     1.11E+01
                         531.00 1.137E+00 &(  2.158E+01 8.04E+02 1.30E+01 G
                          91.10-2.902E+00 +   1.016E+01 1.06E+02 2.83E+01 G

Kr-85    I   2.9683E+02                                     3.92E+03
                         513.98 2.968E+02 ?(  8.653E+02 8.78E+01 4.30E-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	26071.	-126.	-0.070	181.03	-3.998E+01	
Sn-126	64.28	30070.	-106.	-0.059	232.63	-2.004E+01	
BA-133	80.99	1113.	-56.	-0.031	106.32	-2.649E+00	
Np-237	86.49	2679.	-53.	-0.030	137.51	-6.374E+00	
Sn-126	86.94	2477.	-7.	-0.004	982.87	-1.235E+00	
Nd-147	91.10	1571.	-54.	-0.030	105.63	-2.902E+00	
AC-228	93.35	1473.	-15.	-0.008	359.14	-4.153E+00	
Gd-153	97.50	2576.	-52.	-0.029	138.35	-2.622E+00	
Np-239	99.50	2628.	-52.	-0.029	139.45	-5.235E+00	
Gd-153	103.20	2680.	-15.	-0.008	501.88	-1.001E+00	
Np-239	106.13	2522.	52.	0.029	137.87	3.399E+00	
CO-57	122.06	910.	18.	0.010	238.18	3.137E-01	
HF-181	133.02	2849.	47.	0.026	161.01	1.644E+00	
CE-144	133.54	2896.	14.	0.008	553.86	1.878E+00	
CO-57	136.47	2836.	-48.	-0.027	158.21	-6.811E+00	
Tc-99m	140.51	2789.	-23.	-0.013	332.16	-3.986E-01	
CE-141	145.44	2638.	48.	0.026	152.96	1.533E+00	
Ba-140	162.66	988.	54.	0.030	84.02	1.394E+01	
U-235	163.38	1042.	42.	0.023	109.51	1.343E+01	
CE-139	165.85	959.	33.	0.018	134.75	6.694E-01	
U-235	185.72	698.	27.	0.015	179.79	8.799E-01	P
TH-229	193.51	748.	-10.	-0.006	512.64	-4.021E+00	
U-235	205.33	664.	-29.	-0.016	169.16	-1.049E+01	
TH-229	210.85	678.	-19.	-0.011	253.05	-1.206E+01	
TH-227	235.97	1558.	43.	0.024	132.05	6.955E+00	
EU-152	244.69	1659.	-8.	-0.004	720.30	-2.177E+00	
TH-227	256.24	572.	-31.	-0.017	145.45	-9.434E+00	
Cd-113m	263.70	652.	26.	0.015	137.70	9.606E+03	
BI-210M	265.83	746.	-44.	-0.025	88.11	-1.947E+00	
Hg-203	279.20	737.	-44.	-0.025	87.62	-1.239E+00	
I-131	284.30	528.	-41.	-0.023	106.01	-1.535E+01	
TL-210	296.00	2703.	-43.	-0.024	172.34	-1.285E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-231	300.07	2617.	-43.	-0.024	169.00	-4.183E+01	
PA-233	300.18	2634.	-34.	-0.019	211.92	-1.327E+01	
Ba-140	304.85	2604.	-43.	-0.024	167.87	-2.438E+01	
BI-210M	304.90	526.	5.	0.003	629.06	4.474E-01	
PA-233	312.01	2630.	-38.	-0.021	189.79	-2.627E+00	
CR-51	320.08	2856.	-45.	-0.025	168.76	-1.137E+01	
Cf-249	333.44	669.	38.	0.021	98.72	6.282E+00	
AC-228	338.32	1086.	-43.	-0.024	110.36	-9.312E+00	
Cs-136	340.57	1065.	-38.	-0.021	121.92	-2.147E+00	
HF-181	345.83	1147.	-44.	-0.025	109.40	-7.823E+00	
BA-133	356.00	858.	-41.	-0.023	101.35	-1.818E+00	
I-131	364.48	452.	-25.	-0.014	167.70	-8.497E-01	
BA-133	383.84	1008.	-43.	-0.024	105.68	-1.387E+01	
Cf-249	387.95	1051.	-12.	-0.007	381.08	-5.325E-01	
SN-113	391.69	1054.	12.	0.007	373.29	5.655E-01	
SB-125	427.88	472.	-25.	-0.014	171.32	-2.651E+00	
AG-108M	433.94	456.	-7.	-0.004	598.47	-2.455E-01	
PM-146	453.88	536.	-48.	-0.027	95.53	-2.424E+00	
SB-125	463.37	560.	-52.	-0.029	90.06	-1.658E+01	
BE-7	477.60	1009.	-42.	-0.023	108.75	-1.353E+01	
HF-181	482.00	974.	-23.	-0.013	194.92	-9.719E-01	
RU-103	497.05	316.	-18.	-0.010	194.79	-6.963E-01	
RH-106	511.86	440.	45.	0.025	67.59	8.087E+00	
Kr-85	513.98	465.	35.	0.020	87.77	2.968E+02	
Nd-147	531.00	247.	4.	0.002	803.57	1.137E+00	
Ba-140	537.26	260.	-6.	-0.003	550.08	-9.168E-01	
CS-134	563.24	234.	5.	0.003	626.10	2.311E+00	
CS-134	569.32	233.	-32.	-0.018	69.74	-8.094E+00	
BI-207	569.70	216.	17.	0.009	127.18	6.637E-01	
SB-125	600.50	942.	-34.	-0.019	127.50	-7.781E+00	
SB-124	602.73	976.	-34.	-0.019	129.57	-1.420E+00	
CS-134	604.71	1010.	-34.	-0.019	131.62	-1.435E+00	
BI-214	609.31	1045.	-18.	-0.010	248.48	-1.640E+00	
RH-106	621.92	906.	32.	0.018	134.43	1.335E+01	
SB-125	635.89	182.	-8.	-0.004	241.09	-2.985E+00	
I-131	636.97	235.	-4.	-0.002	502.95	-2.554E+00	
AG-110M	657.76	7870.	32.	0.018	388.77	1.476E+00	
PM-144	696.54	177.	-16.	-0.009	174.71	-7.440E-01	
NB-94	702.63	107.	11.	0.006	208.30	4.944E-01	
SB-124	722.79	183.	9.	0.005	223.54	3.714E+00	
BI-212	727.17	216.	-14.	-0.008	154.35	-8.421E+00	
PM-146	735.72	107.	25.	0.014	88.73	5.299E+00	
PM-146	747.16	121.	24.	0.013	100.85	3.302E+00	
AG-110M	763.94	216.	-20.	-0.011	107.14	-4.292E+00	
PA-234M	766.41	248.	-6.	-0.003	363.27	-1.014E+02	
BI-212	785.42	89.	24.	0.013	86.42	9.143E+01	
CS-134	795.87	238.	12.	0.007	184.09	6.967E-01	
CO-58	810.78	131.	23.	0.013	105.96	1.181E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cs-136	818.50	374.	-33.	-0.019	83.68	-1.692E+00	
Co-56	846.77	155.	8.	0.004	343.96	4.157E-01	
NB-94	871.10	216.	-27.	-0.015	79.35	-1.433E+00	
EU-154	873.23	268.	-8.	-0.004	310.56	-3.246E+00	
AG-110M	884.68	416.	-37.	-0.020	80.74	-2.693E+00	
Y-88	898.04	185.	-18.	-0.010	167.79	-1.041E+00	
AG-110M	937.49	275.	-44.	-0.024	84.12	-7.167E+00	
EU-152	964.11	375.	-43.	-0.024	66.09	-1.664E+01	
AC-228	968.97	426.	-23.	-0.013	127.37	-7.621E+00	
EU-154	996.33	356.	-36.	-0.020	75.48	-1.997E+01	
PA-234M	1001.00	392.	-6.	-0.003	501.62	-3.924E+01	
EU-154	1004.77	451.	-38.	-0.021	79.88	-1.254E+01	
Co-56	1037.84	128.	29.	0.016	90.60	1.236E+01	
Cs-136	1048.07	189.	18.	0.010	110.55	1.364E+00	
RH-106	1050.36	196.	5.	0.003	373.43	2.076E+01	
BI-207	1063.66	203.	-39.	-0.022	84.44	-3.211E+00	
FE-59	1099.25	133.	16.	0.009	169.43	1.742E+00	
EU-152	1112.07	209.	28.	0.016	74.79	1.311E+01	
ZN-65	1115.55	237.	28.	0.016	79.25	3.550E+00	
BI-214	1120.29	266.	15.	0.009	151.20	6.522E+00	
Ta-182	1121.30	268.	22.	0.012	109.72	3.927E+00	
Ta-182	1189.05	48.	11.	0.006	146.30	4.522E+00	
Co-56	1238.28	40.	-11.	-0.006	141.82	-1.109E+00	
NA-22	1274.53	17.	7.	0.004	91.47	4.917E-01	
FE-59	1291.60	28.	-2.	-0.001	538.99	-3.831E-01	
TL-210	1313.00	34.	-6.	-0.003	231.54	-2.052E+00	
AG-110M	1384.30	17.	-2.	-0.001	488.62	-6.163E-01	
EU-152	1408.00	12.	5.	0.003	173.21	1.806E+00	
K-40	1460.83	12.	10.	0.006	89.44	7.321E+00	
SB-124	1690.98	6.	6.	0.003	118.01	1.045E+00	
BI-214	1764.49	8.	8.	0.004	64.34	4.553E+00	
Y-88	1836.06	20.	-6.	-0.003	194.37	-5.728E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
BE-7	#A	-1.3533E+01	-1.3534E+01	1.088E+02%		4.89E+01
NA-22	#A	4.9169E-01	4.9169E-01	9.147E+01%		1.54E+00
K-40	#A	7.3208E+00	7.3208E+00	8.944E+01%		1.38E+01
Sc-46	#A	1.3249E+00	1.3249E+00	1.160E+02%		5.13E+00
CR-51	#A	-1.1373E+01	-1.1373E+01	1.688E+02%		6.37E+01
MN-54	#A	8.0546E-01	8.0546E-01	1.674E+02%		3.07E+00
FE-59	#A	1.7415E+00	1.7415E+00	1.694E+02%		6.28E+00
Co-56	#A	1.8948E+00	1.8948E+00	9.060E+01%		3.16E+00

CO-57	#A	3.1370E-01	3.1370E-01	2.382E+02%	2.50E+00
CO-58	#A	1.1807E+00	1.1807E+00	1.060E+02%	2.83E+00
CO-60		1.6015E+02	1.6015E+02	1.613E+00%	2.13E+00
ZN-65	#A	3.5503E+00	3.5503E+00	7.925E+01%	9.35E+00
NB-94	#A	4.9442E-01	4.9442E-01	2.083E+02%	2.36E+00
ZR-95	#A	-2.0515E-01	-2.0515E-01	1.113E+03%	5.25E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.59E+00
RU-103	#A	-6.9625E-01	-6.9625E-01	1.948E+02%	3.31E+00
RH-106	#A	1.4359E+01	1.4359E+01	1.344E+02%	5.98E+01
AG-108M	#A	-2.4547E-01	-2.4547E-01	5.985E+02%	3.58E+00
AG-110M	#A	-2.6933E+00	-2.6933E+00	8.074E+01%	7.21E+00
SN-113	#A	5.6545E-01	5.6545E-01	3.733E+02%	7.06E+00
SB-124	#A	-3.1539E-01	-3.1539E-01	9.468E+01%	6.12E+00
SB-125	#A	-2.6513E+00	-2.6513E+00	1.713E+02%	1.10E+01
I-131	#A	-8.4967E-01	-8.4970E-01	1.677E+02%	3.46E+00
Gd-153	#A	-2.6221E+00	-2.6221E+00	1.383E+02%	1.20E+01
Ga-68	#A	2.9047E+00	2.9256E+00	2.009E+03%	1.26E+02
Tc-99m	#A	-3.9810E-01	-3.9864E-01	3.322E+02%	4.40E+00
BA-133	#A	-1.8180E+00	-1.8180E+00	1.014E+02%	6.12E+00
CS-134	#A	8.4030E-01	8.4030E-01	1.841E+02%	4.33E+00
CS-137		3.8450E+02	3.8450E+02	1.295E+00%	4.20E+00
CE-139	#A	6.6936E-01	6.6937E-01	1.347E+02%	3.00E+00
Ba-140	#A	2.1026E+00	2.1027E+00	8.402E+01%	1.19E+01
La-140	A	1.4375E+00	1.4376E+00	8.686E+01%	1.66E+00
CE-141	#A	1.5333E+00	1.5333E+00	1.530E+02%	7.78E+00
CE-144	#A	1.8780E+00	1.8780E+00	5.539E+02%	3.46E+01
PM-144	#A	-7.4396E-01	-7.4396E-01	1.747E+02%	2.95E+00
EU-152	#A	4.3084E+00	4.3084E+00	7.479E+01%	8.32E+00
EU-154	#A	0.0000E+00	0.0000E+00	5.774E+02%	5.30E+00
EU-155	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.72E+01
HF-181	#A	-5.6824E-02	-5.6824E-02	1.264E+02%	6.32E+00
Ta-182	#A	4.1153E+00	4.1153E+00	9.144E+01%	1.44E+01
Hg-203	#A	-1.2388E+00	-1.2388E+00	8.762E+01%	3.60E+00
TL-208	#C	5.3873E+00	5.3873E+00	4.246E+01%	3.31E+00
PM-146	#A	6.0836E-01	6.0836E-01	5.494E+01%	5.59E+00
Y-88	#A	-5.7281E-01	-5.7281E-01	1.944E+02%	2.25E+00
Cd-113m	#A	9.6064E+03	9.6064E+03	1.377E+02%	4.41E+04
Cd-109	#A	2.3419E-06	2.3419E-06	1.228E+09%	9.59E+01
Cf-251	#A	6.3000E+00	6.3000E+00	5.027E+01%	8.30E+00
Cf-249	#A	7.6428E-01	7.6428E-01	9.872E+01%	6.79E+00
Sn-126	#A	-2.0042E+01	-2.0042E+01	2.326E+02%	1.54E+02
PB-210		1.0731E+04	1.0731E+04	1.011E+00%	2.11E+02
PB-212	#	8.2197E+00	8.2197E+00	1.684E+01%	4.20E+00
PB-214	#	1.0457E+01	1.0457E+01	2.381E+01%	6.10E+00
BI-207	#A	-3.2115E+00	-3.2115E+00	8.444E+01%	5.68E+00
BI-212	#A	-8.4212E+00	-8.4212E+00	1.544E+02%	4.38E+01
U-235	#A	4.2529E+00	4.2529E+00	1.095E+02%	3.49E+01
BI-214	#A	1.2145E+00	1.2145E+00	6.434E+01%	1.36E+01
BI-210M	#A	-1.9472E+00	-1.9472E+00	8.811E+01%	5.69E+00

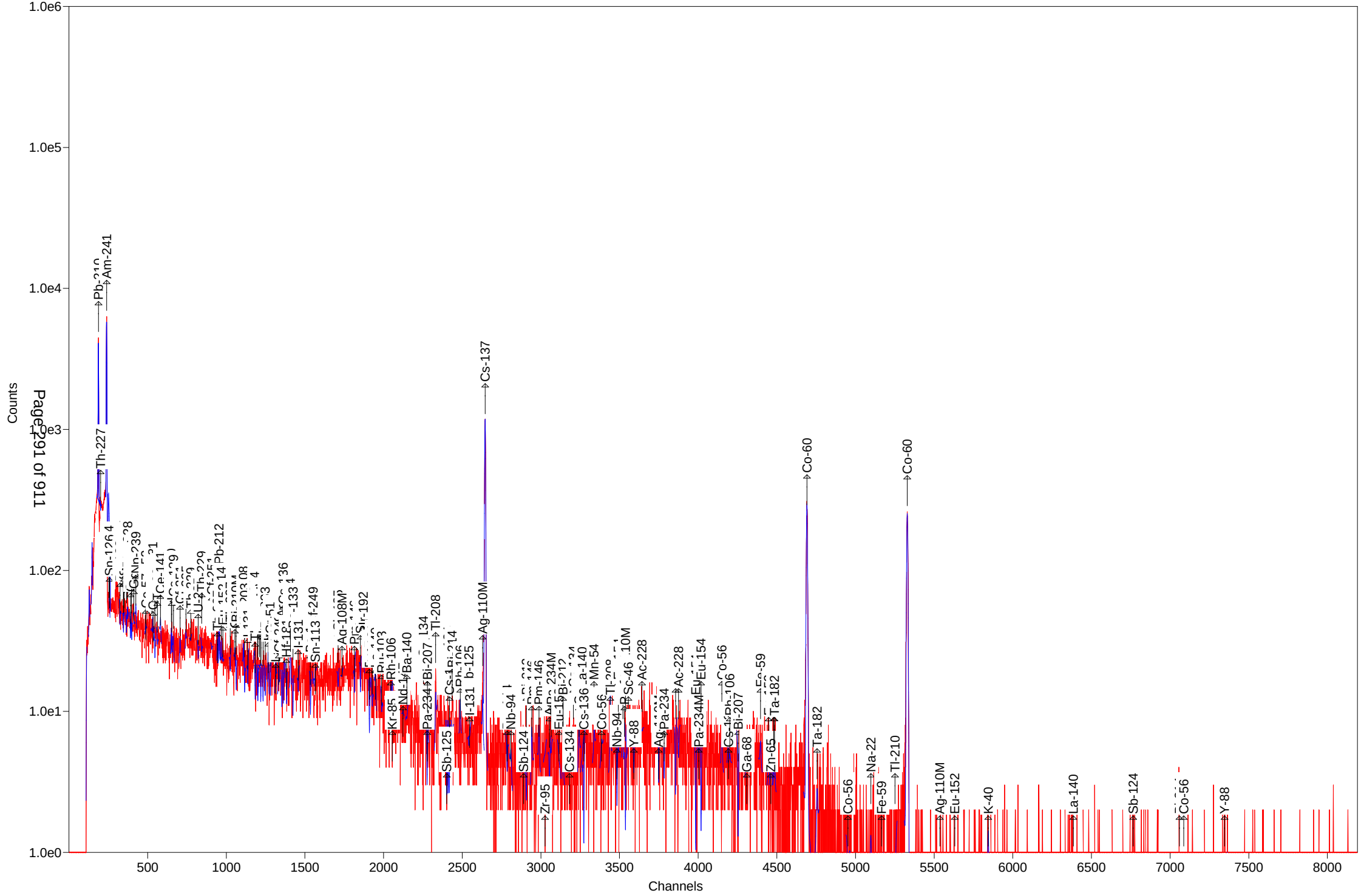
AC-228	#A	-5.6640E-01	-5.6640E-01	1.113E+03%	1.39E+01
TH-227	#A	1.0109E+00	1.0109E+00	9.822E+01%	3.47E+01
TH-229	#A	-4.0207E+00	-4.0207E+00	5.126E+02%	5.23E+01
TH-234	A	1.7054E+01	1.7054E+01	5.355E+01%	2.71E+01
PA-231	#A	-6.3832E-06	-6.3832E-06	9.575E+08%	2.04E+02
PA-233	#A	-2.6270E+00	-2.6270E+00	1.898E+02%	1.66E+01
PA-234	#A	5.4932E+00	5.4932E+00	1.083E+02%	1.62E+01
PA-234M	#A	-3.9242E+01	-3.9242E+01	5.016E+02%	6.65E+02
AM-241		1.2108E+03	1.2108E+03	7.597E-01%	1.42E+01
Np-237	#A	-6.3739E+00	-6.3739E+00	1.375E+02%	2.91E+01
Ir-192	A	1.8377E+00	1.8377E+00	4.602E+01%	1.91E+00
Cs-136	#A	-1.6917E+00	-1.6918E+00	8.368E+01%	4.70E+00
Np-239	#A	3.3986E+00	3.3991E+00	1.379E+02%	1.55E+01
Nd-147	#A	1.1367E+00	1.1367E+00	8.036E+02%	2.16E+01
TL-210	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.85E+00
Kr-85	#A	2.9683E+02	2.9683E+02	8.777E+01%	8.65E+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 (25.1 to 1999.1 keV) 1.253E+04 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 1.2530229E+04 Bq/Sample

412881_Gamma_LCS 160-412881~2-A. 12_Gamma_20190305.spc.



Test America St. Louis Spectrum ID: 5_Gamma_20190285

Sample Description: 412881_Gamma_180-86110-A-1-A
Detector: Detector # 5
Batch ID: 412881
Work Order Number: Gamma
Lot Number: 180-86110-A-1-A

Decay to Time: 2/20/2019 08:13 Live Time: 1800 sec
Acquisition Time: 2/20/2019 08:13:45 Real Time: 1806 sec
Analysis Time: 2/20/2019 08:44 Dead Time: 0.31 %
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_Rev15.lib
Bkgd Correction File: 5_2019-01-20_1014.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-3.513E+00	108.2	3.802E+00	3.806E+00	1.299E+01
NA-22	-1.942E-01	291.5	5.662E-01	5.663E-01	2.073E+00
K-40	1.379E+02	8.7	1.203E+01	1.395E+01	9.188E+00
Sc-46	5.469E-01	107.8	5.898E-01	5.905E-01	2.025E+00
CR-51	-1.165E+00	352.3	4.104E+00	4.105E+00	1.421E+01
MN-54	2.268E-01	280.4	6.357E-01	6.358E-01	1.554E+00
FE-59	-1.102E-01	147.5	1.626E-01	1.627E-01	2.646E+00
Co-56	2.177E-01	248.4	5.409E-01	5.410E-01	8.911E-01
CO-57	-2.973E-01	96.4	2.865E-01	2.870E-01	9.618E-01
CO-58	3.502E-01	94.1	3.297E-01	3.302E-01	1.141E+00
CO-60	-7.084E-01	78.9	5.589E-01	5.601E-01	2.153E+00
ZN-65	2.105E-01	665.6	1.401E+00	1.401E+00	5.038E+00
NB-94	-2.734E-02	2338.8	6.393E-01	6.393E-01	1.334E+00
ZR-95	6.134E-01	120.7	7.404E-01	7.411E-01	1.890E+00
NB-95	1.057E-01	616.8	6.517E-01	6.517E-01	2.302E+00
RU-103	3.235E-01	110.3	3.568E-01	3.572E-01	9.363E-01
RH-106	-7.218E+00	74.9	5.405E+00	5.418E+00	3.461E+01
AG-108M	-5.076E-01	71.2	3.616E-01	3.625E-01	1.269E+00
AG-110M	3.122E-01	85.5	2.669E-01	2.674E-01	3.162E+00
SN-113	5.821E-01	130.0	7.568E-01	7.574E-01	2.573E+00
SB-124	-1.372E-01	54.9	7.535E-02	7.569E-02	3.766E+00
SB-125	1.371E+00	74.1	1.016E+00	1.018E+00	2.806E+00
I-131	9.764E-02	248.7	2.428E-01	2.429E-01	1.231E+00
Gd-153	-8.781E-01	113.1	9.935E-01	9.949E-01	3.338E+00
Ga-68	1.758E+01	93.2	1.638E+01	1.641E+01	3.924E+01
Tc-99m	-3.255E-01	126.0	4.101E-01	4.105E-01	1.377E+00
BA-133	-6.125E-01	161.4	9.887E-01	9.892E-01	3.348E+00
CS-134	8.527E-01	88.5	7.543E-01	7.556E-01	1.675E+00
CS-137	-9.983E-01	69.8	6.971E-01	6.990E-01	2.281E+00
CE-139	1.184E-01	277.9	3.289E-01	3.291E-01	9.109E-01
Ba-140	-7.714E-01	224.5	1.732E+00	1.733E+00	4.542E+00
La-140	1.351E-01	115.4	1.558E-01	1.560E-01	1.697E+00
CE-141	-6.084E-01	129.8	7.897E-01	7.903E-01	2.651E+00

CE-144	0.000E+00	1.#INF	1.378E+00	1.378E+00	1.095E+01
PM-144	1.682E-02	94.8	1.595E-02	1.597E-02	1.780E+00
EU-152	2.485E+00	79.0	1.963E+00	1.968E+00	2.438E+00
EU-154	7.410E-01	112.4	8.332E-01	8.341E-01	1.845E+00
EU-155	-1.189E+00	90.5	1.076E+00	1.078E+00	4.578E+00
HF-181	3.883E-01	112.2	4.356E-01	4.360E-01	1.499E+00
Ta-182	1.559E+00	106.2	1.656E+00	1.658E+00	6.356E+00
Hg-203	-2.010E-01	236.9	4.760E-01	4.762E-01	1.636E+00
TL-208	2.877E+00	18.7	5.379E-01	5.583E-01	9.819E-01
PM-146	5.251E-01	146.1	7.672E-01	7.676E-01	1.606E+00
Y-88	1.105E-01	275.8	3.048E-01	3.049E-01	9.809E-01
Cd-113m	2.747E+03	157.6	4.330E+03	4.333E+03	1.498E+04
Cd-109	0.000E+00	1.#INF	3.225E+00	3.225E+00	3.879E+01
Cf-251	-1.538E+00	109.7	1.686E+00	1.692E+00	4.581E+00
Cf-249	-6.355E-01	112.0	7.119E-01	7.126E-01	2.412E+00
Sn-126	1.257E+00	348.6	4.383E+00	4.384E+00	1.261E+01
PB-210	1.985E+01	47.1	9.342E+00	9.415E+00	2.530E+01
PB-212	1.016E+01	8.4	8.549E-01	1.078E+00	1.496E+00
PB-214	7.681E+00	12.3	9.451E-01	1.026E+00	1.779E+00
BI-207	-5.625E-01	143.1	8.048E-01	8.053E-01	2.636E+00
BI-212	-6.804E+00	126.1	8.583E+00	8.590E+00	2.939E+01
U-235	-2.764E+00	81.2	2.246E+00	2.250E+00	1.143E+01
BI-214	8.742E+00	13.0	1.139E+00	1.226E+00	1.791E+00
BI-210M	1.976E-01	281.1	5.555E-01	5.556E-01	1.940E+00
AC-228	1.294E+01	12.0	1.554E+00	1.688E+00	1.860E+00
TH-227	2.013E+00	146.5	2.950E+00	2.952E+00	1.220E+01
TH-229	2.093E-01	188.5	3.946E-01	3.950E-01	1.836E+01
TH-234	3.260E+00	128.4	4.185E+00	4.189E+00	1.413E+01
PA-231	2.026E+00	959.2	1.943E+01	1.943E+01	6.660E+01
PA-233	6.018E-01	189.7	1.141E+00	1.142E+00	3.911E+00
PA-234	-6.104E-01	128.8	7.863E-01	7.869E-01	6.318E+00
PA-234M	9.384E+01	79.2	7.436E+01	7.451E+01	2.327E+02
AM-241	3.434E-01	288.9	9.921E-01	9.923E-01	2.902E+00
Np-237	-2.403E+00	164.4	3.951E+00	3.953E+00	1.323E+01
Ir-192	-4.595E-01	102.2	4.695E-01	4.703E-01	1.584E+00
Cs-136	-3.073E-02	69.1	2.124E-02	2.131E-02	2.152E+00
Np-239	-1.138E+00	124.4	1.416E+00	1.417E+00	4.758E+00
Nd-147	0.000E+00	1.#INF	1.755E+00	1.755E+00	7.650E+00
TL-210	4.823E-01	102.7	4.951E-01	4.959E-01	1.701E+00
Kr-85	4.534E+01	302.5	1.372E+02	1.372E+02	4.748E+02
Total	3.126E+03				

Analyst: kody Saulters

Sample description
412881_Gamma_180-86110-A-1-A

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20190285.An1

Acquisition information
Start time: 2/20/2019 8:13:45 AM
Live time: 1800
Real time: 1806
Dead time: 0.31 %
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_Rev15.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	2/20/2019 8:13:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2019-01-20_1014.PBC 1/20/2019 10:14:28 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0923

***** 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
46.12	3.	275.32	0.78	1.766E-02	46.54	4.250	PBC<MDA	PB210
50.14	7.	198.98	0.79	2.012E-02	50.14	8.000	PBC<MDA	TH227
59.54	6.	288.95	0.80	2.533E-02	59.54	35.900	PBC<MDA	AM241
64.28	6.	348.57	0.80	2.757E-02	64.28	9.700	PBC<MDA	Sn126
74.72	102.	16.27	0.81	3.149E-02				
77.06	123.	12.95	0.81	3.219E-02				
86.94	17.	155.60	0.83	3.443E-02	86.54	30.700	PBC<MDA	EU155
					86.94	9.040	3.031E+00	Sn126
87.57	6.	421.30	0.83	3.454E-02	87.57	37.500	PBC<MDA	Sn126
90.04	44.	26.19	0.52	3.493E-02				
92.50	12.	128.36	0.83	3.527E-02	92.59	5.584	PBC<MDA	TH234
93.26	11.	239.81	0.83	3.536E-02	93.35	5.561	PBC<MDA	AC228
121.78	12.	112.16	0.86	3.584E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.144E-01	CO57
165.85	5.	277.86	0.91	3.133E-02	165.85	79.900	PBC<MDA	CE139
185.72	30.	49.44	0.93	2.854E-02	185.72	54.000	PBC<MDA	U235
210.85	6.	255.65	0.95	2.569E-02	210.85	2.990	PBC<MDA	TH229
227.00	12.	100.82	0.97	2.417E-02	227.00	6.300	PBC<MDA	Cf251
235.97	11.	234.30	0.98	2.341E-02	235.97	12.300	PBC<MDA	TH227
238.61	186.	8.72	0.90	2.319E-02	238.63	43.300	1.027E+01	PB212
242.00	11.	227.01	0.98	2.293E-02	242.00	7.430	PBC<MDA	PB214
244.69	11.	222.54	0.98	2.272E-02	244.69	7.580	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
256.24	4.	314.25	1.00	2.186E-02	256.24	7.000	PBC<MDA	TH227
263.70	6.	157.63	1.00	2.135E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	4.	281.15	1.00	2.121E-02	265.83	50.000	PBC<MDA	BI210M
295.43	47.	20.95	0.35	1.945E-02	295.09	19.300	6.907E+00	PB214
299.93	11.	67.96	1.04	1.918E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
302.69	2.	959.17	1.04	1.904E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	3.185E-01	BA133
312.01	7.	189.65	1.05	1.857E-02	312.01	36.000	PBC<MDA	PA233
328.76	1.	972.59	1.07	1.778E-02	328.76	20.300	PBC<MDA	La140
338.21	54.	19.29	0.88	1.736E-02	338.32	12.010	1.434E+01	AC228
351.89	92.	12.91	0.77	1.680E-02	351.93	37.600	8.079E+00	PB214
391.69	10.	130.01	1.12	1.537E-02	391.69	64.000	PBC<MDA	SN113
427.88	7.	118.27	1.16	1.428E-02	427.88	29.600	PBC<MDA	SB125
453.88	4.	244.95	1.18	1.360E-02	453.88	65.000	PBC<MDA	PM146
482.00	7.	112.17	1.21	1.293E-02	482.00	80.500	PBC<MDA	HF181
497.05	7.	110.29	1.22	1.260E-02	497.05	90.900	PBC<MDA	RU103
511.86	76.	13.37	2.48	1.230E-02	511.86	20.000	1.709E+01	RH106
513.98	4.	302.54	1.24	1.226E-02	513.98	0.430	PBC<MDA	Kr85
563.24	2.	512.88	1.28	1.135E-02	563.24	8.350	PBC<MDA	CS134
569.47	2.	470.01	1.29	1.125E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.253E+00	PA234
					569.70	97.740	1.051E-01	BI207
583.19	48.	18.70	0.56	1.103E-02	583.02	84.500	2.877E+00	TL208
609.17	77.	13.03	1.23	1.063E-02	609.31	46.090	8.742E+00	BI214
618.06	11.	139.57	1.33	1.051E-02	618.06	99.100	PBC<MDA	PM144
635.89	5.	89.27	1.34	1.026E-02	635.89	11.310	PBC<MDA	SB125
636.97	2.	248.67	1.34	1.025E-02	636.97	7.170	PBC<MDA	I131
657.76	8.	85.50	1.36	9.974E-03	657.76	94.640	PBC<MDA	AG110M
722.79	9.	87.48	1.42	9.217E-03	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	6.194E-01	AG108M
					723.36	20.220	2.784E+00	EU154
735.72	5.	159.32	1.43	9.081E-03	735.72	22.500	PBC<MDA	PM146
756.73	5.	120.71	1.45	8.869E-03	756.73	54.460	PBC<MDA	ZR95
765.79	2.	616.77	1.45	8.781E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	3.589E+01	PA234M
766.41	10.	87.48	1.45	8.776E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.175E+02	PA234M
785.42	3.	219.85	1.47	8.597E-03	785.42	1.280	PBC<MDA	BI212
795.87	7.	88.46	1.48	8.503E-03	795.87	85.530	PBC<MDA	CS134
799.60	7.	102.66	1.48	8.469E-03	799.60	98.960	PBC<MDA	TL210
801.95	5.	173.46	1.48	8.448E-03	801.95	8.690	PBC<MDA	CS134
810.78	5.	94.14	1.49	8.371E-03	810.78	99.460	PBC<MDA	CO58
815.77	5.	115.38	1.49	8.328E-03	815.77	23.280	PBC<MDA	La140
834.85	3.	280.36	1.51	8.168E-03	834.85	99.980	PBC<MDA	MN54
860.85	11.	50.17	1.53	7.963E-03	860.56	12.420	PBC<MDA	TL208
889.28	8.	107.84	1.55	7.747E-03	889.28	99.984	PBC<MDA	Sc46

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
898.04	3.	275.80	1.56	7.684E-03	898.04	93.700	PBC<MDA	Y88
910.88	49.	14.29	0.42	7.591E-03	911.07	29.000	1.237E+01	AC228
937.49	1.	800.00	1.59	7.411E-03	937.49	34.360	PBC<MDA	AG110M
964.11	5.	172.53	1.61	7.239E-03	964.11	14.605	PBC<MDA	EU152
968.57	41.	17.62	1.61	7.209E-03	968.97	17.460	1.795E+01	AC228
1001.00	5.	132.16	1.64	7.014E-03	1001.00	0.837	PBC<MDA	PA234M
1004.77	6.	112.44	1.64	6.992E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	3.	248.45	1.66	6.805E-03	1037.84	14.130	PBC<MDA	Co56
1048.07	6.	72.66	1.67	6.749E-03	1048.07	80.000	PBC<MDA	Cs136
1077.40	6.	93.21	1.69	6.594E-03	1077.40	3.300	PBC<MDA	Ga68
1112.07	8.	89.55	1.72	6.421E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	1.	665.62	1.72	6.404E-03	1115.55	50.600	PBC<MDA	ZN65
1120.41	3.	268.74	1.72	6.381E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	2.613E-01	Sc46
1121.30	6.	122.29	1.72	6.376E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.495E+00	Ta182
1173.24	5.	159.61	1.76	6.138E-03	1173.24	99.900	PBC<MDA	CO60
1189.05	3.	173.74	1.77	6.069E-03	1189.05	16.200	PBC<MDA	Ta182
1291.60	2.	233.08	1.84	5.661E-03	1291.60	43.200	PBC<MDA	FE59
1313.00	5.	44.72	1.85	5.583E-03	1313.00	21.000	PBC<MDA	TL210
1384.30	2.	324.35	1.90	5.340E-03	1384.30	24.290	PBC<MDA	AG110M
1460.49	135.	8.72	2.00	5.103E-03	1460.83	10.670	1.379E+02	K40
1764.49	6.	86.25	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 Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.51	74.75	86.	102.	3.236E+03	16.27	0.813	-	D
307.88	77.09	66.	123.	3.830E+03	12.95	0.815	-	D
359.45	90.04	37.	44.	1.249E+03	24.86	0.828	-	sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev15.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	184.28	46.19	47.	27.	0.015	47.07	0.429s
TH-227	200.11	50.14	66.	7.	0.004	198.98	0.787s
AM-241	237.72	59.54	92.	6.	0.003	288.95	0.797s
Sn-126	256.71	64.28	155.	6.	0.003	348.57	0.802s
BA-133	323.61	80.99	104.	-6.	-0.003	283.85	0.819s
Np-237	345.63	86.49	502.	-19.	-0.011	164.41	0.825s
EU-155	345.84	86.54	483.	-19.	-0.011	161.25	0.825s
Sn-126	347.43	86.94	341.	17.	0.009	155.60	0.825s
Sn-126	349.95	87.57	358.	6.	0.004	421.30	0.826s
Cd-109	351.83	88.04	364.	0.	0.000	1000.00	0.826s
Nd-147	364.08	91.10	364.	0.	0.000	1000.00	0.829s
TH-234	370.05	92.59	103.	12.	0.006	128.36	0.831D
AC-228	373.09	93.35	359.	11.	0.006	239.81	0.832s
Gd-153	389.70	97.50	176.	-17.	-0.009	113.14	0.836s
Np-239	397.71	99.50	171.	-4.	-0.002	460.63	0.838s
Np-239	414.52	103.70	154.	-17.	-0.009	105.65	0.842
EU-155	420.98	105.31	169.	-16.	-0.009	90.47	0.844
Np-239	424.25	106.13	211.	-17.	-0.009	124.40	0.845s
EU-152	486.90	121.78	82.	12.	0.007	112.16	0.861s
CO-57	488.03	122.06	117.	-16.	-0.009	96.37	0.861s
PA-234	524.99	131.29	220.	-17.	-0.009	128.81	0.871s
HF-181	531.91	133.02	237.	-12.	-0.007	177.55	0.872s
CE-144	533.97	133.54	249.	0.	0.000	1000.00	0.873s
HF-181	545.02	136.30	249.	0.	0.000	1000.00	0.876s
CO-57	545.72	136.47	296.	-19.	-0.011	129.79	0.876s
Tc-99m	561.88	140.51	229.	-17.	-0.010	125.98	0.880s
U-235	574.99	143.79	248.	-18.	-0.010	81.24	0.883s
CE-141	581.61	145.44	255.	-18.	-0.010	129.80	0.885s
CE-139	663.32	165.85	68.	5.	0.003	277.86	0.905s
Cf-251	706.34	176.60	70.	-14.	-0.008	109.65	0.916
U-235	742.85	185.72	60.	30.	0.017	49.44	0.925s
TH-229	774.03	193.51	64.	-5.	-0.003	277.12	0.933
U-235	821.35	205.33	77.	-16.	-0.009	102.00	0.945s
TH-229	843.44	210.85	67.	6.	0.003	255.65	0.950s
Cf-251	908.08	227.00	43.	12.	0.007	100.82	0.966s
TH-227	943.98	235.97	311.	11.	0.006	234.30	0.975s
PB-212	954.64	238.63	27.	184.	0.102	8.41	0.978D
PB-214	968.10	242.00	295.	11.	0.006	227.01	0.981s
EU-152	978.89	244.69	313.	11.	0.006	222.54	0.984s
TH-227	1025.11	256.24	44.	4.	0.002	314.25	0.995s
Cd-113m	1054.97	263.70	47.	6.	0.004	157.63	1.002
BI-210M	1063.50	265.83	54.	4.	0.002	281.15	1.005
TL-208	1109.33	277.28	68.	-8.	-0.004	150.00	1.016
Hg-203	1117.00	279.20	98.	-6.	-0.003	236.88	1.017s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	1137.41	284.30	55.	-14.	-0.008	75.89	1.022s
PB-214	1181.97	295.43	13.	47.	0.026	20.95	0.346s
TL-210	1184.24	296.00	229.	-12.	-0.007	181.81	1.034s
PB-212	1200.37	300.03	205.	11.	0.006	67.96	1.038D
PA-231	1200.53	300.07	193.	-8.	-0.005	235.60	1.038
PA-233	1200.97	300.18	185.	0.	0.000	1000.00	1.038s
PA-231	1210.86	302.65	183.	2.	0.001	959.17	1.040s
BA-133	1211.66	302.85	185.	0.	0.000	1000.00	1.040s
Ba-140	1219.66	304.85	185.	0.	0.000	1000.00	1.042s
BI-210M	1219.85	304.90	185.	0.	0.000	1000.00	1.042s
Ir-192	1234.03	308.44	185.	0.	0.000	1000.00	1.046s
PA-233	1248.32	312.01	91.	7.	0.004	189.65	1.049s
Ir-192	1266.25	316.49	84.	-13.	-0.007	102.18	1.053
CR-51	1280.63	320.08	87.	-4.	-0.002	352.29	1.057s
La-140	1315.35	328.76	48.	1.	0.001	972.59	1.065s
Cf-249	1334.08	333.44	48.	-13.	-0.007	105.77	1.070s
AC-228	1353.18	338.21	13.	54.	0.030	19.29	0.880
Cs-136	1362.62	340.57	148.	-12.	-0.007	148.02	1.077s
EU-152	1377.49	344.29	136.	-12.	-0.007	141.77	1.080s
HF-181	1383.66	345.83	124.	-3.	-0.002	537.11	1.082s
PB-214	1407.93	351.89	14.	92.	0.051	12.91	0.772s
BA-133	1424.36	356.00	163.	-11.	-0.006	161.43	1.091s
BA-133	1535.78	383.84	77.	-12.	-0.006	102.60	1.117s
Cf-249	1552.22	387.95	80.	-12.	-0.006	112.01	1.121s
SN-113	1567.19	391.69	85.	10.	0.006	130.01	1.125s
SB-125	1711.99	427.88	16.	7.	0.004	118.27	1.158s
AG-108M	1736.25	433.94	32.	-12.	-0.006	71.23	1.164s
PM-146	1816.05	453.88	24.	4.	0.002	244.95	1.182s
SB-125	1854.01	463.37	51.	-7.	-0.004	116.88	1.191s
Ir-192	1872.79	468.06	64.	-8.	-0.005	142.36	1.195
BE-7	1910.94	477.59	40.	-9.	-0.005	108.24	1.204s
HF-181	1928.56	482.00	30.	7.	0.004	112.17	1.208s
La-140	1948.65	487.02	36.	-10.	-0.006	83.28	1.212s
RU-103	1988.80	497.05	13.	7.	0.004	110.29	1.221s
RH-106	2048.06	511.86	13.	76.	0.042	13.37	2.485s
Kr-85	2056.53	513.98	82.	4.	0.002	302.54	1.237s
Nd-147	2124.62	531.00	16.	0.	0.000	1000.00	1.252s
Ba-140	2149.67	537.26	20.	-4.	-0.002	224.54	1.258s
CS-134	2253.60	563.24	20.	2.	0.001	512.88	1.280
CS-134	2277.94	569.32	36.	-13.	-0.007	68.90	1.286s
PA-234	2278.54	569.47	47.	2.	0.001	470.01	1.286s
BI-207	2279.47	569.70	45.	0.	0.000	1000.00	1.286s
TL-208	2333.45	583.19	9.	48.	0.027	18.70	0.563s
SB-125	2402.69	600.50	230.	-13.	-0.007	168.33	1.313s
SB-124	2411.61	602.73	218.	-14.	-0.008	66.43	1.315s
CS-134	2419.53	604.71	203.	-13.	-0.007	157.92	1.317s
BI-214	2437.36	609.17	8.	77.	0.043	13.03	1.233s
RU-103	2441.89	610.30	190.	-13.	-0.007	152.41	1.322s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-108M	2457.82	614.28	177.	-13.	-0.007	146.89	1.325s
PM-144	2472.94	618.06	119.	11.	0.006	139.57	1.328s
RH-106	2488.37	621.92	177.	-13.	-0.007	74.88	1.332s
SB-125	2544.26	635.89	9.	5.	0.003	89.27	1.344s
I-131	2548.61	636.97	16.	2.	0.001	248.67	1.345s
AG-110M	2631.76	657.76	20.	8.	0.005	85.50	1.362s
CS-137	2647.36	661.66	47.	-15.	-0.008	69.82	1.366s
PM-144	2786.90	696.54	35.	-10.	-0.005	128.42	1.395
SB-124	2891.88	722.79	29.	9.	0.005	87.48	1.417s
AG-108M	2892.48	722.94	38.	0.	0.000	1000.00	1.417s
EU-154	2894.17	723.36	38.	0.	0.000	1000.00	1.418s
ZR-95	2897.53	724.20	50.	-12.	-0.007	85.55	1.418s
BI-212	2909.41	727.17	53.	-8.	-0.005	126.14	1.421s
PM-146	2943.61	735.72	13.	5.	0.003	159.32	1.428s
PM-146	2989.37	747.16	13.	0.	0.000	1000.00	1.437s
ZR-95	3027.65	756.73	9.	5.	0.003	120.71	1.445s
AG-110M	3056.50	763.94	37.	-12.	-0.007	75.63	1.451s
NB-95	3063.89	765.79	52.	2.	0.001	616.77	1.453s
PA-234M	3066.38	766.41	34.	10.	0.006	87.48	1.453s
EU-152	3116.41	778.92	28.	-12.	-0.007	94.44	1.463s
BI-212	3142.41	785.42	10.	3.	0.002	219.85	1.468s
CS-134	3184.20	795.87	17.	7.	0.004	88.46	1.477s
TL-210	3199.12	799.60	24.	7.	0.004	102.66	1.480s
CS-134	3208.53	801.95	32.	5.	0.003	173.46	1.482s
CO-58	3243.82	810.78	10.	5.	0.003	94.14	1.489s
La-140	3263.80	815.77	15.	5.	0.003	115.38	1.493s
Cs-136	3274.72	818.50	40.	-8.	-0.004	117.60	1.495s
MN-54	3340.10	834.85	19.	3.	0.002	280.36	1.508s
TL-208	3442.95	860.56	5.	11.	0.006	50.17	1.529s
NB-94	3485.08	871.10	18.	-6.	-0.004	99.11	1.537s
EU-154	3493.61	873.23	25.	-1.	-0.001	714.14	1.539s
PA-234	3522.80	880.53	31.	-9.	-0.005	93.62	1.544s
PA-234	3533.64	883.24	40.	0.	0.000	1000.00	1.547s
AG-110M	3539.41	884.68	40.	0.	0.000	1000.00	1.547
Sc-46	3557.79	889.28	30.	8.	0.004	107.84	1.551s
Y-88	3592.83	898.04	14.	3.	0.002	275.80	1.558s
AC-228	3644.18	910.88	0.	49.	0.027	14.29	0.417s
AG-110M	3750.60	937.49	14.	1.	0.001	800.00	1.589s
PA-234	3784.70	946.02	19.	-9.	-0.005	93.10	1.595s
EU-152	3857.05	964.11	40.	5.	0.003	172.53	1.609s
AC-228	3876.48	968.97	5.	41.	0.023	17.62	1.612
EU-154	3985.88	996.33	51.	-13.	-0.007	84.27	1.633s
PA-234M	4004.55	1001.00	22.	5.	0.003	132.16	1.636s
EU-154	4019.65	1004.77	18.	6.	0.003	112.44	1.639s
Co-56	4151.87	1037.84	10.	3.	0.002	248.45	1.664s
Cs-136	4192.77	1048.07	6.	6.	0.003	72.66	1.671s
RH-106	4201.93	1050.36	25.	-10.	-0.006	77.37	1.673s
BI-207	4255.11	1063.66	20.	-5.	-0.003	143.06	1.682s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ga-68	4310.04	1077.40	5.	6.	0.003	93.21	1.692s
FE-59	4397.41	1099.25	10.	-4.	-0.002	180.85	1.708s
EU-152	4448.68	1112.07	24.	8.	0.005	89.55	1.717s
ZN-65	4462.56	1115.55	33.	1.	0.001	665.62	1.720s
BI-214	4481.51	1120.29	31.	3.	0.002	268.74	1.723s
Sc-46	4482.57	1120.55	34.	0.	0.000	1000.00	1.723s
Ta-182	4485.56	1121.30	24.	6.	0.003	122.29	1.724s
CO-60	4693.21	1173.24	10.	5.	0.003	159.61	1.760s
Ta-182	4756.42	1189.05	5.	3.	0.002	173.74	1.771s
Ta-182	4885.79	1221.41	27.	-12.	-0.006	104.78	1.793s
Co-56	4953.23	1238.28	33.	-13.	-0.007	58.91	1.804s
NA-22	5098.13	1274.53	16.	-2.	-0.001	291.55	1.828s
EU-154	5098.17	1274.54	18.	0.	0.000	1000.00	1.828s
FE-59	5166.35	1291.60	6.	2.	0.001	233.08	1.840s
TL-210	5251.91	1313.00	0.	5.	0.003	44.72	1.854s
CO-60	5329.85	1332.50	16.	-7.	-0.004	78.91	1.866s
AG-110M	5536.88	1384.30	5.	2.	0.001	324.35	1.899s
EU-152	5631.62	1408.00	0.	0.	0.000	1000.00	1.914s
K-40	5841.40	1460.49	2.	135.	0.075	8.72	2.002
La-140	6383.73	1596.21	6.	-2.	-0.001	343.80	2.024s
SB-124	6762.39	1690.98	11.	-8.	-0.005	140.06	2.076s
BI-214	7056.06	1764.49	11.	6.	0.003	86.25	2.114s
Co-56	7083.46	1771.35	18.	7.	0.004	89.23	2.117
Y-88	7341.96	1836.06	0.	0.	0.000	1000.00	2.149s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-3.5125E+00				5.31E+01	
			477.60	-3.513E+00	?(	1.299E+01 1.08E+02 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	1.3792E+02				4.66E+11	
			1460.83	1.379E+02	(P	9.188E+00 8.72E+00 1.07E+01	G
Sc-46	F	5.4693E-01				8.38E+01	
			889.28	5.469E-01	?(	2.025E+00 1.08E+02 1.00E+02	G
			1120.55	0.000E+00	-	2.602E+00 1.00E+03 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	-1.1650E+00					2.77E+01	
			320.08	-1.165E+00	?(	1.421E+01	3.52E+02	9.94E+00 G
MN-54	C	2.2675E-01					3.12E+02	
			834.85	2.268E-01	?(	1.554E+00	2.80E+02	1.00E+02 G
FE-59	F	-1.1023E-01					4.45E+01	
			1099.25	-6.066E-01	?(	2.646E+00	1.81E+02	5.65E+01 G
			1291.60	5.390E-01	?(P	3.127E+00	2.33E+02	4.32E+01 G
Co-56	C	2.1772E-01					7.73E+01	
			846.77	1.253E-02	%(P	8.911E-01	2.55E+03	9.99E+01 G
			1238.28	-1.808E+00	+ P	4.203E+00	5.89E+01	6.61E+01 G
			1037.84	1.669E+00	?(P	1.013E+01	2.48E+02	1.41E+01 G
			1771.35	6.083E+00	?	1.853E+01	8.92E+01	1.55E+01 A
CO-57	C	-2.9733E-01					2.72E+02	
			122.06	-2.973E-01	*(	9.618E-01	9.64E+01	8.56E+01 G
			136.47	-2.864E+00	+	1.246E+01	1.30E+02	1.07E+01 G
CO-58	C	3.5019E-01					7.09E+01	
			810.78	3.502E-01	&(P	1.141E+00	9.41E+01	9.95E+01 G
CO-60	F	-7.0835E-01					1.93E+03	
			1332.50	-7.084E-01	?(P	2.153E+00	7.89E+01	1.00E+02 G
			1173.24	4.165E-01	+ P	1.607E+00	1.60E+02	9.99E+01 G
ZN-65	F	2.1048E-01					2.44E+02	
			1115.55	2.105E-01	?(	5.038E+00	6.66E+02	5.06E+01 G
NB-94	I	-2.7335E-02					7.41E+06	
			702.63	-2.734E-02	%(P	1.334E+00	2.34E+03	9.79E+01 G
			871.10	-4.586E-01	+	1.567E+00	9.91E+01	9.99E+01 G
ZR-95	I	6.1341E-01					6.40E+01	
			756.73	6.134E-01	?(	1.890E+00	1.21E+02	5.45E+01 G
			724.20	-1.707E+00	+ P	4.865E+00	8.56E+01	4.42E+01 G
NB-95	I	1.0566E-01					6.40E+01	
			765.79	1.057E-01	?(	2.302E+00	6.17E+02	9.98E+01 G
RU-103	I	3.2353E-01					3.93E+01	
			497.05	3.235E-01	?(P	9.363E-01	1.10E+02	9.09E+01 G
			610.30	-1.183E+01	+	6.087E+01	1.52E+02	5.75E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RH-106	I	-7.2178E+00					3.74E+02	
			621.92	-7.218E+00	?(P	3.461E+01	7.49E+01	9.93E+00 G
			1050.36	-5.323E+01	+	1.383E+02	7.74E+01	1.56E+00 G
			511.86	1.709E+01	?	4.455E+00	1.34E+01	2.00E+01 GA
AG-108M	C	-5.0763E-01					1.53E+05	
			433.94	-5.076E-01	?(P	1.269E+00	7.12E+01	9.05E+01 G
			722.94	0.000E+00	+	2.086E+00	1.00E+03	9.08E+01 G
			614.28	-7.630E-01	+	3.786E+00	1.47E+02	8.98E+01 G
AG-110M	F	3.1216E-01					2.50E+02	
			884.68	0.000E+00	&(	3.162E+00	1.00E+03	7.27E+01 G
			657.76	4.829E-01	?(	1.401E+00	8.55E+01	9.46E+01 G
			937.49	2.182E-01	?(	4.395E+00	8.00E+02	3.44E+01 G
			1384.30	7.138E-01	?(	5.770E+00	3.24E+02	2.43E+01 G
			763.94	-3.495E+00	+	8.837E+00	7.56E+01	2.23E+01 G
SN-113	F	5.8211E-01					1.15E+02	
			391.69	5.821E-01	?(P	2.573E+00	1.30E+02	6.40E+01 G
SB-124	F	-1.3720E-01					6.02E+01	
			602.73	-7.248E-01	?(P	3.766E+00	6.64E+01	9.83E+01 G
			1690.98	-2.172E+00	+ P	4.758E+00	1.40E+02	4.78E+01 G
			722.79	5.204E+00	?(	1.542E+01	8.75E+01	1.08E+01 G
SB-125	I	1.3711E+00					1.01E+03	
			427.88	9.193E-01	?(P	2.806E+00	1.18E+02	2.96E+01 G
			600.50	-3.732E+00	+	2.120E+01	1.68E+02	1.79E+01 G
			635.89	2.553E+00	?(	7.866E+00	8.93E+01	1.13E+01 G
			463.37	-2.871E+00	+ P	1.432E+01	1.17E+02	1.05E+01 G
I-131	I	9.7643E-02					8.02E+00	
			364.48	-4.866E-02	%(P	1.231E+00	1.02E+03	8.17E+01 G
			284.30	-6.325E+00	+ P	1.685E+01	7.59E+01	6.14E+00 G
			636.97	1.765E+00	?(	1.600E+01	2.49E+02	7.17E+00 G
Gd-153	F	-8.7807E-01					2.42E+02	
			97.50	-8.781E-01	?(	3.338E+00	1.13E+02	3.00E+01 G
			103.20	1.058E-01	%	4.318E+00	1.19E+03	2.18E+01 G
Ga-68	C	1.7577E+01					4.71E-02	
			1077.40	1.758E+01	?(	3.924E+01	9.32E+01	3.30E+00 G
Tc-99m	I	-3.2553E-01					2.51E-01	
			140.51	-3.255E-01	&(	1.377E+00	1.26E+02	8.93E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BA-133	F	-6.1245E-01					3.85E+03	
			356.00	-6.125E-01	?(	3.348E+00	1.61E+02	6.20E+01 G
			302.85	0.000E+00	&	1.052E+01	1.00E+03	1.83E+01 G
			383.84	-4.633E+00	+ P	1.730E+01	1.03E+02	8.94E+00 GA
			80.99	-2.877E-01	+ P	2.466E+00	2.84E+02	3.41E+01 GA
CS-134	I	8.5274E-01					7.54E+02	
			795.87	5.547E-01	&(	1.675E+00	8.85E+01	8.55E+01 G
			604.71	-6.888E-01	-	3.672E+00	1.58E+02	9.76E+01 G
			569.32	-4.306E+00	+	9.845E+00	6.89E+01	1.54E+01 G
			801.95	3.629E+00	?(	2.206E+01	1.73E+02	8.69E+00 G
			563.24	1.016E+00	?(P	1.388E+01	5.13E+02	8.35E+00 G
CS-137	I	-9.9832E-01					1.10E+04	
			661.66	-9.983E-01	(P	2.281E+00	6.98E+01	8.52E+01 G
CE-139	F	1.1836E-01					1.38E+02	
			165.85	1.184E-01	?(	9.109E-01	2.78E+02	7.99E+01 G
Ba-140	I	-7.7143E-01					1.28E+01	
			537.26	-7.714E-01	?(	4.542E+00	2.25E+02	2.44E+01 G
			162.66	2.869E-01	&	1.543E+01	1.55E+03	6.22E+00 G
			304.85	0.000E+00	+	4.521E+01	1.00E+03	4.29E+00 G
La-140	I	1.3506E-01					1.28E+01	
			1596.21	-2.050E-01	?(	1.697E+00	3.44E+02	9.54E+01 G
			487.02	-9.704E-01	+ P	2.928E+00	8.33E+01	4.55E+01 G
			328.76	2.052E-01	?(	5.369E+00	9.73E+02	2.03E+01 G
			815.77	1.467E+00	?(P	5.923E+00	1.15E+02	2.33E+01 G
CE-141	I	-6.0842E-01					3.25E+01	
			145.44	-6.084E-01	?(	2.651E+00	1.30E+02	4.82E+01 G
PM-144	C	1.6817E-02					3.63E+02	
			696.54	-5.706E-01	?(	1.780E+00	1.28E+02	9.90E+01 G
			618.06	6.036E-01	?(	2.857E+00	1.40E+02	9.91E+01 G
EU-152	F	2.4850E+00					4.94E+03	
			121.78	6.419E-01	*(	2.438E+00	1.12E+02	2.86E+01 G
			344.29	-1.455E+00	+	6.986E+00	1.42E+02	2.65E+01 G
			1112.07	5.352E+00	?(	1.630E+01	8.95E+01	1.36E+01 G
			778.92	-6.179E+00	+	1.357E+01	9.44E+01	1.29E+01 G
			964.11	2.802E+00	&(	1.685E+01	1.73E+02	1.46E+01 G
			244.69	3.662E+00	?(	2.749E+01	2.23E+02	7.58E+00 G
			1408.00	0.000E+00	-	3.703E+00	1.00E+03	2.10E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	7.4101E-01					3.14E+03	
			123.10	-4.153E-02	%(	1.845E+00	1.28E+03	4.08E+01 G
			1274.54	0.000E+00	&	6.200E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	9.377E+00	1.00E+03	2.02E+01 G
			873.23	-5.756E-01	+	1.497E+01	7.14E+02	1.23E+01 G
			1004.77	2.513E+00	?(	9.837E+00	1.12E+02	1.80E+01 G
			996.33	-9.445E+00	+	2.674E+01	8.43E+01	1.06E+01 G
EU-155	I	-1.1890E+00					1.81E+03	
			105.31	-1.189E+00	?(P	4.578E+00	9.05E+01	2.12E+01 G
			86.54	-1.025E+00	+	5.535E+00	1.61E+02	3.07E+01 G
HF-181	F	3.8832E-01					4.24E+01	
			482.00	3.883E-01	?(	1.499E+00	1.12E+02	8.05E+01 G
			133.02	-4.560E-01	+	2.733E+00	1.78E+02	4.33E+01 G
			345.83	-6.377E-01	+	1.181E+01	5.37E+02	1.51E+01 G
			136.30	0.000E+00	-	2.094E+01	1.00E+03	5.85E+00 G
Ta-182	F	1.5587E+00					1.14E+02	
			1121.30	1.495E+00	?(	6.356E+00	1.22E+02	3.49E+01 G
			1221.41	-4.046E+00	+	9.284E+00	1.05E+02	2.70E+01 G
			1189.05	1.695E+00	?(	7.419E+00	1.74E+02	1.62E+01 G
Hg-203	F	-2.0096E-01					4.66E+01	
			279.20	-2.010E-01	?(	1.636E+00	2.37E+02	8.15E+01 G
TL-208	N	2.8770E+00					6.98E+02	
			583.02	2.877E+00	(P	9.819E-01	1.87E+01	8.45E+01 G
			277.28	-3.439E+00	-	1.769E+01	1.50E+02	6.31E+00 G
			860.56	6.366E+00	+	7.177E+00	5.02E+01	1.24E+01 G
PM-146	C	5.2509E-01					2.02E+03	
			453.88	2.515E-01	&(	1.606E+00	2.45E+02	6.50E+01 G
			747.16	0.000E+00	-	3.556E+00	1.00E+03	3.40E+01 G
			735.72	1.316E+00	?(P	5.334E+00	1.59E+02	2.25E+01 G
Y-88	F	1.1053E-01					1.07E+02	
			1836.06	0.000E+00	?(	9.809E-01	1.00E+03	9.92E+01 G
			898.04	2.275E-01	?(P	1.557E+00	2.76E+02	9.37E+01 G
Cd-113m		2.7466E+03					5.33E+03	
			263.70	2.747E+03	?(	1.498E+04	1.58E+02	6.00E-03 K
Cf-251	T	-1.5380E+00					3.28E+05	
			176.60	-1.538E+00	?(	4.581E+00	1.10E+02	1.70E+01 G
			227.00	4.422E+00	&	1.218E+01	1.01E+02	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	-6.3551E-01					1.28E+05	
			387.95	-6.355E-01	?(	2.412E+00	1.12E+02	6.60E+01 G
			333.44	-2.582E+00	+	7.111E+00	1.06E+02	1.55E+01 G
Sn-126		1.2575E+00					3.65E+07	
			87.57	2.735E-01	&	3.896E+00	4.21E+02	3.75E+01 GA
			64.28	1.257E+00	&(	1.261E+01	3.49E+02	9.70E+00 G
			86.94	3.031E+00	*	1.584E+01	1.56E+02	9.04E+00 GA
PB-210	N	1.9848E+01					8.14E+03	
			46.54	1.985E+01	*(P	2.530E+01	4.71E+01	4.25E+00 G
PB-212	N	1.0164E+01					6.98E+02	
			238.63	1.016E+01	(P	1.496E+00	8.41E+00	4.33E+01 G
			300.03	9.800E+00	} P	6.137E+01	6.80E+01	3.28E+00 GA
PB-214	N	7.6813E+00					5.84E+05	
			351.93	8.079E+00	(P	1.779E+00	1.29E+01	3.76E+01 G
			295.09	6.907E+00	@(	2.920E+00	2.09E+01	1.93E+01 G
			242.00	3.520E+00	&	2.698E+01	2.27E+02	7.43E+00 GA
BI-207	C	-5.6254E-01					1.18E+04	
			1063.66	-5.625E-01	?(P	2.636E+00	1.43E+02	7.45E+01 G
			569.70	0.000E+00	+	1.711E+00	1.00E+03	9.77E+01 G
BI-212	N	-6.8042E+00					6.98E+02	
			727.17	-6.804E+00	?(P	2.939E+01	1.26E+02	7.55E+00 G
			785.42	1.563E+01	& P	8.772E+01	2.20E+02	1.28E+00 GA
U-235	N	-2.7644E+00					2.57E+11	
			143.79	-2.764E+00	(P	1.143E+01	8.12E+01	1.10E+01 G
			205.33	-6.656E+00	+	1.837E+01	1.02E+02	5.01E+00 G
			163.38	-9.829E-02	& P	1.905E+01	5.37E+03	5.08E+00 G
			185.72	1.082E+00	+	1.399E+00	4.94E+01	5.40E+01 GA
BI-214	N	8.7420E+00					5.84E+05	
			609.31	8.742E+00	*(P	1.791E+00	1.30E+01	4.61E+01 G
			1120.29	1.730E+00	-	1.652E+01	2.69E+02	1.51E+01 G
			1764.49	5.111E+00	- P	1.506E+01	8.62E+01	1.54E+01 G
BI-210M	T	1.9757E-01					1.10E+09	
			265.83	1.976E-01	?(P	1.940E+00	2.81E+02	5.00E+01 G
			304.90	0.000E+00	-	6.928E+00	1.00E+03	2.80E+01 G
AC-228	N	1.2944E+01					2.10E+03	
			911.07	1.237E+01	@(	1.860E+00	1.43E+01	2.90E+01 G
			968.97	1.795E+01	+	5.946E+00	1.76E+01	1.75E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          338.32 1.434E+01  (P 5.229E+00 1.93E+01 1.20E+01 G
                           93.35 3.180E+00 -   2.570E+01 2.40E+02 5.56E+00 XA

TH-227   N   2.0130E+00                                     7.95E+03
                          256.24 1.452E+00 ?(  1.220E+01 3.14E+02 7.00E+00 G
                          235.97 2.070E+00 ?(  1.637E+01 2.34E+02 1.23E+01 G
                           50.14 2.416E+00  (  1.400E+01 1.99E+02 8.00E+00 G

TH-229   N   2.0934E-01                                     2.68E+06
                          193.51-2.488E+00 &(P 1.836E+01 2.77E+02 4.40E+00 G
                          210.85 4.178E+00 ?(P 2.959E+01 2.56E+02 2.99E+00 G

TH-234   N   3.2599E+00                                     1.63E+12
                           92.59 3.260E+00  (P 1.413E+01 1.28E+02 5.58E+00 G
                           63.29 5.766E-01 % P 3.529E+01 1.79E+03 3.81E+00 G

PA-231   N   2.0258E+00                                     1.20E+07
                          302.65 2.026E+00 ?(  6.660E+01 9.59E+02 2.88E+00 G
                          300.07-9.936E+00 +   7.950E+01 2.36E+02 2.46E+00 G

PA-233   C   6.0175E-01                                     7.82E+08
                          312.01 6.018E-01 ?(P 3.911E+00 1.90E+02 3.60E+01 G
                          300.18 0.000E+00 -   3.089E+01 1.00E+03 6.20E+00 G

PA-234   N  -6.1041E-01                                     1.63E+12
                          131.29-1.459E+00 ?(  6.318E+00 1.29E+02 1.80E+01 G
                          946.02-4.935E+00 + P 1.290E+01 9.31E+01 1.34E+01 G
                          569.47 1.253E+00 ?(  2.082E+01 4.70E+02 8.20E+00 G
                          883.24 0.000E+00 +   2.390E+01 1.00E+03 9.60E+00 G
                          880.53-1.067E+01 +   3.397E+01 9.36E+01 6.00E+00 GA

PA-234M  N   9.3835E+01                                     1.63E+12
                         1001.00 5.038E+01  (P 2.327E+02 1.32E+02 8.37E-01 G
                          766.41 2.175E+02 ?(  6.435E+02 8.75E+01 2.94E-01 G

AM-241   T   3.4336E-01                                     1.58E+05
                           59.54 3.434E-01 &(P 2.902E+00 2.89E+02 3.59E+01 G

Np-237   F  -2.4029E+00                                     2.14E+06
                           86.49-2.403E+00 *(  1.323E+01 1.64E+02 1.31E+01 G

Ir-192   F  -4.5950E-01                                     7.40E+01
                          316.49-4.595E-01 ?(  1.584E+00 1.02E+02 8.70E+01 G
                          468.06-6.616E-01 +   3.228E+00 1.42E+02 5.18E+01 G
                          308.44 0.000E+00 +   6.169E+00 1.00E+03 3.18E+01 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Cs-136   F  -3.0730E-02                                      1.30E+01
                         818.50-5.334E-01 ?(  2.152E+00 1.18E+02 1.00E+02 G
                        1048.07 5.976E-01 ?(  1.453E+00 7.27E+01 8.00E+01 G
                         340.57-8.124E-01 +   4.071E+00 1.48E+02 4.69E+01 G

Np-239   T  -1.1381E+00                                      2.36E+00
                         103.70-1.095E+00 +   3.885E+00 1.06E+02 2.40E+01 X
                         106.13-1.138E+00 &(  4.758E+00 1.24E+02 2.27E+01 G
                          99.50-4.164E-01 +   6.563E+00 4.61E+02 1.50E+01 X

TL-210   N   4.8231E-01                                      5.84E+05
                         799.60 4.823E-01 ?(  1.701E+00 1.03E+02 9.90E+01 G
                         296.00-4.323E-01 -   2.655E+00 1.82E+02 7.90E+01 G
                        1313.00 2.369E+00 ?   3.492E+00 4.47E+01 2.10E+01 GA

Kr-85    I   4.5338E+01                                      3.92E+03
                         513.98 4.534E+01 ?(  4.748E+02 3.03E+02 4.30E-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	66.	7.	0.004	198.98	2.416E+00	
AM-241	59.54	92.	6.	0.003	288.95	3.434E-01	P
Sn-126	64.28	155.	6.	0.003	348.57	1.257E+00	
BA-133	80.99	104.	-6.	-0.003	283.85	-2.877E-01	P
Np-237	86.49	502.	-19.	-0.011	164.41	-2.403E+00	
EU-155	86.54	483.	-19.	-0.011	161.25	-1.025E+00	
Sn-126	86.94	341.	17.	0.009	155.60	3.031E+00	
Sn-126	87.57	358.	6.	0.004	421.30	2.735E-01	
Gd-153	97.50	176.	-17.	-0.009	113.14	-8.781E-01	
Np-239	99.50	171.	-4.	-0.002	460.63	-4.164E-01	
Np-239	103.70	154.	-17.	-0.009	105.65	-1.095E+00	
EU-155	105.31	169.	-16.	-0.009	90.47	-1.189E+00	P
Np-239	106.13	211.	-17.	-0.009	124.40	-1.138E+00	
CO-57	122.06	117.	-16.	-0.009	96.37	-2.973E-01	
PA-234	131.29	220.	-17.	-0.009	128.81	-1.459E+00	
HF-181	133.02	237.	-12.	-0.007	177.55	-4.560E-01	
CO-57	136.47	296.	-19.	-0.011	129.79	-2.864E+00	
Tc-99m	140.51	229.	-17.	-0.010	125.98	-3.255E-01	
U-235	143.79	248.	-18.	-0.010	81.24	-2.764E+00	P
CE-141	145.44	255.	-18.	-0.010	129.80	-6.084E-01	
CE-139	165.85	68.	5.	0.003	277.86	1.184E-01	
Cf-251	176.60	70.	-14.	-0.008	109.65	-1.538E+00	
U-235	185.72	60.	30.	0.017	49.44	1.082E+00	
TH-229	193.51	64.	-5.	-0.003	277.12	-2.488E+00	P
U-235	205.33	77.	-16.	-0.009	102.00	-6.656E+00	
TH-229	210.85	67.	6.	0.003	255.65	4.178E+00	P
Cf-251	227.00	43.	12.	0.007	100.82	4.422E+00	
TH-227	235.97	311.	11.	0.006	234.30	2.070E+00	
TH-227	256.24	44.	4.	0.002	314.25	1.452E+00	
Cd-113m	263.70	47.	6.	0.004	157.63	2.747E+03	
BI-210M	265.83	54.	4.	0.002	281.15	1.976E-01	P
Hg-203	279.20	98.	-6.	-0.003	236.88	-2.010E-01	
I-131	284.30	55.	-14.	-0.008	75.89	-6.325E+00	P
TL-210	296.00	229.	-12.	-0.007	181.81	-4.323E-01	
PA-233	312.01	91.	7.	0.004	189.65	6.018E-01	P
Ir-192	316.49	84.	-13.	-0.007	102.18	-4.595E-01	
CR-51	320.08	87.	-4.	-0.002	352.29	-1.165E+00	
La-140	328.76	48.	1.	0.001	972.59	2.052E-01	
Cf-249	333.44	48.	-13.	-0.007	105.77	-2.582E+00	
Cs-136	340.57	148.	-12.	-0.007	148.02	-8.124E-01	
HF-181	345.83	124.	-3.	-0.002	537.11	-6.377E-01	
BA-133	356.00	163.	-11.	-0.006	161.43	-6.125E-01	
BA-133	383.84	77.	-12.	-0.006	102.60	-4.633E+00	P
Cf-249	387.95	80.	-12.	-0.006	112.01	-6.355E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SN-113	391.69	85.	10.	0.006	130.01	5.821E-01	P
SB-125	427.88	16.	7.	0.004	118.27	9.193E-01	P
AG-108M	433.94	32.	-12.	-0.006	71.23	-5.076E-01	P
PM-146	453.88	24.	4.	0.002	244.95	2.515E-01	
SB-125	463.37	51.	-7.	-0.004	116.88	-2.871E+00	P
Ir-192	468.06	64.	-8.	-0.005	142.36	-6.616E-01	
BE-7	477.59	40.	-9.	-0.005	108.24	-3.513E+00	
HF-181	482.00	30.	7.	0.004	112.17	3.883E-01	
La-140	487.02	36.	-10.	-0.006	83.28	-9.704E-01	P
RU-103	497.05	13.	7.	0.004	110.29	3.235E-01	P
RH-106	511.86	13.	76.	0.042	13.37	1.709E+01	
Kr-85	513.98	82.	4.	0.002	302.54	4.534E+01	
Ba-140	537.26	20.	-4.	-0.002	224.54	-7.714E-01	
CS-134	563.24	20.	2.	0.001	512.88	1.016E+00	P
CS-134	569.32	36.	-13.	-0.007	68.90	-4.306E+00	
PA-234	569.47	47.	2.	0.001	470.01	1.253E+00	
SB-125	600.50	230.	-13.	-0.007	168.33	-3.732E+00	
SB-124	602.73	218.	-14.	-0.008	66.43	-7.248E-01	P
CS-134	604.71	203.	-13.	-0.007	157.92	-6.888E-01	
RU-103	610.30	190.	-13.	-0.007	152.41	-1.183E+01	
AG-108M	614.28	177.	-13.	-0.007	146.89	-7.630E-01	
PM-144	618.06	119.	11.	0.006	139.57	6.036E-01	
RH-106	621.92	177.	-13.	-0.007	74.88	-7.218E+00	P
SB-125	635.89	9.	5.	0.003	89.27	2.553E+00	
I-131	636.97	16.	2.	0.001	248.67	1.765E+00	
AG-110M	657.76	20.	8.	0.005	85.50	4.829E-01	
CS-137	661.66	47.	-15.	-0.008	69.82	-9.983E-01	P
PM-144	696.54	35.	-10.	-0.005	128.42	-5.706E-01	
SB-124	722.79	29.	9.	0.005	87.48	5.204E+00	
ZR-95	724.20	50.	-12.	-0.007	85.55	-1.707E+00	P
BI-212	727.17	53.	-8.	-0.005	126.14	-6.804E+00	P
PM-146	735.72	13.	5.	0.003	159.32	1.316E+00	P
ZR-95	756.73	9.	5.	0.003	120.71	6.134E-01	
AG-110M	763.94	37.	-12.	-0.007	75.63	-3.495E+00	
NB-95	765.79	52.	2.	0.001	616.77	1.057E-01	
PA-234M	766.41	34.	10.	0.006	87.48	2.175E+02	
BI-212	785.42	10.	3.	0.002	219.85	1.563E+01	P
CS-134	795.87	17.	7.	0.004	88.46	5.547E-01	
TL-210	799.60	24.	7.	0.004	102.66	4.823E-01	
CS-134	801.95	32.	5.	0.003	173.46	3.629E+00	
CO-58	810.78	10.	5.	0.003	94.14	3.502E-01	P
La-140	815.77	15.	5.	0.003	115.38	1.467E+00	P
Cs-136	818.50	40.	-8.	-0.004	117.60	-5.334E-01	
MN-54	834.85	19.	3.	0.002	280.36	2.268E-01	
NB-94	871.10	18.	-6.	-0.004	99.11	-4.586E-01	
EU-154	873.23	25.	-1.	-0.001	714.14	-5.756E-01	
PA-234	880.53	31.	-9.	-0.005	93.62	-1.067E+01	
Sc-46	889.28	30.	8.	0.004	107.84	5.469E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Y-88	898.04	14.	3.	0.002	275.80	2.275E-01	P
AG-110M	937.49	14.	1.	0.001	800.00	2.182E-01	
PA-234	946.02	19.	-9.	-0.005	93.10	-4.935E+00	P
EU-154	996.33	51.	-13.	-0.007	84.27	-9.445E+00	
PA-234M	1001.00	22.	5.	0.003	132.16	5.038E+01	P
EU-154	1004.77	18.	6.	0.003	112.44	2.513E+00	
Co-56	1037.84	10.	3.	0.002	248.45	1.669E+00	P
Cs-136	1048.07	6.	6.	0.003	72.66	5.976E-01	
RH-106	1050.36	25.	-10.	-0.006	77.37	-5.323E+01	
BI-207	1063.66	20.	-5.	-0.003	143.06	-5.625E-01	P
Ga-68	1077.40	5.	6.	0.003	93.21	1.758E+01	
FE-59	1099.25	10.	-4.	-0.002	180.85	-6.066E-01	
ZN-65	1115.55	33.	1.	0.001	665.62	2.105E-01	
Ta-182	1121.30	24.	6.	0.003	122.29	1.495E+00	
CO-60	1173.24	10.	5.	0.003	159.61	4.165E-01	P
Ta-182	1189.05	5.	3.	0.002	173.74	1.695E+00	
Ta-182	1221.41	27.	-12.	-0.006	104.78	-4.046E+00	
Co-56	1238.28	33.	-13.	-0.007	58.91	-1.808E+00	P
NA-22	1274.53	16.	-2.	-0.001	291.55	-1.942E-01	
FE-59	1291.60	6.	2.	0.001	233.08	5.390E-01	P
TL-210	1313.00	0.	5.	0.003	44.72	2.369E+00	
CO-60	1332.50	16.	-7.	-0.004	78.91	-7.084E-01	P
AG-110M	1384.30	5.	2.	0.001	324.35	7.138E-01	
La-140	1596.21	6.	-2.	-0.001	343.80	-2.050E-01	
SB-124	1690.98	11.	-8.	-0.005	140.06	-2.172E+00	P
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	-3.5125E+00	-3.5125E+00	1.082E+02%	1.30E+01
NA-22	#A	-1.9420E-01	-1.9420E-01	2.915E+02%	2.07E+00
K-40		1.3792E+02	1.3792E+02	8.724E+00%	9.19E+00
Sc-46	#A	5.4693E-01	5.4693E-01	1.078E+02%	2.03E+00
CR-51	#A	-1.1650E+00	-1.1650E+00	3.523E+02%	1.42E+01
MN-54	#A	2.2675E-01	2.2675E-01	2.804E+02%	1.55E+00
FE-59	#A	-1.1023E-01	-1.1023E-01	1.475E+02%	2.65E+00
Co-56	#A	2.1772E-01	2.1772E-01	2.484E+02%	8.91E-01
CO-57	#A	-2.9733E-01	-2.9733E-01	9.637E+01%	9.62E-01
CO-58	#A	3.5019E-01	3.5019E-01	9.414E+01%	1.14E+00
CO-60	#A	-7.0835E-01	-7.0835E-01	7.891E+01%	2.15E+00
ZN-65	#A	2.1048E-01	2.1048E-01	6.656E+02%	5.04E+00
NB-94	#A	-2.7335E-02	-2.7335E-02	2.339E+03%	1.33E+00
ZR-95	#A	6.1341E-01	6.1341E-01	1.207E+02%	1.89E+00

NB-95	#A	1.0566E-01	1.0566E-01	6.168E+02%	2.30E+00
RU-103	#A	3.2352E-01	3.2353E-01	1.103E+02%	9.36E-01
RH-106	#A	-7.2178E+00	-7.2178E+00	7.488E+01%	3.46E+01
AG-108M	#A	-5.0763E-01	-5.0763E-01	7.123E+01%	1.27E+00
AG-110M	#A	3.1216E-01	3.1216E-01	8.550E+01%	3.16E+00
SN-113	#A	5.8211E-01	5.8211E-01	1.300E+02%	2.57E+00
SB-124	#A	-1.3720E-01	-1.3720E-01	5.492E+01%	3.77E+00
SB-125	#A	1.3711E+00	1.3711E+00	7.409E+01%	2.81E+00
I-131	#A	9.7639E-02	9.7643E-02	2.487E+02%	1.23E+00
Gd-153	#A	-8.7807E-01	-8.7807E-01	1.131E+02%	3.34E+00
Ga-68	#A	1.7443E+01	1.7577E+01	9.321E+01%	3.92E+01
Tc-99m	#A	-3.2506E-01	-3.2553E-01	1.260E+02%	1.38E+00
BA-133	#A	-6.1245E-01	-6.1245E-01	1.614E+02%	3.35E+00
CS-134	#A	8.5274E-01	8.5274E-01	8.846E+01%	1.67E+00
CS-137	#A	-9.9832E-01	-9.9832E-01	6.982E+01%	2.28E+00
CE-139	#A	1.1836E-01	1.1836E-01	2.779E+02%	9.11E-01
Ba-140	#A	-7.7141E-01	-7.7143E-01	2.245E+02%	4.54E+00
La-140	#A	1.3506E-01	1.3506E-01	1.154E+02%	1.70E+00
CE-141	#A	-6.0841E-01	-6.0842E-01	1.298E+02%	2.65E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.10E+01
PM-144	#A	1.6817E-02	1.6817E-02	9.483E+01%	1.78E+00
EU-152	#C	2.4850E+00	2.4850E+00	7.901E+01%	2.44E+00
EU-154	#A	7.4101E-01	7.4101E-01	1.124E+02%	1.84E+00
EU-155	#A	-1.1890E+00	-1.1890E+00	9.047E+01%	4.58E+00
HF-181	#A	3.8831E-01	3.8832E-01	1.122E+02%	1.50E+00
Ta-182	#A	1.5587E+00	1.5587E+00	1.062E+02%	6.36E+00
Hg-203	#A	-2.0095E-01	-2.0096E-01	2.369E+02%	1.64E+00
TL-208		2.8770E+00	2.8770E+00	1.870E+01%	9.82E-01
PM-146	#A	5.2509E-01	5.2509E-01	1.461E+02%	1.61E+00
Y-88	#A	1.1053E-01	1.1053E-01	2.758E+02%	9.81E-01
Cd-113m	#A	2.7466E+03	2.7466E+03	1.576E+02%	1.50E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.88E+01
Cf-251	#A	-1.5380E+00	-1.5380E+00	1.097E+02%	4.58E+00
Cf-249	#A	-6.3551E-01	-6.3551E-01	1.120E+02%	2.41E+00
Sn-126	#A	1.2575E+00	1.2575E+00	3.486E+02%	1.26E+01
PB-210	#A	1.9848E+01	1.9848E+01	4.707E+01%	2.53E+01
PB-212		1.0164E+01	1.0164E+01	8.411E+00%	1.50E+00
PB-214		7.6813E+00	7.6813E+00	1.230E+01%	1.78E+00
BI-207	#A	-5.6254E-01	-5.6254E-01	1.431E+02%	2.64E+00
BI-212	#A	-6.8042E+00	-6.8042E+00	1.261E+02%	2.94E+01
U-235	#A	-2.7644E+00	-2.7644E+00	8.124E+01%	1.14E+01
BI-214	#	8.7420E+00	8.7420E+00	1.303E+01%	1.79E+00
BI-210M	#A	1.9757E-01	1.9757E-01	2.811E+02%	1.94E+00
AC-228		1.2944E+01	1.2944E+01	1.200E+01%	1.86E+00
TH-227	#A	2.0130E+00	2.0130E+00	1.465E+02%	1.22E+01
TH-229	#A	2.0934E-01	2.0934E-01	1.885E+02%	1.84E+01
TH-234	#A	3.2599E+00	3.2599E+00	1.284E+02%	1.41E+01
PA-231	#A	2.0258E+00	2.0258E+00	9.592E+02%	6.66E+01
PA-233	#A	6.0175E-01	6.0175E-01	1.897E+02%	3.91E+00

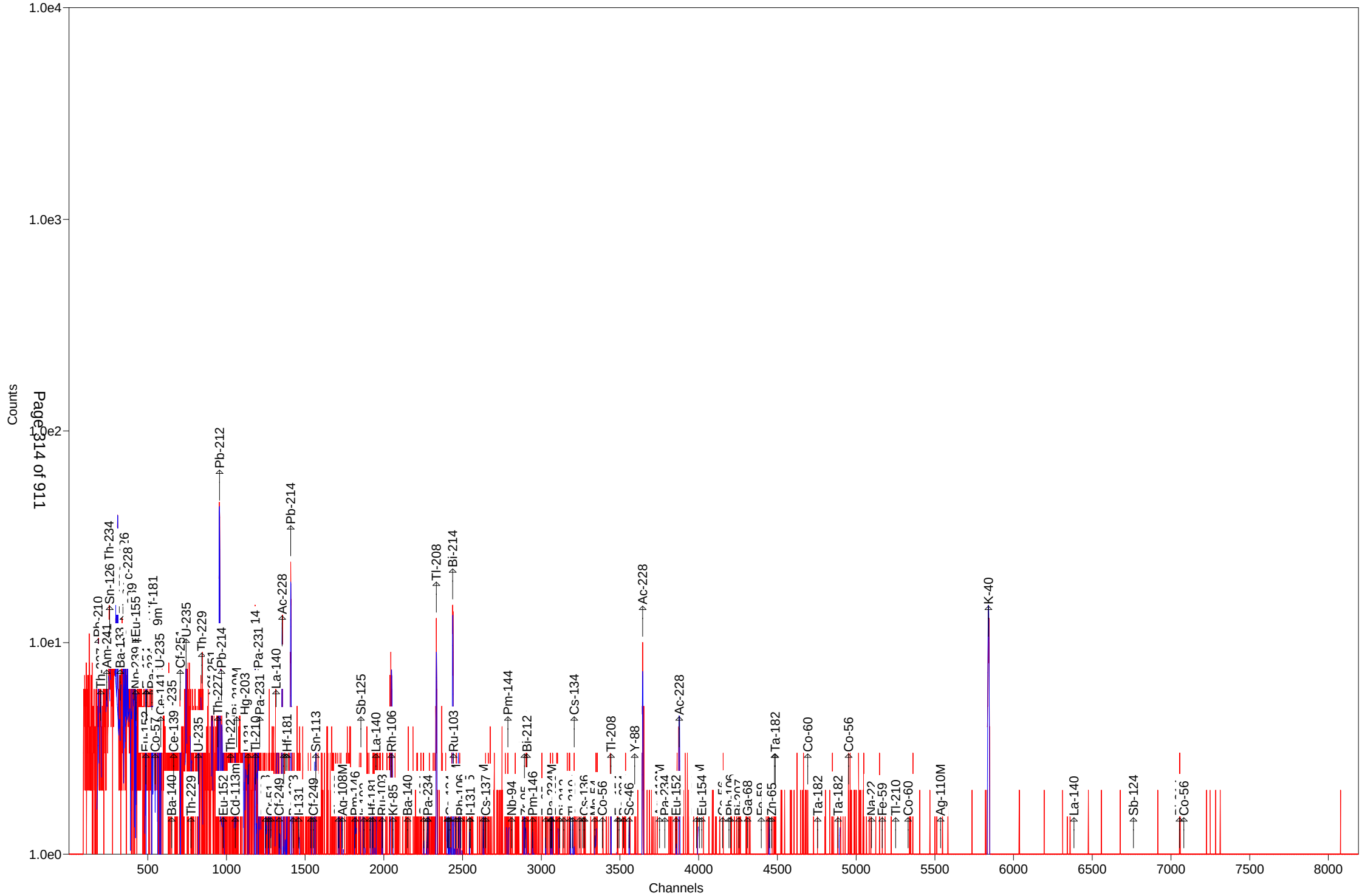
PA-234 #A	-6.1041E-01	-6.1041E-01	1.288E+02%		6.32E+00
PA-234M#A	9.3835E+01	9.3835E+01	7.925E+01%		2.33E+02
AM-241 #A	3.4336E-01	3.4336E-01	2.889E+02%		2.90E+00
Np-237 #A	-2.4029E+00	-2.4029E+00	1.644E+02%		1.32E+01
Ir-192 #A	-4.5949E-01	-4.5950E-01	1.022E+02%		1.58E+00
Cs-136 #A	-3.0729E-02	-3.0730E-02	6.912E+01%		2.15E+00
Np-239 #A	-1.1380E+00	-1.1381E+00	1.244E+02%		4.76E+00
Nd-147 #A	0.0000E+00	0.0000E+00	7.071E+02%		7.65E+00
TL-210 #A	4.8231E-01	4.8231E-01	1.027E+02%		1.70E+00
Kr-85 #A	4.5338E+01	4.5338E+01	3.025E+02%		4.75E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.8 keV) 2.002E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 2.0017155E+02 Bq/Sample

412881_Gamma_180-86110-A-1-A. 5_Gamma_20190285.spc.



Test America St. Louis Spectrum ID: 9_Gamma_20190340

Sample Description: 412881_Gamma_180-86110-A-1-B DU
Detector: Detector # 9
Batch ID: 412881
Work Order Number: Gamma
Lot Number: 180-86110-A-1-B DU

Decay to Time: 2/20/2019 09:33 Live Time: 1800 sec
Acquisition Time: 2/20/2019 09:33:13 Real Time: 1803 sec
Analysis Time: 2/20/2019 10:03 Dead Time: 0.19 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 9_Soil_TunaCan.Clb
Efficiency Cal Desc: 9_Soil_TunaCan_90099_050312
Efficiency Cal Date: 6/14/2012 10:19
Energy Cal Date: 3/1/2012 13:57
Library: Client_Long_Rev15.lib
Bkgd Correction File: 9_2019-01-20_1010.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	97.8	2.173E+00	2.176E+00	7.385E+00
NA-22	3.568E-01	64.0	2.283E-01	2.290E-01	7.452E-01
K-40	1.347E+02	6.5	8.717E+00	1.111E+01	7.896E+00
Sc-46	-5.746E-01	62.2	3.574E-01	3.586E-01	1.562E+00
CR-51	-3.314E+00	69.0	2.285E+00	2.292E+00	9.870E+00
MN-54	3.038E-01	90.7	2.756E-01	2.761E-01	6.390E-01
FE-59	5.760E-02	1278.3	7.363E-01	7.363E-01	1.728E+00
Co-56	-1.335E-03	205.5	2.744E-03	2.745E-03	9.636E-01
CO-57	0.000E+00	1.#INF	9.158E-02	9.159E-02	7.088E-01
CO-58	-2.880E-01	117.3	3.377E-01	3.381E-01	1.159E+00
CO-60	6.642E-01	25.9	1.722E-01	1.754E-01	3.900E-01
ZN-65	5.987E-01	141.6	8.475E-01	8.480E-01	2.931E+00
NB-94	2.843E-01	117.3	3.335E-01	3.338E-01	1.141E+00
ZR-95	-8.109E-01	103.8	8.419E-01	8.430E-01	1.889E+00
NB-95	2.757E-01	89.9	2.479E-01	2.483E-01	8.443E-01
RU-103	-7.569E-02	415.7	3.146E-01	3.146E-01	7.332E-01
RH-106	-3.315E+00	107.8	3.573E+00	3.577E+00	2.247E+01
AG-108M	8.404E-02	338.5	2.845E-01	2.845E-01	7.096E-01
AG-110M	4.045E-01	77.9	3.151E-01	3.158E-01	1.719E+00
SN-113	2.832E-01	149.5	4.233E-01	4.236E-01	1.447E+00
SB-124	-1.759E-01	82.6	1.453E-01	1.456E-01	2.680E+00
SB-125	8.226E-01	89.1	7.333E-01	7.345E-01	1.839E+00
I-131	2.417E-01	129.0	3.117E-01	3.120E-01	7.849E-01
Gd-153	5.390E-01	144.7	7.798E-01	7.805E-01	4.687E+00
Ga-68	5.252E+00	229.3	1.204E+01	1.205E+01	2.825E+01
Tc-99m	0.000E+00	1.#INF	1.531E-01	1.531E-01	1.254E+00
BA-133	-8.941E-02	755.7	6.757E-01	6.757E-01	2.305E+00
CS-134	6.694E-01	80.2	5.368E-01	5.379E-01	1.111E+00
CS-137	-3.602E-02	1063.0	3.829E-01	3.829E-01	1.354E+00
CE-139	-3.001E-01	97.6	2.929E-01	2.943E-01	9.799E-01
Ba-140	-2.006E+00	62.2	1.248E+00	1.252E+00	4.081E+00
La-140	4.483E-01	36.4	1.632E-01	1.649E-01	4.733E-01
CE-141	-5.091E-01	138.9	7.069E-01	7.074E-01	2.364E+00

CE-144	2.020E+00	145.9	2.946E+00	2.948E+00	9.860E+00
PM-144	1.289E-01	262.2	3.380E-01	3.381E-01	1.181E+00
EU-152	8.413E-01	69.3	5.828E-01	5.844E-01	2.110E+00
EU-154	2.772E-01	74.6	2.066E-01	2.071E-01	1.422E+00
EU-155	1.005E+00	151.0	1.518E+00	1.519E+00	5.082E+00
HF-181	2.930E-01	107.6	3.153E-01	3.156E-01	1.073E+00
Ta-182	1.489E+00	72.8	1.084E+00	1.086E+00	4.459E+00
Hg-203	-3.327E-01	93.8	3.122E-01	3.128E-01	1.047E+00
TL-208	3.312E+00	11.8	3.920E-01	4.280E-01	6.193E-01
PM-146	7.247E-02	81.4	5.897E-02	5.908E-02	1.300E+00
Y-88	3.113E-01	43.8	1.363E-01	1.375E-01	5.109E-01
Cd-113m	-9.288E+02	357.4	3.320E+03	3.320E+03	1.154E+04
Cd-109	0.000E+00	1.#INF	1.218E+01	1.218E+01	4.065E+01
Cf-251	6.705E-01	205.7	1.379E+00	1.381E+00	3.587E+00
Cf-249	3.526E-01	110.0	3.879E-01	3.884E-01	1.316E+00
Sn-126	-2.935E+00	128.0	3.756E+00	3.759E+00	1.258E+01
PB-210	-3.295E+00	242.4	7.985E+00	7.987E+00	3.624E+01
PB-212	1.144E+01	6.1	6.928E-01	1.014E+00	1.058E+00
PB-214	7.947E+00	10.2	8.103E-01	9.094E-01	1.394E+00
BI-207	-3.165E-01	201.6	6.380E-01	6.382E-01	1.438E+00
BI-212	3.274E+00	124.0	4.060E+00	4.064E+00	1.397E+01
U-235	5.204E-01	263.6	1.372E+00	1.372E+00	1.002E+01
BI-214	6.964E+00	10.8	7.549E-01	8.372E-01	1.129E+00
BI-210M	3.471E-01	124.9	4.336E-01	4.341E-01	1.472E+00
AC-228	1.208E+01	10.2	1.229E+00	1.375E+00	9.956E-01
TH-227	1.868E+00	138.1	2.580E+00	2.583E+00	8.921E+00
TH-229	4.679E+00	106.3	4.976E+00	4.990E+00	1.453E+01
TH-234	5.722E+00	67.7	3.874E+00	3.887E+00	2.598E+01
PA-231	5.999E+00	219.6	1.317E+01	1.318E+01	5.663E+01
PA-233	-3.850E-02	1599.4	6.158E-01	6.158E-01	4.705E+00
PA-234	2.250E-01	144.0	3.240E-01	3.242E-01	5.953E+00
PA-234M	-2.299E+01	164.0	3.771E+01	3.772E+01	2.068E+02
AM-241	-1.018E+00	65.8	6.694E-01	6.715E-01	3.337E+00
Np-237	0.000E+00	1.#INF	3.555E+00	3.556E+00	1.187E+01
Ir-192	4.134E-01	89.5	3.701E-01	3.709E-01	1.719E+00
Cs-136	-5.143E-01	86.0	4.421E-01	4.431E-01	1.484E+00
Np-239	-1.012E+00	106.8	1.081E+00	1.082E+00	3.614E+00
Nd-147	-1.137E+00	216.2	2.458E+00	2.459E+00	6.047E+00
TL-210	2.873E-01	112.8	3.241E-01	3.246E-01	1.112E+00
Kr-85	8.290E+01	108.8	9.023E+01	9.036E+01	3.043E+02
Total	3.037E+02				

Analyst: kody Saulters

Sample description
412881_Gamma_180-86110-A-1-B DU

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20190340.An1

Acquisition information
Start time: 2/20/2019 9:33:13 AM
Live time: 1800
Real time: 1803
Dead time: 0.19 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/14/2012 10:19:51 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.30 %
Log(Eff): -8.079856E-01 + (-2.367265E-01*Log(E)) + (-3.950640E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -2.387916E+01 + (8.875647E+00*Log(E)) + (-9.401100E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev15.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.08keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	2/20/2019 9:33:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2019-01-20_1010.PBC 1/20/2019 10:10:08 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 22 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1566

***** 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	14.	138.14	1.00	2.900E-02	50.14	8.000	PBC<MDA	TH227
63.09	19.	67.70	1.01	3.921E-02	63.29	3.810	PBC<MDA	TH234
77.15	169.	15.21	1.04	4.678E-02				
87.32	77.	20.18	1.04	5.031E-02	86.49	13.100	6.493E+00	Np237
					86.54	30.700	2.770E+00	EU155
					86.94	9.040	9.386E+00	Sn126
					87.57	37.500	2.255E+00	Sn126
					88.04	3.790	2.226E+01	Cd109
90.03	40.	32.88	1.04	5.099E-02				
92.56	24.	166.03	1.04	5.156E-02	92.59	5.584	PBC<MDA	TH234
93.32	51.	33.08	1.04	5.171E-02	93.35	5.561	PBC<MDA	AC228
97.50	6.	635.38	1.05	5.240E-02	97.50	30.000	PBC<MDA	Gd153
103.20	20.	144.68	1.05	5.303E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	8.881E-01	Np239
103.70	20.	147.97	1.05	5.307E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	8.885E-01	Np239
105.31	20.	151.02	1.05	5.318E-02	105.31	21.200	PBC<MDA	EU155
133.54	21.	145.86	1.08	5.189E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	2.020E+00	CE144
162.66	18.	96.44	1.11	4.690E-02	162.66	6.220	PBC<MDA	Ba140
163.38	7.	263.64	1.11	4.676E-02	163.38	5.080	PBC<MDA	U235
176.60	9.	205.72	1.12	4.549E-02	176.60	17.000	PBC<MDA	Cf251

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
185.72	22.	93.65	1.13	4.403E-02	185.72	54.000	PBC<MDA	U235
193.51	12.	167.59	1.14	4.287E-02	193.51	4.400	PBC<MDA	TH229
210.85	14.	130.93	1.15	4.052E-02	210.85	2.990	PBC<MDA	TH229
227.00	14.	100.51	1.17	3.858E-02	227.00	6.300	PBC<MDA	Cf251
235.97	15.	214.25	1.18	3.760E-02	235.97	12.300	PBC<MDA	TH227
238.42	317.	7.27	1.14	3.734E-02	238.63	43.300	1.089E+01	PB212
241.86	49.	24.79	1.18	3.697E-02	242.00	7.430	9.893E+00	PB214
265.83	11.	124.94	1.20	3.470E-02	265.83	50.000	PBC<MDA	BI210M
277.66	36.	34.54	1.22	3.372E-02	277.28	6.310	9.510E+00	TL208
295.09	67.	18.52	1.23	3.232E-02	295.09	19.300	5.929E+00	PB214
300.03	11.	93.44	1.24	3.195E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	7.468E+00	PA231
					300.18	6.200	2.964E+00	PA233
300.07	6.	485.50	1.24	3.195E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	4.051E+00	PA231
					300.18	6.200	1.608E+00	PA233
302.65	13.	219.57	1.24	3.176E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.205E+00	BA133
316.49	16.	151.79	1.25	3.080E-02	316.49	87.040	PBC<MDA	Ir192
337.77	67.	17.54	1.65	2.940E-02	338.32	12.010	1.059E+01	AC228
344.29	2.	520.42	1.28	2.905E-02	344.29	26.500	PBC<MDA	EU152
351.77	154.	10.20	1.25	2.861E-02	351.93	37.600	7.947E+00	PB214
364.48	10.	128.97	1.29	2.791E-02	364.48	81.700	PBC<MDA	I131
383.84	11.	105.48	1.31	2.691E-02	383.84	8.940	PBC<MDA	BA133
387.95	11.	110.02	1.31	2.671E-02	387.95	66.000	PBC<MDA	Cf249
391.69	9.	149.47	1.32	2.653E-02	391.69	64.000	PBC<MDA	SN113
427.88	2.	412.43	1.35	2.491E-02	427.88	29.600	PBC<MDA	SB125
433.94	3.	338.54	1.35	2.466E-02	433.94	90.480	PBC<MDA	AG108M
463.37	12.	89.14	1.38	2.352E-02	463.37	10.470	PBC<MDA	SB125
468.06	12.	94.96	1.38	2.335E-02	468.06	51.750	PBC<MDA	Ir192
477.60	10.	97.81	1.39	2.301E-02	477.60	10.520	PBC<MDA	BE7
482.00	10.	107.58	1.40	2.286E-02	482.00	80.500	PBC<MDA	HF181
487.02	6.	200.35	1.40	2.269E-02	487.02	45.500	PBC<MDA	La140
511.86	53.	24.20	2.67	2.188E-02	511.86	20.000	6.739E+00	RH106
513.98	14.	108.84	1.42	2.182E-02	513.98	0.430	PBC<MDA	Kr85
563.24	10.	105.40	1.47	2.040E-02	563.24	8.350	PBC<MDA	CS134
567.84	2.	374.17	1.47	2.024E-02	569.47	8.200	PBC<MDA	PA234
569.32	4.	201.03	1.47	2.024E-02	569.70	97.740	PBC<MDA	BI207
583.07	100.	11.84	1.20	1.989E-02	583.02	84.500	3.312E+00	TL208
609.13	111.	10.84	1.56	1.925E-02	609.31	46.090	6.964E+00	BI214
696.54	4.	262.20	1.58	1.741E-02	696.54	99.000	PBC<MDA	PM144
702.63	9.	117.29	1.58	1.730E-02	702.63	97.900	PBC<MDA	NB94
722.79	11.	86.28	1.60	1.693E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.034E-01	AG108M
					723.36	20.220	1.813E+00	EU154
723.36	10.	92.32	1.60	1.692E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.477E-01	AG108M
					723.36	20.220	1.563E+00	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
724.20	4.	259.04	1.60	1.691E-02	724.20	44.150	PBC<MDA	ZR95
727.17	8.	124.01	1.60	1.686E-02	727.17	7.550	PBC<MDA	BI212
747.16	10.	87.56	1.62	1.651E-02	747.16	34.000	PBC<MDA	PM146
763.94	8.	77.90	1.63	1.624E-02	763.94	22.280	PBC<MDA	AG110M
765.79	8.	89.90	1.63	1.621E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	9.365E+01	PA234M
795.87	10.	80.19	1.66	1.574E-02	795.87	85.530	PBC<MDA	CS134
799.60	8.	112.81	1.66	1.568E-02	799.60	98.960	PBC<MDA	TL210
834.85	8.	90.72	1.69	1.517E-02	834.85	99.980	PBC<MDA	MN54
883.42	2.	501.66	1.72	1.453E-02	883.24	9.600	PBC<MDA	PA234
884.68	3.	297.65	1.73	1.451E-02	884.68	72.680	PBC<MDA	AG110M
898.04	5.	139.81	1.74	1.434E-02	898.04	93.700	PBC<MDA	Y88
910.96	94.	10.31	0.88	1.418E-02	911.07	29.000	1.270E+01	AC228
946.09	5.	176.07	1.77	1.377E-02	946.02	13.400	PBC<MDA	PA234
964.11	14.	69.27	1.79	1.357E-02	964.11	14.605	PBC<MDA	EU152
969.13	12.	84.08	1.79	1.352E-02	968.97	17.460	PBC<MDA	AC228
1077.40	3.	229.35	1.87	1.244E-02	1077.40	3.300	PBC<MDA	Ga68
1115.55	7.	141.56	1.90	1.210E-02	1115.55	50.600	PBC<MDA	ZN65
1120.33	9.	95.95	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	9.	108.14	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	4.357E-01	Sc46
					1121.30	34.900	1.249E+00	Ta182
1121.35	9.	105.92	1.90	1.205E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.235E+00	Ta182
1173.24	16.	42.20	1.94	1.163E-02	1173.24	99.900	7.464E-01	CO60
1189.05	8.	109.13	1.95	1.150E-02	1189.05	16.200	PBC<MDA	Ta182
1220.89	7.	156.67	1.97	1.126E-02	1221.41	27.000	PBC<MDA	Ta182
1238.28	4.	344.44	1.98	1.114E-02	1238.28	66.070	PBC<MDA	Co56
1274.53	7.	63.99	2.01	1.088E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.013E+00	EU154
1274.54	1.	383.19	2.01	1.088E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.954E-01	EU154
1332.50	11.	30.15	2.05	1.050E-02	1332.50	99.980	5.821E-01	CO60
1408.00	9.	35.81	2.10	1.004E-02	1408.00	21.005	2.265E+00	EU152
1460.41	252.	6.47	1.93	9.749E-03	1460.83	10.670	1.347E+02	K40
1596.21	8.	36.40	2.22	9.069E-03	1596.21	95.400	5.053E-01	La140
1764.61	4.	131.37	2.31	8.350E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	4.	157.31	2.32	8.323E-03	1771.35	15.480	PBC<MDA	Co56
1836.06	6.	43.80	2.35	8.079E-03	1836.06	99.200	PBC<MDA	Y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
308.19	77.15	123.	169.	3.613E+03	15.21	1.044	-

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Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
359.45	90.00	72.	36.	7.134E+02	36.93	1.040	- sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev15.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	217.	-6.	-0.004	242.36	0.998
TH-227	200.20	50.14	180.	14.	0.008	138.14	1.001s
AM-241	237.77	59.54	267.	-24.	-0.013	65.76	1.010s
TH-234	252.77	63.29	77.	19.	0.011	67.70	1.014D
Sn-126	256.74	64.28	332.	-20.	-0.011	127.97	1.015s
BA-133	323.56	80.99	637.	-32.	-0.018	114.17	1.031s
Np-237	345.55	86.49	870.	0.	0.000	189.11	1.036A
EU-155	345.76	86.54	942.	-24.	-0.013	180.78	1.036s
Sn-126	347.35	86.94	893.	-24.	-0.013	176.01	1.037
Sn-126	349.87	87.57	788.	-24.	-0.013	165.43	1.037s
Cd-109	351.75	88.04	869.	0.	0.000	173.45	1.038A
Nd-147	363.99	91.10	766.	-5.	-0.003	776.74	1.041s
TH-234	369.94	92.59	802.	24.	0.013	166.03	1.042
AC-228	372.98	93.35	117.	51.	0.028	33.08	1.043D
Gd-153	389.58	97.50	777.	6.	0.003	635.38	1.047s
Gd-153	412.37	103.20	424.	20.	0.011	144.68	1.052s
Np-239	414.37	103.70	444.	20.	0.011	147.97	1.053s
EU-155	420.82	105.31	464.	20.	0.011	151.02	1.054s
Np-239	424.09	106.13	265.	-22.	-0.012	106.82	1.055s
CO-57	487.80	122.06	140.	0.	0.000	1000.00	1.070s
EU-154	491.95	123.10	127.	-14.	-0.008	117.08	1.071s
PA-234	524.72	131.29	441.	-21.	-0.012	143.98	1.079s
HF-181	531.64	133.02	421.	-21.	-0.012	140.40	1.081s
CE-144	533.69	133.54	455.	21.	0.012	145.86	1.081s
CO-57	545.43	136.47	433.	0.	0.000	1000.00	1.084s
Tc-99m	561.57	140.51	433.	0.	0.000	1000.00	1.088
U-235	574.67	143.79	433.	0.	0.000	1000.00	1.091s
CE-141	581.29	145.44	461.	-22.	-0.012	138.87	1.092
Ba-140	650.15	162.66	150.	18.	0.010	96.44	1.108s
U-235	653.03	163.38	168.	7.	0.004	263.64	1.109s
CE-139	662.92	165.85	189.	-20.	-0.011	97.61	1.111s
Cf-251	705.90	176.60	103.	9.	0.005	205.72	1.122s
U-235	742.37	185.72	117.	22.	0.012	93.65	1.130
TH-229	773.52	193.51	100.	12.	0.007	167.59	1.137

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	820.80	205.33	100.	-6.	-0.004	313.33	1.148
TH-229	842.87	210.85	84.	14.	0.008	130.93	1.153s
Cf-251	907.45	227.00	48.	14.	0.008	100.51	1.168s
TH-227	943.33	235.97	530.	15.	0.009	214.25	1.176s
PB-212	953.97	238.63	36.	333.	0.185	6.06	1.179D
PB-214	967.43	242.00	49.	49.	0.027	24.79	1.182D
EU-152	978.21	244.69	567.	-13.	-0.007	251.39	1.185s
Cd-113m	1054.23	263.70	76.	-4.	-0.002	357.43	1.202s
BI-210M	1062.75	265.83	86.	11.	0.006	124.94	1.204
TL-208	1110.05	277.66	27.	36.	0.020	34.54	1.220
Hg-203	1116.22	279.20	110.	-16.	-0.009	93.84	1.216
I-131	1136.61	284.30	60.	-2.	-0.001	548.23	1.221s
PB-214	1179.77	295.09	42.	67.	0.037	18.52	1.231D
TL-210	1183.41	296.00	401.	-11.	-0.006	268.76	1.231D
PB-212	1199.52	300.03	368.	11.	0.006	93.44	1.235D
PA-231	1199.68	300.07	384.	6.	0.003	485.50	1.235
PA-233	1200.12	300.18	390.	0.	0.000	1000.00	1.235
PA-231	1210.00	302.65	377.	13.	0.007	219.57	1.237s
BA-133	1210.81	302.85	390.	0.	0.000	1000.00	1.238s
Ba-140	1218.80	304.85	390.	0.	0.000	1000.00	1.240
BI-210M	1218.99	304.90	390.	0.	0.000	1000.00	1.240
Ir-192	1233.16	308.44	390.	0.	0.000	1000.00	1.243s
Ir-192	1265.35	316.49	296.	16.	0.009	151.79	1.250s
CR-51	1279.73	320.08	121.	-18.	-0.010	68.96	1.253
La-140	1314.43	328.76	252.	-16.	-0.009	144.12	1.261s
Cf-249	1333.15	333.44	236.	-16.	-0.009	139.20	1.265s
AC-228	1350.47	337.77	17.	67.	0.037	17.54	1.651s
EU-152	1376.53	344.29	45.	2.	0.001	520.42	1.275s
HF-181	1382.70	345.83	61.	-3.	-0.002	372.68	1.276s
PB-214	1406.47	351.77	27.	154.	0.085	10.20	1.253
BA-133	1423.37	356.00	228.	-3.	-0.002	755.74	1.285s
I-131	1457.31	364.48	40.	10.	0.006	128.97	1.293s
BA-133	1534.73	383.84	59.	11.	0.006	105.48	1.310s
Cf-249	1551.17	387.95	70.	11.	0.006	110.02	1.314s
SN-113	1566.12	391.69	79.	9.	0.005	149.47	1.317s
SB-125	1710.86	427.88	22.	2.	0.001	412.43	1.349s
AG-108M	1735.10	433.94	31.	3.	0.002	338.54	1.354s
PM-146	1814.87	453.88	52.	-11.	-0.006	137.17	1.372s
SB-125	1852.82	463.37	49.	12.	0.007	89.14	1.380s
Ir-192	1871.59	468.06	57.	12.	0.007	94.96	1.384s
BE-7	1909.73	477.60	40.	10.	0.005	97.81	1.392
HF-181	1927.34	482.00	50.	10.	0.005	107.58	1.396s
La-140	1947.43	487.02	72.	6.	0.003	200.35	1.400s
RU-103	1987.56	497.05	27.	-3.	-0.002	415.66	1.409s
RH-106	2046.81	511.86	56.	53.	0.029	24.20	2.672s
Kr-85	2055.27	513.98	109.	14.	0.008	108.84	1.424s
Nd-147	2123.35	531.00	35.	-6.	-0.003	216.21	1.438s
Ba-140	2148.39	537.26	57.	-19.	-0.010	62.19	1.444s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	2252.30	563.24	24.	10.	0.006	105.40	1.466s
CS-134	2276.64	569.32	25.	4.	0.002	201.03	1.471s
PA-234	2277.24	569.47	27.	2.	0.001	374.17	1.471s
BI-207	2278.16	569.70	33.	-4.	-0.002	255.47	1.471s
TL-208	2331.63	583.07	12.	100.	0.056	11.84	1.202
SB-125	2401.36	600.50	387.	-20.	-0.011	60.15	1.497s
SB-124	2410.29	602.73	367.	-19.	-0.011	140.79	1.499s
CS-134	2418.21	604.71	348.	-20.	-0.011	136.94	1.500s
BI-214	2435.87	609.13	11.	111.	0.062	10.84	1.558
RU-103	2440.56	610.30	328.	-20.	-0.011	132.73	1.505s
AG-108M	2456.49	614.28	308.	-20.	-0.011	128.56	1.508s
PM-144	2471.62	618.06	289.	-20.	-0.011	124.27	1.512s
RH-106	2487.04	621.92	248.	-11.	-0.006	107.79	1.515s
SB-125	2542.94	635.89	34.	-11.	-0.006	80.80	1.526s
I-131	2547.28	636.97	43.	0.	0.000	1000.00	1.527s
AG-110M	2630.43	657.76	45.	-12.	-0.007	100.03	1.544s
PM-144	2785.58	696.54	53.	4.	0.002	262.20	1.576s
NB-94	2809.93	702.63	47.	9.	0.005	117.29	1.581s
SB-124	2890.57	722.79	41.	11.	0.006	86.28	1.598s
AG-108M	2891.17	722.94	52.	0.	0.000	1000.00	1.598s
EU-154	2892.86	723.36	35.	10.	0.005	92.32	1.598s
ZR-95	2896.22	724.20	44.	4.	0.002	259.04	1.599s
BI-212	2908.11	727.17	40.	8.	0.004	124.01	1.601s
PM-146	2942.31	735.72	23.	-3.	-0.002	312.25	1.608s
PM-146	2988.08	747.16	14.	10.	0.005	87.56	1.617s
ZR-95	3026.36	756.73	35.	-13.	-0.007	103.82	1.625s
AG-110M	3055.23	763.94	14.	8.	0.004	77.90	1.631s
NB-95	3062.61	765.79	22.	8.	0.004	89.90	1.632s
PA-234M	3065.10	766.41	16.	0.	0.000	1000.00	1.633s
EU-152	3115.14	778.92	40.	-5.	-0.003	281.66	1.643s
BI-212	3141.15	785.42	70.	-7.	-0.004	165.89	1.648s
CS-134	3182.96	795.87	27.	10.	0.006	80.19	1.656s
TL-210	3197.88	799.60	37.	8.	0.004	112.81	1.659s
CS-134	3207.29	801.95	45.	0.	0.000	1000.00	1.661
CO-58	3242.59	810.78	40.	-8.	-0.004	117.26	1.668s
La-140	3262.58	815.77	48.	0.	0.000	1000.00	1.672s
Cs-136	3273.50	818.50	68.	-14.	-0.008	85.98	1.674s
MN-54	3338.91	834.85	10.	8.	0.005	90.72	1.687s
Co-56	3386.61	846.77	25.	-5.	-0.003	224.35	1.696s
NB-94	3483.94	871.10	51.	-17.	-0.009	64.45	1.715s
EU-154	3492.47	873.23	61.	-1.	-0.001	759.64	1.717s
PA-234	3521.68	880.53	45.	-7.	-0.004	146.97	1.722
PA-234	3532.53	883.24	49.	2.	0.001	501.66	1.724s
AG-110M	3538.30	884.68	41.	3.	0.002	297.65	1.725s
Sc-46	3556.69	889.28	66.	-15.	-0.008	62.20	1.729s
Y-88	3591.74	898.04	11.	5.	0.003	139.81	1.736s
AC-228	3643.44	910.96	0.	94.	0.052	10.31	0.878s
AG-110M	3749.60	937.49	30.	-11.	-0.006	113.55	1.766s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	3783.72	946.02	15.	5.	0.003	176.07	1.772s
EU-152	3856.11	964.11	39.	14.	0.008	69.27	1.786s
AC-228	3875.56	968.97	49.	12.	0.007	84.08	1.790s
EU-154	3985.03	996.33	53.	-14.	-0.008	78.06	1.810s
PA-234M	4003.71	1001.00	68.	-5.	-0.003	164.04	1.814s
RH-106	4201.23	1050.36	33.	-8.	-0.004	95.10	1.850s
BI-207	4254.46	1063.66	21.	-5.	-0.003	201.56	1.860s
Ga-68	4309.44	1077.40	11.	3.	0.002	229.35	1.870s
ZN-65	4462.09	1115.55	40.	7.	0.004	141.56	1.897s
BI-214	4481.06	1120.29	30.	9.	0.005	95.95	1.901
Sc-46	4482.12	1120.55	48.	9.	0.005	108.14	1.901
Ta-182	4485.12	1121.30	44.	9.	0.005	105.92	1.901s
CO-60	4692.96	1173.24	5.	16.	0.009	42.20	1.938s
Ta-182	4756.25	1189.05	11.	8.	0.004	109.13	1.949
Ta-182	4885.75	1221.41	23.	7.	0.004	156.67	1.972s
Co-56	4953.27	1238.28	28.	4.	0.002	344.44	1.984s
NA-22	5098.35	1274.53	6.	7.	0.004	63.99	2.008s
EU-154	5098.39	1274.54	13.	1.	0.001	383.19	2.008s
FE-59	5166.65	1291.60	17.	-5.	-0.003	198.49	2.020s
TL-210	5252.32	1313.00	17.	-5.	-0.003	198.49	2.034s
CO-60	5330.37	1332.50	0.	11.	0.006	30.15	2.047s
AG-110M	5537.69	1384.30	17.	-10.	-0.006	101.73	2.082s
EU-152	5632.56	1408.00	0.	9.	0.005	35.81	2.097s
K-40	5842.34	1460.41	7.	252.	0.140	6.47	1.926
La-140	6385.95	1596.21	0.	8.	0.004	36.40	2.215s
SB-124	6765.35	1690.98	7.	-3.	-0.001	116.52	2.272s
BI-214	7059.65	1764.49	12.	4.	0.002	131.37	2.314s
Co-56	7087.11	1771.35	19.	4.	0.002	157.31	2.318s
Y-88	7346.20	1836.06	0.	6.	0.003	43.80	2.354s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	2.2217E+00				5.31E+01	
			477.60	2.222E+00	(	7.385E+00 9.78E+01 1.05E+01	G
NA-22	C	3.5682E-01				9.50E+02	
			1274.53	3.568E-01	?(	7.452E-01 6.40E+01 9.99E+01	G
K-40	N	1.3474E+02				4.66E+11	
			1460.83	1.347E+02	(P	7.896E+00 6.47E+00 1.07E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sc-46	F -5.7461E-01					8.38E+01	
		889.28	-5.746E-01	?(P	1.562E+00	6.22E+01	1.00E+02 G
		1120.55	4.357E-01	+	1.605E+00	1.08E+02	1.00E+02 G
CR-51	F -3.3138E+00					2.77E+01	
		320.08	-3.314E+00	(P	9.870E+00	6.90E+01	9.94E+00 G
MN-54	C 3.0384E-01					3.12E+02	
		834.85	3.038E-01	?(	6.390E-01	9.07E+01	1.00E+02 G
FE-59	F 5.7599E-02					4.45E+01	
		1099.25	5.760E-02	%(P	1.728E+00	1.28E+03	5.65E+01 G
		1291.60	-5.971E-01	+	2.618E+00	1.98E+02	4.32E+01 G
Co-56	C -1.3350E-03					7.73E+01	
		846.77	-1.852E-01	?(	9.636E-01	2.24E+02	9.99E+01 G
		1238.28	2.768E-01	?(	2.077E+00	3.44E+02	6.61E+01 G
		1037.84	2.046E-01	%	7.438E+00	1.58E+03	1.41E+01 G
		1771.35	1.774E+00	?	9.900E+00	1.57E+02	1.55E+01 A
CO-58	C -2.8802E-01					7.09E+01	
		810.78	-2.880E-01	?(	1.159E+00	1.17E+02	9.95E+01 G
CO-60	F 6.6420E-01					1.93E+03	
		1332.50	5.821E-01	?(	3.900E-01	3.02E+01	1.00E+02 G
		1173.24	7.464E-01	?(P	6.472E-01	4.22E+01	9.99E+01 G
ZN-65	F 5.9868E-01					2.44E+02	
		1115.55	5.987E-01	?(	2.931E+00	1.42E+02	5.06E+01 G
NB-94	I 2.8430E-01					7.41E+06	
		702.63	2.843E-01	?(	1.141E+00	1.17E+02	9.79E+01 G
		871.10	-6.390E-01	+	1.359E+00	6.45E+01	9.99E+01 G
ZR-95	I -8.1092E-01					6.40E+01	
		756.73	-8.109E-01	?(	1.889E+00	1.04E+02	5.45E+01 G
		724.20	2.760E-01	+	2.510E+00	2.59E+02	4.42E+01 G
NB-95	I 2.7574E-01					6.40E+01	
		765.79	2.757E-01	?(	8.443E-01	8.99E+01	9.98E+01 G
RU-103	I -7.5693E-02					3.93E+01	
		497.05	-7.569E-02	(P	7.332E-01	4.16E+02	9.09E+01 G
		610.30	-9.842E+00	+	4.378E+01	1.33E+02	5.75E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RH-106	I	-3.3147E+00					3.74E+02	
			621.92	-3.315E+00	?(P	2.247E+01	1.08E+02	9.93E+00 G
			1050.36	-2.240E+01	+ P	8.309E+01	9.51E+01	1.56E+00 G
			511.86	6.739E+00	?	4.771E+00	2.42E+01	2.00E+01 GA
AG-108M	C	8.4040E-02					1.53E+05	
			433.94	8.404E-02	?(P	7.096E-01	3.39E+02	9.05E+01 G
			722.94	0.000E+00	-	1.312E+00	1.00E+03	9.08E+01 G
			614.28	-6.342E-01	+	2.733E+00	1.29E+02	8.98E+01 G
AG-110M	F	4.0451E-01					2.50E+02	
			884.68	1.638E-01	&(P	1.719E+00	2.98E+02	7.27E+01 G
			657.76	-3.914E-01	+ P	1.098E+00	1.00E+02	9.46E+01 G
			937.49	-1.282E+00	&	3.291E+00	1.14E+02	3.44E+01 G
			1384.30	-2.246E+00	+	4.924E+00	1.02E+02	2.43E+01 G
			763.94	1.190E+00	?(P	3.120E+00	7.79E+01	2.23E+01 G
SN-113	F	2.8322E-01					1.15E+02	
			391.69	2.832E-01	*(	1.447E+00	1.49E+02	6.40E+01 G
SB-124	F	-1.7595E-01					6.02E+01	
			602.73	-5.682E-01	&(	2.680E+00	1.41E+02	9.83E+01 G
			1690.98	-3.408E-01	+ P	1.965E+00	1.17E+02	4.78E+01 G
			722.79	3.389E+00	?(	9.860E+00	8.63E+01	1.08E+01 G
SB-125	I	8.2259E-01					1.01E+03	
			427.88	1.758E-01	?(	1.839E+00	4.12E+02	2.96E+01 G
			600.50	-3.165E+00	+ P	1.509E+01	6.02E+01	1.79E+01 G
			635.89	-2.898E+00	+	7.873E+00	8.08E+01	1.13E+01 G
			463.37	2.651E+00	?(	7.970E+00	8.91E+01	1.05E+01 G
I-131	I	2.4171E-01					8.02E+00	
			364.48	2.417E-01	&(P	7.849E-01	1.29E+02	8.17E+01 G
			284.30	-6.283E-01	+ P	1.062E+01	5.48E+02	6.14E+00 G
			636.97	0.000E+00	-	1.384E+01	1.00E+03	7.17E+00 G
Gd-153	F	5.3901E-01					2.42E+02	
			97.50	2.197E-01	?(	4.687E+00	6.35E+02	3.00E+01 G
			103.20	9.784E-01	?(	4.740E+00	1.45E+02	2.18E+01 G
Ga-68	C	5.2515E+00					4.71E-02	
			1077.40	5.252E+00	?(	2.825E+01	2.29E+02	3.30E+00 G
BA-133	F	-8.9406E-02					3.85E+03	
			356.00	-8.941E-02	(	2.305E+00	7.56E+02	6.20E+01 G
			302.85	0.000E+00	+	9.045E+00	1.00E+03	1.83E+01 G
			383.84	2.494E+00	& P	8.917E+00	1.05E+02	8.94E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			80.99	-1.069E+00	+	4.063E+00	1.14E+02	3.41E+01 GA
CS-134	I	6.6937E-01					7.54E+02	
			795.87	4.117E-01	?(	1.111E+00	8.02E+01	8.55E+01 G
			604.71	-5.739E-01	-	2.634E+00	1.37E+02	9.76E+01 G
			569.32	6.544E-01	&(	4.670E+00	2.01E+02	1.54E+01 G
			801.95	0.000E+00	&	1.388E+01	1.00E+03	8.69E+00 G
			563.24	3.336E+00	&(P	8.293E+00	1.05E+02	8.35E+00 G
CS-137	I	-3.6024E-02					1.10E+04	
			661.66	-3.602E-02	%(	1.354E+00	1.06E+03	8.52E+01 G
CE-139	F	-3.0010E-01					1.38E+02	
			165.85	-3.001E-01	&(	9.799E-01	9.76E+01	7.99E+01 G
Ba-140	I	-2.0061E+00					1.28E+01	
			537.26	-2.006E+00	?(P	4.081E+00	6.22E+01	2.44E+01 G
			162.66	3.519E+00	+	1.137E+01	9.64E+01	6.22E+00 G
			304.85	0.000E+00	&	3.882E+01	1.00E+03	4.29E+00 G
La-140	I	4.4830E-01					1.28E+01	
			1596.21	5.053E-01	?(P	4.733E-01	3.64E+01	9.54E+01 G
			487.02	3.288E-01	?(	2.272E+00	2.00E+02	4.55E+01 G
			328.76	-1.442E+00	-	6.990E+00	1.44E+02	2.03E+01 G
			815.77	0.000E+00	-	5.408E+00	1.00E+03	2.33E+01 G
CE-141	I	-5.0906E-01					3.25E+01	
			145.44	-5.091E-01	&(	2.364E+00	1.39E+02	4.82E+01 G
CE-144	I	2.0197E+00					2.85E+02	
			133.54	2.020E+00	?(	9.860E+00	1.46E+02	1.11E+01 G
PM-144	C	1.2891E-01					3.63E+02	
			696.54	1.289E-01	?(	1.181E+00	2.62E+02	9.90E+01 G
			618.06	-5.789E-01	&	2.411E+00	1.24E+02	9.91E+01 G
EU-152	F	8.4128E-01					4.94E+03	
			121.78	-6.107E-02	%(	2.110E+00	1.00E+03	2.86E+01 G
			344.29	1.327E-01	?(	2.448E+00	5.20E+02	2.65E+01 G
			1112.07	2.201E-01	%	1.336E+01	1.72E+03	1.36E+01 G
			778.92	-1.342E+00	+	8.637E+00	2.82E+02	1.29E+01 G
			964.11	3.893E+00	&(	8.951E+00	6.93E+01	1.46E+01 G
			244.69	-2.692E+00	+	2.271E+01	2.51E+02	7.58E+00 G
			1408.00	2.265E+00	? P	1.941E+00	3.58E+01	2.10E+01 GA
EU-154	I	2.7715E-01					3.14E+03	
			123.10	-3.601E-01	&(	1.422E+00	1.17E+02	4.08E+01 G
			1274.54	1.954E-01	+	2.798E+00	3.83E+02	3.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			723.36	1.563E+00	?(	4.895E+00	9.23E+01	2.02E+01 G
			873.23	-4.527E-01	+	1.210E+01	7.60E+02	1.23E+01 G
			1004.77	-1.565E-01	%	1.000E+01	1.82E+03	1.80E+01 G
			996.33	-5.578E+00	+	1.456E+01	7.81E+01	1.06E+01 G
EU-155	I	1.0053E+00					1.81E+03	
			105.31	1.005E+00	(	5.082E+00	1.51E+02	2.12E+01 G
			86.54	-8.728E-01	+	5.264E+00	1.81E+02	3.07E+01 G
HF-181	F	2.9305E-01					4.24E+01	
			482.00	2.930E-01	?(	1.073E+00	1.08E+02	8.05E+01 G
			133.02	-5.164E-01	+	2.427E+00	1.40E+02	4.33E+01 G
			345.83	-3.820E-01	+	4.979E+00	3.73E+02	1.51E+01 G
			136.30	2.832E-01	&	1.840E+01	1.92E+03	5.85E+00 G
Ta-182	F	1.4893E+00					1.14E+02	
			1121.30	1.235E+00	?(	4.459E+00	1.06E+02	3.49E+01 G
			1221.41	1.340E+00	?(	4.549E+00	1.57E+02	2.70E+01 G
			1189.05	2.285E+00	(	5.484E+00	1.09E+02	1.62E+01 G
Hg-203	F	-3.3267E-01					4.66E+01	
			279.20	-3.327E-01	&(	1.047E+00	9.38E+01	8.15E+01 G
TL-208	N	3.3117E+00					6.98E+02	
			583.02	3.312E+00	(P	6.193E-01	1.18E+01	8.45E+01 G
			277.28	9.510E+00	+ P	6.980E+00	3.45E+01	6.31E+00 G
			860.56	9.157E-02	& P	8.610E+00	3.99E+03	1.24E+01 G
PM-146	C	7.2470E-02					2.02E+03	
			453.88	-3.938E-01	?(	1.300E+00	1.37E+02	6.50E+01 G
			747.16	9.638E-01	&(	1.994E+00	8.76E+01	3.40E+01 G
			735.72	-4.926E-01	+	3.727E+00	3.12E+02	2.25E+01 G
Y-88	F	3.1127E-01					1.07E+02	
			1836.06	3.978E-01	?(P	5.109E-01	4.38E+01	9.92E+01 G
			898.04	2.197E-01	?(P	7.419E-01	1.40E+02	9.37E+01 G
Cd-113m		-9.2879E+02					5.33E+03	
			263.70	-9.288E+02	?(	1.154E+04	3.57E+02	6.00E-03 K
Cf-251	T	6.7055E-01					3.28E+05	
			176.60	6.705E-01	?(	3.587E+00	2.06E+02	1.70E+01 G
			227.00	3.200E+00	?	7.998E+00	1.01E+02	6.30E+00 GA
Cf-249	T	3.5262E-01					1.28E+05	
			387.95	3.526E-01	?(	1.316E+00	1.10E+02	6.60E+01 G
			333.44	-1.912E+00	+	8.955E+00	1.39E+02	1.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sn-126		-2.9351E+00					3.65E+07	
			87.57	-7.112E-01	}	3.927E+00	1.65E+02	3.75E+01 GA
			64.28	-2.935E+00	?(	1.258E+01	1.28E+02	9.70E+00 G
			86.94	-2.958E+00	}	1.737E+01	1.76E+02	9.04E+00 GA
PB-210	N	-3.2947E+00					8.14E+03	
			46.54	-3.295E+00	?(P	3.624E+01	2.42E+02	4.25E+00 G
PB-212	N	1.1439E+01					6.98E+02	
			238.63	1.144E+01	(P	1.058E+00	6.06E+00	4.33E+01 G
			300.03	5.600E+00	}	4.884E+01	9.34E+01	3.28E+00 GA
PB-214	N	7.9470E+00					5.84E+05	
			351.93	7.947E+00	(P	1.394E+00	1.02E+01	3.76E+01 G
			295.09	5.929E+00	- P	2.945E+00	1.85E+01	1.93E+01 G
			242.00	9.893E+00		7.151E+00	2.48E+01	7.43E+00 GA
BI-207	C	-3.1651E-01					1.18E+04	
			1063.66	-3.165E-01	(	1.438E+00	2.02E+02	7.45E+01 G
			569.70	-1.232E-01	& P	8.326E-01	2.55E+02	9.77E+01 G
BI-212	N	3.2741E+00					6.98E+02	
			727.17	3.274E+00	(	1.397E+01	1.24E+02	7.55E+00 G
			785.42	-2.002E+01	+	1.141E+02	1.66E+02	1.28E+00 GA
U-235	N	5.2037E-01					2.57E+11	
			143.79	0.000E+00	?(	1.002E+01	1.00E+03	1.10E+01 G
			205.33	-1.710E+00	+ P	1.328E+01	3.13E+02	5.01E+00 G
			163.38	1.643E+00	?(	1.476E+01	2.64E+02	5.08E+00 G
			185.72	5.191E-01		1.243E+00	9.37E+01	5.40E+01 GA
BI-214	N	6.9642E+00					5.84E+05	
			609.31	6.964E+00	(P	1.129E+00	1.08E+01	4.61E+01 G
			1120.29	2.633E+00	- P	8.601E+00	9.60E+01	1.51E+01 G
			1764.49	1.772E+00	- P	8.227E+00	1.31E+02	1.54E+01 G
BI-210M	T	3.4706E-01					1.10E+09	
			265.83	3.471E-01	(P	1.472E+00	1.25E+02	5.00E+01 G
			304.90	0.000E+00	&	5.949E+00	1.00E+03	2.80E+01 G
AC-228	N	1.2082E+01					2.10E+03	
			911.07	1.270E+01	(	9.956E-01	1.03E+01	2.90E+01 G
			968.97	2.930E+00	-	8.281E+00	8.41E+01	1.75E+01 G
			338.32	1.059E+01	(	3.419E+00	1.75E+01	1.20E+01 G
			93.35	9.867E+00	-	1.027E+01	3.31E+01	5.56E+00 XA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	N	1.8678E+00					7.95E+03	
			256.24	2.231E-01	%(	8.921E+00	1.57E+03	7.00E+00 G
			235.97	1.838E+00	?(	1.321E+01	2.14E+02	1.23E+01 G
			50.14	3.353E+00	(	1.562E+01	1.38E+02	8.00E+00 G
TH-229	N	4.6794E+00					2.68E+06	
			193.51	3.497E+00	&(P	1.453E+01	1.68E+02	4.40E+00 G
			210.85	6.420E+00	?(	2.083E+01	1.31E+02	2.99E+00 G
TH-234	N	5.7216E+00					1.63E+12	
			92.59	4.688E+00	?(	2.598E+01	1.66E+02	5.58E+00 G
			63.29	7.236E+00	(	1.622E+01	6.77E+01	3.81E+00 G
PA-231	N	5.9992E+00					1.20E+07	
			302.65	7.663E+00	?(	5.663E+01	2.20E+02	2.88E+00 G
			300.07	4.051E+00	(	6.649E+01	4.85E+02	2.46E+00 G
PA-233	C	-3.8501E-02					7.82E+08	
			312.01	-3.850E-02	&(P	4.705E+00	1.60E+03	3.60E+01 G
			300.18	0.000E+00	+	2.658E+01	1.00E+03	6.20E+00 G
PA-234	N	2.2503E-01					1.63E+12	
			131.29	-1.235E+00	?(	5.953E+00	1.44E+02	1.80E+01 G
			946.02	1.505E+00	?(	6.249E+00	1.76E+02	1.34E+01 G
			569.47	6.696E-01	&(	9.014E+00	3.74E+02	8.20E+00 G
			883.24	7.968E-01	?(	1.412E+01	5.02E+02	9.60E+00 G
			880.53	-4.239E+00	+	2.153E+01	1.47E+02	6.00E+00 GA
PA-234M	N	-2.2985E+01					1.63E+12	
			1001.00	-2.299E+01	?(P	2.068E+02	1.64E+02	8.37E-01 G
			766.41	0.000E+00	+	2.494E+02	1.00E+03	2.94E-01 G
AM-241	T	-1.0180E+00					1.58E+05	
			59.54	-1.018E+00	?(P	3.337E+00	6.58E+01	3.59E+01 G
Ir-192	F	4.1337E-01					7.40E+01	
			316.49	3.369E-01	?(	1.719E+00	1.52E+02	8.70E+01 G
			468.06	5.419E-01	?(	1.738E+00	9.50E+01	5.18E+01 G
			308.44	0.000E+00	-	5.288E+00	1.00E+03	3.18E+01 G
Cs-136	F	-5.1425E-01					1.30E+01	
			818.50	-5.143E-01	?(	1.484E+00	8.60E+01	1.00E+02 G
			1048.07	-3.642E-02	%	1.463E+00	1.10E+03	8.00E+01 G
			340.57	-3.393E-02	&	2.906E+00	2.50E+03	4.69E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Np-239   T  -1.0116E+00                                      2.36E+00
                          103.70 8.885E-01 ?   4.401E+00 1.48E+02 2.40E+01 X
                          106.13-1.012E+00  (  3.614E+00 1.07E+02 2.27E+01 G
                           99.50-6.708E-07 %   9.291E+00 4.12E+08 1.50E+01 X

Nd-147      -1.1367E+00                                      1.11E+01
                          531.00-1.137E+00 ?(  6.047E+00 2.16E+02 1.30E+01 G
                           91.10-1.934E-01 +   5.044E+00 7.77E+02 2.83E+01 G

TL-210   N   2.8733E-01                                      5.84E+05
                          799.60 2.873E-01 ?(  1.112E+00 1.13E+02 9.90E+01 G
                          296.00-2.312E-01 +   2.093E+00 2.69E+02 7.90E+01 G
                         1313.00-1.245E+00 +   5.458E+00 1.98E+02 2.10E+01 GA

Kr-85    I   8.2902E+01                                      3.92E+03
                          513.98 8.290E+01 ?(  3.043E+02 1.09E+02 4.30E-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	217.	-6.	-0.004	242.36	-3.295E+00	P
TH-227	50.14	180.	14.	0.008	138.14	3.353E+00	
AM-241	59.54	267.	-24.	-0.013	65.76	-1.018E+00	P
Sn-126	64.28	332.	-20.	-0.011	127.97	-2.935E+00	
BA-133	80.99	637.	-32.	-0.018	114.17	-1.069E+00	
EU-155	86.54	942.	-24.	-0.013	180.78	-8.728E-01	
Sn-126	86.94	893.	-24.	-0.013	176.01	-2.958E+00	
Sn-126	87.57	788.	-24.	-0.013	165.43	-7.112E-01	
Nd-147	91.10	766.	-5.	-0.003	776.74	-1.934E-01	
Gd-153	97.50	777.	6.	0.003	635.38	2.197E-01	
Gd-153	103.20	424.	20.	0.011	144.68	9.784E-01	
Np-239	103.70	444.	20.	0.011	147.97	8.885E-01	
EU-155	105.31	464.	20.	0.011	151.02	1.005E+00	
Np-239	106.13	265.	-22.	-0.012	106.82	-1.012E+00	
EU-154	123.10	127.	-14.	-0.008	117.08	-3.601E-01	
HF-181	133.02	421.	-21.	-0.012	140.40	-5.164E-01	
CE-141	145.44	461.	-22.	-0.012	138.87	-5.091E-01	
Ba-140	162.66	150.	18.	0.010	96.44	3.519E+00	
U-235	163.38	168.	7.	0.004	263.64	1.643E+00	
CE-139	165.85	189.	-20.	-0.011	97.61	-3.001E-01	
Cf-251	176.60	103.	9.	0.005	205.72	6.705E-01	
U-235	185.72	117.	22.	0.012	93.65	5.191E-01	
TH-229	193.51	100.	12.	0.007	167.59	3.497E+00	P
U-235	205.33	100.	-6.	-0.004	313.33	-1.710E+00	P
TH-229	210.85	84.	14.	0.008	130.93	6.420E+00	
Cf-251	227.00	48.	14.	0.008	100.51	3.200E+00	
TH-227	235.97	530.	15.	0.009	214.25	1.838E+00	
EU-152	244.69	567.	-13.	-0.007	251.39	-2.692E+00	
Cd-113m	263.70	76.	-4.	-0.002	357.43	-9.288E+02	
BI-210M	265.83	86.	11.	0.006	124.94	3.471E-01	P
Hg-203	279.20	110.	-16.	-0.009	93.84	-3.327E-01	
I-131	284.30	60.	-2.	-0.001	548.23	-6.283E-01	P
TL-210	296.00	401.	-11.	-0.006	268.76	-2.312E-01	
Ir-192	316.49	296.	16.	0.009	151.79	3.369E-01	
CR-51	320.08	121.	-18.	-0.010	68.96	-3.314E+00	P
La-140	328.76	252.	-16.	-0.009	144.12	-1.442E+00	
Cf-249	333.44	236.	-16.	-0.009	139.20	-1.912E+00	
EU-152	344.29	45.	2.	0.001	520.42	1.327E-01	
HF-181	345.83	61.	-3.	-0.002	372.68	-3.820E-01	
BA-133	356.00	228.	-3.	-0.002	755.74	-8.941E-02	
I-131	364.48	40.	10.	0.006	128.97	2.417E-01	P
BA-133	383.84	59.	11.	0.006	105.48	2.494E+00	P
Cf-249	387.95	70.	11.	0.006	110.02	3.526E-01	
SN-113	391.69	79.	9.	0.005	149.47	2.832E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	427.88	22.	2.	0.001	412.43	1.758E-01	
AG-108M	433.94	31.	3.	0.002	338.54	8.404E-02	P
PM-146	453.88	52.	-11.	-0.006	137.17	-3.938E-01	
SB-125	463.37	49.	12.	0.007	89.14	2.651E+00	
Ir-192	468.06	57.	12.	0.007	94.96	5.419E-01	
HF-181	482.00	50.	10.	0.005	107.58	2.930E-01	
La-140	487.02	72.	6.	0.003	200.35	3.288E-01	
RU-103	497.05	27.	-3.	-0.002	415.66	-7.569E-02	P
RH-106	511.86	56.	53.	0.029	24.20	6.739E+00	
Kr-85	513.98	109.	14.	0.008	108.84	8.290E+01	
Nd-147	531.00	35.	-6.	-0.003	216.21	-1.137E+00	
Ba-140	537.26	57.	-19.	-0.010	62.19	-2.006E+00	P
CS-134	563.24	24.	10.	0.006	105.40	3.336E+00	P
CS-134	569.32	25.	4.	0.002	201.03	6.544E-01	
BI-207	569.70	33.	-4.	-0.002	255.47	-1.232E-01	P
SB-125	600.50	387.	-20.	-0.011	60.15	-3.165E+00	P
SB-124	602.73	367.	-19.	-0.011	140.79	-5.682E-01	
CS-134	604.71	348.	-20.	-0.011	136.94	-5.739E-01	
RU-103	610.30	328.	-20.	-0.011	132.73	-9.842E+00	
AG-108M	614.28	308.	-20.	-0.011	128.56	-6.342E-01	
PM-144	618.06	289.	-20.	-0.011	124.27	-5.789E-01	
RH-106	621.92	248.	-11.	-0.006	107.79	-3.315E+00	P
SB-125	635.89	34.	-11.	-0.006	80.80	-2.898E+00	
AG-110M	657.76	45.	-12.	-0.007	100.03	-3.914E-01	P
PM-144	696.54	53.	4.	0.002	262.20	1.289E-01	
NB-94	702.63	47.	9.	0.005	117.29	2.843E-01	
SB-124	722.79	41.	11.	0.006	86.28	3.389E+00	
EU-154	723.36	35.	10.	0.005	92.32	1.563E+00	
ZR-95	724.20	44.	4.	0.002	259.04	2.760E-01	
BI-212	727.17	40.	8.	0.004	124.01	3.274E+00	
PM-146	735.72	23.	-3.	-0.002	312.25	-4.926E-01	
PM-146	747.16	14.	10.	0.005	87.56	9.638E-01	
ZR-95	756.73	35.	-13.	-0.007	103.82	-8.109E-01	
AG-110M	763.94	14.	8.	0.004	77.90	1.190E+00	P
NB-95	765.79	22.	8.	0.004	89.90	2.757E-01	
EU-152	778.92	40.	-5.	-0.003	281.66	-1.342E+00	
BI-212	785.42	70.	-7.	-0.004	165.89	-2.002E+01	
CS-134	795.87	27.	10.	0.006	80.19	4.117E-01	
TL-210	799.60	37.	8.	0.004	112.81	2.873E-01	
CO-58	810.78	40.	-8.	-0.004	117.26	-2.880E-01	
Cs-136	818.50	68.	-14.	-0.008	85.98	-5.143E-01	
MN-54	834.85	10.	8.	0.005	90.72	3.038E-01	
Co-56	846.77	25.	-5.	-0.003	224.35	-1.852E-01	
NB-94	871.10	51.	-17.	-0.009	64.45	-6.390E-01	
EU-154	873.23	61.	-1.	-0.001	759.64	-4.527E-01	
AG-110M	884.68	41.	3.	0.002	297.65	1.638E-01	P
Sc-46	889.28	66.	-15.	-0.008	62.20	-5.746E-01	P
Y-88	898.04	11.	5.	0.003	139.81	2.197E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
AG-110M	937.49	30.	-11.	-0.006	113.55	-1.282E+00		
EU-152	964.11	39.	14.	0.008	69.27	3.893E+00		
EU-154	996.33	53.	-14.	-0.008	78.06	-5.578E+00		
PA-234M	1001.00	68.	-5.	-0.003	164.04	-2.299E+01		P
RH-106	1050.36	33.	-8.	-0.004	95.10	-2.240E+01		P
BI-207	1063.66	21.	-5.	-0.003	201.56	-3.165E-01		
Ga-68	1077.40	11.	3.	0.002	229.35	5.252E+00		
ZN-65	1115.55	40.	7.	0.004	141.56	5.987E-01		
Sc-46	1120.55	48.	9.	0.005	108.14	4.357E-01		
Co-56	1238.28	28.	4.	0.002	344.44	2.768E-01		
NA-22	1274.53	6.	7.	0.004	63.99	3.568E-01		
EU-154	1274.54	13.	1.	0.001	383.19	1.954E-01		
FE-59	1291.60	17.	-5.	-0.003	198.49	-5.971E-01		
TL-210	1313.00	17.	-5.	-0.003	198.49	-1.245E+00		
AG-110M	1384.30	17.	-10.	-0.006	101.73	-2.246E+00		
EU-152	1408.00	0.	9.	0.005	35.81	2.265E+00		P
La-140	1596.21	0.	8.	0.004	36.40	5.053E-01		P
SB-124	1690.98	7.	-3.	-0.001	116.52	-3.408E-01		P
Co-56	1771.35	19.	4.	0.002	157.31	1.774E+00		
Y-88	1836.06	0.	6.	0.003	43.80	3.978E-01		P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	A	2.2217E+00	2.2217E+00	9.781E+01%	7.38E+00
NA-22	#A	3.5682E-01	3.5682E-01	6.399E+01%	7.45E-01
K-40		1.3474E+02	1.3474E+02	6.469E+00%	7.90E+00
Sc-46	#A	-5.7461E-01	-5.7461E-01	6.220E+01%	1.56E+00
CR-51	#A	-3.3137E+00	-3.3138E+00	6.896E+01%	9.87E+00
MN-54	#A	3.0384E-01	3.0384E-01	9.072E+01%	6.39E-01
FE-59	#A	5.7599E-02	5.7599E-02	1.278E+03%	1.73E+00
Co-56	#A	-1.3350E-03	-1.3350E-03	2.055E+02%	9.64E-01
CO-57	#A	0.0000E+00	0.0000E+00	7.071E+02%	7.09E-01
CO-58	#A	-2.8802E-01	-2.8802E-01	1.173E+02%	1.16E+00
CO-60	#	6.6420E-01	6.6420E-01	2.593E+01%	3.90E-01
ZN-65	#A	5.9868E-01	5.9868E-01	1.416E+02%	2.93E+00
NB-94	#A	2.8430E-01	2.8430E-01	1.173E+02%	1.14E+00
ZR-95	#A	-8.1092E-01	-8.1092E-01	1.038E+02%	1.89E+00
NB-95	#A	2.7573E-01	2.7574E-01	8.990E+01%	8.44E-01
RU-103	#A	-7.5693E-02	-7.5693E-02	4.157E+02%	7.33E-01
RH-106	#A	-3.3147E+00	-3.3147E+00	1.078E+02%	2.25E+01
AG-108M	#A	8.4040E-02	8.4040E-02	3.385E+02%	7.10E-01
AG-110M	#A	4.0451E-01	4.0451E-01	7.790E+01%	1.72E+00
SN-113	#A	2.8322E-01	2.8322E-01	1.495E+02%	1.45E+00

SB-124	#A	-1.7595E-01	-1.7595E-01	8.256E+01%	2.68E+00
SB-125	#A	8.2259E-01	8.2259E-01	8.914E+01%	1.84E+00
I-131	#A	2.4171E-01	2.4171E-01	1.290E+02%	7.85E-01
Gd-153	#A	5.3901E-01	5.3901E-01	1.447E+02%	4.69E+00
Ga-68	#A	5.2399E+00	5.2515E+00	2.293E+02%	2.82E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.25E+00
BA-133	#A	-8.9406E-02	-8.9406E-02	7.557E+02%	2.31E+00
CS-134	#A	6.6937E-01	6.6937E-01	8.019E+01%	1.11E+00
CS-137	#A	-3.6024E-02	-3.6024E-02	1.063E+03%	1.35E+00
CE-139	#A	-3.0010E-01	-3.0010E-01	9.761E+01%	9.80E-01
Ba-140	#A	-2.0061E+00	-2.0061E+00	6.219E+01%	4.08E+00
La-140	#A	4.4830E-01	4.4830E-01	3.640E+01%	4.73E-01
CE-141	#A	-5.0906E-01	-5.0906E-01	1.389E+02%	2.36E+00
CE-144	#A	2.0197E+00	2.0197E+00	1.459E+02%	9.86E+00
PM-144	#A	1.2891E-01	1.2891E-01	2.622E+02%	1.18E+00
EU-152	#A	8.4128E-01	8.4128E-01	6.927E+01%	2.11E+00
EU-154	#A	2.7715E-01	2.7715E-01	7.455E+01%	1.42E+00
EU-155	#A	1.0053E+00	1.0053E+00	1.510E+02%	5.08E+00
HF-181	#A	2.9304E-01	2.9305E-01	1.076E+02%	1.07E+00
Ta-182	A	1.4893E+00	1.4893E+00	7.278E+01%	4.46E+00
Hg-203	#A	-3.3267E-01	-3.3267E-01	9.384E+01%	1.05E+00
TL-208		3.3117E+00	3.3117E+00	1.184E+01%	6.19E-01
PM-146	#A	7.2470E-02	7.2470E-02	8.137E+01%	1.30E+00
Y-88	#A	3.1127E-01	3.1127E-01	4.380E+01%	5.11E-01
Cd-113m	#A	-9.2879E+02	-9.2879E+02	3.574E+02%	1.15E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.06E+01
Cf-251	#A	6.7055E-01	6.7055E-01	2.057E+02%	3.59E+00
Cf-249	#A	3.5262E-01	3.5262E-01	1.100E+02%	1.32E+00
Sn-126	#A	-2.9351E+00	-2.9351E+00	1.280E+02%	1.26E+01
PB-210	#A	-3.2947E+00	-3.2947E+00	2.424E+02%	3.62E+01
PB-212		1.1439E+01	1.1439E+01	6.056E+00%	1.06E+00
PB-214		7.9470E+00	7.9470E+00	1.020E+01%	1.39E+00
BI-207	#A	-3.1651E-01	-3.1651E-01	2.016E+02%	1.44E+00
BI-212	#A	3.2741E+00	3.2741E+00	1.240E+02%	1.40E+01
U-235	#A	5.2037E-01	5.2037E-01	2.636E+02%	1.00E+01
BI-214		6.9642E+00	6.9642E+00	1.084E+01%	1.13E+00
BI-210M	#A	3.4706E-01	3.4706E-01	1.249E+02%	1.47E+00
AC-228		1.2082E+01	1.2082E+01	1.018E+01%	9.96E-01
TH-227	#A	1.8678E+00	1.8678E+00	1.381E+02%	8.92E+00
TH-229	#A	4.6794E+00	4.6794E+00	1.063E+02%	1.45E+01
TH-234	A	5.7216E+00	5.7216E+00	6.770E+01%	2.60E+01
PA-231	A	5.9992E+00	5.9992E+00	2.196E+02%	5.66E+01
PA-233	#A	-3.8501E-02	-3.8501E-02	1.599E+03%	4.71E+00
PA-234	#A	2.2503E-01	2.2503E-01	1.440E+02%	5.95E+00
PA-234M	#A	-2.2985E+01	-2.2985E+01	1.640E+02%	2.07E+02
AM-241	#A	-1.0180E+00	-1.0180E+00	6.576E+01%	3.34E+00
Np-237	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.19E+01
Ir-192	#A	4.1337E-01	4.1337E-01	8.952E+01%	1.72E+00
Cs-136	#A	-5.1425E-01	-5.1425E-01	8.598E+01%	1.48E+00

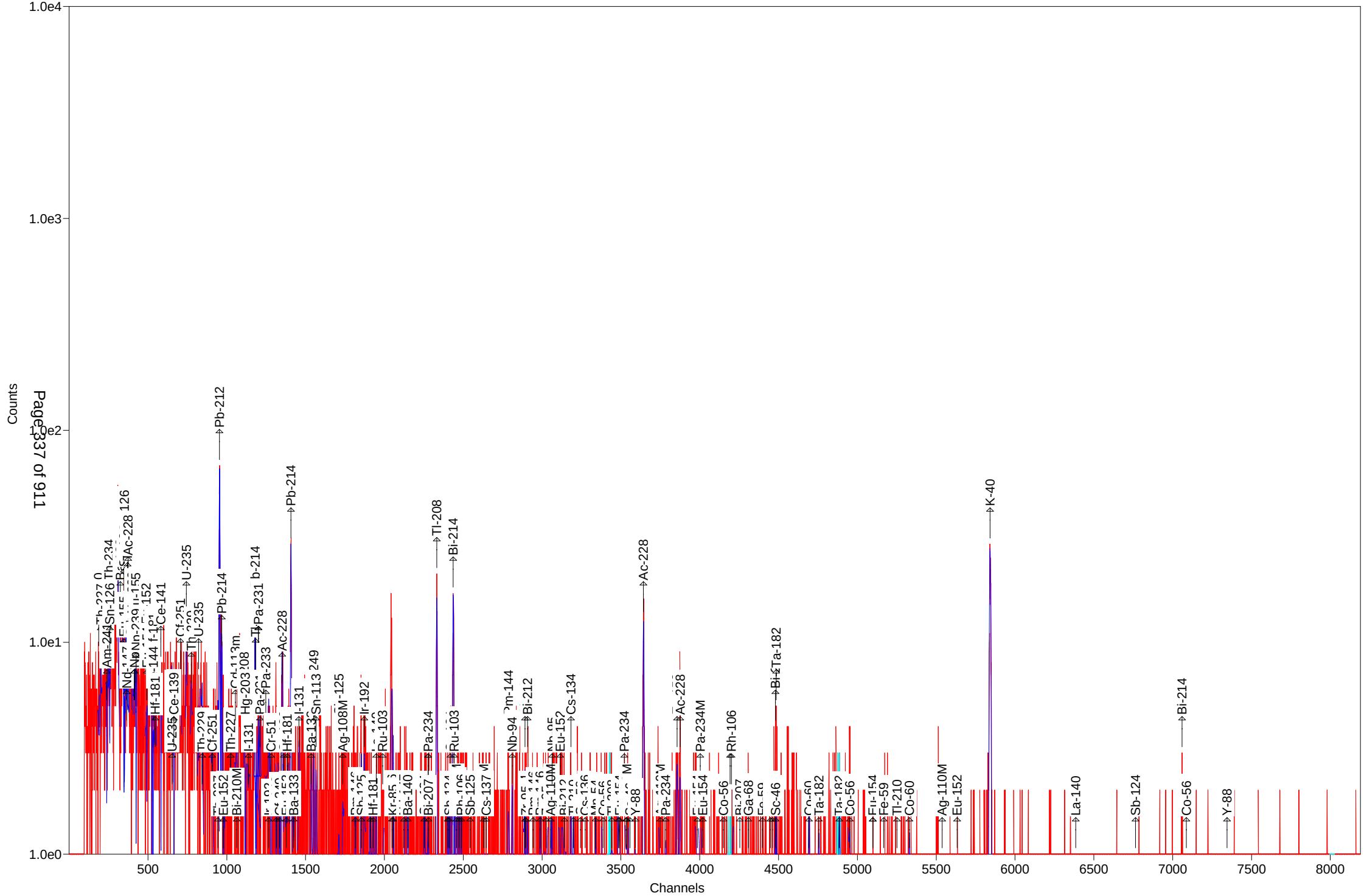
Np-239	#A	-1.0116E+00	-1.0116E+00	1.068E+02%	3.61E+00
Nd-147	#A	-1.1367E+00	-1.1367E+00	2.162E+02%	6.05E+00
TL-210	#A	2.8733E-01	2.8733E-01	1.128E+02%	1.11E+00
Kr-85	#A	8.2902E+01	8.2902E+01	1.088E+02%	3.04E+02

- 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 (25.1 to 1999.3 keV) 1.765E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.3 keV) 1.7648906E+02 Bq/Sample

412881_Gamma_180-86110-A-1-B DU. 9_Gamma_20190340.spc.



Test America St. Louis Spectrum ID: 2_Gamma_20190272

Sample Description: 412881_Gamma_180-86110-A-2-A
Detector: Detector # 2
Batch ID: 412881
Work Order Number: Gamma
Lot Number: 180-86110-A-2-A

Decay to Time: 2/21/2019 01:55 Live Time: 1800 sec
Acquisition Time: 2/21/2019 01:55:30 Real Time: 1805 sec
Analysis Time: 2/21/2019 02:26 Dead Time: 0.26 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 2_Soil_TunaCan.Clb
Efficiency Cal Desc: 2_Soil_TunaCan_101407
Efficiency Cal Date: 4/20/2018 13:56
Energy Cal Date: 4/20/2018 13:54
Library: Client_Long_Rev15.lib
Bkgd Correction File: 2_2019-01-20_1014.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	-3.025E+00	138.0	4.173E+00	4.176E+00	1.428E+01
NA-22	7.918E-01	33.3	2.639E-01	2.669E-01	6.484E-01
K-40	2.079E+02	6.8	1.407E+01	1.756E+01	8.942E+00
Sc-46	4.658E-01	105.2	4.900E-01	4.905E-01	1.685E+00
CR-51	-1.859E+00	206.3	3.835E+00	3.836E+00	1.313E+01
MN-54	3.697E-01	162.5	6.009E-01	6.012E-01	1.497E+00
FE-59	-2.025E+00	85.8	1.738E+00	1.741E+00	4.010E+00
Co-56	2.529E-01	189.4	4.792E-01	4.793E-01	1.508E+00
CO-57	-2.389E-01	119.0	2.842E-01	2.845E-01	9.567E-01
CO-58	5.105E-01	95.6	4.880E-01	4.887E-01	1.663E+00
CO-60	1.042E+00	31.3	3.259E-01	3.300E-01	6.746E-01
ZN-65	-2.135E+00	95.4	2.036E+00	2.039E+00	6.856E+00
NB-94	3.121E-01	127.4	3.977E-01	3.980E-01	1.435E+00
ZR-95	-3.777E-01	331.9	1.254E+00	1.254E+00	3.105E+00
NB-95	-9.477E-01	75.3	7.139E-01	7.156E-01	2.379E+00
RU-103	-2.562E-01	200.0	5.125E-01	5.126E-01	1.310E+00
RH-106	7.625E-01	514.1	3.920E+00	3.920E+00	3.280E+01
AG-108M	3.685E-01	103.8	3.824E-01	3.828E-01	9.682E-01
AG-110M	6.938E-01	33.3	2.313E-01	2.339E-01	3.016E+00
SN-113	7.175E-01	126.6	9.085E-01	9.092E-01	3.061E+00
SB-124	4.622E-01	194.2	8.976E-01	8.979E-01	3.045E+00
SB-125	1.747E+00	99.8	1.745E+00	1.747E+00	3.509E+00
I-131	7.058E-02	53.3	3.762E-02	3.779E-02	1.411E+00
Gd-153	-9.857E-01	148.6	1.465E+00	1.466E+00	4.897E+00
Ga-68	-2.864E+01	117.7	3.371E+01	3.375E+01	7.878E+01
Tc-99m	9.544E-02	362.9	3.463E-01	3.464E-01	1.177E+00
BA-133	-6.470E-01	156.9	1.015E+00	1.016E+00	3.420E+00
CS-134	6.956E-01	89.1	6.201E-01	6.211E-01	2.487E+00
CS-137	4.630E-01	102.6	4.752E-01	4.758E-01	1.628E+00
CE-139	2.975E-01	106.0	3.153E-01	3.156E-01	1.060E+00
Ba-140	1.085E+00	117.5	1.275E+00	1.276E+00	4.358E+00
La-140	2.682E-01	102.2	2.741E-01	2.744E-01	1.544E+00
CE-141	0.000E+00	1.#INF	3.718E-01	3.718E-01	2.174E+00

CE-144	-2.971E+00	114.5	3.403E+00	3.406E+00	1.137E+01
PM-144	4.486E-01	127.8	5.732E-01	5.737E-01	1.409E+00
EU-152	8.207E-01	105.0	8.617E-01	8.628E-01	2.286E+00
EU-154	1.380E+00	39.0	5.382E-01	5.429E-01	2.001E+00
EU-155	1.271E+00	154.7	1.967E+00	1.968E+00	6.583E+00
HF-181	5.081E-01	102.6	5.212E-01	5.218E-01	1.767E+00
Ta-182	9.280E-01	243.3	2.258E+00	2.258E+00	9.385E+00
Hg-203	-9.319E-02	450.0	4.194E-01	4.194E-01	1.113E+00
TL-208	5.172E+00	12.5	6.449E-01	6.965E-01	1.045E+00
PM-146	6.933E-01	84.0	5.825E-01	5.836E-01	1.182E+00
Y-88	0.000E+00	1.#INF	1.255E-01	1.255E-01	9.247E-01
Cd-113m	-2.162E+03	238.0	5.147E+03	5.148E+03	1.768E+04
Cd-109	8.671E+00	149.8	1.299E+01	1.300E+01	4.338E+01
Cf-251	-5.513E-01	313.7	1.730E+00	1.730E+00	4.740E+00
Cf-249	-7.854E-01	121.0	9.502E-01	9.510E-01	3.194E+00
Sn-126	-4.467E+00	116.8	5.219E+00	5.225E+00	1.394E+01
PB-210	2.395E+01	57.4	1.376E+01	1.384E+01	3.665E+01
PB-212	1.388E+01	6.8	9.401E-01	1.187E+00	1.763E+00
PB-214	9.336E+00	10.8	1.005E+00	1.111E+00	1.905E+00
BI-207	3.007E-02	244.4	7.350E-02	7.351E-02	2.546E+00
BI-212	2.357E+01	20.9	4.932E+00	5.077E+00	1.091E+01
U-235	-6.224E-01	653.7	4.069E+00	4.069E+00	9.608E+00
BI-214	7.139E+00	18.7	1.334E+00	1.383E+00	2.590E+00
BI-210M	5.725E-01	99.1	5.676E-01	5.684E-01	1.915E+00
AC-228	1.859E+01	9.1	1.698E+00	1.942E+00	2.726E+00
TH-227	2.244E+00	140.7	3.156E+00	3.158E+00	1.283E+01
TH-229	-1.263E-01	5685.9	7.181E+00	7.181E+00	1.982E+01
TH-234	-9.535E+00	57.4	5.470E+00	5.496E+00	3.033E+01
PA-231	0.000E+00	1.#INF	4.344E+00	4.344E+00	6.921E+01
PA-233	-4.659E-02	1760.0	8.200E-01	8.200E-01	5.702E+00
PA-234	4.862E-01	401.6	1.953E+00	1.953E+00	6.606E+00
PA-234M	1.022E+02	70.2	7.171E+01	7.190E+01	1.727E+02
AM-241	-1.271E+00	112.6	1.432E+00	1.434E+00	3.828E+00
Np-237	-1.018E+00	393.4	4.006E+00	4.007E+00	1.344E+01
Ir-192	4.430E-01	88.0	3.896E-01	3.904E-01	1.289E+00
Cs-136	-2.299E-02	76.2	1.752E-02	1.757E-02	2.337E+00
Np-239	1.205E+00	151.8	1.829E+00	1.830E+00	6.120E+00
Nd-147	-1.737E-01	215.6	3.746E-01	3.747E-01	9.211E+00
TL-210	0.000E+00	1.#INF	2.657E-01	2.657E-01	2.158E+00
Kr-85	0.000E+00	1.#INF	5.425E+01	5.425E+01	4.922E+02
Total	4.429E+02				

Analyst: Morgan Reichert

Sample description
412881_Gamma_180-86110-A-2-A

Spectrum Filename: C:\User\SPC\Det2\2_Gamma_20190272.An1

Acquisition information
Start time: 2/21/2019 1:55:30 AM
Live time: 1800
Real time: 1805
Dead time: 0.26 %
Detector ID: 2

Detector system
Ge 2 SN/164

Calibration
Filename: 2_Soil_TunaCan.Clb
2_Soil_TunaCan_101407

Energy Calibration
Created: 4/20/2018 1:54:10 PM
Zero offset: 0.101 keV
Gain: 0.250 keV/channel
Quadratic: -4.975E-09 keV/channel^2

Efficiency Calibration
Created: 4/20/2018 1:56:20 PM
Type: Polynomial
Uncertainty: 1.003 %
Coefficients: -0.414971 -4.933446 0.551852
-0.058768 0.002630 -0.000046

Library Files
Main analysis library: Client_Long_Rev15.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.60keV)
Stop channel: 8000 (2000.01keV)
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	2/21/2019 1:55:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	2_2019-01-20_1014.PBC 1/20/2019 10:14:02 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 20 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1315

***** 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
46.35	65.	30.41	0.51	1.805E-02	46.54	4.250	PBC<MDA	PB210
50.14	16.	140.67	0.84	2.273E-02	50.14	8.000	PBC<MDA	TH227
74.83	128.	16.50	0.86	3.744E-02				
77.20	244.	8.69	0.86	3.819E-02				
86.82	18.	93.75	0.87	4.055E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	8.233E-01	EU155
					86.94	9.040	2.791E+00	Sn126
87.45	24.	77.20	0.87	4.066E-02	87.57	37.500	PBC<MDA	Sn126
87.92	24.	149.81	0.87	4.075E-02	88.04	3.790	PBC<MDA	Cd109
89.83	56.	31.02	0.80	4.105E-02				
91.10	10.	367.22	0.87	4.124E-02	91.10	28.300	PBC<MDA	Nd147
93.23	67.	25.19	0.87	4.154E-02	93.35	5.561	1.622E+01	AC228
105.31	21.	154.73	0.88	4.240E-02	105.31	21.200	PBC<MDA	EU155
106.13	21.	151.83	0.88	4.242E-02	106.13	22.700	PBC<MDA	Np239
121.78	14.	105.00	0.89	4.203E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.157E-01	CO57
122.36	12.	149.72	0.90	4.194E-02	122.06	85.600	PBC<MDA	CO57
					123.10	40.790	3.951E-01	EU154
131.29	6.	401.62	0.90	4.126E-02	131.29	18.000	PBC<MDA	PA234
140.51	6.	362.86	0.91	4.029E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	-5.	653.72	0.91	3.990E-02	143.79	10.960	PBC<MDA	U235
162.66	17.	117.48	0.93	3.746E-02	162.66	6.220	PBC<MDA	Ba140
165.85	16.	105.96	0.93	3.703E-02	165.85	79.900	PBC<MDA	CE139
185.72	36.	53.78	0.95	3.435E-02	185.72	54.000	PBC<MDA	U235
227.00	8.	204.59	0.98	2.931E-02	227.00	6.300	PBC<MDA	Cf251
235.97	13.	277.07	0.99	2.836E-02	235.97	12.300	PBC<MDA	TH227
238.56	297.	7.55	1.13	2.809E-02	238.63	43.300	1.355E+01	PB212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
241.95	47.	29.58	0.99	2.774E-02	242.00	7.430	1.266E+01	PB214
265.83	13.	99.14	1.01	2.551E-02	265.83	50.000	PBC<MDA	BI210M
284.30	22.	53.30	1.03	2.399E-02	284.30	6.140	PBC<MDA	I131
294.98	67.	18.33	0.60	2.318E-02	295.09	19.300	8.303E+00	PB214
316.49	13.	102.67	1.05	2.172E-02	316.49	87.040	PBC<MDA	Ir192
328.76	14.	102.21	1.06	2.096E-02	328.76	20.300	PBC<MDA	La140
338.24	72.	18.00	1.38	2.041E-02	338.32	12.010	1.643E+01	AC228
344.29	10.	185.73	1.07	2.008E-02	344.29	26.500	PBC<MDA	EU152
351.61	136.	10.79	1.03	1.969E-02	351.93	37.600	9.867E+00	PB214
391.69	15.	126.62	1.11	1.780E-02	391.69	64.000	PBC<MDA	SN113
427.88	5.	239.17	1.14	1.641E-02	427.88	29.600	PBC<MDA	SB125
433.94	10.	103.77	1.14	1.620E-02	433.94	90.480	PBC<MDA	AG108M
453.88	8.	107.34	1.16	1.554E-02	453.88	65.000	PBC<MDA	PM146
463.37	10.	99.84	1.16	1.525E-02	463.37	10.470	PBC<MDA	SB125
468.06	8.	142.84	1.17	1.511E-02	468.06	51.750	PBC<MDA	Ir192
482.00	11.	102.58	1.18	1.472E-02	482.00	80.500	PBC<MDA	HF181
511.86	56.	23.69	2.45	1.394E-02	511.86	20.000	1.116E+01	RH106
537.26	2.	484.77	1.22	1.335E-02	537.26	24.390	PBC<MDA	Ba140
563.24	8.	101.65	1.24	1.280E-02	563.24	8.350	PBC<MDA	CS134
569.70	4.	244.44	1.24	1.267E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.960E+00	PA234
					569.70	97.740	1.645E-01	BI207
583.20	98.	12.47	1.32	1.241E-02	583.02	84.500	5.172E+00	TL208
600.50	10.	186.95	1.27	1.210E-02	600.50	17.860	PBC<MDA	SB125
602.73	10.	194.22	1.27	1.206E-02	602.73	98.260	PBC<MDA	SB124
604.71	10.	199.15	1.27	1.202E-02	604.71	97.620	PBC<MDA	CS134
609.21	71.	18.69	0.86	1.194E-02	609.31	46.090	7.139E+00	BI214
610.30	3.	667.17	1.27	1.193E-02	610.30	5.750	PBC<MDA	RU103
657.76	8.	85.99	1.31	1.117E-02	657.76	94.640	PBC<MDA	AG110M
661.66	8.	102.64	1.31	1.112E-02	661.66	85.210	PBC<MDA	CS137
696.54	9.	127.77	1.34	1.063E-02	696.54	99.000	PBC<MDA	PM144
702.63	9.	127.40	1.34	1.055E-02	702.63	97.900	PBC<MDA	NB94
723.54	7.	170.18	1.36	1.029E-02	722.94	90.840	PBC<MDA	AG108M
					723.36	20.220	1.784E+00	EU154
					724.20	44.150	8.177E-01	ZR95
727.35	33.	20.93	1.36	1.025E-02	727.17	7.550	2.357E+01	BI212
735.72	6.	129.28	1.36	1.014E-02	735.72	22.500	PBC<MDA	PM146
766.41	14.	89.37	1.39	9.796E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.629E+02	PA234M
782.23	4.	237.58	1.40	9.593E-03	785.42	1.280	PBC<MDA	BI212
801.95	10.	89.15	1.41	9.424E-03	801.95	8.690	PBC<MDA	CS134
810.78	9.	95.59	1.42	9.337E-03	810.78	99.460	PBC<MDA	CO58
834.85	6.	162.54	1.43	9.107E-03	834.85	99.980	PBC<MDA	MN54
860.62	23.	38.41	1.45	8.874E-03	860.56	12.420	1.154E+01	TL208
871.10	3.	324.52	1.46	8.783E-03	871.10	99.890	PBC<MDA	NB94
889.28	7.	105.18	1.47	8.630E-03	889.28	99.984	PBC<MDA	Sc46
911.16	76.	12.89	1.64	8.453E-03	911.07	29.000	1.722E+01	AC228
937.49	5.	171.98	1.50	8.250E-03	937.49	34.360	PBC<MDA	AG110M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
969.27	56.	16.15	0.56	8.020E-03	968.97	17.460	2.235E+01	AC228
996.01	7.	39.00	1.54	7.832E-03	996.33	10.600	PBC<MDA	EU154
1001.00	5.	108.20	1.55	7.800E-03	1001.00	0.837	PBC<MDA	PA234M
1048.07	5.	76.22	1.58	7.498E-03	1048.07	80.000	PBC<MDA	Cs136
1050.36	1.	514.10	1.58	7.484E-03	1050.36	1.560	PBC<MDA	RH106
1120.19	28.	23.04	1.62	7.078E-03	1120.29	15.100	1.434E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.20	3.	398.37	1.63	7.073E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	6.756E-01	Ta182
1221.41	4.	279.32	1.69	6.562E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	5.	189.45	1.70	6.483E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	9.	33.33	1.72	6.318E-03	1274.53	99.940	7.918E-01	NA22
					1274.54	35.190	2.249E+00	EU154
1313.00	5.	146.06	1.75	6.152E-03	1313.00	21.000	PBC<MDA	TL210
1332.50	11.	31.28	1.76	6.071E-03	1332.50	99.980	1.042E+00	CO60
1384.30	9.	33.33	1.79	5.864E-03	1384.30	24.290	3.510E+00	AG110M
1408.00	6.	41.88	1.80	5.773E-03	1408.00	21.005	PBC<MDA	EU152
1460.78	223.	6.77	1.92	5.580E-03	1460.83	10.670	2.079E+02	K40
1765.26	17.	25.34	2.00	4.648E-03	1764.49	15.400	1.282E+01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.87	74.81	159.	128.	3.424E+03	16.50	0.856	- D
308.36	77.19	103.	244.	6.390E+03	8.69	0.858	- D
358.38	89.83	88.	52.	1.261E+03	29.10	0.868	- 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_Rev15.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	184.74	46.29	108.	34.	0.019	57.43	0.504s
TH-227	200.14	50.14	250.	16.	0.009	140.67	0.835s
AM-241	237.72	59.54	243.	-25.	-0.014	112.63	0.843s
Sn-126	256.69	64.28	280.	-26.	-0.014	116.83	0.847s
BA-133	323.52	80.99	250.	-26.	-0.014	110.32	0.861s
Np-237	345.52	86.49	726.	-10.	-0.005	393.43	0.866

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-155	345.73	86.54	718.	-24.	-0.013	158.75	0.866s
Sn-126	347.32	86.94	140.	18.	0.010	93.75	0.866D
Sn-126	349.84	87.57	625.	24.	0.013	77.20	0.866D
Cd-109	351.72	88.04	640.	24.	0.013	149.81	0.867A
Nd-147	363.96	91.10	664.	10.	0.006	367.22	0.869s
TH-234	369.92	92.59	704.	-40.	-0.022	57.37	0.870s
AC-228	372.96	93.35	111.	67.	0.037	25.19	0.871D
Gd-153	389.56	97.50	540.	-22.	-0.012	148.62	0.875s
Np-239	397.56	99.50	562.	-22.	-0.012	151.32	0.876s
Gd-153	412.36	103.20	585.	-22.	-0.012	153.74	0.879s
Np-239	414.35	103.70	607.	-22.	-0.012	156.54	0.879s
EU-155	420.81	105.31	496.	21.	0.011	154.73	0.881s
Np-239	424.07	106.13	492.	21.	0.012	151.83	0.882s
EU-152	486.67	121.78	100.	14.	0.008	105.00	0.894s
CO-57	487.79	122.06	161.	-15.	-0.009	118.96	0.895s
EU-154	491.95	123.10	160.	12.	0.007	149.72	0.895s
PA-234	524.72	131.29	338.	6.	0.004	401.62	0.902s
HF-181	531.64	133.02	344.	0.	0.000	1000.00	0.904s
CE-144	533.70	133.54	376.	-24.	-0.014	114.53	0.904
HF-181	544.74	136.30	438.	-25.	-0.014	120.01	0.906s
CO-57	545.43	136.47	463.	-25.	-0.014	123.30	0.906s
Tc-99m	561.58	140.51	234.	6.	0.003	362.86	0.910s
U-235	574.68	143.79	245.	-5.	-0.003	653.72	0.912s
CE-141	581.30	145.44	240.	0.	0.000	1000.00	0.914s
Ba-140	650.17	162.66	186.	17.	0.009	117.48	0.928s
U-235	653.05	163.38	162.	-17.	-0.010	114.62	0.928s
CE-139	662.94	165.85	133.	16.	0.009	105.96	0.930s
Cf-251	705.93	176.60	110.	-6.	-0.003	313.73	0.939s
U-235	742.41	185.72	115.	36.	0.020	53.78	0.946
U-235	820.85	205.33	92.	-15.	-0.008	131.71	0.962s
TH-229	842.92	210.85	127.	-21.	-0.012	99.15	0.967s
Cf-251	907.51	227.00	81.	8.	0.005	204.59	0.980s
TH-227	943.39	235.97	596.	13.	0.007	277.07	0.987s
PB-212	954.04	238.63	59.	304.	0.169	6.77	0.989D
PB-214	967.50	242.00	73.	47.	0.026	29.58	0.992D
EU-152	978.28	244.69	616.	-18.	-0.010	200.71	0.994s
Cd-113m	1054.30	263.70	99.	-6.	-0.003	238.05	1.009s
BI-210M	1062.83	265.83	78.	13.	0.007	99.14	1.011s
Hg-203	1116.30	279.20	63.	-3.	-0.002	450.00	1.021
I-131	1136.69	284.30	33.	22.	0.012	53.30	1.025s
PB-214	1179.43	294.98	23.	67.	0.037	18.33	0.600s
TL-210	1183.49	296.00	330.	-14.	-0.008	186.34	1.034s
PB-212	1199.61	300.03	290.	-6.	-0.003	189.38	1.038
PA-231	1199.77	300.07	284.	0.	0.000	1000.00	1.038
PA-233	1200.21	300.18	284.	0.	0.000	1000.00	1.038
PA-231	1210.09	302.65	284.	0.	0.000	1000.00	1.040s
BA-133	1210.90	302.85	284.	0.	0.000	1000.00	1.040s
Ba-140	1218.89	304.85	284.	0.	0.000	1000.00	1.041s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	1219.07	304.90	284.	0.	0.000	1000.00	1.041s
Ir-192	1233.25	308.44	284.	0.	0.000	1000.00	1.044s
Ir-192	1265.45	316.49	78.	13.	0.007	102.67	1.050s
CR-51	1279.82	320.08	105.	-7.	-0.004	206.27	1.053s
La-140	1314.53	328.76	52.	14.	0.008	102.21	1.060s
Cf-249	1333.24	333.44	62.	-3.	-0.002	446.49	1.064s
AC-228	1352.44	338.24	26.	72.	0.040	18.00	1.383s
Cs-136	1361.76	340.57	178.	-12.	-0.006	166.92	1.069s
EU-152	1376.62	344.29	156.	10.	0.005	185.73	1.072s
HF-181	1382.80	345.83	177.	-10.	-0.005	197.10	1.073
PB-214	1405.90	351.61	24.	131.	0.073	11.31	1.027
BA-133	1423.48	356.00	236.	-14.	-0.008	156.87	1.081s
I-131	1457.41	364.48	62.	-15.	-0.009	99.66	1.088s
BA-133	1534.84	383.84	180.	-17.	-0.009	116.29	1.103s
Cf-249	1551.27	387.95	197.	-17.	-0.009	120.99	1.106s
SN-113	1566.23	391.69	166.	15.	0.008	126.62	1.109s
SB-125	1710.97	427.88	36.	5.	0.003	239.17	1.137
AG-108M	1735.21	433.94	24.	10.	0.005	103.77	1.141s
PM-146	1814.98	453.88	16.	8.	0.004	107.34	1.157s
SB-125	1852.93	463.37	44.	10.	0.006	99.84	1.164s
Ir-192	1871.70	468.06	60.	8.	0.004	142.84	1.167s
BE-7	1909.84	477.60	64.	-8.	-0.005	137.95	1.175s
HF-181	1927.44	482.00	56.	11.	0.006	102.58	1.178s
La-140	1947.54	487.02	36.	-3.	-0.002	395.81	1.182s
RU-103	1987.67	497.05	36.	-6.	-0.003	200.00	1.189s
RH-106	2046.91	511.86	60.	56.	0.031	23.69	2.450s
Kr-85	2055.37	513.98	116.	0.	0.000	1000.00	1.202s
Nd-147	2123.45	531.00	32.	-5.	-0.003	225.98	1.215s
Ba-140	2148.49	537.26	24.	2.	0.001	484.77	1.219s
CS-134	2252.39	563.24	16.	8.	0.005	101.65	1.239s
CS-134	2276.73	569.32	36.	-5.	-0.003	175.50	1.243s
PA-234	2277.33	569.47	41.	0.	0.000	1000.00	1.243s
BI-207	2278.25	569.70	38.	4.	0.002	244.44	1.244s
TL-208	2332.26	583.20	13.	98.	0.054	12.47	1.321
SB-125	2401.44	600.50	187.	10.	0.006	186.95	1.266s
SB-124	2410.37	602.73	178.	10.	0.005	194.22	1.268s
CS-134	2418.28	604.71	188.	10.	0.005	199.15	1.269
BI-214	2436.27	609.21	24.	71.	0.039	18.69	0.860s
RU-103	2440.64	610.30	198.	3.	0.002	667.17	1.274s
AG-108M	2456.57	614.28	201.	0.	0.000	1000.00	1.276s
PM-144	2471.69	618.06	201.	0.	0.000	1000.00	1.279s
RH-106	2487.11	621.92	201.	0.	0.000	1000.00	1.282s
SB-125	2543.00	635.89	40.	-10.	-0.006	94.87	1.292s
I-131	2547.34	636.97	61.	-4.	-0.002	260.06	1.293s
AG-110M	2630.49	657.76	19.	8.	0.004	85.99	1.308s
CS-137	2646.08	661.66	29.	8.	0.004	102.64	1.311
PM-144	2785.61	696.54	26.	9.	0.005	127.77	1.336s
NB-94	2809.96	702.63	26.	9.	0.005	127.40	1.340s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-124	2890.59	722.79	92.	-12.	-0.007	112.46	1.355s
AG-108M	2891.19	722.94	80.	-12.	-0.006	113.19	1.355s
EU-154	2892.88	723.36	61.	7.	0.004	170.18	1.355s
ZR-95	2896.24	724.20	77.	-11.	-0.006	116.77	1.356s
BI-212	2908.12	727.17	7.	33.	0.018	20.93	1.358D
PM-146	2942.32	735.72	13.	6.	0.003	129.28	1.364s
PM-146	2988.08	747.16	35.	-8.	-0.005	132.39	1.372s
ZR-95	3026.36	756.73	35.	-4.	-0.002	331.91	1.379s
AG-110M	3055.21	763.94	33.	-3.	-0.001	309.23	1.384s
NB-95	3062.60	765.79	71.	-17.	-0.009	75.34	1.385s
PA-234M	3065.09	766.41	67.	14.	0.008	89.37	1.386s
EU-152	3115.12	778.92	26.	-8.	-0.004	134.82	1.395s
BI-212	3141.12	785.42	17.	4.	0.002	237.58	1.399s
CS-134	3182.92	795.87	52.	0.	0.000	1000.00	1.407s
TL-210	3197.84	799.60	52.	0.	0.000	1000.00	1.409s
CS-134	3207.25	801.95	33.	10.	0.005	89.15	1.411s
CO-58	3242.54	810.77	29.	9.	0.005	95.59	1.417s
La-140	3262.52	815.77	63.	-13.	-0.007	90.48	1.421s
Cs-136	3273.44	818.50	61.	-7.	-0.004	151.85	1.422s
MN-54	3338.84	834.85	22.	6.	0.003	162.54	1.434s
TL-208	3441.70	860.56	13.	23.	0.013	38.41	1.452s
NB-94	3483.84	871.10	17.	3.	0.001	324.52	1.459s
EU-154	3492.37	873.23	31.	-3.	-0.002	268.74	1.460
PA-234	3521.57	880.53	41.	-4.	-0.002	215.25	1.465s
PA-234	3532.41	883.24	46.	0.	0.000	1000.00	1.467s
AG-110M	3538.19	884.68	46.	0.	0.000	1000.00	1.468s
Sc-46	3556.57	889.28	25.	7.	0.004	105.18	1.471s
Y-88	3591.61	898.04	28.	-13.	-0.007	69.43	1.477s
AC-228	3644.11	911.16	4.	76.	0.042	12.89	1.640
AG-110M	3749.43	937.49	14.	5.	0.003	171.98	1.504s
PA-234	3783.54	946.02	28.	-11.	-0.006	106.41	1.510s
EU-152	3855.90	964.11	111.	-13.	-0.007	118.41	1.522
AC-228	3876.56	969.27	5.	56.	0.031	16.15	0.563s
EU-154	3984.78	996.33	0.	7.	0.004	39.00	1.544s
PA-234M	4003.46	1001.00	14.	5.	0.003	108.20	1.547s
EU-154	4018.57	1004.77	12.	0.	0.000	1000.00	1.549
Co-56	4150.84	1037.84	28.	-13.	-0.007	88.23	1.571s
Cs-136	4191.76	1048.07	6.	5.	0.003	76.22	1.578s
RH-106	4200.92	1050.36	18.	1.	0.001	514.10	1.579s
BI-207	4254.12	1063.66	23.	-1.	-0.001	570.47	1.588s
Ga-68	4309.08	1077.40	33.	-11.	-0.006	117.72	1.597s
FE-59	4396.49	1099.25	33.	-15.	-0.008	85.82	1.611s
EU-152	4447.79	1112.07	94.	-14.	-0.008	102.82	1.620s
ZN-65	4461.68	1115.55	80.	-14.	-0.008	95.38	1.622s
BI-214	4480.64	1120.29	6.	28.	0.015	23.04	1.625D
Sc-46	4481.70	1120.55	65.	-4.	-0.002	283.95	1.625s
Ta-182	4484.70	1121.30	70.	3.	0.002	398.37	1.626s
Ta-182	4755.72	1189.05	30.	-9.	-0.005	137.89	1.669s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	4885.17	1221.41	25.	4.	0.002	279.32	1.689
Co-56	4952.65	1238.28	15.	5.	0.003	189.45	1.700
NA-22	5097.66	1274.53	0.	9.	0.005	33.33	1.723s
EU-154	5097.70	1274.54	9.	0.	0.000	1000.00	1.723s
FE-59	5165.93	1291.60	15.	-4.	-0.002	213.59	1.733s
TL-210	5251.56	1313.00	10.	5.	0.003	146.06	1.746s
CO-60	5329.57	1332.50	1.	11.	0.006	31.28	1.758
AG-110M	5536.78	1384.30	0.	9.	0.005	33.33	1.789s
EU-152	5631.60	1408.00	0.	6.	0.003	41.88	1.804
K-40	5842.74	1460.78	2.	223.	0.124	6.77	1.925
BI-214	7057.76	1764.49	0.	17.	0.009	25.34	2.005s
Co-56	7085.20	1771.35	17.	0.	0.000	1000.00	2.008s
Y-88	7344.09	1836.06	0.	0.	0.000	1000.00	2.042s

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	-3.0252E+00				5.31E+01	
			477.60	-3.025E+00	?(	1.428E+01 1.38E+02 1.05E+01	G
NA-22	C	7.9181E-01				9.50E+02	
			1274.53	7.918E-01	?(	6.484E-01 3.33E+01 9.99E+01	G
K-40	N	2.0792E+02				4.66E+11	
			1460.83	2.079E+02	(P	8.942E+00 6.77E+00 1.07E+01	G
Sc-46	F	4.6583E-01				8.38E+01	
			889.28	4.658E-01	?(	1.685E+00 1.05E+02 1.00E+02	G
			1120.55	-3.204E-01	-	3.164E+00 2.84E+02 1.00E+02	G
CR-51	F	-1.8590E+00				2.77E+01	
			320.08	-1.859E+00	?(	1.313E+01 2.06E+02 9.94E+00	G
MN-54	C	3.6968E-01				3.12E+02	
			834.85	3.697E-01	?(P	1.497E+00 1.63E+02 1.00E+02	G
FE-59	F	-2.0254E+00				4.45E+01	
			1099.25	-2.025E+00	?(	4.010E+00 8.58E+01 5.65E+01	G
			1291.60	-8.533E-01	+ P	4.293E+00 2.14E+02 4.32E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C 2.5293E-01					7.73E+01	
		846.77	2.060E-02	%(	1.508E+00	2.86E+03	9.99E+01 G
		1238.28	6.044E-01	?(P	2.719E+00	1.89E+02	6.61E+01 G
		1037.84	-6.958E+00	+	1.423E+01	8.82E+01	1.41E+01 G
		1771.35	0.000E+00	-	1.699E+01	1.00E+03	1.55E+01 A
CO-57	C -2.3890E-01					2.72E+02	
		122.06	-2.389E-01	?(	9.567E-01	1.19E+02	8.56E+01 G
		136.47	-3.193E+00	+	1.315E+01	1.23E+02	1.07E+01 G
CO-58	C 5.1053E-01					7.09E+01	
		810.78	5.105E-01	?(	1.663E+00	9.56E+01	9.95E+01 G
CO-60	F 1.0417E+00					1.93E+03	
		1332.50	1.042E+00	?(P	6.746E-01	3.13E+01	1.00E+02 G
		1173.24	4.927E-02	% P	1.451E+00	1.17E+03	9.99E+01 G
ZN-65	F -2.1348E+00					2.44E+02	
		1115.55	-2.135E+00	?(	6.856E+00	9.54E+01	5.06E+01 G
NB-94	I 3.1214E-01					7.41E+06	
		702.63	4.583E-01	&(P	1.435E+00	1.27E+02	9.79E+01 G
		871.10	1.689E-01	&(	1.400E+00	3.25E+02	9.99E+01 G
ZR-95	I -3.7770E-01					6.40E+01	
		756.73	-3.777E-01	?(	3.105E+00	3.32E+02	5.45E+01 G
		724.20	-1.346E+00	+	5.335E+00	1.17E+02	4.42E+01 G
NB-95	I -9.4765E-01					6.40E+01	
		765.79	-9.477E-01	?(	2.379E+00	7.53E+01	9.98E+01 G
RU-103	I -2.5623E-01					3.93E+01	
		497.05	-2.562E-01	?(	1.310E+00	2.00E+02	9.09E+01 G
		610.30	2.426E+00	?	5.532E+01	6.67E+02	5.75E+00 GA
RH-106	I 7.6252E-01					3.74E+02	
		621.92	0.000E+00	?(	3.280E+01	1.00E+03	9.93E+00 G
		1050.36	5.616E+00	&(	1.065E+02	5.14E+02	1.56E+00 G
		511.86	1.116E+01	?	7.734E+00	2.37E+01	2.00E+01 GA
AG-108M	C 3.6847E-01					1.53E+05	
		433.94	3.685E-01	?(	9.682E-01	1.04E+02	9.05E+01 G
		722.94	-6.853E-01	+	2.629E+00	1.13E+02	9.08E+01 G
		614.28	0.000E+00	-	3.586E+00	1.00E+03	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	6.9381E-01					2.50E+02	
			884.68	0.000E+00	?(	3.016E+00	1.00E+03	7.27E+01 G
			657.76	4.138E-01	&(	1.210E+00	8.60E+01	9.46E+01 G
			937.49	9.415E-01	?(P	3.972E+00	1.72E+02	3.44E+01 G
			1384.30	3.510E+00	?(	2.875E+00	3.33E+01	2.43E+01 G
			763.94	-6.769E-01	+	7.449E+00	3.09E+02	2.23E+01 G
SN-113	F	7.1750E-01					1.15E+02	
			391.69	7.175E-01	(P	3.061E+00	1.27E+02	6.40E+01 G
SB-124	F	4.6217E-01					6.02E+01	
			602.73	4.622E-01	?(	3.045E+00	1.94E+02	9.83E+01 G
			1690.98	-6.923E-02	% P	1.767E+00	5.23E+03	4.78E+01 G
			722.79	-6.218E+00	+	2.365E+01	1.12E+02	1.08E+01 G
SB-125	I	1.7474E+00					1.01E+03	
			427.88	5.720E-01	?(	3.509E+00	2.39E+02	2.96E+01 G
			600.50	2.699E+00	?(P	1.709E+01	1.87E+02	1.79E+01 G
			635.89	-4.269E+00	+	1.374E+01	9.49E+01	1.13E+01 G
			463.37	3.448E+00	?(	1.170E+01	9.98E+01	1.05E+01 G
I-131	I	7.0581E-02					8.02E+00	
			364.48	-5.477E-01	?(	1.411E+00	9.97E+01	8.17E+01 G
			284.30	8.297E+00	?(	1.112E+01	5.33E+01	6.14E+00 G
			636.97	-2.923E+00	&	2.644E+01	2.60E+02	7.17E+00 G
Gd-153	F	-9.8568E-01					2.42E+02	
			97.50	-9.857E-01	?(	4.897E+00	1.49E+02	3.00E+01 G
			103.20	-1.352E+00	+	6.947E+00	1.54E+02	2.18E+01 G
Ga-68	C	-2.8635E+01					4.71E-02	
			1077.40	-2.864E+01	&(	7.878E+01	1.18E+02	3.30E+00 G
Tc-99m	I	9.5439E-02					2.51E-01	
			140.51	9.544E-02	&(	1.177E+00	3.63E+02	8.93E+01 G
BA-133	F	-6.4703E-01					3.85E+03	
			356.00	-6.470E-01	?(	3.420E+00	1.57E+02	6.20E+01 G
			302.85	0.000E+00	+	1.088E+01	1.00E+03	1.83E+01 G
			383.84	-5.725E+00	+	2.237E+01	1.16E+02	8.94E+00 GA
			80.99	-1.077E+00	+	3.175E+00	1.10E+02	3.41E+01 GA
CS-134	I	6.9559E-01					7.54E+02	
			795.87	0.000E+00	(	2.487E+00	1.00E+03	8.55E+01 G
			604.71	4.671E-01	?(	3.154E+00	1.99E+02	9.76E+01 G
			569.32	-1.425E+00	+	8.738E+00	1.75E+02	1.54E+01 G
			801.95	6.655E+00	?(	2.009E+01	8.91E+01	8.69E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	4.290E+00	?(P	1.121E+01	1.02E+02	8.35E+00 G
CS-137	I	4.6299E-01					1.10E+04	
			661.66	4.630E-01	?(	1.628E+00	1.03E+02	8.52E+01 G
CE-139	F	2.9751E-01					1.38E+02	
			165.85	2.975E-01	?(	1.060E+00	1.06E+02	7.99E+01 G
Ba-140	I	1.0852E+00					1.28E+01	
			537.26	3.413E-01	?(	4.358E+00	4.85E+02	2.44E+01 G
			162.66	4.002E+00	?(P	1.580E+01	1.17E+02	6.22E+00 G
			304.85	0.000E+00	-	4.678E+01	1.00E+03	4.29E+00 G
La-140	I	2.6816E-01					1.28E+01	
			1596.21	-5.315E-02	%(P	1.544E+00	3.22E+03	9.54E+01 G
			487.02	-2.513E-01	+	2.569E+00	3.96E+02	4.55E+01 G
			328.76	1.778E+00	?(P	4.720E+00	1.02E+02	2.03E+01 G
			815.77	-3.358E+00	+	1.023E+01	9.05E+01	2.33E+01 G
CE-144	I	-2.9711E+00					2.85E+02	
			133.54	-2.971E+00	?(	1.137E+01	1.15E+02	1.11E+01 G
PM-144	C	4.4864E-01					3.63E+02	
			696.54	4.486E-01	(P	1.409E+00	1.28E+02	9.90E+01 G
			618.06	0.000E+00	-	3.269E+00	1.00E+03	9.91E+01 G
EU-152	F	8.2070E-01					4.94E+03	
			121.78	6.458E-01	?(	2.286E+00	1.05E+02	2.86E+01 G
			344.29	1.009E+00	?(	6.366E+00	1.86E+02	2.65E+01 G
			1112.07	-7.885E+00	+	2.733E+01	1.03E+02	1.36E+01 G
			778.92	-3.555E+00	&	1.176E+01	1.35E+02	1.29E+01 G
			964.11	-6.122E+00	+	2.450E+01	1.18E+02	1.46E+01 G
			244.69	-4.699E+00	+	3.158E+01	2.01E+02	7.58E+00 G
			1408.00	2.709E+00	& P	3.376E+00	4.19E+01	2.10E+01 GA
EU-154	I	1.3799E+00					3.14E+03	
			123.10	3.951E-01	&(	2.001E+00	1.50E+02	4.08E+01 G
			1274.54	0.000E+00	-	4.170E+00	1.00E+03	3.52E+01 G
			723.36	1.784E+00	?(	1.046E+01	1.70E+02	2.02E+01 G
			873.23	-1.550E+00	+	1.480E+01	2.69E+02	1.23E+01 G
			1004.77	0.000E+00	-	7.467E+00	1.00E+03	1.80E+01 G
			996.33	4.399E+00	?(	4.932E+00	3.90E+01	1.06E+01 G
EU-155	I	1.2714E+00					1.81E+03	
			105.31	1.271E+00	(P	6.583E+00	1.55E+02	2.12E+01 G
			86.54	-1.076E+00	+	5.704E+00	1.59E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	5.0809E-01					4.24E+01	
			482.00	5.081E-01	(	1.767E+00	1.03E+02	8.05E+01 G
			133.02	0.000E+00	-	2.783E+00	1.00E+03	4.33E+01 G
			345.83	-1.782E+00	&	1.192E+01	1.97E+02	1.51E+01 G
			136.30	-5.827E+00	+	2.335E+01	1.20E+02	5.85E+00 G
Ta-182	F	9.2801E-01					1.14E+02	
			1121.30	6.756E-01	?(	9.385E+00	3.98E+02	3.49E+01 G
			1221.41	1.254E+00	(	8.156E+00	2.79E+02	2.70E+01 G
			1189.05	-4.593E+00	&	1.441E+01	1.38E+02	1.62E+01 G
Hg-203	F	-9.3195E-02					4.66E+01	
			279.20	-9.319E-02	(	1.113E+00	4.50E+02	8.15E+01 G
TL-208	N	5.1722E+00					6.98E+02	
			583.02	5.172E+00	(P	1.045E+00	1.25E+01	8.45E+01 G
			277.28	2.990E-01	% P	1.762E+01	1.69E+03	6.31E+00 G
			860.56	1.154E+01	+ P	9.869E+00	3.84E+01	1.24E+01 G
PM-146	C	6.9334E-01					2.02E+03	
			453.88	4.279E-01	?(P	1.182E+00	1.07E+02	6.50E+01 G
			747.16	-1.346E+00	+ P	4.958E+00	1.32E+02	3.40E+01 G
			735.72	1.460E+00	?(	4.749E+00	1.29E+02	2.25E+01 G
Cd-113m		-2.1621E+03					5.33E+03	
			263.70	-2.162E+03	&(	1.768E+04	2.38E+02	6.00E-03 K
Cd-109	F	8.6708E+00					4.53E+02	
							Derived Ave Activity	
			88.04	8.671E+00	}(	4.338E+01	1.50E+02	3.79E+00 G
Cf-251	T	-5.5128E-01					3.28E+05	
			176.60	-5.513E-01	?(	4.740E+00	3.14E+02	1.70E+01 G
			227.00	2.507E+00	*	1.341E+01	2.05E+02	6.30E+00 GA
Cf-249	T	-7.8536E-01					1.28E+05	
			387.95	-7.854E-01	?(	3.194E+00	1.21E+02	6.60E+01 G
			333.44	-5.771E-01	+	6.839E+00	4.46E+02	1.55E+01 G
Sn-126		-4.4672E+00					3.65E+07	
			87.57	8.777E-01	}	4.345E+00	7.72E+01	3.75E+01 GA
			64.28	-4.467E+00	?(	1.394E+01	1.17E+02	9.70E+00 G
			86.94	2.791E+00	+	8.761E+00	9.37E+01	9.04E+00 GA
PB-210	N	2.3954E+01					8.14E+03	
			46.54	2.395E+01	@(P	3.665E+01	5.74E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	1.3878E+01					6.98E+02	
			238.63	1.388E+01	(P	1.763E+00	6.77E+00	4.33E+01 G
			300.03	-4.555E+00	- P	6.091E+01	1.89E+02	3.28E+00 GA
PB-214	N	9.3363E+00					5.84E+05	
			351.93	9.867E+00	(P	1.905E+00	1.13E+01	3.76E+01 G
			295.09	8.303E+00	(P	3.120E+00	1.83E+01	1.93E+01 G
			242.00	1.266E+01	+	1.146E+01	2.96E+01	7.43E+00 GA
BI-207	C	3.0067E-02					1.18E+04	
			1063.66	-1.463E-01	?(P	2.546E+00	5.70E+02	7.45E+01 G
			569.70	1.645E-01	?(	1.416E+00	2.44E+02	9.77E+01 G
BI-212	N	2.3569E+01					6.98E+02	
			727.17	2.357E+01	(	1.091E+01	2.09E+01	7.55E+00 G
			785.42	1.659E+01	&	1.000E+02	2.38E+02	1.28E+00 GA
U-235	N	-6.2244E-01					2.57E+11	
			143.79	-6.224E-01	?(P	9.608E+00	6.54E+02	1.10E+01 G
			205.33	-5.213E+00	+ P	1.651E+01	1.32E+02	5.01E+00 G
			163.38	-5.046E+00	+ P	1.817E+01	1.15E+02	5.08E+00 G
			185.72	1.091E+00	P	1.575E+00	5.38E+01	5.40E+01 GA
BI-214	N	7.1388E+00					5.84E+05	
			609.31	7.139E+00	(P	2.590E+00	1.87E+01	4.61E+01 G
			1120.29	1.434E+01	+ P	7.523E+00	2.30E+01	1.51E+01 G
			1764.49	1.282E+01	+ P	5.720E+00	2.53E+01	1.54E+01 G
BI-210M	T	5.7252E-01					1.10E+09	
			265.83	5.725E-01	?(	1.915E+00	9.91E+01	5.00E+01 G
			304.90	0.000E+00	-	7.168E+00	1.00E+03	2.80E+01 G
AC-228	N	1.8591E+01					2.10E+03	
			911.07	1.722E+01	(	2.726E+00	1.29E+01	2.90E+01 G
			968.97	2.235E+01	(	5.069E+00	1.62E+01	1.75E+01 G
			338.32	1.643E+01	*(	5.948E+00	1.80E+01	1.20E+01 G
			93.35	1.622E+01		1.244E+01	2.52E+01	5.56E+00 XA
TH-227	N	2.2436E+00					7.95E+03	
			256.24	-4.013E-01	%(	1.283E+01	1.20E+03	7.00E+00 G
			235.97	1.996E+00	(	1.856E+01	2.77E+02	1.23E+01 G
			50.14	4.939E+00	&(	2.336E+01	1.41E+02	8.00E+00 G
TH-229	N	-1.2629E-01					2.68E+06	
			193.51	-1.263E-01	%(	1.982E+01	5.69E+03	4.40E+00 G
			210.85	-1.235E+01	+	3.288E+01	9.92E+01	2.99E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	-9.5347E+00					1.63E+12	
			92.59	-9.535E+00	(P	3.033E+01	5.74E+01	5.58E+00 G
			63.29	-4.165E-01	% P	3.431E+01	2.41E+03	3.81E+00 G
PA-233	C	-4.6588E-02					7.82E+08	
			312.01	-4.659E-02	%(P	5.702E+00	1.76E+03	3.60E+01 G
			300.18	0.000E+00	+	3.191E+01	1.00E+03	6.20E+00 G
PA-234	N	4.8617E-01					1.63E+12	
			131.29	4.862E-01	?(	6.606E+00	4.02E+02	1.80E+01 G
			946.02	-5.571E+00	+	1.386E+01	1.06E+02	1.34E+01 G
			569.47	0.000E+00	-	1.740E+01	1.00E+03	8.20E+00 G
			883.24	0.000E+00	-	2.280E+01	1.00E+03	9.60E+00 G
			880.53	-4.611E+00	+	3.476E+01	2.15E+02	6.00E+00 GA
PA-234M	N	1.0220E+02					1.63E+12	
			1001.00	4.576E+01	(	1.727E+02	1.08E+02	8.37E-01 G
			766.41	2.629E+02	?(	7.900E+02	8.94E+01	2.94E-01 G
AM-241	T	-1.2713E+00					1.58E+05	
			59.54	-1.271E+00	?(	3.828E+00	1.13E+02	3.59E+01 G
Np-237	F	-1.0183E+00					2.14E+06	
			86.49	-1.018E+00	(	1.344E+01	3.93E+02	1.31E+01 G
Ir-192	F	4.4295E-01					7.40E+01	
			316.49	3.717E-01	?(	1.289E+00	1.03E+02	8.70E+01 G
			468.06	5.628E-01	?(	2.758E+00	1.43E+02	5.18E+01 G
			308.44	0.000E+00	-	6.390E+00	1.00E+03	3.18E+01 G
Cs-136	F	-2.2990E-02					1.30E+01	
			818.50	-4.479E-01	?(	2.337E+00	1.52E+02	1.00E+02 G
			1048.07	5.081E-01	?(	1.308E+00	7.62E+01	8.00E+01 G
			340.57	-6.716E-01	+	3.794E+00	1.67E+02	4.69E+01 G
Np-239	T	1.2045E+00					2.36E+00	
			103.70	-1.228E+00	+	6.425E+00	1.57E+02	2.40E+01 X
			106.13	1.205E+00	&(	6.120E+00	1.52E+02	2.27E+01 G
			99.50	-1.968E+00	+	9.954E+00	1.51E+02	1.50E+01 X
Nd-147		-1.7373E-01					1.11E+01	
			531.00	-1.584E+00	?(	9.211E+00	2.26E+02	1.30E+01 G
			91.10	4.742E-01	?(	5.846E+00	3.67E+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	250.	16.	0.009	140.67	4.939E+00	
AM-241	59.54	243.	-25.	-0.014	112.63	-1.271E+00	
BA-133	80.99	250.	-26.	-0.014	110.32	-1.077E+00	
Np-237	86.49	726.	-10.	-0.005	393.43	-1.018E+00	
EU-155	86.54	718.	-24.	-0.013	158.75	-1.076E+00	
Nd-147	91.10	664.	10.	0.006	367.22	4.742E-01	
TH-234	92.59	704.	-40.	-0.022	57.37	-9.535E+00	P
Gd-153	97.50	540.	-22.	-0.012	148.62	-9.857E-01	
Np-239	99.50	562.	-22.	-0.012	151.32	-1.968E+00	
Gd-153	103.20	585.	-22.	-0.012	153.74	-1.352E+00	
Np-239	103.70	607.	-22.	-0.012	156.54	-1.228E+00	
EU-155	105.31	496.	21.	0.011	154.73	1.271E+00	P
Np-239	106.13	492.	21.	0.012	151.83	1.205E+00	
EU-152	121.78	100.	14.	0.008	105.00	6.458E-01	
CO-57	122.06	161.	-15.	-0.009	118.96	-2.389E-01	
PA-234	131.29	338.	6.	0.004	401.62	4.862E-01	
CE-144	133.54	376.	-24.	-0.014	114.53	-2.971E+00	
HF-181	136.30	438.	-25.	-0.014	120.01	-5.827E+00	
CO-57	136.47	463.	-25.	-0.014	123.30	-3.193E+00	
Tc-99m	140.51	234.	6.	0.003	362.86	9.544E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	143.79	245.	-5.	-0.003	653.72	-6.224E-01	P
Ba-140	162.66	186.	17.	0.009	117.48	4.002E+00	P
U-235	163.38	162.	-17.	-0.010	114.62	-5.046E+00	P
CE-139	165.85	133.	16.	0.009	105.96	2.975E-01	
Cf-251	176.60	110.	-6.	-0.003	313.73	-5.513E-01	
U-235	185.72	115.	36.	0.020	53.78	1.091E+00	P
U-235	205.33	92.	-15.	-0.008	131.71	-5.213E+00	P
TH-229	210.85	127.	-21.	-0.012	99.15	-1.235E+01	
Cf-251	227.00	81.	8.	0.005	204.59	2.507E+00	
TH-227	235.97	596.	13.	0.007	277.07	1.996E+00	
EU-152	244.69	616.	-18.	-0.010	200.71	-4.699E+00	
Cd-113m	263.70	99.	-6.	-0.003	238.05	-2.162E+03	
BI-210M	265.83	78.	13.	0.007	99.14	5.725E-01	
Hg-203	279.20	63.	-3.	-0.002	450.00	-9.319E-02	
I-131	284.30	33.	22.	0.012	53.30	8.297E+00	
TL-210	296.00	330.	-14.	-0.008	186.34	-4.236E-01	
Ir-192	316.49	78.	13.	0.007	102.67	3.717E-01	
CR-51	320.08	105.	-7.	-0.004	206.27	-1.859E+00	
La-140	328.76	52.	14.	0.008	102.21	1.778E+00	P
Cf-249	333.44	62.	-3.	-0.002	446.49	-5.771E-01	
Cs-136	340.57	178.	-12.	-0.006	166.92	-6.716E-01	
EU-152	344.29	156.	10.	0.005	185.73	1.009E+00	
HF-181	345.83	177.	-10.	-0.005	197.10	-1.782E+00	
BA-133	356.00	236.	-14.	-0.008	156.87	-6.470E-01	
I-131	364.48	62.	-15.	-0.009	99.66	-5.477E-01	
BA-133	383.84	180.	-17.	-0.009	116.29	-5.725E+00	
Cf-249	387.95	197.	-17.	-0.009	120.99	-7.854E-01	
SN-113	391.69	166.	15.	0.008	126.62	7.175E-01	P
SB-125	427.88	36.	5.	0.003	239.17	5.720E-01	
AG-108M	433.94	24.	10.	0.005	103.77	3.685E-01	
PM-146	453.88	16.	8.	0.004	107.34	4.279E-01	P
SB-125	463.37	44.	10.	0.006	99.84	3.448E+00	
Ir-192	468.06	60.	8.	0.004	142.84	5.628E-01	
BE-7	477.60	64.	-8.	-0.005	137.95	-3.025E+00	
HF-181	482.00	56.	11.	0.006	102.58	5.081E-01	
La-140	487.02	36.	-3.	-0.002	395.81	-2.513E-01	
RU-103	497.05	36.	-6.	-0.003	200.00	-2.562E-01	
RH-106	511.86	60.	56.	0.031	23.69	1.116E+01	
Nd-147	531.00	32.	-5.	-0.003	225.98	-1.584E+00	
Ba-140	537.26	24.	2.	0.001	484.77	3.413E-01	
CS-134	563.24	16.	8.	0.005	101.65	4.290E+00	P
CS-134	569.32	36.	-5.	-0.003	175.50	-1.425E+00	
BI-207	569.70	38.	4.	0.002	244.44	1.645E-01	
SB-125	600.50	187.	10.	0.006	186.95	2.699E+00	P
SB-124	602.73	178.	10.	0.005	194.22	4.622E-01	
CS-134	604.71	188.	10.	0.005	199.15	4.671E-01	
RU-103	610.30	198.	3.	0.002	667.17	2.426E+00	
SB-125	635.89	40.	-10.	-0.006	94.87	-4.269E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
I-131	636.97	61.	-4.	-0.002	260.06	-2.923E+00		
AG-110M	657.76	19.	8.	0.004	85.99	4.138E-01		
CS-137	661.66	29.	8.	0.004	102.64	4.630E-01		
PM-144	696.54	26.	9.	0.005	127.77	4.486E-01		P
NB-94	702.63	26.	9.	0.005	127.40	4.583E-01		P
SB-124	722.79	92.	-12.	-0.007	112.46	-6.218E+00		
AG-108M	722.94	80.	-12.	-0.006	113.19	-6.853E-01		
ZR-95	724.20	77.	-11.	-0.006	116.77	-1.346E+00		
PM-146	735.72	13.	6.	0.003	129.28	1.460E+00		
PM-146	747.16	35.	-8.	-0.005	132.39	-1.346E+00		P
ZR-95	756.73	35.	-4.	-0.002	331.91	-3.777E-01		
AG-110M	763.94	33.	-3.	-0.001	309.23	-6.769E-01		
NB-95	765.79	71.	-17.	-0.009	75.34	-9.477E-01		
PA-234M	766.41	67.	14.	0.008	89.37	2.629E+02		
EU-152	778.92	26.	-8.	-0.004	134.82	-3.555E+00		
CS-134	801.95	33.	10.	0.005	89.15	6.655E+00		
CO-58	810.77	29.	9.	0.005	95.59	5.105E-01		
La-140	815.77	63.	-13.	-0.007	90.48	-3.358E+00		
Cs-136	818.50	61.	-7.	-0.004	151.85	-4.479E-01		
MN-54	834.85	22.	6.	0.003	162.54	3.697E-01		P
NB-94	871.10	17.	3.	0.001	324.52	1.689E-01		
PA-234	880.53	41.	-4.	-0.002	215.25	-4.611E+00		
Sc-46	889.28	25.	7.	0.004	105.18	4.658E-01		
Y-88	898.04	28.	-13.	-0.007	69.43	-8.800E-01		P
AG-110M	937.49	14.	5.	0.003	171.98	9.415E-01		P
PA-234	946.02	28.	-11.	-0.006	106.41	-5.571E+00		
EU-152	964.11	111.	-13.	-0.007	118.41	-6.122E+00		
PA-234M	1001.00	14.	5.	0.003	108.20	4.576E+01		
Co-56	1037.84	28.	-13.	-0.007	88.23	-6.958E+00		
Cs-136	1048.07	6.	5.	0.003	76.22	5.081E-01		
RH-106	1050.36	18.	1.	0.001	514.10	5.616E+00		
BI-207	1063.66	23.	-1.	-0.001	570.47	-1.463E-01		P
Ga-68	1077.40	33.	-11.	-0.006	117.72	-2.864E+01		
FE-59	1099.25	33.	-15.	-0.008	85.82	-2.025E+00		
EU-152	1112.07	94.	-14.	-0.008	102.82	-7.885E+00		
ZN-65	1115.55	80.	-14.	-0.008	95.38	-2.135E+00		
Sc-46	1120.55	65.	-4.	-0.002	283.95	-3.204E-01		
Co-56	1238.28	15.	5.	0.003	189.45	6.044E-01		P
FE-59	1291.60	15.	-4.	-0.002	213.59	-8.533E-01		P
TL-210	1313.00	10.	5.	0.003	146.06	2.150E+00		
AG-110M	1384.30	0.	9.	0.005	33.33	3.510E+00		
EU-152	1408.00	0.	6.	0.003	41.88	2.709E+00		P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-3.0252E+00	-3.0252E+00	1.380E+02%	1.43E+01
NA-22	#	7.9181E-01	7.9181E-01	3.333E+01%	6.48E-01
K-40		2.0792E+02	2.0792E+02	6.768E+00%	8.94E+00
Sc-46	#A	4.6583E-01	4.6583E-01	1.052E+02%	1.68E+00
CR-51	#A	-1.8590E+00	-1.8590E+00	2.063E+02%	1.31E+01
MN-54	#A	3.6968E-01	3.6968E-01	1.625E+02%	1.50E+00
FE-59	#A	-2.0254E+00	-2.0254E+00	8.582E+01%	4.01E+00
Co-56	#A	2.5293E-01	2.5293E-01	1.894E+02%	1.51E+00
CO-57	#A	-2.3890E-01	-2.3890E-01	1.190E+02%	9.57E-01
CO-58	#A	5.1053E-01	5.1053E-01	9.559E+01%	1.66E+00
CO-60	#	1.0417E+00	1.0417E+00	3.128E+01%	6.75E-01
ZN-65	#A	-2.1348E+00	-2.1348E+00	9.538E+01%	6.86E+00
NB-94	#A	3.1214E-01	3.1214E-01	1.274E+02%	1.43E+00
ZR-95	#A	-3.7770E-01	-3.7770E-01	3.319E+02%	3.11E+00
NB-95	#A	-9.4765E-01	-9.4765E-01	7.534E+01%	2.38E+00
RU-103	#A	-2.5623E-01	-2.5623E-01	2.000E+02%	1.31E+00
RH-106	#A	7.6252E-01	7.6252E-01	5.141E+02%	3.28E+01
AG-108M	#A	3.6847E-01	3.6847E-01	1.038E+02%	9.68E-01
AG-110M	#A	6.9381E-01	6.9381E-01	3.333E+01%	3.02E+00
SN-113	#A	7.1750E-01	7.1750E-01	1.266E+02%	3.06E+00
SB-124	#A	4.6217E-01	4.6217E-01	1.942E+02%	3.04E+00
SB-125	#A	1.7474E+00	1.7474E+00	9.984E+01%	3.51E+00
I-131	#A	7.0579E-02	7.0581E-02	5.330E+01%	1.41E+00
Gd-153	#A	-9.8568E-01	-9.8568E-01	1.486E+02%	4.90E+00
Ga-68	#A	-2.8489E+01	-2.8635E+01	1.177E+02%	7.88E+01
Tc-99m	#A	9.5347E-02	9.5439E-02	3.629E+02%	1.18E+00
BA-133	#A	-6.4703E-01	-6.4703E-01	1.569E+02%	3.42E+00
CS-134	#A	6.9559E-01	6.9559E-01	8.915E+01%	2.49E+00
CS-137	#A	4.6299E-01	4.6299E-01	1.026E+02%	1.63E+00
CE-139	#A	2.9751E-01	2.9751E-01	1.060E+02%	1.06E+00
Ba-140	#A	1.0852E+00	1.0852E+00	1.175E+02%	4.36E+00
La-140	#A	2.6815E-01	2.6816E-01	1.022E+02%	1.54E+00
CE-141	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.17E+00
CE-144	#A	-2.9711E+00	-2.9711E+00	1.145E+02%	1.14E+01
PM-144	#A	4.4864E-01	4.4864E-01	1.278E+02%	1.41E+00
EU-152	#A	8.2070E-01	8.2070E-01	1.050E+02%	2.29E+00
EU-154	#A	1.3799E+00	1.3799E+00	3.900E+01%	2.00E+00
EU-155	#A	1.2714E+00	1.2714E+00	1.547E+02%	6.58E+00
HF-181	#A	5.0809E-01	5.0809E-01	1.026E+02%	1.77E+00
Ta-182	A	9.2801E-01	9.2801E-01	2.433E+02%	9.39E+00
Hg-203	#A	-9.3194E-02	-9.3195E-02	4.500E+02%	1.11E+00
TL-208		5.1722E+00	5.1722E+00	1.247E+01%	1.04E+00
PM-146	#A	6.9334E-01	6.9334E-01	8.402E+01%	1.18E+00

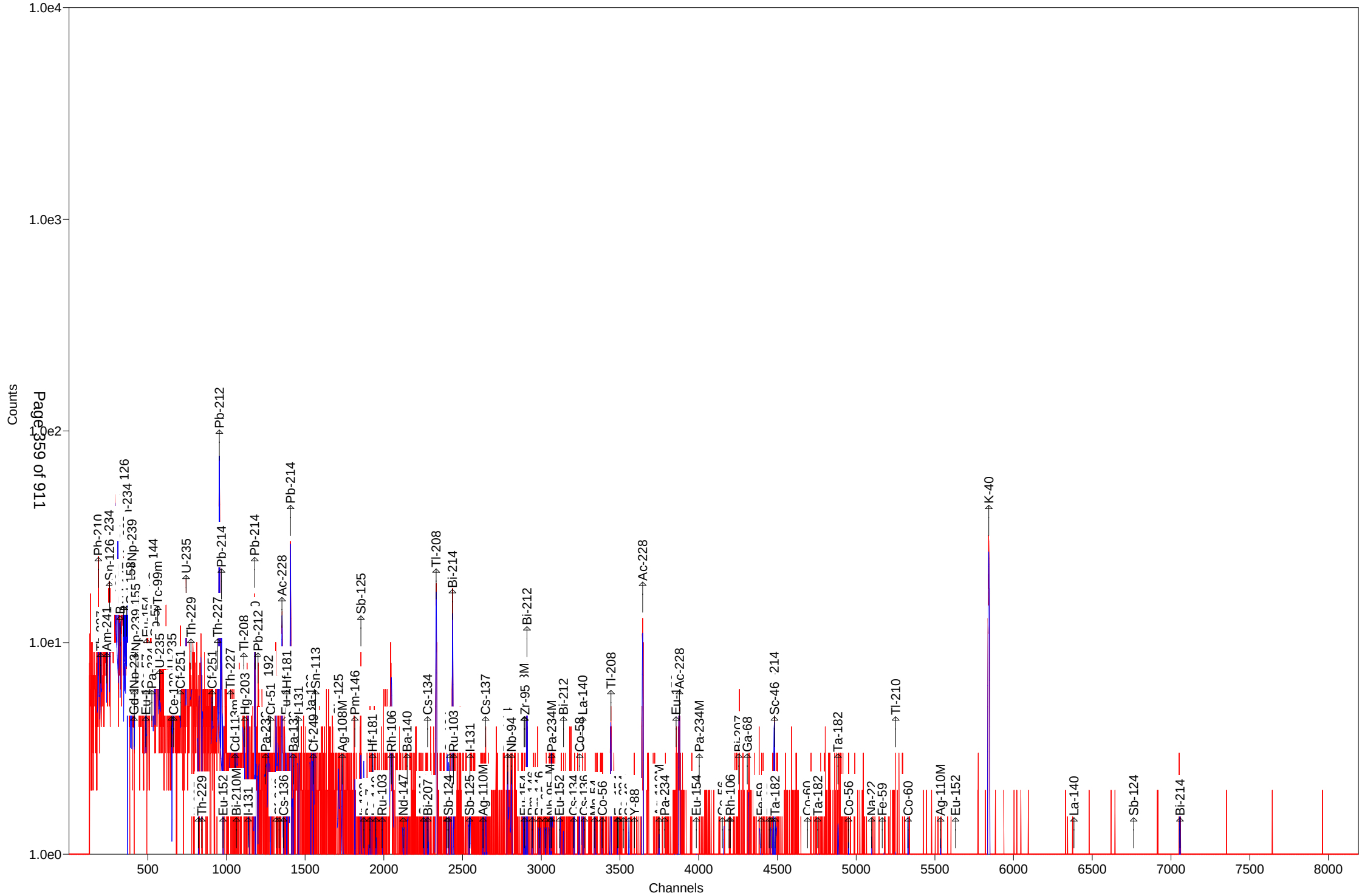
Y-88	#A	0.0000E+00	0.0000E+00	1.000E+03%	9.25E-01
Cd-113m	#A	-2.1621E+03	-2.1621E+03	2.380E+02%	1.77E+04
Cd-109	#A	8.6708E+00	8.6708E+00	1.498E+02%	4.34E+01
Cf-251	#A	-5.5128E-01	-5.5128E-01	3.137E+02%	4.74E+00
Cf-249	#A	-7.8536E-01	-7.8536E-01	1.210E+02%	3.19E+00
Sn-126	A	-4.4672E+00	-4.4672E+00	1.168E+02%	1.39E+01
PB-210	#A	2.3954E+01	2.3954E+01	5.743E+01%	3.66E+01
PB-212		1.3878E+01	1.3878E+01	6.774E+00%	1.76E+00
PB-214		9.3363E+00	9.3363E+00	1.077E+01%	1.91E+00
BI-207	#A	3.0067E-02	3.0067E-02	2.444E+02%	2.55E+00
BI-212		2.3569E+01	2.3569E+01	2.093E+01%	1.09E+01
U-235	#A	-6.2244E-01	-6.2244E-01	6.537E+02%	9.61E+00
BI-214		7.1388E+00	7.1388E+00	1.869E+01%	2.59E+00
BI-210M	#A	5.7252E-01	5.7252E-01	9.914E+01%	1.91E+00
AC-228		1.8591E+01	1.8591E+01	9.134E+00%	2.73E+00
TH-227	#A	2.2436E+00	2.2436E+00	1.407E+02%	1.28E+01
TH-229	#A	-1.2629E-01	-1.2629E-01	5.686E+03%	1.98E+01
TH-234	#A	-9.5347E+00	-9.5347E+00	5.737E+01%	3.03E+01
PA-231	#A	0.0000E+00	0.0000E+00	7.071E+02%	6.92E+01
PA-233	#A	-4.6588E-02	-4.6588E-02	1.760E+03%	5.70E+00
PA-234	#A	4.8617E-01	4.8617E-01	4.016E+02%	6.61E+00
PA-234M	#A	1.0220E+02	1.0220E+02	7.017E+01%	1.73E+02
AM-241	#A	-1.2713E+00	-1.2713E+00	1.126E+02%	3.83E+00
Np-237	#A	-1.0183E+00	-1.0183E+00	3.934E+02%	1.34E+01
Ir-192	#A	4.4295E-01	4.4295E-01	8.796E+01%	1.29E+00
Cs-136	#A	-2.2989E-02	-2.2990E-02	7.622E+01%	2.34E+00
Np-239	#A	1.2044E+00	1.2045E+00	1.518E+02%	6.12E+00
Nd-147	#A	-1.7373E-01	-1.7373E-01	2.156E+02%	9.21E+00
TL-210	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.16E+00
Kr-85	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.92E+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 2000.0 keV) 3.096E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.0 keV) 3.0956247E+02 Bq/Sample

412881_Gamma_180-86110-A-2-A. 2_Gamma_20190272.spc.



Test America St. Louis Spectrum ID: 7_Gamma_20190289

Sample Description: 412881_Gamma_180-86110-A-3-A
Detector: Detector # 7
Batch ID: 412881
Work Order Number: Gamma
Lot Number: 180-86110-A-3-A

Decay to Time: 2/20/2019 08:10 Live Time: 1800 sec
Acquisition Time: 2/20/2019 08:11:11 Real Time: 1805 sec
Analysis Time: 2/20/2019 08:42 Dead Time: 0.30 %
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_Rev15.lib
Bkgd Correction File: 7_2019-01-20_1017.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	6.510E-01	6.510E-01	1.247E+01
NA-22	2.685E-01	154.1	4.138E-01	4.141E-01	1.472E+00
K-40	2.335E+02	5.6	1.303E+01	1.768E+01	7.961E+00
Sc-46	3.227E-01	82.8	2.672E-01	2.677E-01	1.107E+00
CR-51	-3.305E+00	98.2	3.245E+00	3.250E+00	1.089E+01
MN-54	-1.097E-01	361.7	3.968E-01	3.968E-01	1.261E+00
FE-59	3.433E-01	90.3	3.100E-01	3.105E-01	3.021E+00
Co-56	1.597E-01	79.0	1.261E-01	1.264E-01	1.366E+00
CO-57	2.062E-01	138.0	2.845E-01	2.847E-01	8.946E-01
CO-58	4.185E-01	99.7	4.175E-01	4.180E-01	1.421E+00
CO-60	-1.858E-02	2132.7	3.963E-01	3.963E-01	1.005E+00
ZN-65	0.000E+00	1.#INF	2.349E-01	2.349E-01	4.697E+00
NB-94	9.358E-01	44.4	4.155E-01	4.183E-01	9.161E-01
ZR-95	7.093E-01	92.4	6.554E-01	6.564E-01	1.555E+00
NB-95	4.814E-01	86.8	4.176E-01	4.184E-01	1.408E+00
RU-103	3.220E-01	99.1	3.191E-01	3.195E-01	7.771E-01
RH-106	0.000E+00	1.#INF	1.328E+00	1.328E+00	2.674E+01
AG-108M	2.212E-01	147.1	3.254E-01	3.255E-01	8.290E-01
AG-110M	8.073E-01	53.1	4.283E-01	4.303E-01	2.184E+00
SN-113	9.740E-02	556.7	5.423E-01	5.423E-01	1.876E+00
SB-124	3.521E-01	46.3	1.629E-01	1.639E-01	2.743E+00
SB-125	1.180E+00	90.4	1.067E+00	1.069E+00	2.192E+00
I-131	-1.083E-01	369.7	4.005E-01	4.005E-01	1.018E+00
Gd-153	8.225E-01	92.7	7.627E-01	7.643E-01	2.138E+00
Ga-68	-2.873E+01	115.6	3.322E+01	3.326E+01	7.182E+01
Tc-99m	-1.624E-01	202.7	3.290E-01	3.292E-01	1.107E+00
BA-133	2.388E-01	319.0	7.616E-01	7.617E-01	2.586E+00
CS-134	9.462E-01	60.0	5.676E-01	5.697E-01	1.697E+00
CS-137	2.438E-01	207.7	5.063E-01	5.065E-01	1.253E+00
CE-139	1.994E-01	174.1	3.472E-01	3.477E-01	1.169E+00
Ba-140	-1.228E+00	167.6	2.058E+00	2.059E+00	4.956E+00
La-140	-1.468E+00	81.6	1.198E+00	1.200E+00	2.441E+00
CE-141	-5.303E-01	160.5	8.509E-01	8.513E-01	2.841E+00

CE-144	0.000E+00	1.#INF	1.139E+00	1.139E+00	8.523E+00
PM-144	4.070E-01	93.9	3.822E-01	3.828E-01	8.990E-01
EU-152	2.472E+00	29.5	7.283E-01	7.398E-01	2.648E+00
EU-154	6.006E-01	173.1	1.040E+00	1.040E+00	1.726E+00
EU-155	-1.139E+00	81.8	9.315E-01	9.336E-01	5.355E+00
HF-181	0.000E+00	1.#INF	8.576E-02	8.576E-02	1.643E+00
Ta-182	-3.106E+00	85.5	2.657E+00	2.662E+00	8.884E+00
Hg-203	-4.534E-01	89.8	4.072E-01	4.081E-01	1.360E+00
TL-208	4.948E+00	10.3	5.091E-01	5.702E-01	6.568E-01
PM-146	-1.851E-02	2555.0	4.730E-01	4.730E-01	1.446E+00
Y-88	4.731E-01	44.7	2.116E-01	2.133E-01	6.973E-01
Cd-113m	-5.779E+03	93.4	5.395E+03	5.408E+03	1.803E+04
Cd-109	2.950E-01	3722.7	1.098E+01	1.098E+01	3.692E+01
Cf-251	-6.818E-01	236.6	1.613E+00	1.614E+00	4.172E+00
Cf-249	6.012E-01	104.3	6.268E-01	6.276E-01	1.714E+00
Sn-126	4.169E-01	890.2	3.711E+00	3.711E+00	1.258E+01
PB-210	1.474E+01	73.2	1.079E+01	1.082E+01	2.704E+01
PB-212	1.233E+01	7.0	8.573E-01	1.171E+00	1.883E+00
PB-214	1.046E+01	9.0	9.386E-01	1.085E+00	1.356E+00
BI-207	-1.018E+00	63.2	6.429E-01	6.449E-01	2.231E+00
BI-212	6.916E+00	90.0	6.227E+00	6.237E+00	2.097E+01
U-235	-2.463E+00	78.5	1.934E+00	1.938E+00	1.258E+01
BI-214	9.378E+00	12.6	1.182E+00	1.279E+00	1.957E+00
BI-210M	5.105E-01	103.4	5.278E-01	5.287E-01	1.775E+00
AC-228	1.522E+01	9.2	1.394E+00	1.596E+00	1.286E+00
TH-227	-4.800E+00	99.7	4.786E+00	4.795E+00	1.226E+01
TH-229	-1.195E+00	496.5	5.933E+00	5.933E+00	1.678E+01
TH-234	-7.845E+00	46.5	3.647E+00	3.673E+00	2.501E+01
PA-231	-1.070E+01	193.6	2.071E+01	2.072E+01	6.947E+01
PA-233	-4.221E-02	2299.2	9.705E-01	9.705E-01	5.550E+00
PA-234	-1.067E+00	146.0	1.558E+00	1.559E+00	5.222E+00
PA-234M	0.000E+00	1.#INF	3.642E+01	3.642E+01	2.187E+02
AM-241	1.394E-02	8386.4	1.169E+00	1.169E+00	3.173E+00
Np-237	3.838E-01	847.9	3.255E+00	3.255E+00	1.093E+01
Ir-192	2.937E-01	166.7	4.896E-01	4.899E-01	2.085E+00
Cs-136	-5.848E-01	109.3	6.393E-01	6.402E-01	1.480E+00
Np-239	6.051E-01	226.5	1.371E+00	1.371E+00	4.602E+00
Nd-147	2.187E+00	97.4	2.130E+00	2.134E+00	5.217E+00
TL-210	0.000E+00	1.#INF	1.991E-01	1.991E-01	1.631E+00
Kr-85	7.009E+01	153.2	1.074E+02	1.074E+02	3.650E+02
Total	3.961E+02				

Analyst: kody Saulters

Sample description
412881_Gamma_180-86110-A-3-A

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20190289.An1

Acquisition information
Start time: 2/20/2019 8:11:11 AM
Live time: 1800
Real time: 1805
Dead time: 0.30 %
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_Rev15.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	2/20/2019 8:10:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2019-01-20_1017.PBC 1/20/2019 10:17:25 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 23 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1855

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
47.01	28.	73.16	1.98	2.483E-02	46.54	4.250	PBC<MDA	PB210
63.39	34.	60.89	1.32	4.013E-02	63.29	3.810	PBC<MDA	TH234
					64.28	9.700	4.730E+00	Sn126
74.74	167.	13.14	0.87	4.764E-02				
77.27	226.	10.97	0.87	4.896E-02				
87.23	69.	26.31	0.88	5.302E-02	86.49	13.100	5.525E+00	Np237
					86.54	30.700	2.357E+00	EU155
					86.94	9.040	7.984E+00	Sn126
					87.57	37.500	1.917E+00	Sn126
					88.04	3.790	1.892E+01	Cd109
89.95	39.	48.86	0.88	5.384E-02				
93.30	66.	30.00	0.89	5.470E-02	93.35	5.561	1.203E+01	AC228
97.50	22.	106.91	0.89	5.550E-02	97.50	30.000	PBC<MDA	Gd153
99.50	20.	148.92	0.89	5.580E-02	99.50	15.000	PBC<MDA	Np239
103.20	20.	151.54	0.90	5.622E-02	103.20	21.800	PBC<MDA	Gd153
103.70	20.	152.63	0.90	5.626E-02	103.70	24.000	PBC<MDA	Np239
106.13	14.	226.51	0.90	5.643E-02	106.13	22.700	PBC<MDA	Np239
121.00	6.	374.91	0.92	5.608E-02	121.78	28.580	PBC<MDA	EU152
123.10	8.	272.46	0.92	5.596E-02	123.10	40.790	PBC<MDA	EU154
136.47	19.	137.95	0.93	5.410E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.859E+00	CO57
150.54	24.	51.29	0.67	5.127E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
165.85	14.	174.09	0.96	4.881E-02	165.85	79.900	PBC<MDA	CE139
185.72	22.	106.71	0.99	4.443E-02	185.72	54.000	PBC<MDA	U235
227.00	18.	102.91	1.03	3.757E-02	227.00	6.300	PBC<MDA	Cf251
235.97	16.	214.39	1.04	3.636E-02	235.97	12.300	PBC<MDA	TH227
238.57	366.	8.46	0.93	3.603E-02	238.63	43.300	1.304E+01	PB212
241.99	16.	207.17	1.04	3.560E-02	242.00	7.430	PBC<MDA	PB214
244.69	16.	212.92	1.05	3.526E-02	244.69	7.580	PBC<MDA	EU152
265.83	15.	103.40	1.07	3.288E-02	265.83	50.000	PBC<MDA	BI210M
278.08	17.	82.98	1.08	3.172E-02	277.28	6.310	PBC<MDA	TL208
295.25	116.	15.54	1.62	3.009E-02	295.09	19.300	1.108E+01	PB214
					296.00	79.000	PBC<MDA	TL210
299.89	46.	30.07	0.58	2.966E-02	300.03	3.280	2.598E+01	PB212
					300.07	2.460	3.464E+01	PA231
					300.18	6.200	1.375E+01	PA233
316.49	17.	166.70	1.12	2.834E-02	316.49	87.040	PBC<MDA	Ir192
328.76	15.	104.95	1.13	2.744E-02	328.76	20.300	PBC<MDA	La140
333.44	10.	173.89	1.14	2.711E-02	333.44	15.510	PBC<MDA	Cf249
338.26	98.	16.84	1.17	2.677E-02	338.32	12.010	1.699E+01	AC228
351.88	178.	8.99	1.21	2.588E-02	351.93	37.600	1.014E+01	PB214
356.00	7.	319.00	1.16	2.562E-02	356.00	62.050	PBC<MDA	BA133
383.84	12.	108.27	1.19	2.402E-02	383.84	8.940	PBC<MDA	BA133
387.95	12.	115.10	1.19	2.380E-02	387.95	66.000	PBC<MDA	Cf249
391.69	3.	556.75	1.20	2.360E-02	391.69	64.000	PBC<MDA	SN113
427.88	5.	187.83	1.23	2.186E-02	427.88	29.600	PBC<MDA	SB125
433.94	8.	147.06	1.24	2.160E-02	433.94	90.480	PBC<MDA	AG108M
463.37	12.	90.44	1.27	2.040E-02	463.37	10.470	PBC<MDA	SB125
468.06	3.	413.06	1.27	2.022E-02	468.06	51.750	PBC<MDA	Ir192
487.02	12.	105.37	1.29	1.954E-02	487.02	45.500	PBC<MDA	La140
497.05	10.	99.10	1.30	1.919E-02	497.05	90.900	PBC<MDA	RU103
511.86	31.	45.66	2.56	1.870E-02	511.86	20.000	PBC<MDA	RH106
513.98	10.	153.18	1.32	1.864E-02	513.98	0.430	PBC<MDA	Kr85
531.00	9.	97.38	1.33	1.811E-02	531.00	13.000	PBC<MDA	Nd147
563.24	9.	120.36	1.36	1.720E-02	563.24	8.350	PBC<MDA	CS134
569.32	9.	96.08	1.37	1.704E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.447E+00	PA234
					569.70	97.740	PBC<MDA	BI207
582.77	126.	10.29	1.65	1.669E-02	583.02	84.500	4.966E+00	TL208
609.46	125.	12.61	1.48	1.605E-02	609.31	46.090	9.378E+00	BI214
661.66	6.	207.71	1.46	1.492E-02	661.66	85.210	PBC<MDA	CS137
696.54	10.	93.92	1.49	1.426E-02	696.54	99.000	PBC<MDA	PM144
702.63	23.	44.40	1.49	1.415E-02	702.63	97.900	9.358E-01	NB94
722.79	15.	78.16	1.51	1.380E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	6.586E-01	AG108M
					723.36	20.220	2.960E+00	EU154
727.17	13.	90.04	1.51	1.373E-02	727.17	7.550	PBC<MDA	BI212
756.73	9.	92.40	1.54	1.325E-02	756.73	54.460	PBC<MDA	ZR95
763.94	7.	147.99	1.55	1.314E-02	763.94	22.280	PBC<MDA	AG110M
765.79	11.	86.75	1.55	1.311E-02	765.79	99.790	PBC<MDA	NB95

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					766.41	0.294	1.635E+02	PA234M
785.42	10.	110.78	1.57	1.281E-02	785.42	1.280	PBC<MDA	BI212
795.87	10.	93.07	1.58	1.266E-02	795.87	85.530	PBC<MDA	CS134
810.78	9.	99.74	1.59	1.246E-02	810.78	99.460	PBC<MDA	CO58
889.28	8.	82.79	1.66	1.147E-02	889.28	99.984	PBC<MDA	Sc46
911.19	92.	10.56	1.69	1.122E-02	911.07	29.000	1.569E+01	AC228
937.49	15.	53.05	1.70	1.094E-02	937.49	34.360	PBC<MDA	AG110M
964.11	20.	29.46	1.72	1.066E-02	964.11	14.605	7.077E+00	EU152
968.97	44.	18.97	1.72	1.062E-02	968.97	17.460	1.322E+01	AC228
996.33	4.	213.59	1.75	1.035E-02	996.33	10.600	PBC<MDA	EU154
1048.07	1.	728.01	1.79	9.890E-03	1048.07	80.000	PBC<MDA	Cs136
1112.10	4.	264.70	1.84	9.373E-03	1112.07	13.644	PBC<MDA	EU152
1119.71	9.	112.92	1.85	9.311E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	4.	264.84	1.85	9.309E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	2.508E-01	Sc46
					1121.30	34.900	7.189E-01	Ta182
1238.28	10.	113.27	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	9.	90.30	1.98	8.180E-03	1291.60	43.200	PBC<MDA	FE59
1313.00	7.	143.21	1.99	8.059E-03	1313.00	21.000	PBC<MDA	TL210
1408.49	8.	35.36	2.06	7.560E-03	1408.00	21.005	2.799E+00	EU152
1460.57	328.	5.58	2.03	7.309E-03	1460.83	10.670	2.335E+02	K40
1690.98	5.	46.28	2.25	6.388E-03	1690.98	47.790	PBC<MDA	SB124
1764.03	26.	20.57	2.29	6.141E-03	1764.49	15.400	1.555E+01	BI214
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 Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
253.67	63.39	123.	55.	1.377E+03	31.39	0.855	-	sD
298.53	74.75	155.	168.	3.527E+03	13.01	0.867	-	D
308.64	77.28	188.	231.	4.713E+03	10.68	0.870	-	sD
359.04	89.92	153.	49.	9.064E+02	38.65	0.883	-	sD
601.77	150.54	51.	24.	4.681E+02	51.29	0.673	-	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_Rev15.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	187.57	47.01	109.	28.	0.016	73.16	1.976s
TH-227	200.12	50.14	344.	-21.	-0.011	128.81	0.840s
TH-234	252.71	63.29	358.	-46.	-0.025	47.01	0.854s
Sn-126	256.68	64.28	348.	3.	0.002	890.19	0.856s
BA-133	323.52	80.99	1111.	-30.	-0.016	160.26	0.874
Np-237	345.53	86.49	818.	5.	0.003	847.88	0.880A
EU-155	345.74	86.54	873.	-28.	-0.015	152.04	0.880D
Sn-126	347.33	86.94	815.	4.	0.002	553.01	0.880D
Sn-126	349.85	87.57	769.	15.	0.008	139.16	0.881D
TH-234	369.93	92.59	831.	-43.	-0.024	46.49	0.886s
AC-228	372.97	93.35	162.	66.	0.037	30.00	0.887D
Gd-153	389.57	97.50	173.	22.	0.012	106.91	0.892s
Np-239	397.57	99.50	450.	20.	0.011	148.92	0.894
Gd-153	412.38	103.20	471.	20.	0.011	151.54	0.898s
Np-239	414.38	103.70	478.	20.	0.011	152.63	0.898s
EU-155	420.83	105.31	583.	-25.	-0.014	81.77	0.900s
Np-239	424.10	106.13	492.	14.	0.008	226.51	0.901
EU-152	486.70	121.78	250.	6.	0.003	374.91	0.918s
CO-57	487.83	122.06	256.	0.	0.000	1000.00	0.918s
EU-154	491.98	123.10	214.	8.	0.004	272.46	0.919s
PA-234	524.77	131.29	375.	-19.	-0.011	145.95	0.928s
HF-181	531.68	133.02	361.	-14.	-0.008	198.37	0.930s
CE-144	533.74	133.54	374.	0.	0.000	1000.00	0.930s
HF-181	544.79	136.30	374.	0.	0.000	1000.00	0.933s
CO-57	545.48	136.47	346.	19.	0.011	137.95	0.933s
Tc-99m	561.63	140.51	368.	-14.	-0.007	202.66	0.938s
U-235	574.73	143.79	756.	-26.	-0.014	78.51	0.941s
CE-141	581.35	145.44	735.	-24.	-0.013	160.47	0.943s
Ba-140	650.24	162.66	291.	-23.	-0.013	108.53	0.961s
U-235	653.11	163.38	295.	-15.	-0.008	135.46	0.962s
CE-139	663.01	165.85	290.	14.	0.008	174.09	0.965s
Cf-251	706.00	176.60	147.	-10.	-0.005	236.58	0.976s
U-235	742.49	185.72	147.	22.	0.012	106.71	0.986s
TH-229	773.64	193.51	136.	-4.	-0.002	496.53	0.994s
U-235	820.94	205.33	121.	-7.	-0.004	283.33	1.007s
Cf-251	907.62	227.00	88.	18.	0.010	102.91	1.029s
TH-227	943.50	235.97	591.	16.	0.009	214.39	1.039s
PB-212	954.15	238.63	116.	346.	0.192	6.95	1.041D
PB-214	967.61	242.00	558.	16.	0.009	207.17	1.045
EU-152	978.39	244.69	563.	16.	0.009	212.92	1.048
TH-227	1024.59	256.24	114.	-21.	-0.011	99.71	1.060s
Cd-113m	1054.43	263.70	176.	-21.	-0.011	93.36	1.067s
BI-210M	1062.96	265.83	114.	15.	0.008	103.40	1.070s
TL-208	1108.77	277.28	91.	17.	0.009	82.98	1.081s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Hg-203	1116.44	279.20	167.	-21.	-0.012	89.81	1.083s
I-131	1136.83	284.30	88.	-15.	-0.008	103.73	1.089s
PB-214	1180.66	295.25	45.	116.	0.064	15.54	1.617s
TL-210	1183.64	296.00	540.	-16.	-0.009	204.03	1.101s
PB-212	1199.21	299.89	32.	46.	0.025	30.07	0.585s
PA-231	1199.92	300.07	524.	-16.	-0.009	200.25	1.105s
PA-233	1200.36	300.18	508.	-16.	-0.009	197.16	1.105s
PA-231	1210.24	302.65	492.	-16.	-0.009	193.58	1.107s
BA-133	1211.05	302.85	475.	-11.	-0.006	273.51	1.108s
Ba-140	1219.04	304.85	464.	0.	0.000	1000.00	1.110
BI-210M	1219.23	304.90	464.	0.	0.000	1000.00	1.110s
Ir-192	1233.41	308.44	464.	0.	0.000	1000.00	1.113s
Ir-192	1265.61	316.49	372.	17.	0.009	166.70	1.122s
CR-51	1279.99	320.08	125.	-17.	-0.009	98.21	1.125s
La-140	1314.69	328.76	111.	15.	0.008	104.95	1.134
Cf-249	1333.41	333.44	138.	10.	0.005	173.89	1.139s
AC-228	1352.70	338.26	33.	98.	0.055	16.84	1.169s
Cs-136	1361.93	340.57	287.	-17.	-0.010	140.07	1.146s
EU-152	1376.80	344.29	266.	-18.	-0.010	23.16	1.150s
HF-181	1382.97	345.83	232.	-9.	-0.005	244.90	1.151s
PB-214	1407.16	351.88	20.	178.	0.099	8.99	1.211s
BA-133	1423.66	356.00	234.	7.	0.004	319.00	1.162s
I-131	1457.59	364.48	56.	-4.	-0.002	369.68	1.170s
BA-133	1535.03	383.84	84.	12.	0.007	108.27	1.189s
Cf-249	1551.47	387.95	96.	12.	0.007	115.10	1.193s
SN-113	1566.43	391.69	107.	3.	0.001	556.75	1.197s
SB-125	1711.18	427.88	24.	5.	0.003	187.83	1.233s
AG-108M	1735.43	433.94	32.	8.	0.004	147.06	1.239s
SB-125	1853.15	463.37	57.	12.	0.007	90.44	1.268s
Ir-192	1871.93	468.06	77.	3.	0.002	413.06	1.272s
BE-7	1910.07	477.60	90.	0.	0.000	1000.00	1.282s
HF-181	1927.68	482.00	90.	0.	0.000	1000.00	1.286s
La-140	1947.77	487.02	72.	12.	0.007	105.37	1.291s
RU-103	1987.91	497.05	22.	10.	0.006	99.10	1.301s
RH-106	2047.15	511.86	84.	31.	0.017	45.66	2.565s
Kr-85	2055.62	513.98	115.	10.	0.006	153.18	1.317s
Nd-147	2123.70	531.00	17.	9.	0.005	97.38	1.333s
Ba-140	2148.74	537.26	61.	-10.	-0.005	167.59	1.339s
CS-134	2252.65	563.24	26.	9.	0.005	120.36	1.364s
CS-134	2276.99	569.32	30.	9.	0.005	96.08	1.369s
PA-234	2277.59	569.47	54.	-11.	-0.006	101.84	1.370s
BI-207	2278.51	569.70	50.	-2.	-0.001	674.86	1.370s
TL-208	2330.80	582.77	9.	126.	0.070	10.29	1.654s
SB-125	2401.71	600.50	279.	-14.	-0.008	173.83	1.399s
SB-124	2410.64	602.73	265.	-14.	-0.008	169.35	1.401s
CS-134	2418.55	604.71	267.	-15.	-0.008	160.17	1.403s
BI-214	2437.57	609.46	25.	125.	0.069	12.61	1.483s
RU-103	2440.91	610.30	253.	-10.	-0.005	234.68	1.408s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-108M	2456.84	614.28	243.	0.	0.000	1000.00	1.412s
PM-144	2471.96	618.06	243.	0.	0.000	1000.00	1.415s
RH-106	2487.38	621.92	243.	0.	0.000	1000.00	1.419s
SB-125	2543.28	635.89	73.	-19.	-0.010	83.81	1.432s
I-131	2547.62	636.97	75.	-2.	-0.001	559.88	1.433s
CS-137	2646.36	661.66	31.	6.	0.003	207.71	1.455s
PM-144	2785.90	696.54	19.	10.	0.006	93.92	1.487s
NB-94	2810.25	702.63	19.	23.	0.013	44.40	1.493s
SB-124	2890.87	722.79	60.	15.	0.008	78.16	1.511s
EU-154	2893.17	723.36	76.	0.	0.000	1000.00	1.511s
ZR-95	2896.52	724.20	76.	0.	0.000	1000.00	1.512s
BI-212	2908.41	727.17	61.	13.	0.007	90.04	1.515s
PM-146	2942.61	735.72	47.	-5.	-0.003	233.64	1.523s
PM-146	2988.37	747.16	43.	-13.	-0.007	92.59	1.533s
ZR-95	3026.65	756.73	14.	9.	0.005	92.40	1.541s
AG-110M	3055.51	763.94	45.	7.	0.004	147.99	1.548s
NB-95	3062.89	765.79	43.	11.	0.006	86.75	1.549s
PA-234M	3065.38	766.41	55.	-3.	-0.002	354.34	1.550s
EU-152	3115.41	778.92	24.	-1.	-0.001	951.63	1.561s
BI-212	3141.41	785.42	23.	10.	0.005	110.78	1.567s
CS-134	3183.22	795.87	42.	10.	0.006	93.07	1.576s
TL-210	3198.14	799.60	53.	0.	0.000	1000.00	1.579s
CO-58	3242.84	810.78	39.	9.	0.005	99.74	1.589s
Cs-136	3273.74	818.50	42.	-13.	-0.007	109.33	1.596s
MN-54	3339.13	834.85	28.	-2.	-0.001	361.65	1.610s
Co-56	3386.82	846.77	33.	-8.	-0.004	110.06	1.620s
TL-208	3442.00	860.56	40.	-3.	-0.002	160.26	1.632s
NB-94	3484.13	871.10	48.	-13.	-0.007	80.31	1.641s
EU-154	3492.66	873.23	78.	-13.	-0.007	39.08	1.643s
PA-234	3532.70	883.24	42.	0.	0.000	1000.00	1.652s
AG-110M	3538.47	884.68	42.	0.	0.000	1000.00	1.653s
Sc-46	3556.86	889.28	19.	8.	0.005	82.79	1.657s
Y-88	3591.90	898.04	55.	-19.	-0.011	26.82	1.664s
AC-228	3644.49	911.19	1.	92.	0.051	10.56	1.686s
AG-110M	3749.71	937.49	10.	15.	0.008	53.05	1.697s
PA-234	3783.82	946.02	25.	-1.	-0.001	945.11	1.704s
EU-152	3856.18	964.11	7.	20.	0.011	29.46	1.719D
AC-228	3875.62	968.97	13.	44.	0.025	18.97	1.724D
EU-154	3985.06	996.33	41.	4.	0.002	213.59	1.746s
PA-234M	4003.73	1001.00	45.	0.	0.000	1000.00	1.750s
EU-154	4018.84	1004.77	58.	-11.	-0.006	105.23	1.753s
Co-56	4151.10	1037.84	20.	-3.	-0.002	332.78	1.780s
Cs-136	4192.02	1048.07	26.	1.	0.001	728.01	1.788
RH-106	4201.18	1050.36	35.	-6.	-0.003	141.83	1.790s
BI-207	4254.38	1063.66	32.	-13.	-0.007	63.16	1.801s
Ga-68	4309.34	1077.40	48.	-14.	-0.008	115.62	1.812s
FE-59	4396.74	1099.25	32.	-5.	-0.003	166.16	1.829s
EU-152	4448.04	1112.07	60.	4.	0.002	264.70	1.839s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZN-65	4461.92	1115.55	64.	0.	0.000	1000.00	1.842s
BI-214	4480.88	1120.29	50.	9.	0.005	112.92	1.845s
Sc-46	4481.94	1120.55	60.	4.	0.002	264.84	1.846s
Ta-182	4484.94	1121.30	112.	-18.	-0.010	85.55	1.846s
Ta-182	4755.93	1189.05	37.	-8.	-0.005	170.22	1.899s
Ta-182	4885.37	1221.41	64.	-23.	-0.013	81.22	1.923s
Co-56	4952.84	1238.28	21.	10.	0.005	113.27	1.936s
NA-22	5097.84	1274.53	17.	4.	0.002	154.11	1.963s
EU-154	5097.88	1274.54	21.	0.	0.000	1000.00	1.963s
FE-59	5166.10	1291.60	12.	9.	0.005	90.30	1.975s
TL-210	5251.71	1313.00	17.	7.	0.004	143.21	1.991s
EU-152	5631.70	1408.00	0.	8.	0.004	35.36	2.059s
K-40	5841.97	1460.57	3.	328.	0.182	5.58	2.035
La-140	6384.49	1596.21	30.	-17.	-0.009	81.57	2.185s
SB-124	6763.55	1690.98	0.	5.	0.003	46.28	2.245s
BI-214	7057.56	1764.49	2.	26.	0.015	20.57	2.290s
Co-56	7084.99	1771.35	28.	0.	0.000	1000.00	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
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	2.3345E+02				4.66E+11	
			1460.83	2.335E+02	(P	7.961E+00 5.58E+00 1.07E+01	G
Sc-46	F	3.2272E-01				8.38E+01	
			889.28	3.947E-01	?(	1.107E+00 8.28E+01 1.00E+02	G
			1120.55	2.508E-01	(	2.313E+00 2.65E+02 1.00E+02	G
CR-51	F	-3.3045E+00				2.77E+01	
			320.08	-3.305E+00	&(	1.089E+01 9.82E+01 9.94E+00	G
MN-54	C	-1.0972E-01				3.12E+02	
			834.85	-1.097E-01	?(P	1.261E+00 3.62E+02 1.00E+02	G
FE-59	F	3.4335E-01				4.45E+01	
			1099.25	-5.266E-01	?(P	3.021E+00 1.66E+02 5.65E+01	G
			1291.60	1.481E+00	?(P	2.924E+00 9.03E+01 4.32E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C 1.5969E-01					7.73E+01	
		846.77	-3.669E-01	?(P	1.366E+00	1.10E+02	9.99E+01 G
		1238.28	9.562E-01	?(	2.397E+00	1.13E+02	6.61E+01 G
		1037.84	-1.182E+00	+	9.280E+00	3.33E+02	1.41E+01 G
		1771.35	0.000E+00	-	1.605E+01	1.00E+03	1.55E+01 A
CO-57	C 2.0622E-01					2.72E+02	
		122.06	0.000E+00	?(	8.946E-01	1.00E+03	8.56E+01 G
		136.47	1.859E+00	&(	8.596E+00	1.38E+02	1.07E+01 G
CO-58	C 4.1853E-01					7.09E+01	
		810.78	4.185E-01	?(	1.421E+00	9.97E+01	9.95E+01 G
CO-60	F -1.8581E-02					1.93E+03	
		1332.50	-1.858E-02	%(P	1.005E+00	2.13E+03	1.00E+02 G
		1173.24	2.076E-02	%	1.668E+00	3.53E+03	9.99E+01 G
NB-94	I 9.3576E-01					7.41E+06	
		702.63	9.358E-01	?(	9.161E-01	4.44E+01	9.79E+01 G
		871.10	-6.189E-01	-	1.666E+00	8.03E+01	9.99E+01 G
ZR-95	I 7.0928E-01					6.40E+01	
		756.73	7.093E-01	?(P	1.555E+00	9.24E+01	5.45E+01 G
		724.20	0.000E+00	-	3.959E+00	1.00E+03	4.42E+01 G
NB-95	I 4.8138E-01					6.40E+01	
		765.79	4.814E-01	?(	1.408E+00	8.68E+01	9.98E+01 G
RU-103	I 3.2199E-01					3.93E+01	
		497.05	3.220E-01	&(	7.771E-01	9.91E+01	9.09E+01 G
		610.30	-5.829E+00	+	4.629E+01	2.35E+02	5.75E+00 GA
AG-108M	C 2.2123E-01					1.53E+05	
		433.94	2.212E-01	&(P	8.290E-01	1.47E+02	9.05E+01 G
		722.94	5.063E-02	%	1.907E+00	1.08E+03	9.08E+01 G
		614.28	0.000E+00	-	2.924E+00	1.00E+03	8.98E+01 G
AG-110M	F 8.0728E-01					2.50E+02	
		884.68	0.000E+00	?(	2.184E+00	1.00E+03	7.27E+01 G
		657.76	-1.304E-02	&	1.487E+00	3.22E+03	9.46E+01 G
		937.49	2.218E+00	?(	2.579E+00	5.31E+01	3.44E+01 G
		1384.30	-9.929E-02	%	5.480E+00	2.37E+03	2.43E+01 G
		763.94	1.266E+00	?(	6.471E+00	1.48E+02	2.23E+01 G
SN-113	F 9.7398E-02					1.15E+02	
		391.69	9.740E-02	?(	1.876E+00	5.57E+02	6.40E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-124	F	3.5207E-01					6.02E+01	
			602.73	-4.807E-01	?(	2.743E+00	1.69E+02	9.83E+01 G
			1690.98	8.921E-01	?(P	1.341E+00	4.63E+01	4.78E+01 G
			722.79	5.534E+00	?(	1.445E+01	7.82E+01	1.08E+01 G
SB-125	I	1.1802E+00					1.01E+03	
			427.88	4.507E-01	?(	2.192E+00	1.88E+02	2.96E+01 G
			600.50	-2.632E+00	+	1.541E+01	1.74E+02	1.79E+01 G
			635.89	-5.977E+00	+ P	1.347E+01	8.38E+01	1.13E+01 G
			463.37	3.242E+00	?(	9.882E+00	9.04E+01	1.05E+01 G
I-131	I	-1.0832E-01					8.02E+00	
			364.48	-1.083E-01	(	1.018E+00	3.70E+02	8.17E+01 G
			284.30	-4.391E+00	+ P	1.353E+01	1.04E+02	6.14E+00 G
			636.97	-1.110E+00	+	2.168E+01	5.60E+02	7.17E+00 G
Gd-153	F	8.2250E-01					2.42E+02	
			97.50	7.460E-01	?(	2.138E+00	1.07E+02	3.00E+01 G
			103.20	9.278E-01	?(	4.706E+00	1.52E+02	2.18E+01 G
Ga-68	C	-2.8730E+01					4.71E-02	
			1077.40	-2.873E+01	?(	7.182E+01	1.16E+02	3.30E+00 G
Tc-99m	I	-1.6236E-01					2.51E-01	
			140.51	-1.624E-01	(	1.107E+00	2.03E+02	8.93E+01 G
BA-133	F	2.3876E-01					3.85E+03	
			356.00	2.388E-01	&(	2.586E+00	3.19E+02	6.20E+01 G
			302.85	-1.168E+00	+	1.074E+01	2.74E+02	1.83E+01 G
			383.84	3.210E+00	?	1.175E+01	1.08E+02	8.94E+00 GA
			80.99	-9.529E-01	+	5.086E+00	1.60E+02	3.41E+01 GA
CS-134	I	9.4624E-01					7.54E+02	
			795.87	5.385E-01	?(	1.697E+00	9.31E+01	8.55E+01 G
			604.71	-5.153E-01	-	2.779E+00	1.60E+02	9.76E+01 G
			569.32	1.837E+00	*(	6.015E+00	9.61E+01	1.54E+01 G
			801.95	-3.388E-01	%	1.889E+01	1.57E+03	8.69E+00 G
			563.24	3.481E+00	?(	1.024E+01	1.20E+02	8.35E+00 G
CS-137	I	2.4377E-01					1.10E+04	
			661.66	2.438E-01	*(P	1.253E+00	2.08E+02	8.52E+01 G
CE-139	F	1.9943E-01					1.38E+02	
			165.85	1.994E-01	&(	1.169E+00	1.74E+02	7.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ba-140	I	-1.2282E+00					1.28E+01	
			537.26	-1.228E+00	?(	4.956E+00	1.68E+02	2.44E+01 G
			162.66	-4.181E+00	+	1.517E+01	1.09E+02	6.22E+00 G
			304.85	0.000E+00	+	4.562E+01	1.00E+03	4.29E+00 G
La-140	I	-1.4684E+00					1.28E+01	
			1596.21	-1.468E+00	?(	2.441E+00	8.16E+01	9.54E+01 G
			487.02	7.422E-01	&	2.647E+00	1.05E+02	4.55E+01 G
			328.76	1.460E+00	& P	5.160E+00	1.05E+02	2.03E+01 G
			815.77	-2.396E-02	% P	6.750E+00	6.92E+03	2.33E+01 G
CE-141	I	-5.3025E-01					3.25E+01	
			145.44	-5.303E-01	?(	2.841E+00	1.60E+02	4.82E+01 G
PM-144	C	4.0697E-01					3.63E+02	
			696.54	4.070E-01	&(	8.990E-01	9.39E+01	9.90E+01 G
			618.06	0.000E+00	-	2.665E+00	1.00E+03	9.91E+01 G
EU-152	F	2.4721E+00					4.94E+03	
			121.78	2.080E-01	&(	2.648E+00	3.75E+02	2.86E+01 G
			344.29	-1.402E+00	& P	6.257E+00	2.32E+01	2.65E+01 G
			1112.07	1.826E+00	?(	1.683E+01	2.65E+02	1.36E+01 G
			778.92	-3.000E-01	+ P	8.478E+00	9.52E+02	1.29E+01 G
			964.11	7.077E+00	(	5.415E+00	2.95E+01	1.46E+01 G
			244.69	3.299E+00	?(	2.355E+01	2.13E+02	7.58E+00 G
			1408.00	2.799E+00	?	2.578E+00	3.54E+01	2.10E+01 GA
EU-154	I	6.0062E-01					3.14E+03	
			123.10	1.866E-01	?(	1.726E+00	2.72E+02	4.08E+01 G
			1274.54	0.000E+00	-	4.588E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	8.635E+00	1.00E+03	2.02E+01 G
			873.23	-5.105E+00	+ P	1.705E+01	3.91E+01	1.23E+01 G
			1004.77	-3.203E+00	&	1.144E+01	1.05E+02	1.80E+01 G
			996.33	2.194E+00	?(	1.642E+01	2.14E+02	1.06E+01 G
EU-155	I	-1.1392E+00					1.81E+03	
			105.31	-1.139E+00	&(P	5.355E+00	8.18E+01	2.12E+01 G
			86.54	-9.492E-01	+	4.811E+00	1.52E+02	3.07E+01 G
Ta-182	F	-3.1062E+00					1.14E+02	
			1121.30	-3.106E+00	?(	8.884E+00	8.55E+01	3.49E+01 G
			1221.41	-5.536E+00	+	9.559E+00	8.12E+01	2.70E+01 G
			1189.05	-3.240E+00	+	1.212E+01	1.70E+02	1.62E+01 G
Hg-203	F	-4.5345E-01					4.66E+01	
			279.20	-4.534E-01	?(	1.360E+00	8.98E+01	8.15E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N	4.9483E+00					6.98E+02	
			583.02	4.966E+00	@(P	6.568E-01	1.03E+01	8.45E+01 G
			277.28	4.718E+00	&(	1.309E+01	8.30E+01	6.31E+00 G
			860.56	-1.204E+00	- P	1.221E+01	1.60E+02	1.24E+01 G
PM-146	C	-1.8511E-02					2.02E+03	
			453.88	-1.851E-02	%(P	1.446E+00	2.56E+03	6.50E+01 G
			747.16	-1.539E+00	+ P	4.041E+00	9.26E+01	3.40E+01 G
			735.72	-9.044E-01	+ P	6.298E+00	2.34E+02	2.25E+01 G
Y-88	F	4.7308E-01					1.07E+02	
			1836.06	4.731E-01	?(	6.973E-01	4.47E+01	9.92E+01 G
			898.04	-1.005E+00	- P	1.945E+00	2.68E+01	9.37E+01 G
Cd-113m		-5.7786E+03					5.33E+03	
			263.70	-5.779E+03	?(	1.803E+04	9.34E+01	6.00E-03 K
Cd-109	F	2.9498E-01					4.53E+02	
							Derived Ave Activity	
			88.04	2.950E-01	}(	3.692E+01	3.72E+03	3.79E+00 G
Cf-251	T	-6.8179E-01					3.28E+05	
			176.60	-6.818E-01	?(	4.172E+00	2.37E+02	1.70E+01 G
			227.00	4.116E+00	?	1.090E+01	1.03E+02	6.30E+00 GA
Cf-249	T	6.0116E-01					1.28E+05	
			387.95	4.403E-01	(	1.714E+00	1.15E+02	6.60E+01 G
			333.44	1.286E+00	&(	7.599E+00	1.74E+02	1.55E+01 G
Sn-126		4.1689E-01					3.65E+07	
			87.57	4.169E-01	}	3.677E+00	1.39E+02	3.75E+01 GA
			64.28	4.169E-01	?(	1.258E+01	8.90E+02	9.70E+00 G
			86.94	4.169E-01	}	1.576E+01	5.53E+02	9.04E+00 GA
PB-210	N	1.4742E+01					8.14E+03	
			46.54	1.474E+01	*(P	2.704E+01	7.32E+01	4.25E+00 G
PB-212	N	1.2330E+01					6.98E+02	
			238.63	1.233E+01	(P	1.883E+00	6.95E+00	4.33E+01 G
			300.03	2.598E+01	+	1.648E+01	3.01E+01	3.28E+00 GA
PB-214	N	1.0459E+01					5.84E+05	
			351.93	1.014E+01	(P	1.356E+00	8.99E+00	3.76E+01 G
			295.09	1.108E+01	*(P	3.256E+00	1.55E+01	1.93E+01 G
			242.00	3.413E+00	-	2.370E+01	2.07E+02	7.43E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-207	C	-1.0179E+00					1.18E+04	
			1063.66	-1.018E+00	?(P	2.231E+00	6.32E+01	7.45E+01 G
			569.70	-5.736E-02	+ P	1.187E+00	6.75E+02	9.77E+01 G
BI-212	N	6.9159E+00					6.98E+02	
			727.17	6.916E+00	&(	2.097E+01	9.00E+01	7.55E+00 G
			785.42	3.274E+01	?	8.542E+01	1.11E+02	1.28E+00 GA
U-235	N	-2.4630E+00					2.57E+11	
			143.79	-2.463E+00	?(P	1.258E+01	7.85E+01	1.10E+01 G
			205.33	-1.934E+00	+ P	1.465E+01	2.83E+02	5.01E+00 G
			163.38	-3.370E+00	+ P	1.876E+01	1.35E+02	5.08E+00 G
			185.72	5.019E-01	+	1.369E+00	1.07E+02	5.40E+01 GA
BI-214	N	9.3784E+00					5.84E+05	
			609.31	9.378E+00	*(P	1.957E+00	1.26E+01	4.61E+01 G
			1120.29	3.680E+00	& P	1.415E+01	1.13E+02	1.51E+01 G
			1764.49	1.555E+01	+ P	4.972E+00	2.06E+01	1.54E+01 G
BI-210M	T	5.1047E-01					1.10E+09	
			265.83	5.105E-01	*(P	1.775E+00	1.03E+02	5.00E+01 G
			304.90	0.000E+00	&	6.990E+00	1.00E+03	2.80E+01 G
AC-228	N	1.5222E+01					2.10E+03	
			911.07	1.569E+01	@(P	1.286E+00	1.06E+01	2.90E+01 G
			968.97	1.322E+01	(P	5.827E+00	1.90E+01	1.75E+01 G
			338.32	1.699E+01	(P	5.071E+00	1.68E+01	1.20E+01 G
			93.35	1.203E+01	-	1.133E+01	3.00E+01	5.56E+00 XA
TH-227	N	-4.8002E+00					7.95E+03	
			256.24	-4.800E+00	&(	1.226E+01	9.97E+01	7.00E+00 G
			235.97	2.006E+00	&	1.441E+01	2.14E+02	1.23E+01 G
			50.14	-5.048E+00	+	2.178E+01	1.29E+02	8.00E+00 G
TH-229	N	-1.1948E+00					2.68E+06	
			193.51	-1.195E+00	&(P	1.678E+01	4.97E+02	4.40E+00 G
			210.85	4.649E-01	%	2.615E+01	2.15E+03	2.99E+00 G
TH-234	N	-7.8448E+00					1.63E+12	
			92.59	-7.845E+00	*(P	2.501E+01	4.65E+01	5.58E+00 G
			63.29	-1.664E+01	+ P	3.308E+01	4.70E+01	3.81E+00 G
PA-231	N	-1.0700E+01					1.20E+07	
			302.65	-1.070E+01	?(	6.947E+01	1.94E+02	2.88E+00 G
			300.07	-1.241E+01	&	8.330E+01	2.00E+02	2.46E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-233   C  -4.2210E-02                                      7.82E+08
                         312.01-4.221E-02 %(P 5.550E+00 2.30E+03 3.60E+01 G
                         300.18-4.924E+00 +   3.256E+01 1.97E+02 6.20E+00 G

PA-234   N  -1.0675E+00                                      1.63E+12
                         131.29-1.067E+00 ?(  5.222E+00 1.46E+02 1.80E+01 G
                         946.02-3.931E-01 + P 9.946E+00 9.45E+02 1.34E+01 G
                         569.47-4.242E+00 +   1.465E+01 1.02E+02 8.20E+00 G
                         883.24 0.000E+00 +   1.651E+01 1.00E+03 9.60E+00 G
                         880.53 5.335E-01 %   2.615E+01 1.37E+03 6.00E+00 GA

AM-241   T   1.3937E-02                                      1.58E+05
                          59.54 1.394E-02 %(  3.173E+00 8.39E+03 3.59E+01 G

Np-237   F   3.8384E-01                                      2.14E+06
                                                           Derived Ave Activity
                          86.49 3.838E-01 }(  1.093E+01 8.48E+02 1.31E+01 G

Ir-192   F   2.9369E-01                                      7.40E+01
                         316.49 3.726E-01 ?(  2.085E+00 1.67E+02 8.70E+01 G
                         468.06 1.610E-01 ?(  2.314E+00 4.13E+02 5.18E+01 G
                         308.44 0.000E+00 -   6.226E+00 1.00E+03 3.18E+01 G

Cs-136   F  -5.8476E-01                                      1.30E+01
                         818.50-5.848E-01  (  1.480E+00 1.09E+02 1.00E+02 G
                        1048.07 7.022E-02 +   1.859E+00 7.28E+02 8.00E+01 G
                         340.57-7.728E-01 +   3.635E+00 1.40E+02 4.69E+01 G

Np-239   T   6.0507E-01                                      2.36E+00
                         103.70 8.428E-01 ?   4.306E+00 1.53E+02 2.40E+01 X
                         106.13 6.051E-01 ?(  4.602E+00 2.27E+02 2.27E+01 G
                          99.50 1.353E+00     6.746E+00 1.49E+02 1.50E+01 X

Nd-147       2.1872E+00                                      1.11E+01
                         531.00 2.187E+00  (  5.217E+00 9.74E+01 1.30E+01 G
                          91.10 5.532E-07 %   4.918E+00 2.64E+08 2.83E+01 G

Kr-85    I   7.0093E+01                                      3.92E+03
                         513.98 7.009E+01 &(  3.650E+02 1.53E+02 4.30E-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.
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% - 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	344.	-21.	-0.011	128.81	-5.048E+00	
TH-234	63.29	358.	-46.	-0.025	47.01	-1.664E+01	P
BA-133	80.99	1111.	-30.	-0.016	160.26	-9.529E-01	
EU-155	86.54	873.	-28.	-0.015	152.04	-9.492E-01	
TH-234	92.59	831.	-43.	-0.024	46.49	-7.845E+00	P
Gd-153	97.50	173.	22.	0.012	106.91	7.460E-01	
Gd-153	103.20	471.	20.	0.011	151.54	9.278E-01	
EU-155	105.31	583.	-25.	-0.014	81.77	-1.139E+00	P
EU-154	123.10	214.	8.	0.004	272.46	1.866E-01	
PA-234	131.29	375.	-19.	-0.011	145.95	-1.067E+00	
HF-181	133.02	361.	-14.	-0.008	198.37	-3.208E-01	
CO-57	136.47	346.	19.	0.011	137.95	1.859E+00	
Tc-99m	140.51	368.	-14.	-0.007	202.66	-1.624E-01	
U-235	143.79	756.	-26.	-0.014	78.51	-2.463E+00	P
CE-141	145.44	735.	-24.	-0.013	160.47	-5.303E-01	
Ba-140	162.66	291.	-23.	-0.013	108.53	-4.181E+00	
U-235	163.38	295.	-15.	-0.008	135.46	-3.370E+00	P
CE-139	165.85	290.	14.	0.008	174.09	1.994E-01	
Cf-251	176.60	147.	-10.	-0.005	236.58	-6.818E-01	
U-235	185.72	147.	22.	0.012	106.71	5.019E-01	
TH-229	193.51	136.	-4.	-0.002	496.53	-1.195E+00	P
U-235	205.33	121.	-7.	-0.004	283.33	-1.934E+00	P
Cf-251	227.00	88.	18.	0.010	102.91	4.116E+00	
TH-227	235.97	591.	16.	0.009	214.39	2.006E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-227	256.24	114.	-21.	-0.011	99.71	-4.800E+00	
Cd-113m	263.70	176.	-21.	-0.011	93.36	-5.779E+03	
BI-210M	265.83	114.	15.	0.008	103.40	5.105E-01	P
Hg-203	279.20	167.	-21.	-0.012	89.81	-4.534E-01	
I-131	284.30	88.	-15.	-0.008	103.73	-4.391E+00	P
TL-210	296.00	540.	-16.	-0.009	204.03	-3.805E-01	
PA-231	300.07	524.	-16.	-0.009	200.25	-1.241E+01	
PA-233	300.18	508.	-16.	-0.009	197.16	-4.924E+00	
PA-231	302.65	492.	-16.	-0.009	193.58	-1.070E+01	
BA-133	302.85	475.	-11.	-0.006	273.51	-1.168E+00	
Ir-192	316.49	372.	17.	0.009	166.70	3.726E-01	
CR-51	320.08	125.	-17.	-0.009	98.21	-3.305E+00	
La-140	328.76	111.	15.	0.008	104.95	1.460E+00	P
Cf-249	333.44	138.	10.	0.005	173.89	1.286E+00	
Cs-136	340.57	287.	-17.	-0.010	140.07	-7.728E-01	
HF-181	345.83	232.	-9.	-0.005	244.90	-1.246E+00	
BA-133	356.00	234.	7.	0.004	319.00	2.388E-01	
I-131	364.48	56.	-4.	-0.002	369.68	-1.083E-01	
BA-133	383.84	84.	12.	0.007	108.27	3.210E+00	
Cf-249	387.95	96.	12.	0.007	115.10	4.403E-01	
SN-113	391.69	107.	3.	0.001	556.75	9.740E-02	
SB-125	427.88	24.	5.	0.003	187.83	4.507E-01	
AG-108M	433.94	32.	8.	0.004	147.06	2.212E-01	P
SB-125	463.37	57.	12.	0.007	90.44	3.242E+00	
Ir-192	468.06	77.	3.	0.002	413.06	1.610E-01	
La-140	487.02	72.	12.	0.007	105.37	7.422E-01	
RU-103	497.05	22.	10.	0.006	99.10	3.220E-01	
RH-106	511.86	84.	31.	0.017	45.66	4.587E+00	
Kr-85	513.98	115.	10.	0.006	153.18	7.009E+01	
Nd-147	531.00	17.	9.	0.005	97.38	2.187E+00	
Ba-140	537.26	61.	-10.	-0.005	167.59	-1.228E+00	
CS-134	563.24	26.	9.	0.005	120.36	3.481E+00	
CS-134	569.32	30.	9.	0.005	96.08	1.837E+00	
PA-234	569.47	54.	-11.	-0.006	101.84	-4.242E+00	
BI-207	569.70	50.	-2.	-0.001	674.86	-5.736E-02	P
SB-125	600.50	279.	-14.	-0.008	173.83	-2.632E+00	
SB-124	602.73	265.	-14.	-0.008	169.35	-4.807E-01	
CS-134	604.71	267.	-15.	-0.008	160.17	-5.153E-01	
RU-103	610.30	253.	-10.	-0.005	234.68	-5.829E+00	
SB-125	635.89	73.	-19.	-0.010	83.81	-5.977E+00	P
I-131	636.97	75.	-2.	-0.001	559.88	-1.110E+00	
CS-137	661.66	31.	6.	0.003	207.71	2.438E-01	P
PM-144	696.54	19.	10.	0.006	93.92	4.070E-01	
SB-124	722.79	60.	15.	0.008	78.16	5.534E+00	
BI-212	727.17	61.	13.	0.007	90.04	6.916E+00	
PM-146	735.72	47.	-5.	-0.003	233.64	-9.044E-01	P
PM-146	747.16	43.	-13.	-0.007	92.59	-1.539E+00	P
ZR-95	756.73	14.	9.	0.005	92.40	7.093E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
AG-110M	763.94	45.	7.	0.004	147.99	1.266E+00		
NB-95	765.79	43.	11.	0.006	86.75	4.814E-01		
PA-234M	766.41	55.	-3.	-0.002	354.34	-4.328E+01		
BI-212	785.42	23.	10.	0.005	110.78	3.274E+01		
CS-134	795.87	42.	10.	0.006	93.07	5.385E-01		
CO-58	810.78	39.	9.	0.005	99.74	4.185E-01		
Cs-136	818.50	42.	-13.	-0.007	109.33	-5.848E-01		
MN-54	834.85	28.	-2.	-0.001	361.65	-1.097E-01		P
Co-56	846.77	33.	-8.	-0.004	110.06	-3.669E-01		P
EU-154	873.23	78.	-13.	-0.007	39.08	-5.105E+00		P
Sc-46	889.28	19.	8.	0.005	82.79	3.947E-01		
Y-88	898.04	55.	-19.	-0.011	26.82	-1.005E+00		P
AG-110M	937.49	10.	15.	0.008	53.05	2.218E+00		
PA-234	946.02	25.	-1.	-0.001	945.11	-3.931E-01		P
EU-154	996.33	41.	4.	0.002	213.59	2.194E+00		
EU-154	1004.77	58.	-11.	-0.006	105.23	-3.203E+00		
Co-56	1037.84	20.	-3.	-0.002	332.78	-1.182E+00		
Cs-136	1048.07	26.	1.	0.001	728.01	7.022E-02		
RH-106	1050.36	35.	-6.	-0.003	141.83	-2.225E+01		
BI-207	1063.66	32.	-13.	-0.007	63.16	-1.018E+00		P
Ga-68	1077.40	48.	-14.	-0.008	115.62	-2.873E+01		
FE-59	1099.25	32.	-5.	-0.003	166.16	-5.266E-01		P
Sc-46	1120.55	60.	4.	0.002	264.84	2.508E-01		
Ta-182	1121.30	112.	-18.	-0.010	85.55	-3.106E+00		
Ta-182	1189.05	37.	-8.	-0.005	170.22	-3.240E+00		
Ta-182	1221.41	64.	-23.	-0.013	81.22	-5.536E+00		
Co-56	1238.28	21.	10.	0.005	113.27	9.562E-01		
NA-22	1274.53	17.	4.	0.002	154.11	2.685E-01		
FE-59	1291.60	12.	9.	0.005	90.30	1.481E+00		P
TL-210	1313.00	17.	7.	0.004	143.21	2.298E+00		
La-140	1596.21	30.	-17.	-0.009	81.57	-1.468E+00		
SB-124	1690.98	0.	5.	0.003	46.28	8.921E-01		P
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	0.0000E+00	0.0000E+00	1.000E+03%	1.25E+01
NA-22	#A	2.6853E-01	2.6853E-01	1.541E+02%	1.47E+00
K-40		2.3345E+02	2.3345E+02	5.581E+00%	7.96E+00
Sc-46	#A	3.2272E-01	3.2272E-01	8.279E+01%	1.11E+00
CR-51	#A	-3.3045E+00	-3.3045E+00	9.821E+01%	1.09E+01
MN-54	#A	-1.0972E-01	-1.0972E-01	3.617E+02%	1.26E+00
FE-59	#A	3.4334E-01	3.4335E-01	9.030E+01%	3.02E+00

Co-56	#A	1.5969E-01	1.5969E-01	7.897E+01%	1.37E+00
CO-57	#A	2.0622E-01	2.0622E-01	1.380E+02%	8.95E-01
CO-58	#A	4.1853E-01	4.1853E-01	9.974E+01%	1.42E+00
CO-60	#A	-1.8581E-02	-1.8581E-02	2.133E+03%	1.00E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.70E+00
NB-94	#	9.3576E-01	9.3576E-01	4.440E+01%	9.16E-01
ZR-95	#A	7.0927E-01	7.0928E-01	9.240E+01%	1.55E+00
NB-95	#A	4.8138E-01	4.8138E-01	8.675E+01%	1.41E+00
RU-103	#A	3.2199E-01	3.2199E-01	9.910E+01%	7.77E-01
RH-106	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.67E+01
AG-108M	#A	2.2123E-01	2.2123E-01	1.471E+02%	8.29E-01
AG-110M	#A	8.0728E-01	8.0728E-01	5.305E+01%	2.18E+00
SN-113	#A	9.7397E-02	9.7398E-02	5.567E+02%	1.88E+00
SB-124	#A	3.5207E-01	3.5207E-01	4.628E+01%	2.74E+00
SB-125	#A	1.1802E+00	1.1802E+00	9.044E+01%	2.19E+00
I-131	#A	-1.0832E-01	-1.0832E-01	3.697E+02%	1.02E+00
Gd-153	#A	8.2250E-01	8.2250E-01	9.273E+01%	2.14E+00
Ga-68	#A	-2.8384E+01	-2.8730E+01	1.156E+02%	7.18E+01
Tc-99m	#A	-1.6199E-01	-1.6236E-01	2.027E+02%	1.11E+00
BA-133	#A	2.3876E-01	2.3876E-01	3.190E+02%	2.59E+00
CS-134	#A	9.4624E-01	9.4624E-01	5.998E+01%	1.70E+00
CS-137	#A	2.4377E-01	2.4377E-01	2.077E+02%	1.25E+00
CE-139	#A	1.9943E-01	1.9943E-01	1.741E+02%	1.17E+00
Ba-140	#A	-1.2282E+00	-1.2282E+00	1.676E+02%	4.96E+00
La-140	#A	-1.4683E+00	-1.4684E+00	8.157E+01%	2.44E+00
CE-141	#A	-5.3024E-01	-5.3025E-01	1.605E+02%	2.84E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.52E+00
PM-144	#A	4.0697E-01	4.0697E-01	9.392E+01%	8.99E-01
EU-152	A	2.4721E+00	2.4721E+00	2.946E+01%	2.65E+00
EU-154	#A	6.0062E-01	6.0062E-01	1.731E+02%	1.73E+00
EU-155	#A	-1.1392E+00	-1.1392E+00	8.177E+01%	5.35E+00
HF-181	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.64E+00
Ta-182	#A	-3.1062E+00	-3.1062E+00	8.555E+01%	8.88E+00
Hg-203	#A	-4.5344E-01	-4.5345E-01	8.981E+01%	1.36E+00
TL-208	#	4.9483E+00	4.9483E+00	1.029E+01%	6.57E-01
PM-146	#A	-1.8511E-02	-1.8511E-02	2.555E+03%	1.45E+00
Y-88	#A	4.7308E-01	4.7308E-01	4.472E+01%	6.97E-01
Cd-113m	#A	-5.7786E+03	-5.7786E+03	9.336E+01%	1.80E+04
Cd-109	#A	2.9498E-01	2.9498E-01	3.723E+03%	3.69E+01
Cf-251	#A	-6.8179E-01	-6.8179E-01	2.366E+02%	4.17E+00
Cf-249	#A	6.0116E-01	6.0116E-01	1.043E+02%	1.71E+00
Sn-126	#A	4.1689E-01	4.1689E-01	8.902E+02%	1.26E+01
PB-210	#A	1.4742E+01	1.4742E+01	7.316E+01%	2.70E+01
PB-212	#	1.2330E+01	1.2330E+01	6.953E+00%	1.88E+00
PB-214	#	1.0459E+01	1.0459E+01	8.974E+00%	1.36E+00
BI-207	#A	-1.0179E+00	-1.0179E+00	6.316E+01%	2.23E+00
BI-212	#A	6.9159E+00	6.9159E+00	9.004E+01%	2.10E+01
U-235	#A	-2.4630E+00	-2.4630E+00	7.851E+01%	1.26E+01
BI-214		9.3784E+00	9.3784E+00	1.261E+01%	1.96E+00

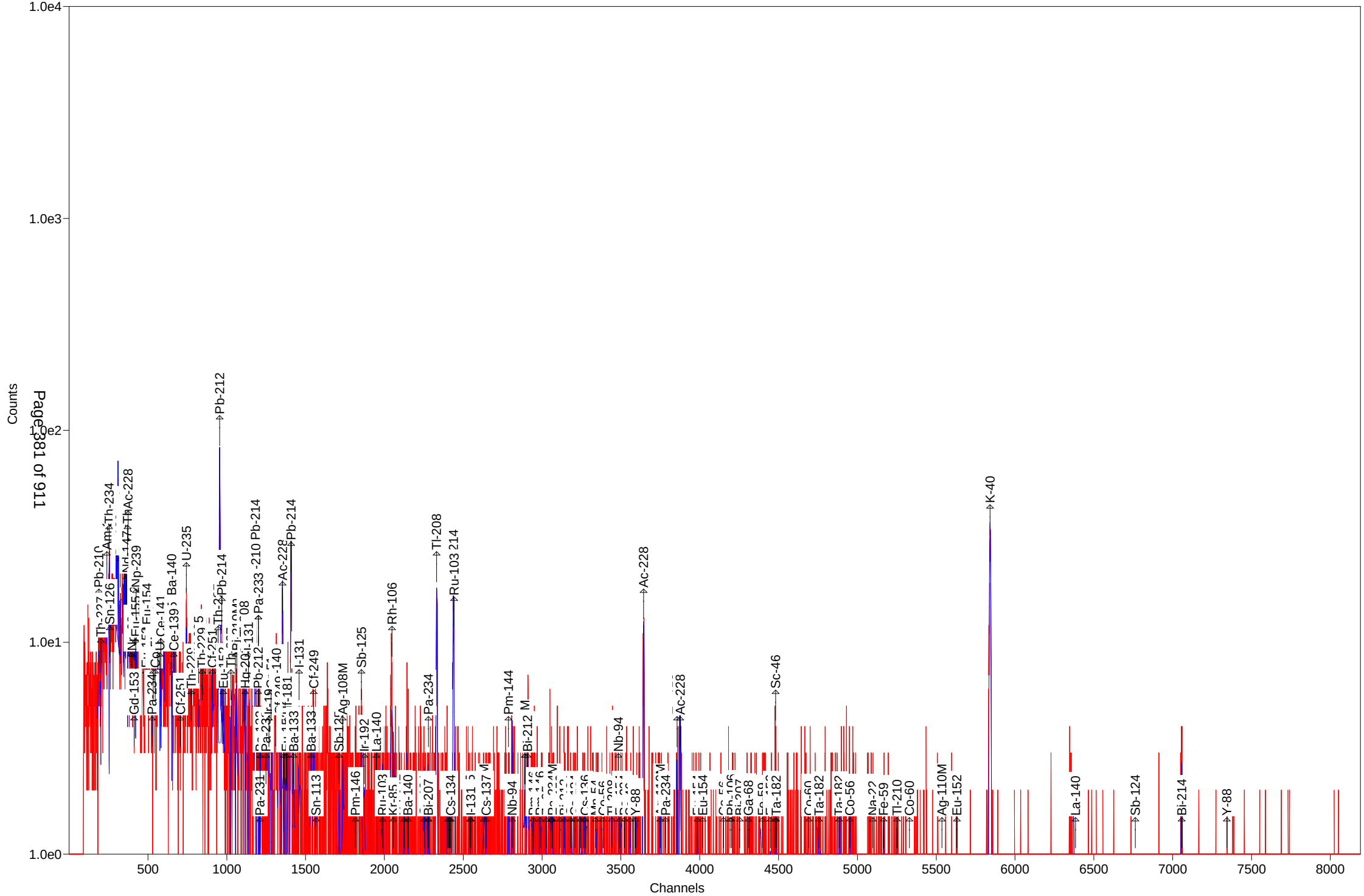
BI-210M#A	5.1047E-01	5.1047E-01	1.034E+02%	1.78E+00
AC-228	1.5222E+01	1.5222E+01	9.157E+00%	1.29E+00
TH-227 #A	-4.8002E+00	-4.8002E+00	9.971E+01%	1.23E+01
TH-229 #A	-1.1948E+00	-1.1948E+00	4.965E+02%	1.68E+01
TH-234 #A	-7.8448E+00	-7.8448E+00	4.649E+01%	2.50E+01
PA-231 #A	-1.0700E+01	-1.0700E+01	1.936E+02%	6.95E+01
PA-233 #A	-4.2210E-02	-4.2210E-02	2.299E+03%	5.55E+00
PA-234 #A	-1.0675E+00	-1.0675E+00	1.460E+02%	5.22E+00
PA-234M#A	0.0000E+00	0.0000E+00	1.000E+03%	2.19E+02
AM-241 #A	1.3937E-02	1.3937E-02	8.386E+03%	3.17E+00
Np-237 #A	3.8384E-01	3.8384E-01	8.479E+02%	1.09E+01
Ir-192 #A	2.9368E-01	2.9369E-01	1.667E+02%	2.09E+00
Cs-136 #A	-5.8473E-01	-5.8476E-01	1.093E+02%	1.48E+00
Np-239 A	6.0492E-01	6.0507E-01	2.265E+02%	4.60E+00
Nd-147 #A	2.1871E+00	2.1872E+00	9.738E+01%	5.22E+00
TL-210 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.63E+00
Kr-85 #A	7.0093E+01	7.0093E+01	1.532E+02%	3.65E+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) 3.005E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 3.0053329E+02 Bq/Sample

412881_Gamma_180-86110-A-3-A. 7_Gamma_20190289.spc.



Test America St. Louis Spectrum ID: 2_Gamma_20190266

Sample Description: 412881_Gamma_180-86110-A-4-A
Detector: Detector # 2
Batch ID: 412881
Work Order Number: Gamma
Lot Number: 180-86110-A-4-A

Decay to Time: 2/20/2019 08:14 Live Time: 1800 sec
Acquisition Time: 2/20/2019 08:14:38 Real Time: 1804 sec
Analysis Time: 2/20/2019 08:45 Dead Time: 0.24 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 2_Soil_TunaCan.Clb
Efficiency Cal Desc: 2_Soil_TunaCan_101407
Efficiency Cal Date: 4/20/2018 13:56
Energy Cal Date: 4/20/2018 13:54
Library: Client_Long_Rev15.lib
Bkgd Correction File: 2_2019-01-20_1014.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	3.500E+00	106.7	3.736E+00	3.740E+00	1.271E+01
NA-22	-8.798E-02	556.8	4.898E-01	4.899E-01	1.826E+00
K-40	1.921E+02	7.0	1.354E+01	1.665E+01	8.942E+00
Sc-46	7.136E-01	73.3	5.228E-01	5.241E-01	2.543E+00
CR-51	-1.435E+00	250.6	3.595E+00	3.596E+00	1.238E+01
MN-54	-3.015E-01	177.9	5.364E-01	5.366E-01	1.497E+00
FE-59	-5.356E-03	100.5	5.381E-03	5.387E-03	3.122E+00
Co-56	9.077E-01	50.2	4.560E-01	4.584E-01	7.668E-01
CO-57	-2.923E-01	90.9	2.658E-01	2.662E-01	8.891E-01
CO-58	-1.994E-01	300.0	5.983E-01	5.984E-01	2.100E+00
CO-60	3.021E-01	145.4	4.391E-01	4.394E-01	1.259E+00
ZN-65	-7.335E-01	204.5	1.500E+00	1.501E+00	5.236E+00
NB-94	-7.067E-01	87.8	6.204E-01	6.215E-01	1.631E+00
ZR-95	4.018E-01	184.2	7.399E-01	7.402E-01	2.278E+00
NB-95	2.736E-01	90.8	2.485E-01	2.489E-01	8.624E-01
RU-103	1.281E-01	267.4	3.425E-01	3.426E-01	9.117E-01
RH-106	-8.055E-03	177.2	1.427E-02	1.428E-02	3.029E+01
AG-108M	1.103E-01	100.2	1.106E-01	1.107E-01	1.163E+00
AG-110M	7.114E-02	355.9	2.532E-01	2.532E-01	3.766E+00
SN-113	4.307E-01	135.5	5.836E-01	5.840E-01	1.994E+00
SB-124	-6.470E-02	84.6	5.476E-02	5.486E-02	3.257E+00
SB-125	5.642E-01	109.1	6.156E-01	6.163E-01	1.376E+00
I-131	-2.483E-01	168.8	4.191E-01	4.193E-01	1.372E+00
Gd-153	-8.589E-01	148.8	1.278E+00	1.279E+00	4.283E+00
Ga-68	-1.523E+01	167.1	2.545E+01	2.547E+01	6.141E+01
Tc-99m	-3.142E-01	124.5	3.913E-01	3.917E-01	1.311E+00
BA-133	4.125E-01	236.0	9.733E-01	9.736E-01	2.679E+00
CS-134	-1.384E-01	76.1	1.053E-01	1.056E-01	2.487E+00
CS-137	1.955E-02	2304.3	4.505E-01	4.505E-01	1.639E+00
CE-139	2.783E-01	114.9	3.197E-01	3.200E-01	1.077E+00
Ba-140	1.489E+00	139.8	2.082E+00	2.083E+00	3.217E+00
La-140	-1.531E-02	10762.8	1.648E+00	1.648E+00	8.365E-01
CE-141	-5.832E-01	123.4	7.194E-01	7.200E-01	2.410E+00

CE-144	0.000E+00	1.#INF	5.979E-01	5.979E-01	1.026E+01
PM-144	-8.756E-01	69.2	6.062E-01	6.079E-01	1.925E+00
EU-152	8.917E-01	139.5	1.244E+00	1.245E+00	2.809E+00
EU-154	1.945E+00	51.9	1.010E+00	1.015E+00	1.771E+00
EU-155	6.765E-01	150.0	1.015E+00	1.016E+00	5.729E+00
HF-181	-5.761E-01	101.3	5.838E-01	5.845E-01	1.973E+00
Ta-182	-4.401E-01	115.9	5.101E-01	5.105E-01	7.957E+00
Hg-203	3.144E-02	1121.0	3.524E-01	3.524E-01	1.233E+00
TL-208	3.380E+00	17.6	5.952E-01	6.195E-01	1.131E+00
PM-146	4.538E-01	107.3	4.871E-01	4.877E-01	1.182E+00
Y-88	1.688E-01	102.3	1.727E-01	1.730E-01	9.247E-01
Cd-113m	-5.054E+03	98.3	4.967E+03	4.976E+03	1.673E+04
Cd-109	6.013E+00	185.9	1.118E+01	1.118E+01	3.749E+01
Cf-251	1.133E+00	137.3	1.556E+00	1.557E+00	4.235E+00
Cf-249	3.357E-01	124.9	4.192E-01	4.196E-01	1.547E+00
Sn-126	-4.354E-01	805.6	3.507E+00	3.507E+00	1.199E+01
PB-210	3.134E+01	35.3	1.107E+01	1.124E+01	3.024E+01
PB-212	1.008E+01	7.5	7.571E-01	9.219E-01	1.217E+00
PB-214	7.198E+00	12.0	8.653E-01	9.391E-01	1.715E+00
BI-207	-7.913E-02	664.4	5.258E-01	5.258E-01	2.307E+00
BI-212	-7.581E+00	111.8	8.473E+00	8.482E+00	2.879E+01
U-235	-2.814E+00	125.9	3.542E+00	3.545E+00	8.956E+00
BI-214	8.461E+00	13.9	1.176E+00	1.253E+00	1.954E+00
BI-210M	5.301E-01	105.3	5.582E-01	5.589E-01	1.888E+00
AC-228	1.169E+01	12.1	1.420E+00	1.538E+00	5.177E+00
TH-227	-2.910E+00	164.7	4.792E+00	4.795E+00	1.252E+01
TH-229	1.389E+00	418.9	5.819E+00	5.820E+00	1.615E+01
TH-234	2.781E+00	120.0	3.336E+00	3.340E+00	1.298E+01
PA-231	8.095E+00	160.1	1.296E+01	1.297E+01	5.915E+01
PA-233	4.701E-01	226.7	1.066E+00	1.066E+00	5.173E+00
PA-234	-1.427E+00	125.6	1.792E+00	1.794E+00	6.009E+00
PA-234M	3.752E+01	175.1	6.569E+01	6.571E+01	2.313E+02
AM-241	-1.009E+00	113.1	1.141E+00	1.143E+00	3.067E+00
Np-237	2.019E+00	161.7	3.265E+00	3.267E+00	1.094E+01
Ir-192	-3.717E-01	102.7	3.816E-01	3.822E-01	1.289E+00
Cs-136	3.999E-02	1505.0	6.019E-01	6.019E-01	2.139E+00
Np-239	1.016E+00	142.5	1.447E+00	1.449E+00	4.858E+00
Nd-147	2.458E+00	94.5	2.323E+00	2.327E+00	5.974E+00
TL-210	3.994E-01	105.0	4.194E-01	4.201E-01	1.810E+00
Kr-85	7.810E+01	166.6	1.301E+02	1.302E+02	4.447E+02
Total	4.203E+02				

Analyst: kody Saulters

Sample description
412881_Gamma_180-86110-A-4-A

Spectrum Filename: C:\User\SPC\Det2\2_Gamma_20190266.An1

Acquisition information

Start time:	2/20/2019 8:14:38 AM
Live time:	1800
Real time:	1804
Dead time:	0.24 %
Detector ID:	2

Detector system
Ge 2 SN/164

Calibration

Filename:	2_Soil_TunaCan.Clb

2_Soil_TunaCan_101407

Energy Calibration

Created:	4/20/2018 1:54:10 PM
Zero offset:	0.101 keV
Gain:	0.250 keV/channel
Quadratic:	-4.975E-09 keV/channel^2

Efficiency Calibration

Created:	4/20/2018 1:56:20 PM
Type:	Polynomial
Uncertainty:	1.003 %
Coefficients:	-0.414971 -4.933446 0.551852
	-0.058768 0.002630 -0.000046

Library Files

Main analysis library:	Client_Long_Rev15.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.60keV)
Stop channel:	8000 (2000.01keV)
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	2/20/2019 8:14:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	2_2019-01-20_1014.PBC 1/20/2019 10:14:02 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0772

***** 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	44.	35.32	0.92	1.828E-02	46.54	4.250	3.134E+01	PB210
63.30	12.	119.96	0.85	3.262E-02	63.29	3.810	PBC<MDA	TH234
74.86	105.	17.39	0.86	3.746E-02				
77.15	113.	15.56	0.86	3.818E-02				
87.09	66.	23.50	0.78	4.058E-02	86.49	13.100	6.865E+00	Np237
					86.54	30.700	2.929E+00	EU155
					86.94	9.040	9.927E+00	Sn126
					87.57	37.500	2.386E+00	Sn126
88.04	17.	185.89	0.87	4.075E-02	88.04	3.790	PBC<MDA	Cd109
92.49	4.	366.84	0.87	4.144E-02	92.59	5.584	PBC<MDA	TH234
103.70	19.	152.21	0.88	4.235E-02	103.70	24.000	PBC<MDA	Np239
105.31	18.	150.04	0.88	4.240E-02	105.31	21.200	PBC<MDA	EU155
106.13	18.	142.48	0.88	4.242E-02	106.13	22.700	PBC<MDA	Np239
123.10	15.	108.51	0.90	4.194E-02	123.10	40.790	PBC<MDA	EU154
165.85	15.	114.87	0.93	3.703E-02	165.85	79.900	PBC<MDA	CE139
176.60	12.	137.31	0.94	3.557E-02	176.60	17.000	PBC<MDA	Cf251
185.72	32.	54.85	0.95	3.435E-02	185.72	54.000	PBC<MDA	U235
193.51	4.	418.87	0.95	3.333E-02	193.51	4.400	PBC<MDA	TH229
227.00	11.	109.32	0.98	2.931E-02	227.00	6.300	PBC<MDA	Cf251
238.52	218.	8.44	0.81	2.809E-02	238.63	43.300	9.956E+00	PB212
241.95	13.	205.32	0.99	2.774E-02	242.00	7.430	PBC<MDA	PB214
244.69	3.	863.30	0.99	2.747E-02	244.69	7.580	PBC<MDA	EU152
265.83	12.	105.31	1.01	2.551E-02	265.83	50.000	PBC<MDA	BI210M
277.28	11.	87.28	1.02	2.455E-02	277.28	6.310	PBC<MDA	TL208
295.00	60.	19.75	0.56	2.319E-02	295.09	19.300	7.413E+00	PB214
					296.00	79.000	1.816E+00	TL210
299.99	21.	39.88	1.35	2.283E-02	300.03	3.280	PBC<MDA	PB212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					300.07	2.460	2.088E+01	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	9.	221.63	1.04	2.282E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	8.742E+00	PA231
					300.18	6.200	3.470E+00	PA233
300.18	9.	226.68	1.04	2.282E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	8.742E+00	PA231
					300.18	6.200	3.470E+00	PA233
302.65	9.	231.18	1.04	2.264E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.186E+00	BA133
302.85	9.	235.98	1.04	2.263E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.186E+00	BA133
304.85	9.	240.35	1.04	2.249E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	7.823E-01	BI210M
333.44	1.	854.04	1.06	2.069E-02	333.44	15.510	PBC<MDA	Cf249
338.73	55.	20.41	1.19	2.041E-02	338.32	12.010	1.254E+01	AC228
351.72	94.	13.71	1.06	1.968E-02	351.93	37.600	7.087E+00	PB214
356.00	4.	424.26	1.08	1.946E-02	356.00	62.050	PBC<MDA	BA133
383.84	6.	141.29	1.10	1.814E-02	383.84	8.940	PBC<MDA	BA133
387.95	8.	124.87	1.11	1.796E-02	387.95	66.000	PBC<MDA	Cf249
391.69	9.	135.50	1.11	1.780E-02	391.69	64.000	PBC<MDA	SN113
427.88	4.	109.11	1.14	1.641E-02	427.88	29.600	PBC<MDA	SB125
453.88	8.	107.34	1.16	1.554E-02	453.88	65.000	PBC<MDA	PM146
463.37	2.	578.79	1.16	1.525E-02	463.37	10.470	PBC<MDA	SB125
468.06	5.	237.98	1.17	1.511E-02	468.06	51.750	PBC<MDA	Ir192
477.60	10.	106.74	1.17	1.484E-02	477.60	10.520	PBC<MDA	BE7
497.05	3.	267.36	1.19	1.431E-02	497.05	90.900	PBC<MDA	RU103
511.86	27.	46.99	2.45	1.394E-02	511.86	20.000	PBC<MDA	RH106
513.98	8.	166.61	1.20	1.389E-02	513.98	0.430	PBC<MDA	Kr85
531.00	8.	94.51	1.21	1.349E-02	531.00	13.000	PBC<MDA	Nd147
537.26	5.	142.83	1.22	1.335E-02	537.26	24.390	PBC<MDA	Ba140
563.24	9.	107.39	1.24	1.280E-02	563.24	8.350	PBC<MDA	CS134
569.32	4.	180.28	1.24	1.268E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.138E+00	PA234
					569.70	97.740	1.794E-01	BI207
583.19	63.	17.61	1.30	1.241E-02	583.02	84.500	3.336E+00	TL208
604.71	8.	215.21	1.27	1.202E-02	604.71	97.620	PBC<MDA	CS134
609.49	82.	13.90	1.47	1.194E-02	609.31	46.090	8.299E+00	BI214
618.06	6.	236.34	1.28	1.180E-02	618.06	99.100	PBC<MDA	PM144
635.89	2.	399.50	1.29	1.151E-02	635.89	11.310	PBC<MDA	SB125
636.97	1.	964.36	1.29	1.149E-02	636.97	7.170	PBC<MDA	I131
722.79	9.	84.64	1.35	1.030E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.139E-01	AG108M
					723.36	20.220	2.310E+00	EU154
722.94	8.	102.88	1.35	1.030E-02	722.79	10.810	4.071E+00	SB124
					722.94	90.840	4.845E-01	AG108M
					723.36	20.220	2.178E+00	EU154
723.36	8.	114.15	1.36	1.029E-02	722.79	10.810	PBC<MDA	SB124

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					722.94	90.840	4.847E-01	AG108M
					723.36	20.220	2.178E+00	EU154
724.20	4.	281.48	1.36	1.028E-02	724.20	44.150	PBC<MDA	ZR95
747.16	3.	283.61	1.37	1.001E-02	747.16	34.000	PBC<MDA	PM146
756.73	4.	237.58	1.38	9.903E-03	756.73	54.460	PBC<MDA	ZR95
763.94	2.	355.90	1.38	9.823E-03	763.94	22.280	PBC<MDA	AG110M
765.79	5.	90.85	1.39	9.803E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	9.292E+01	PA234M
785.42	10.	93.05	1.40	9.593E-03	785.42	1.280	PBC<MDA	BI212
799.60	8.	105.03	1.41	9.448E-03	799.60	98.960	PBC<MDA	TL210
846.77	11.	50.24	1.44	8.997E-03	846.77	99.935	PBC<MDA	Co56
873.23	7.	100.29	1.46	8.765E-03	873.23	12.270	PBC<MDA	EU154
889.28	10.	113.52	1.47	8.630E-03	889.28	99.984	PBC<MDA	Sc46
898.04	5.	102.30	1.48	8.558E-03	898.04	93.700	PBC<MDA	Y88
911.19	46.	24.64	1.49	8.453E-03	911.07	29.000	1.050E+01	AC228
964.11	7.	139.51	1.52	8.055E-03	964.11	14.605	PBC<MDA	EU152
969.07	33.	17.41	1.66	8.020E-03	968.97	17.460	1.309E+01	AC228
996.33	8.	90.89	1.54	7.832E-03	996.33	10.600	PBC<MDA	EU154
1001.00	4.	175.06	1.55	7.800E-03	1001.00	0.837	PBC<MDA	PA234M
1050.36	4.	194.72	1.58	7.484E-03	1050.36	1.560	PBC<MDA	RH106
1118.55	10.	104.18	1.63	7.078E-03	1120.29	15.100	PBC<MDA	BI214
1120.55	10.	92.64	1.63	7.077E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.203E+00	Ta182
1173.24	4.	243.53	1.66	6.799E-03	1173.24	99.900	PBC<MDA	CO60
1189.05	4.	180.85	1.67	6.719E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	10.	92.14	1.70	6.483E-03	1238.28	66.070	PBC<MDA	Co56
1291.60	5.	111.56	1.73	6.244E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	3.	158.85	1.76	6.071E-03	1332.50	99.980	PBC<MDA	CO60
1460.74	206.	7.05	2.24	5.580E-03	1460.83	10.670	1.921E+02	K40
1764.88	12.	30.72	2.00	4.648E-03	1764.49	15.400	8.944E+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
298.99	74.86	114.	105.	2.807E+03	17.39	0.856	- sD
308.15	77.15	99.	113.	2.968E+03	15.56	0.858	- 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_Rev15.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	46.54	72.	44.	0.024	35.32	0.920
TH-227	200.14	50.14	267.	-17.	-0.010	136.75	0.835s
AM-241	237.72	59.54	153.	-20.	-0.011	113.09	0.843s
TH-234	252.72	63.29	96.	12.	0.007	119.96	0.846D
Sn-126	256.69	64.28	205.	-3.	-0.001	805.58	0.847s
BA-133	323.52	80.99	163.	-16.	-0.009	141.42	0.861s
Np-237	345.52	86.49	476.	19.	0.011	161.73	0.866A
EU-155	345.73	86.54	495.	8.	0.004	395.47	0.866
Sn-126	347.32	86.94	450.	19.	0.011	79.85	0.866D
Sn-126	349.84	87.57	455.	19.	0.011	82.44	0.866D
Cd-109	351.72	88.04	474.	17.	0.009	185.89	0.867A
Nd-147	363.96	91.10	554.	-23.	-0.013	147.36	0.869s
TH-234	369.92	92.59	121.	4.	0.002	366.84	0.870D
AC-228	372.96	93.35	514.	-22.	-0.012	147.04	0.871s
Gd-153	389.56	97.50	410.	-19.	-0.011	148.84	0.875
Np-239	397.56	99.50	429.	-20.	-0.011	151.97	0.876s
Gd-153	412.36	103.20	449.	-7.	-0.004	427.91	0.879s
Np-239	414.35	103.70	391.	19.	0.010	152.21	0.879s
EU-155	420.81	105.31	373.	18.	0.010	150.04	0.881s
Np-239	424.07	106.13	306.	18.	0.010	142.48	0.882s
EU-152	486.67	121.78	155.	-9.	-0.005	198.45	0.894
CO-57	487.79	122.06	138.	-19.	-0.011	90.93	0.895s
EU-154	491.95	123.10	124.	15.	0.008	108.51	0.895s
PA-234	524.72	131.29	278.	-19.	-0.011	125.59	0.902s
HF-181	531.64	133.02	297.	-8.	-0.005	291.22	0.904s
CE-144	533.70	133.54	305.	0.	0.000	1000.00	0.904s
HF-181	544.74	136.30	305.	0.	0.000	1000.00	0.906s
CO-57	545.43	136.47	341.	-22.	-0.012	122.78	0.906s
Tc-99m	561.58	140.51	292.	-20.	-0.011	124.51	0.910s
U-235	574.68	143.79	212.	-22.	-0.012	125.88	0.912s
CE-141	581.30	145.44	297.	-20.	-0.011	123.37	0.914s
Ba-140	650.17	162.66	146.	-19.	-0.010	150.60	0.928s
U-235	653.05	163.38	163.	-5.	-0.003	568.79	0.928
CE-139	662.94	165.85	138.	15.	0.008	114.87	0.930s
Cf-251	705.93	176.60	87.	12.	0.007	137.31	0.939s
U-235	742.41	185.72	95.	32.	0.018	54.85	0.946s
TH-229	773.56	193.51	73.	4.	0.002	418.87	0.953s
U-235	820.85	205.33	85.	-7.	-0.004	245.53	0.962s
TH-229	842.92	210.85	97.	-6.	-0.003	311.60	0.967s
Cf-251	907.51	227.00	40.	11.	0.006	109.32	0.980s
TH-227	943.39	235.97	414.	-8.	-0.004	381.75	0.987s
PB-212	954.04	238.63	26.	221.	0.123	7.51	0.989D
PB-214	967.50	242.00	369.	13.	0.007	205.32	0.991s
EU-152	978.28	244.69	394.	3.	0.002	863.30	0.994s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-227	1024.46	256.24	70.	-10.	-0.005	164.71	1.003s
Cd-113m	1054.30	263.70	88.	-14.	-0.008	98.28	1.009s
BI-210M	1062.83	265.83	76.	12.	0.007	105.31	1.011s
TL-208	1108.63	277.28	41.	11.	0.006	87.28	1.020s
I-131	1136.69	284.30	55.	-14.	-0.008	104.06	1.025s
PB-214	1179.49	295.00	21.	60.	0.033	19.75	0.561s
TL-210	1183.49	296.00	178.	9.	0.005	217.17	1.034
PB-212	1199.44	299.99	18.	21.	0.012	39.88	1.351s
PA-231	1199.77	300.07	187.	9.	0.005	221.63	1.038s
PA-233	1200.21	300.18	196.	9.	0.005	226.68	1.038s
PA-231	1210.09	302.65	205.	9.	0.005	231.18	1.040s
BA-133	1210.90	302.85	214.	9.	0.005	235.98	1.040s
Ba-140	1218.89	304.85	223.	9.	0.005	240.35	1.041s
Ir-192	1233.25	308.44	232.	0.	0.000	1000.00	1.044s
Ir-192	1265.45	316.49	78.	-13.	-0.007	102.67	1.050s
CR-51	1279.82	320.08	93.	-6.	-0.003	250.57	1.053
La-140	1314.53	328.76	66.	-16.	-0.009	54.10	1.060s
Cf-249	1333.24	333.44	37.	1.	0.001	854.04	1.064s
AC-228	1354.39	338.73	17.	55.	0.031	20.41	1.189s
Cs-136	1361.76	340.57	147.	-12.	-0.007	148.75	1.069s
EU-152	1376.62	344.29	135.	-11.	-0.006	149.27	1.072s
PB-214	1406.35	351.72	19.	94.	0.052	13.71	1.064s
BA-133	1423.48	356.00	142.	4.	0.002	424.26	1.081s
I-131	1457.41	364.48	59.	-9.	-0.005	168.79	1.088s
BA-133	1534.84	383.84	36.	6.	0.003	141.29	1.103s
Cf-249	1551.27	387.95	42.	8.	0.004	124.87	1.106s
SN-113	1566.23	391.69	67.	9.	0.005	135.50	1.109
SB-125	1710.97	427.88	4.	4.	0.002	109.11	1.137s
AG-108M	1735.21	433.94	36.	-7.	-0.004	172.02	1.141s
PM-146	1814.98	453.88	16.	8.	0.004	107.34	1.157s
SB-125	1852.93	463.37	66.	2.	0.001	578.79	1.164s
Ir-192	1871.70	468.06	59.	5.	0.003	237.98	1.167s
BE-7	1909.84	477.60	50.	10.	0.005	106.74	1.175s
HF-181	1927.44	482.00	71.	-12.	-0.007	101.33	1.178s
La-140	1947.54	487.02	32.	-11.	-0.006	105.10	1.182s
RU-103	1987.67	497.05	16.	3.	0.002	267.36	1.189s
RH-106	2046.91	511.86	67.	27.	0.015	46.99	2.450s
Kr-85	2055.37	513.98	94.	8.	0.005	166.61	1.202
Nd-147	2123.45	531.00	12.	8.	0.004	94.51	1.215s
Ba-140	2148.49	537.26	12.	5.	0.003	142.83	1.219s
CS-134	2252.39	563.24	20.	9.	0.005	107.39	1.239s
CS-134	2276.73	569.32	24.	4.	0.002	180.28	1.243s
PA-234	2277.33	569.47	28.	0.	0.000	1000.00	1.243s
BI-207	2278.25	569.70	33.	-4.	-0.002	201.51	1.244s
TL-208	2332.20	583.19	16.	63.	0.035	17.61	1.303
SB-125	2401.44	600.50	217.	-12.	-0.007	93.31	1.266s
SB-124	2410.37	602.73	205.	-12.	-0.006	176.16	1.268s
CS-134	2418.28	604.71	156.	8.	0.005	215.21	1.269s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	2437.39	609.49	13.	82.	0.046	13.90	1.471s
AG-108M	2456.57	614.28	164.	0.	0.000	1000.00	1.276s
PM-144	2471.69	618.06	107.	6.	0.003	236.34	1.279s
RH-106	2487.11	621.92	170.	-6.	-0.003	296.12	1.282s
SB-125	2543.00	635.89	21.	2.	0.001	399.50	1.292s
I-131	2547.34	636.97	20.	1.	0.000	964.36	1.293s
AG-110M	2630.49	657.76	27.	-1.	-0.001	561.25	1.308s
PM-144	2785.61	696.54	52.	-17.	-0.009	69.24	1.336
NB-94	2809.96	702.63	35.	-13.	-0.007	87.80	1.340s
SB-124	2890.59	722.79	22.	9.	0.005	84.64	1.355s
AG-108M	2891.19	722.94	31.	8.	0.005	102.88	1.355s
EU-154	2892.88	723.36	39.	8.	0.005	114.15	1.355s
ZR-95	2896.24	724.20	47.	4.	0.002	281.48	1.356s
BI-212	2908.12	727.17	64.	-11.	-0.006	111.77	1.358s
PM-146	2942.32	735.72	35.	-13.	-0.007	93.67	1.364s
PM-146	2988.08	747.16	18.	3.	0.002	283.61	1.372s
ZR-95	3026.36	756.73	17.	4.	0.002	237.58	1.379
AG-110M	3055.21	763.94	14.	2.	0.001	355.90	1.384
NB-95	3062.60	765.79	7.	5.	0.003	90.85	1.385s
PA-234M	3065.09	766.41	24.	-1.	-0.001	536.69	1.386s
EU-152	3115.12	778.92	35.	-14.	-0.008	91.70	1.395s
BI-212	3141.12	785.42	17.	10.	0.005	93.05	1.399s
CS-134	3182.92	795.87	52.	-12.	-0.007	89.90	1.407s
TL-210	3197.84	799.60	35.	8.	0.005	105.03	1.409s
CS-134	3207.25	801.95	70.	-14.	-0.008	89.51	1.411
CO-58	3242.54	810.77	48.	-3.	-0.002	300.00	1.417
La-140	3262.52	815.77	52.	0.	0.000	1000.00	1.421s
MN-54	3338.84	834.85	22.	-5.	-0.003	177.90	1.434s
Co-56	3386.53	846.77	4.	11.	0.006	50.24	1.442s
NB-94	3483.84	871.10	30.	-11.	-0.006	76.60	1.459s
EU-154	3492.37	873.23	22.	7.	0.004	100.29	1.460s
PA-234	3521.57	880.53	53.	-11.	-0.006	95.37	1.465s
PA-234	3532.41	883.24	65.	-9.	-0.005	131.58	1.467s
AG-110M	3538.19	884.68	74.	0.	0.000	1000.00	1.468s
Sc-46	3556.57	889.28	62.	10.	0.006	113.52	1.471s
Y-88	3591.61	898.04	5.	5.	0.003	102.30	1.477s
AC-228	3643.73	911.07	19.	46.	0.026	24.64	1.486s
AG-110M	3749.43	937.49	24.	-10.	-0.005	54.40	1.504s
PA-234	3783.54	946.02	14.	-1.	-0.001	800.00	1.510s
EU-152	3855.90	964.11	49.	7.	0.004	139.51	1.522s
AC-228	3875.76	969.07	0.	33.	0.018	17.41	1.656
EU-154	3984.78	996.33	20.	8.	0.004	90.89	1.544s
PA-234M	4003.46	1001.00	28.	4.	0.002	175.06	1.547s
EU-154	4018.57	1004.77	43.	-9.	-0.005	104.64	1.549s
Co-56	4150.84	1037.84	23.	-3.	-0.002	312.25	1.571s
Cs-136	4191.76	1048.07	19.	-4.	-0.002	174.63	1.578s
RH-106	4200.92	1050.36	28.	4.	0.002	194.72	1.579s
BI-207	4254.12	1063.66	19.	-1.	0.000	664.43	1.588s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ga-68	4309.08	1077.40	19.	-6.	-0.003	167.10	1.597s
FE-59	4396.49	1099.25	19.	-6.	-0.003	167.10	1.611s
EU-152	4447.79	1112.07	55.	-10.	-0.005	112.19	1.620s
ZN-65	4461.68	1115.55	45.	-5.	-0.003	204.54	1.622s
BI-214	4480.64	1120.29	46.	10.	0.005	104.18	1.625
Sc-46	4481.70	1120.55	36.	10.	0.005	92.64	1.625
Ta-182	4484.70	1121.30	49.	-7.	-0.004	145.02	1.626s
CO-60	4692.46	1173.24	15.	4.	0.002	243.53	1.659s
Ta-182	4755.72	1189.05	10.	4.	0.002	180.85	1.669s
Co-56	4952.65	1238.28	15.	10.	0.005	92.14	1.700s
NA-22	5097.66	1274.53	15.	-1.	-0.001	556.78	1.723s
EU-154	5097.70	1274.54	16.	0.	0.000	1000.00	1.723s
FE-59	5165.93	1291.60	5.	5.	0.003	111.56	1.733s
TL-210	5251.56	1313.00	15.	-6.	-0.003	147.67	1.746s
CO-60	5329.57	1332.50	6.	3.	0.002	158.85	1.758s
AG-110M	5536.78	1384.30	0.	0.	0.000	1000.00	1.789s
EU-152	5631.60	1408.00	5.	-1.	-0.001	379.72	1.804s
K-40	5842.59	1460.74	2.	206.	0.114	7.05	2.239s
BI-214	7057.76	1764.49	0.	12.	0.006	30.72	2.005
Co-56	7085.20	1771.35	12.	0.	0.000	1000.00	2.008s
Y-88	7344.09	1836.06	0.	0.	0.000	1000.00	2.042s

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	3.4997E+00				5.31E+01	
			477.60	3.500E+00	?(	1.271E+01 1.07E+02 1.05E+01	G
NA-22	C	-8.7979E-02				9.50E+02	
			1274.53	-8.798E-02	&(	1.826E+00 5.57E+02 9.99E+01	G
K-40	N	1.9206E+02				4.66E+11	
			1460.83	1.921E+02	(P	8.942E+00 7.05E+00 1.07E+01	G
Sc-46	F	7.1360E-01				8.38E+01	
			889.28	6.588E-01	&(	2.543E+00 1.14E+02 1.00E+02	G
			1120.55	7.684E-01	&(	2.415E+00 9.26E+01 1.00E+02	G
CR-51	F	-1.4348E+00				2.77E+01	
			320.08	-1.435E+00	?(	1.238E+01 2.51E+02 9.94E+00	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C	-3.0152E-01					3.12E+02	
			834.85	-3.015E-01	?(P	1.497E+00	1.78E+02	1.00E+02 G
FE-59	F	-5.3561E-03					4.45E+01	
			1099.25	-7.743E-01	&(	3.122E+00	1.67E+02	5.65E+01 G
			1291.60	1.000E+00	?(P	2.735E+00	1.12E+02	4.32E+01 G
Co-56	C	9.0766E-01					7.73E+01	
			846.77	6.591E-01	?(	7.668E-01	5.02E+01	9.99E+01 G
			1238.28	1.284E+00	?(P	2.719E+00	9.21E+01	6.61E+01 G
			1037.84	-1.733E+00	-	1.311E+01	3.12E+02	1.41E+01 G
			1771.35	0.000E+00	-	1.461E+01	1.00E+03	1.55E+01 A
CO-57	C	-2.9227E-01					2.72E+02	
			122.06	-2.923E-01	?(	8.891E-01	9.09E+01	8.56E+01 G
			136.47	-2.758E+00	+	1.133E+01	1.23E+02	1.07E+01 G
CO-58	C	-1.9942E-01					7.09E+01	
			810.78	-1.994E-01	&(	2.100E+00	3.00E+02	9.95E+01 G
CO-60	F	3.0206E-01					1.93E+03	
			1332.50	3.094E-01	?(P	1.259E+00	1.59E+02	1.00E+02 G
			1173.24	2.947E-01	?(P	1.717E+00	2.44E+02	9.99E+01 G
ZN-65	F	-7.3345E-01					2.44E+02	
			1115.55	-7.335E-01	?(	5.236E+00	2.05E+02	5.06E+01 G
NB-94	I	-7.0665E-01					7.41E+06	
			702.63	-7.067E-01	?(P	1.631E+00	8.78E+01	9.79E+01 G
			871.10	-6.966E-01	+	1.788E+00	7.66E+01	9.99E+01 G
ZR-95	I	4.0175E-01					6.40E+01	
			756.73	3.777E-01	?(	2.278E+00	2.38E+02	5.45E+01 G
			724.20	4.314E-01	&(	4.261E+00	2.81E+02	4.42E+01 G
NB-95	I	2.7356E-01					6.40E+01	
			765.79	2.736E-01	?(	8.624E-01	9.08E+01	9.98E+01 G
RU-103	I	1.2811E-01					3.93E+01	
			497.05	1.281E-01	?(	9.117E-01	2.67E+02	9.09E+01 G
			610.30	-6.181E-06	%	5.054E+01	2.37E+08	5.75E+00 GA
RH-106	I	-8.0552E-03					3.74E+02	
			621.92	-2.999E+00	?(	3.029E+01	2.96E+02	9.93E+00 G
			1050.36	1.903E+01	?(	1.309E+02	1.95E+02	1.56E+00 G
			511.86	5.369E+00	@	8.123E+00	4.70E+01	2.00E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-108M	C	1.1032E-01					1.53E+05	
			433.94	-2.654E-01	?(	1.163E+00	1.72E+02	9.05E+01 G
			722.94	4.845E-01	?(	1.706E+00	1.03E+02	9.08E+01 G
			614.28	0.000E+00	-	3.253E+00	1.00E+03	8.98E+01 G
AG-110M	F	7.1140E-02					2.50E+02	
			884.68	0.000E+00	?(	3.766E+00	1.00E+03	7.27E+01 G
			657.76	-7.005E-02	+	1.422E+00	5.61E+02	9.46E+01 G
			937.49	-1.868E+00	& P	4.961E+00	5.44E+01	3.44E+01 G
			1384.30	0.000E+00	?(	2.875E+00	1.00E+03	2.43E+01 G
			763.94	3.808E-01	&(	5.034E+00	3.56E+02	2.23E+01 G
SN-113	F	4.3073E-01					1.15E+02	
			391.69	4.307E-01	(P	1.994E+00	1.35E+02	6.40E+01 G
SB-124	F	-6.4702E-02					6.02E+01	
			602.73	-5.468E-01	?(	3.257E+00	1.76E+02	9.83E+01 G
			1690.98	-6.923E-02	% P	1.767E+00	5.03E+03	4.78E+01 G
			722.79	4.318E+00	?(	1.238E+01	8.46E+01	1.08E+01 G
SB-125	I	5.6423E-01					1.01E+03	
			427.88	4.614E-01	&(	1.376E+00	1.09E+02	2.96E+01 G
			600.50	-3.069E+00	+ P	1.835E+01	9.33E+01	1.79E+01 G
			635.89	7.115E-01	?(	1.035E+01	3.99E+02	1.13E+01 G
			463.37	6.958E-01	&(	1.411E+01	5.79E+02	1.05E+01 G
I-131	I	-2.4831E-01					8.02E+00	
			364.48	-3.096E-01	?(	1.372E+00	1.69E+02	8.17E+01 G
			284.30	-5.206E+00	+	1.406E+01	1.04E+02	6.14E+00 G
			636.97	4.496E-01	&(	1.600E+01	9.64E+02	7.17E+00 G
Gd-153	F	-8.5888E-01					2.42E+02	
			97.50	-8.589E-01	&(	4.283E+00	1.49E+02	3.00E+01 G
			103.20	-4.232E-01	+	6.107E+00	4.28E+02	2.18E+01 G
Ga-68	C	-1.5233E+01					4.71E-02	
			1077.40	-1.523E+01	?(	6.141E+01	1.67E+02	3.30E+00 G
Tc-99m	I	-3.1424E-01					2.51E-01	
			140.51	-3.142E-01	?(	1.311E+00	1.25E+02	8.93E+01 G
BA-133	F	4.1248E-01					3.85E+03	
			356.00	1.840E-01	&(	2.679E+00	4.24E+02	6.20E+01 G
			302.85	1.186E+00	?(	9.490E+00	2.36E+02	1.83E+01 G
			383.84	2.145E+00		1.051E+01	1.41E+02	8.94E+00 GA
			80.99	-6.789E-01	&	2.588E+00	1.41E+02	3.41E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	I	-1.3844E-01					7.54E+02	
			795.87	-8.203E-01	?(	2.487E+00	8.99E+01	8.55E+01 G
			604.71	3.933E-01	+	2.881E+00	2.15E+02	9.76E+01 G
			569.32	1.140E+00	&(	7.277E+00	1.80E+02	1.54E+01 G
			801.95	-9.411E+00	+	2.832E+01	8.95E+01	8.69E+00 G
			563.24	4.492E+00	?(P	1.234E+01	1.07E+02	8.35E+00 G
CS-137	I	1.9551E-02					1.10E+04	
			661.66	1.955E-02	%(	1.639E+00	2.30E+03	8.52E+01 G
CE-139	F	2.7830E-01					1.38E+02	
			165.85	2.783E-01	?(	1.077E+00	1.15E+02	7.99E+01 G
Ba-140	I	1.4894E+00					1.28E+01	
			537.26	8.533E-01	?(	3.217E+00	1.43E+02	2.44E+01 G
			162.66	-4.421E+00	+ P	1.407E+01	1.51E+02	6.22E+00 G
			304.85	5.106E+00	?(	4.160E+01	2.40E+02	4.29E+00 G
La-140	I	-1.5311E-02					1.28E+01	
			1596.21	-1.531E-02	%(P	8.365E-01	1.08E+04	9.54E+01 G
			487.02	-9.214E-01	+	2.435E+00	1.05E+02	4.55E+01 G
			328.76	-2.063E+00	+ P	5.303E+00	5.41E+01	2.03E+01 G
			815.77	0.000E+00	+	9.303E+00	1.00E+03	2.33E+01 G
CE-141	I	-5.8315E-01					3.25E+01	
			145.44	-5.832E-01	?(	2.410E+00	1.23E+02	4.82E+01 G
PM-144	C	-8.7556E-01					3.63E+02	
			696.54	-8.756E-01	?(P	1.925E+00	6.92E+01	9.90E+01 G
			618.06	2.989E-01	+	2.423E+00	2.36E+02	9.91E+01 G
EU-152	F	8.9174E-01					4.94E+03	
			121.78	-4.163E-01	&(	2.809E+00	1.98E+02	2.86E+01 G
			344.29	-1.174E+00	+	5.941E+00	1.49E+02	2.65E+01 G
			1112.07	-5.575E+00	+	2.130E+01	1.12E+02	1.36E+01 G
			778.92	-6.094E+00	&	1.340E+01	9.17E+01	1.29E+01 G
			964.11	3.463E+00	?(	1.663E+01	1.40E+02	1.46E+01 G
			244.69	8.690E-01	?(	2.539E+01	8.63E+02	7.58E+00 G
			1408.00	-6.509E-01	+ P	6.212E+00	3.80E+02	2.10E+01 GA
EU-154	I	1.9454E+00					3.14E+03	
			123.10	4.848E-01	?(	1.771E+00	1.09E+02	4.08E+01 G
			1274.54	0.000E+00	&	5.335E+00	1.00E+03	3.52E+01 G
			723.36	2.178E+00	?(	8.522E+00	1.14E+02	2.02E+01 G
			873.23	3.709E+00	?(	1.278E+01	1.00E+02	1.23E+01 G
			1004.77	-3.702E+00	+	1.320E+01	1.05E+02	1.80E+01 G
			996.33	5.080E+00	?(	1.576E+01	9.09E+01	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	6.7652E-01					1.81E+03	
			105.31	1.139E+00	@(P	5.729E+00	1.50E+02	2.12E+01 G
			86.54	3.572E-01	&(	4.757E+00	3.95E+02	3.07E+01 G
HF-181	F	-5.7612E-01					4.24E+01	
			482.00	-5.761E-01	?(	1.973E+00	1.01E+02	8.05E+01 G
			133.02	-2.629E-01	+	2.590E+00	2.91E+02	4.33E+01 G
			345.83	-1.844E-01	%	9.872E+00	1.55E+03	1.51E+01 G
			136.30	0.000E+00	+	1.959E+01	1.00E+03	5.85E+00 G
Ta-182	F	-4.4005E-01					1.14E+02	
			1121.30	-1.592E+00	?(	7.957E+00	1.45E+02	3.49E+01 G
			1221.41	3.136E-01	%	8.156E+00	1.10E+03	2.70E+01 G
			1189.05	2.042E+00	?(	8.904E+00	1.81E+02	1.62E+01 G
Hg-203	F	3.1436E-02					4.66E+01	
			279.20	3.144E-02	%(	1.233E+00	1.12E+03	8.15E+01 G
TL-208	N	3.3797E+00					6.98E+02	
			583.02	3.336E+00	(P	1.131E+00	1.76E+01	8.45E+01 G
			277.28	3.961E+00	?(P	1.165E+01	8.73E+01	6.31E+00 G
			860.56	1.158E-01	% P	1.233E+01	4.15E+03	1.24E+01 G
PM-146	C	4.5383E-01					2.02E+03	
			453.88	4.279E-01	?(P	1.182E+00	1.07E+02	6.50E+01 G
			747.16	5.035E-01	?(P	3.661E+00	2.84E+02	3.40E+01 G
			735.72	-3.265E+00	+	7.338E+00	9.37E+01	2.25E+01 G
Y-88	F	1.6884E-01					1.07E+02	
			1836.06	0.000E+00	?(	9.247E-01	1.00E+03	9.92E+01 G
			898.04	3.476E-01	?(P	8.941E-01	1.02E+02	9.37E+01 G
Cd-113m		-5.0544E+03					5.33E+03	
			263.70	-5.054E+03	&(	1.673E+04	9.83E+01	6.00E-03 K
Cd-109	F	6.0130E+00					4.53E+02	
							Derived Ave Activity	
			88.04	6.013E+00	}(	3.749E+01	1.86E+02	3.79E+00 G
Cf-251	T	1.1332E+00					3.28E+05	
			176.60	1.133E+00	&(	4.235E+00	1.37E+02	1.70E+01 G
			227.00	3.398E+00	?	9.718E+00	1.09E+02	6.30E+00 GA
Cf-249	T	3.3571E-01					1.28E+05	
			387.95	3.603E-01	*(	1.547E+00	1.25E+02	6.60E+01 G
			333.44	2.308E-01	?(	5.355E+00	8.54E+02	1.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sn-126		-4.3536E-01					3.65E+07	
			87.57	7.025E-01	}	3.720E+00	8.24E+01	3.75E+01 GA
			64.28	-4.354E-01	&(	1.199E+01	8.06E+02	9.70E+00 G
			86.94	2.920E+00	}	1.539E+01	7.98E+01	9.04E+00 GA
PB-210	N	3.1343E+01					8.14E+03	
			46.54	3.134E+01	(P	3.024E+01	3.53E+01	4.25E+00 G
PB-212	N	1.0084E+01					6.98E+02	
			238.63	1.008E+01	(P	1.217E+00	7.51E+00	4.33E+01 G
			300.03	1.566E+01	+ P	1.664E+01	3.99E+01	3.28E+00 GA
PB-214	N	7.1980E+00					5.84E+05	
			351.93	7.087E+00	@(P	1.715E+00	1.37E+01	3.76E+01 G
			295.09	7.413E+00	(P	3.007E+00	1.97E+01	1.93E+01 G
			242.00	3.598E+00	&	2.486E+01	2.05E+02	7.43E+00 GA
BI-207	C	-7.9134E-02					1.18E+04	
			1063.66	-7.913E-02	?(P	2.307E+00	6.64E+02	7.45E+01 G
			569.70	-1.869E-01	+	1.325E+00	2.02E+02	9.77E+01 G
BI-212	N	-7.5809E+00					6.98E+02	
			727.17	-7.581E+00	(	2.879E+01	1.12E+02	7.55E+00 G
			785.42	4.402E+01	?	1.000E+02	9.30E+01	1.28E+00 GA
U-235	N	-2.8136E+00					2.57E+11	
			143.79	-2.814E+00	(P	8.956E+00	1.26E+02	1.10E+01 G
			205.33	-2.543E+00	& P	1.594E+01	2.46E+02	5.01E+00 G
			163.38	-1.439E+00	& P	1.822E+01	5.69E+02	5.08E+00 G
			185.72	9.707E-01	+ P	1.439E+00	5.49E+01	5.40E+01 GA
BI-214	N	8.4609E+00					5.84E+05	
			609.31	8.299E+00	(P	1.954E+00	1.39E+01	4.61E+01 G
			1120.29	5.038E+00	& P	1.785E+01	1.04E+02	1.51E+01 G
			1764.49	8.944E+00	?(P	5.720E+00	3.07E+01	1.54E+01 G
BI-210M	T	5.3005E-01					1.10E+09	
			265.83	5.301E-01	(	1.888E+00	1.05E+02	5.00E+01 G
			304.90	3.963E-02	%	6.495E+00	4.79E+03	2.80E+01 G
AC-228	N	1.1693E+01					2.10E+03	
			911.07	1.050E+01	?(	5.177E+00	2.46E+01	2.90E+01 G
			968.97	1.309E+01	(	2.924E+00	1.74E+01	1.75E+01 G
			338.32	1.254E+01	*(	4.926E+00	2.04E+01	1.20E+01 G
			93.35	-5.302E+00	&	2.607E+01	1.47E+02	5.56E+00 XA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	N	-2.9096E+00					7.95E+03	
			256.24	-2.910E+00	?(	1.252E+01	1.65E+02	7.00E+00 G
			235.97	-1.205E+00	+	1.553E+01	3.82E+02	1.23E+01 G
			50.14	-5.248E+00	&	2.410E+01	1.37E+02	8.00E+00 G
TH-229	N	1.3892E+00					2.68E+06	
			193.51	1.389E+00	&(	1.615E+01	4.19E+02	4.40E+00 G
			210.85	-3.378E+00	+	2.893E+01	3.12E+02	2.99E+00 G
TH-234	N	2.7811E+00					1.63E+12	
			92.59	1.036E+00	(P	1.298E+01	3.67E+02	5.58E+00 G
			63.29	5.339E+00	(P	2.157E+01	1.20E+02	3.81E+00 G
PA-231	N	8.0945E+00					1.20E+07	
			302.65	7.541E+00	?(	5.915E+01	2.31E+02	2.88E+00 G
			300.07	8.742E+00	(	6.579E+01	2.22E+02	2.46E+00 G
PA-233	C	4.7005E-01					7.82E+08	
			312.01	-4.659E-02	%(P	5.173E+00	1.28E+03	3.60E+01 G
			300.18	3.470E+00	(	2.670E+01	2.27E+02	6.20E+00 G
PA-234	N	-1.4269E+00					1.63E+12	
			131.29	-1.427E+00	&(	6.009E+00	1.26E+02	1.80E+01 G
			946.02	-5.064E-01	+	1.020E+01	8.00E+02	1.34E+01 G
			569.47	0.000E+00	&	1.463E+01	1.00E+03	8.20E+00 G
			883.24	-5.961E+00	+	2.680E+01	1.32E+02	9.60E+00 G
			880.53	-1.212E+01	+	3.909E+01	9.54E+01	6.00E+00 GA
PA-234M	N	3.7523E+01					1.63E+12	
			1001.00	3.752E+01	?(	2.313E+02	1.75E+02	8.37E-01 G
			766.41	-2.540E+01	+	4.955E+02	5.37E+02	2.94E-01 G
AM-241	T	-1.0092E+00					1.58E+05	
			59.54	-1.009E+00	(	3.067E+00	1.13E+02	3.59E+01 G
Np-237	F	2.0191E+00					2.14E+06	
							Derived Ave Activity	
			86.49	2.019E+00	}(	1.094E+01	1.62E+02	1.31E+01 G
Ir-192	F	-3.7170E-01					7.40E+01	
			316.49	-3.717E-01	?(	1.289E+00	1.03E+02	8.70E+01 G
			468.06	3.315E-01	+	2.742E+00	2.38E+02	5.18E+01 G
			308.44	0.000E+00	+	5.796E+00	1.00E+03	3.18E+01 G
Cs-136	F	3.9992E-02					1.30E+01	
			818.50	3.999E-02	%(	2.139E+00	1.50E+03	1.00E+02 G
			1048.07	-3.396E-01	+	2.116E+00	1.75E+02	8.00E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          340.57-6.865E-01 +   3.458E+00 1.49E+02 4.69E+01 G

Np-239   T   1.0158E+00                                     2.36E+00
                          103.70 1.017E+00 &   5.187E+00 1.52E+02 2.40E+01 X
                          106.13 1.016E+00 ?(  4.858E+00 1.42E+02 2.27E+01 G
                           99.50-1.715E+00 +   8.730E+00 1.52E+02 1.50E+01 X

Nd-147       2.4581E+00                                     1.11E+01
                          531.00 2.458E+00 &(  5.974E+00 9.45E+01 1.30E+01 G
                           91.10-1.086E+00 -   5.349E+00 1.47E+02 2.83E+01 G

TL-210   N   3.9935E-01                                     5.84E+05
                          799.60 5.043E-01 ?(  1.810E+00 1.05E+02 9.90E+01 G
                          296.00 2.679E-01 ?(  1.977E+00 2.17E+02 7.90E+01 G
                         1313.00-2.580E+00 +   8.926E+00 1.48E+02 2.10E+01 GA

Kr-85    I   7.8097E+01                                     3.92E+03
                          513.98 7.810E+01 ?(  4.447E+02 1.67E+02 4.30E-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	267.	-17.	-0.010	136.75	-5.248E+00	
AM-241	59.54	153.	-20.	-0.011	113.09	-1.009E+00	
BA-133	80.99	163.	-16.	-0.009	141.42	-6.789E-01	
EU-155	86.54	495.	8.	0.004	395.47	3.572E-01	
Nd-147	91.10	554.	-23.	-0.013	147.36	-1.086E+00	
Gd-153	97.50	410.	-19.	-0.011	148.84	-8.589E-01	
Np-239	99.50	429.	-20.	-0.011	151.97	-1.715E+00	
Gd-153	103.20	449.	-7.	-0.004	427.91	-4.232E-01	
Np-239	103.70	391.	19.	0.010	152.21	1.017E+00	
EU-155	105.31	373.	18.	0.010	150.04	1.139E+00	P
Np-239	106.13	306.	18.	0.010	142.48	1.016E+00	
EU-152	121.78	155.	-9.	-0.005	198.45	-4.163E-01	
CO-57	122.06	138.	-19.	-0.011	90.93	-2.923E-01	
PA-234	131.29	278.	-19.	-0.011	125.59	-1.427E+00	
HF-181	133.02	297.	-8.	-0.005	291.22	-2.629E-01	
CO-57	136.47	341.	-22.	-0.012	122.78	-2.758E+00	
Tc-99m	140.51	292.	-20.	-0.011	124.51	-3.142E-01	
U-235	143.79	212.	-22.	-0.012	125.88	-2.814E+00	P
CE-141	145.44	297.	-20.	-0.011	123.37	-5.832E-01	
Ba-140	162.66	146.	-19.	-0.010	150.60	-4.421E+00	P
U-235	163.38	163.	-5.	-0.003	568.79	-1.439E+00	P
CE-139	165.85	138.	15.	0.008	114.87	2.783E-01	
Cf-251	176.60	87.	12.	0.007	137.31	1.133E+00	
U-235	185.72	95.	32.	0.018	54.85	9.707E-01	P
TH-229	193.51	73.	4.	0.002	418.87	1.389E+00	
U-235	205.33	85.	-7.	-0.004	245.53	-2.543E+00	P
TH-229	210.85	97.	-6.	-0.003	311.60	-3.378E+00	
Cf-251	227.00	40.	11.	0.006	109.32	3.398E+00	
TH-227	235.97	414.	-8.	-0.004	381.75	-1.205E+00	
EU-152	244.69	394.	3.	0.002	863.30	8.690E-01	
TH-227	256.24	70.	-10.	-0.005	164.71	-2.910E+00	
Cd-113m	263.70	88.	-14.	-0.008	98.28	-5.054E+03	
BI-210M	265.83	76.	12.	0.007	105.31	5.301E-01	
I-131	284.30	55.	-14.	-0.008	104.06	-5.206E+00	
TL-210	296.00	178.	9.	0.005	217.17	2.679E-01	
PA-231	300.07	187.	9.	0.005	221.63	8.742E+00	
PA-233	300.18	196.	9.	0.005	226.68	3.470E+00	
PA-231	302.65	205.	9.	0.005	231.18	7.541E+00	
BA-133	302.85	214.	9.	0.005	235.98	1.186E+00	
Ba-140	304.85	223.	9.	0.005	240.35	5.106E+00	
Ir-192	316.49	78.	-13.	-0.007	102.67	-3.717E-01	
CR-51	320.08	93.	-6.	-0.003	250.57	-1.435E+00	
La-140	328.76	66.	-16.	-0.009	54.10	-2.063E+00	P
Cf-249	333.44	37.	1.	0.001	854.04	2.308E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Cs-136	340.57	147.	-12.	-0.007	148.75	-6.865E-01		
EU-152	344.29	135.	-11.	-0.006	149.27	-1.174E+00		
BA-133	356.00	142.	4.	0.002	424.26	1.840E-01		
I-131	364.48	59.	-9.	-0.005	168.79	-3.096E-01		
BA-133	383.84	36.	6.	0.003	141.29	2.145E+00		
Cf-249	387.95	42.	8.	0.004	124.87	3.603E-01		
SN-113	391.69	67.	9.	0.005	135.50	4.307E-01		P
SB-125	427.88	4.	4.	0.002	109.11	4.614E-01		
AG-108M	433.94	36.	-7.	-0.004	172.02	-2.654E-01		
PM-146	453.88	16.	8.	0.004	107.34	4.279E-01		P
SB-125	463.37	66.	2.	0.001	578.79	6.958E-01		
Ir-192	468.06	59.	5.	0.003	237.98	3.315E-01		
BE-7	477.60	50.	10.	0.005	106.74	3.500E+00		
HF-181	482.00	71.	-12.	-0.007	101.33	-5.761E-01		
La-140	487.02	32.	-11.	-0.006	105.10	-9.214E-01		
RU-103	497.05	16.	3.	0.002	267.36	1.281E-01		
RH-106	511.86	67.	27.	0.015	46.99	5.369E+00		
Kr-85	513.98	94.	8.	0.005	166.61	7.810E+01		
Nd-147	531.00	12.	8.	0.004	94.51	2.458E+00		
Ba-140	537.26	12.	5.	0.003	142.83	8.533E-01		
CS-134	563.24	20.	9.	0.005	107.39	4.492E+00		P
CS-134	569.32	24.	4.	0.002	180.28	1.140E+00		
BI-207	569.70	33.	-4.	-0.002	201.51	-1.869E-01		
SB-125	600.50	217.	-12.	-0.007	93.31	-3.069E+00		P
SB-124	602.73	205.	-12.	-0.006	176.16	-5.468E-01		
CS-134	604.71	156.	8.	0.005	215.21	3.933E-01		
PM-144	618.06	107.	6.	0.003	236.34	2.989E-01		
RH-106	621.92	170.	-6.	-0.003	296.12	-2.999E+00		
SB-125	635.89	21.	2.	0.001	399.50	7.115E-01		
I-131	636.97	20.	1.	0.000	964.36	4.496E-01		
AG-110M	657.76	27.	-1.	-0.001	561.25	-7.005E-02		
PM-144	696.54	52.	-17.	-0.009	69.24	-8.756E-01		P
NB-94	702.63	35.	-13.	-0.007	87.80	-7.067E-01		P
SB-124	722.79	22.	9.	0.005	84.64	4.318E+00		
AG-108M	722.94	31.	8.	0.005	102.88	4.845E-01		
ZR-95	724.20	47.	4.	0.002	281.48	4.314E-01		
BI-212	727.17	64.	-11.	-0.006	111.77	-7.581E+00		
PM-146	735.72	35.	-13.	-0.007	93.67	-3.265E+00		
PM-146	747.16	18.	3.	0.002	283.61	5.035E-01		P
ZR-95	756.73	17.	4.	0.002	237.58	3.777E-01		
AG-110M	763.94	14.	2.	0.001	355.90	3.808E-01		
NB-95	765.79	7.	5.	0.003	90.85	2.736E-01		
PA-234M	766.41	24.	-1.	-0.001	536.69	-2.540E+01		
EU-152	778.92	35.	-14.	-0.008	91.70	-6.094E+00		
BI-212	785.42	17.	10.	0.005	93.05	4.402E+01		
CS-134	795.87	52.	-12.	-0.007	89.90	-8.203E-01		
TL-210	799.60	35.	8.	0.005	105.03	5.043E-01		
CS-134	801.95	70.	-14.	-0.008	89.51	-9.411E+00		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CO-58	810.77	48.	-3.	-0.002	300.00	-1.994E-01		
MN-54	834.85	22.	-5.	-0.003	177.90	-3.015E-01		P
NB-94	871.10	30.	-11.	-0.006	76.60	-6.966E-01		
PA-234	880.53	53.	-11.	-0.006	95.37	-1.212E+01		
PA-234	883.24	65.	-9.	-0.005	131.58	-5.961E+00		
Sc-46	889.28	62.	10.	0.006	113.52	6.588E-01		
Y-88	898.04	5.	5.	0.003	102.30	3.476E-01		P
AG-110M	937.49	24.	-10.	-0.005	54.40	-1.868E+00		P
PA-234	946.02	14.	-1.	-0.001	800.00	-5.064E-01		
EU-152	964.11	49.	7.	0.004	139.51	3.463E+00		
PA-234M	1001.00	28.	4.	0.002	175.06	3.752E+01		
Cs-136	1048.07	19.	-4.	-0.002	174.63	-3.396E-01		
RH-106	1050.36	28.	4.	0.002	194.72	1.903E+01		
BI-207	1063.66	19.	-1.	0.000	664.43	-7.913E-02		P
Ga-68	1077.40	19.	-6.	-0.003	167.10	-1.523E+01		
FE-59	1099.25	19.	-6.	-0.003	167.10	-7.743E-01		
EU-152	1112.07	55.	-10.	-0.005	112.19	-5.575E+00		
ZN-65	1115.55	45.	-5.	-0.003	204.54	-7.335E-01		
Sc-46	1120.55	36.	10.	0.005	92.64	7.684E-01		
Ta-182	1121.30	49.	-7.	-0.004	145.02	-1.592E+00		
CO-60	1173.24	15.	4.	0.002	243.53	2.947E-01		P
Ta-182	1189.05	10.	4.	0.002	180.85	2.042E+00		
NA-22	1274.53	15.	-1.	-0.001	556.78	-8.798E-02		
FE-59	1291.60	5.	5.	0.003	111.56	1.000E+00		P
TL-210	1313.00	15.	-6.	-0.003	147.67	-2.580E+00		
CO-60	1332.50	6.	3.	0.002	158.85	3.094E-01		P
EU-152	1408.00	5.	-1.	-0.001	379.72	-6.509E-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	3.4997E+00	3.4997E+00	1.067E+02%	1.27E+01
NA-22	#A	-8.7978E-02	-8.7979E-02	5.568E+02%	1.83E+00
K-40		1.9206E+02	1.9206E+02	7.048E+00%	8.94E+00
Sc-46	#A	7.1360E-01	7.1360E-01	7.326E+01%	2.54E+00
CR-51	#A	-1.4348E+00	-1.4348E+00	2.506E+02%	1.24E+01
MN-54	#A	-3.0152E-01	-3.0152E-01	1.779E+02%	1.50E+00
FE-59	#A	-5.3560E-03	-5.3561E-03	1.005E+02%	3.12E+00
Co-56	#	9.0765E-01	9.0766E-01	5.024E+01%	7.67E-01
CO-57	#A	-2.9227E-01	-2.9227E-01	9.093E+01%	8.89E-01
CO-58	#A	-1.9942E-01	-1.9942E-01	3.000E+02%	2.10E+00
CO-60	#A	3.0206E-01	3.0206E-01	1.454E+02%	1.26E+00
ZN-65	#A	-7.3345E-01	-7.3345E-01	2.045E+02%	5.24E+00
NB-94	#A	-7.0665E-01	-7.0665E-01	8.780E+01%	1.63E+00

ZR-95	#A	4.0175E-01	4.0175E-01	1.842E+02%	2.28E+00
NB-95	#A	2.7356E-01	2.7356E-01	9.085E+01%	8.62E-01
RU-103	#A	1.2811E-01	1.2811E-01	2.674E+02%	9.12E-01
RH-106	#A	-8.0552E-03	-8.0552E-03	1.772E+02%	3.03E+01
AG-108M	#A	1.1032E-01	1.1032E-01	1.002E+02%	1.16E+00
AG-110M	#A	7.1140E-02	7.1140E-02	3.559E+02%	3.77E+00
SN-113	#A	4.3072E-01	4.3073E-01	1.355E+02%	1.99E+00
SB-124	#A	-6.4702E-02	-6.4702E-02	8.464E+01%	3.26E+00
SB-125	#A	5.6423E-01	5.6423E-01	1.091E+02%	1.38E+00
I-131	#A	-2.4830E-01	-2.4831E-01	1.688E+02%	1.37E+00
Gd-153	#A	-8.5888E-01	-8.5888E-01	1.488E+02%	4.28E+00
Ga-68	#A	-1.5134E+01	-1.5233E+01	1.671E+02%	6.14E+01
Tc-99m	#A	-3.1386E-01	-3.1424E-01	1.245E+02%	1.31E+00
BA-133	#A	4.1248E-01	4.1248E-01	2.360E+02%	2.68E+00
CS-134	#A	-1.3844E-01	-1.3844E-01	7.610E+01%	2.49E+00
CS-137	#A	1.9551E-02	1.9551E-02	2.304E+03%	1.64E+00
CE-139	#A	2.7830E-01	2.7830E-01	1.149E+02%	1.08E+00
Ba-140	#A	1.4893E+00	1.4894E+00	1.398E+02%	3.22E+00
La-140	#A	-1.5311E-02	-1.5311E-02	1.076E+04%	8.37E-01
CE-141	#A	-5.8315E-01	-5.8315E-01	1.234E+02%	2.41E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.03E+01
PM-144	#A	-8.7556E-01	-8.7556E-01	6.924E+01%	1.92E+00
EU-152	#A	8.9174E-01	8.9174E-01	1.395E+02%	2.81E+00
EU-154	#C	1.9454E+00	1.9454E+00	5.191E+01%	1.77E+00
EU-155	#A	6.7652E-01	6.7652E-01	1.500E+02%	5.73E+00
HF-181	#A	-5.7611E-01	-5.7612E-01	1.013E+02%	1.97E+00
Ta-182	#A	-4.4005E-01	-4.4005E-01	1.159E+02%	7.96E+00
Hg-203	#A	3.1436E-02	3.1436E-02	1.121E+03%	1.23E+00
TL-208		3.3797E+00	3.3797E+00	1.761E+01%	1.13E+00
PM-146	#A	4.5383E-01	4.5383E-01	1.073E+02%	1.18E+00
Y-88	#A	1.6884E-01	1.6884E-01	1.023E+02%	9.25E-01
Cd-113m	#A	-5.0544E+03	-5.0544E+03	9.828E+01%	1.67E+04
Cd-109	#A	6.0130E+00	6.0130E+00	1.859E+02%	3.75E+01
Cf-251	#A	1.1332E+00	1.1332E+00	1.373E+02%	4.23E+00
Cf-249	#A	3.3571E-01	3.3571E-01	1.249E+02%	1.55E+00
Sn-126	#A	-4.3536E-01	-4.3536E-01	8.056E+02%	1.20E+01
PB-210		3.1343E+01	3.1343E+01	3.532E+01%	3.02E+01
PB-212		1.0084E+01	1.0084E+01	7.508E+00%	1.22E+00
PB-214		7.1980E+00	7.1980E+00	1.202E+01%	1.71E+00
BI-207	#A	-7.9134E-02	-7.9134E-02	6.644E+02%	2.31E+00
BI-212	#A	-7.5809E+00	-7.5809E+00	1.118E+02%	2.88E+01
U-235	#A	-2.8136E+00	-2.8136E+00	1.259E+02%	8.96E+00
BI-214	#	8.4609E+00	8.4609E+00	1.390E+01%	1.95E+00
BI-210M	#A	5.3005E-01	5.3005E-01	1.053E+02%	1.89E+00
AC-228		1.1693E+01	1.1693E+01	1.214E+01%	5.18E+00
TH-227	#A	-2.9096E+00	-2.9096E+00	1.647E+02%	1.25E+01
TH-229	#A	1.3892E+00	1.3892E+00	4.189E+02%	1.61E+01
TH-234	A	2.7811E+00	2.7811E+00	1.200E+02%	1.30E+01
PA-231	#A	8.0945E+00	8.0945E+00	1.601E+02%	5.91E+01

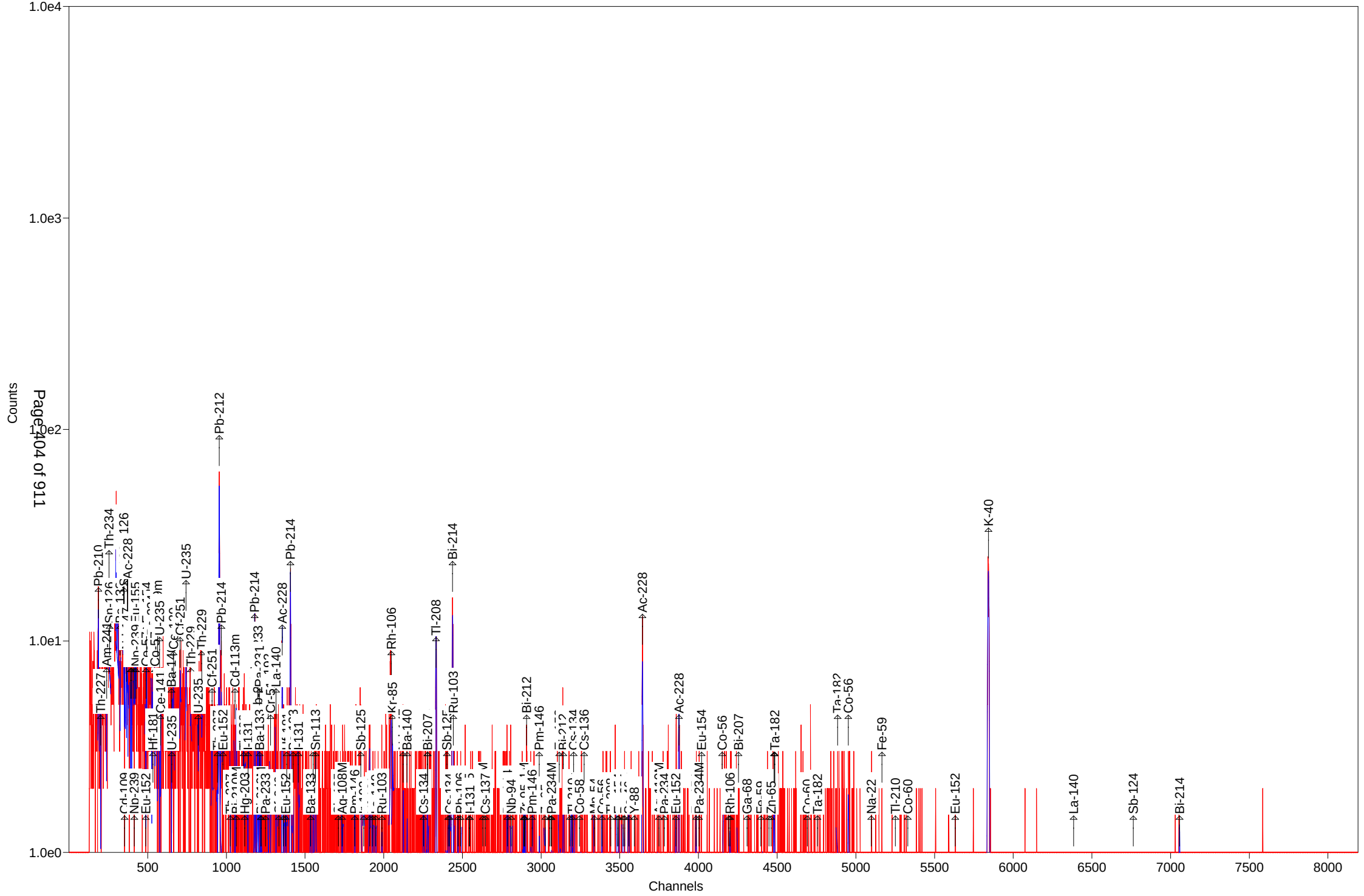
PA-233 #A	4.7005E-01	4.7005E-01	2.267E+02%		5.17E+00
PA-234 #A	-1.4269E+00	-1.4269E+00	1.256E+02%		6.01E+00
PA-234M#A	3.7523E+01	3.7523E+01	1.751E+02%		2.31E+02
AM-241 #A	-1.0092E+00	-1.0092E+00	1.131E+02%		3.07E+00
Np-237 #A	2.0191E+00	2.0191E+00	1.617E+02%		1.09E+01
Ir-192 #A	-3.7170E-01	-3.7170E-01	1.027E+02%		1.29E+00
Cs-136 #A	3.9991E-02	3.9992E-02	1.505E+03%		2.14E+00
Np-239 #A	1.0156E+00	1.0158E+00	1.425E+02%		4.86E+00
Nd-147 #A	2.4580E+00	2.4581E+00	9.451E+01%		5.97E+00
TL-210 #A	3.9935E-01	3.9935E-01	1.050E+02%		1.81E+00
Kr-85 #A	7.8097E+01	7.8097E+01	1.666E+02%		4.45E+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 2000.0 keV) 2.642E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.0 keV) 2.6421869E+02 Bq/Sample

412881_Gamma_180-86110-A-4-A. 2_Gamma_20190266.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20190306

Sample Description: 412881_Gamma_180-86110-B-5-A
Detector: Detector #12
Batch ID: 412881
Work Order Number: Gamma
Lot Number: 180-86110-B-5-A

Decay to Time: 2/20/2019 09:33 Live Time: 1800 sec
Acquisition Time: 2/20/2019 09:34:10 Real Time: 1801 sec
Analysis Time: 2/20/2019 10:04 Dead Time: 0.07 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: Client_Long_Rev15.lib
Bkgd Correction File: 12_2019-01-20_1010.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	-2.054E+00	194.0	3.985E+00	3.987E+00	1.373E+01
NA-22	2.341E-01	114.9	2.690E-01	2.693E-01	9.696E-01
K-40	1.040E+02	8.4	8.724E+00	1.018E+01	5.395E+00
Sc-46	-5.829E-01	94.4	5.501E-01	5.509E-01	1.862E+00
CR-51	-2.970E+00	200.4	5.952E+00	5.954E+00	2.009E+01
MN-54	6.855E-02	692.8	4.749E-01	4.749E-01	1.174E+00
FE-59	2.594E-01	324.8	8.425E-01	8.426E-01	1.993E+00
Co-56	4.641E-01	93.0	4.315E-01	4.322E-01	9.066E-01
CO-57	4.045E-01	90.4	3.655E-01	3.661E-01	7.443E-01
CO-58	3.964E-01	86.4	3.426E-01	3.432E-01	1.165E+00
CO-60	7.266E-01	31.6	2.298E-01	2.326E-01	5.355E-01
ZN-65	6.919E-01	154.4	1.068E+00	1.069E+00	3.724E+00
NB-94	1.266E-01	27.7	3.511E-02	3.570E-02	1.360E+00
ZR-95	-5.568E-01	166.6	9.277E-01	9.281E-01	2.217E+00
NB-95	0.000E+00	1.#INF	2.053E-01	2.053E-01	1.503E+00
RU-103	6.576E-01	33.4	2.199E-01	2.224E-01	4.653E-01
RH-106	3.446E+00	81.0	2.791E+00	2.796E+00	1.309E+01
AG-108M	2.613E-01	98.1	2.564E-01	2.567E-01	6.611E-01
AG-110M	1.015E-01	424.3	4.308E-01	4.308E-01	2.233E+00
SN-113	-6.324E-01	112.1	7.090E-01	7.097E-01	2.392E+00
SB-124	4.492E-01	136.6	6.138E-01	6.142E-01	2.084E+00
SB-125	2.055E-01	95.6	1.965E-01	1.968E-01	3.253E+00
I-131	1.699E-01	212.0	3.602E-01	3.603E-01	9.302E-01
Gd-153	1.912E-01	483.2	9.237E-01	9.238E-01	3.690E+00
Ga-68	-8.815E+00	232.7	2.052E+01	2.052E+01	4.705E+01
Tc-99m	2.101E-01	183.7	3.858E-01	3.860E-01	1.303E+00
BA-133	-5.884E-01	134.9	7.936E-01	7.941E-01	2.680E+00
CS-134	5.754E-01	68.8	3.960E-01	3.971E-01	1.273E+00
CS-137	3.195E+00	17.9	5.731E-01	5.959E-01	9.018E-01
CE-139	0.000E+00	1.#INF	1.555E-01	1.555E-01	9.580E-01
Ba-140	-1.272E-01	102.5	1.303E-01	1.305E-01	3.728E+00
La-140	3.435E-01	90.2	3.098E-01	3.103E-01	6.487E-01
CE-141	3.362E-01	199.7	6.713E-01	6.716E-01	2.273E+00

CE-144	1.727E+00	172.0	2.969E+00	2.971E+00	1.002E+01
PM-144	2.694E-02	77.7	2.094E-02	2.099E-02	1.337E+00
EU-152	2.395E+00	29.9	7.155E-01	7.262E-01	2.749E+00
EU-154	3.776E-01	84.0	3.171E-01	3.177E-01	1.922E+00
EU-155	0.000E+00	1.#INF	5.538E-01	5.538E-01	5.019E+00
HF-181	3.922E-01	167.4	6.565E-01	6.568E-01	1.786E+00
Ta-182	2.711E-01	488.6	1.324E+00	1.325E+00	5.844E+00
Hg-203	2.375E-01	152.7	3.626E-01	3.628E-01	1.240E+00
TL-208	1.546E+00	28.3	4.375E-01	4.445E-01	9.142E-01
PM-146	-6.061E-01	102.1	6.186E-01	6.194E-01	1.549E+00
Y-88	-3.501E-01	187.0	6.545E-01	6.548E-01	1.407E+00
Cd-113m	3.814E+03	95.6	3.647E+03	3.653E+03	1.236E+04
Cd-109	-6.844E+00	144.9	9.916E+00	9.924E+00	3.332E+01
Cf-251	-2.309E-01	636.4	1.469E+00	1.469E+00	3.909E+00
Cf-249	4.331E-01	112.9	4.890E-01	4.895E-01	2.016E+00
Sn-126	2.258E+00	175.3	3.958E+00	3.960E+00	1.338E+01
PB-210	1.554E+01	65.1	1.011E+01	1.016E+01	2.970E+01
PB-212	4.164E+00	14.3	5.951E-01	6.335E-01	1.428E+00
PB-214	5.062E+00	15.0	7.590E-01	8.013E-01	1.621E+00
BI-207	4.663E-01	101.7	4.742E-01	4.748E-01	1.108E+00
BI-212	3.697E+00	142.1	5.253E+00	5.256E+00	1.825E+01
U-235	2.108E+00	122.9	2.590E+00	2.592E+00	1.062E+01
BI-214	2.511E+00	28.9	7.249E-01	7.361E-01	4.773E+00
BI-210M	-6.523E-01	93.9	6.125E-01	6.135E-01	2.059E+00
AC-228	7.363E+00	16.0	1.179E+00	1.237E+00	1.391E+00
TH-227	1.601E+00	175.9	2.817E+00	2.818E+00	9.831E+00
TH-229	8.195E-01	629.0	5.155E+00	5.155E+00	1.588E+01
TH-234	-1.123E+01	37.3	4.189E+00	4.235E+00	1.702E+01
PA-231	4.314E+00	230.6	9.948E+00	9.951E+00	6.404E+01
PA-233	0.000E+00	1.#INF	3.752E-01	3.752E-01	5.242E+00
PA-234	2.248E+00	73.0	1.642E+00	1.646E+00	4.369E+00
PA-234M	7.176E+01	63.5	4.560E+01	4.575E+01	1.507E+02
AM-241	7.379E-01	111.5	8.232E-01	8.243E-01	2.239E+00
Np-237	1.415E+00	198.5	2.810E+00	2.811E+00	9.482E+00
Ir-192	0.000E+00	1.#INF	9.920E-02	9.921E-02	2.192E+00
Cs-136	1.802E-01	144.9	2.611E-01	2.613E-01	1.402E+00
Np-239	9.068E-01	144.4	1.309E+00	1.311E+00	4.417E+00
Nd-147	2.277E+00	98.4	2.241E+00	2.245E+00	5.545E+00
TL-210	2.984E-01	109.1	3.255E-01	3.259E-01	1.053E+00
Kr-85	-9.387E+01	143.3	1.345E+02	1.346E+02	4.561E+02
Total	4.069E+03				

Analyst: kody Saulters

Sample description
412881_Gamma_180-86110-B-5-A

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20190306.An1

Acquisition information
Start time: 2/20/2019 9:34:10 AM
Live time: 1800
Real time: 1801
Dead time: 0.07 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCan_108513

Energy Calibration
Created: 4/20/2018 11:13:27 AM
Zero offset: 0.059 keV
Gain: 0.250 keV/channel
Quadratic: -3.735E-08 keV/channel^2

Efficiency Calibration
Created: 4/20/2018 11:53:09 AM
Type: Polynomial
Uncertainty: 1.020 %
Coefficients: -0.363508 -4.707999 0.462125
-0.051256 0.002384 -0.000043

Library Files
Main analysis library: Client_Long_Rev15.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.08keV)
Stop channel: 8000 (1999.13keV)
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	2/20/2019 9:33:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2019-01-20_1010.PBC 1/20/2019 10:10:35 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1738

***** 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
46.75	21.	65.08	1.09	1.805E-02	46.54	4.250	PBC<MDA	PB210
59.54	13.	111.55	0.86	2.817E-02	59.54	35.900	PBC<MDA	AM241
63.29	-9.	226.87	0.87	2.978E-02	63.29	3.810	PBC<MDA	TH234
64.28	12.	175.25	0.87	3.015E-02	64.28	9.700	PBC<MDA	Sn126
77.12	48.	35.90	0.70	3.386E-02				
80.99	30.	56.11	0.89	3.466E-02	80.99	34.060	PBC<MDA	BA133
86.49	12.	198.53	0.89	3.559E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	6.038E-01	EU155
93.16	15.	96.04	0.90	3.645E-02	93.35	5.561	PBC<MDA	AC228
97.50	4.	538.52	0.90	3.683E-02	97.50	30.000	PBC<MDA	Gd153
99.50	14.	141.25	0.91	3.697E-02	99.50	15.000	PBC<MDA	Np239
103.20	3.	802.51	0.91	3.717E-02	103.20	21.800	PBC<MDA	Gd153
106.13	14.	144.40	0.91	3.729E-02	106.13	22.700	PBC<MDA	Np239
122.06	14.	90.36	0.93	3.724E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.450E-01	CO57
131.82	13.	122.17	0.94	3.683E-02	131.29	18.000	PBC<MDA	PA234
133.02	13.	167.41	0.94	3.673E-02	133.02	43.300	PBC<MDA	HF181
133.54	13.	171.97	0.94	3.670E-02	133.54	11.090	PBC<MDA	CE144
136.30	13.	176.00	0.94	3.652E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.807E+00	CO57
136.47	12.	179.82	0.94	3.651E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.683E+00	CO57
140.51	12.	183.69	0.95	3.623E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	12.	187.53	0.95	3.599E-02	143.79	10.960	PBC<MDA	U235
145.44	10.	199.68	0.95	3.586E-02	145.44	48.200	PBC<MDA	CE141
162.66	11.	110.03	0.97	3.435E-02	162.66	6.220	PBC<MDA	Ba140
185.72	8.	183.60	0.99	3.215E-02	185.72	54.000	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
193.51	2.	889.61	1.00	3.140E-02	193.51	4.400	PBC<MDA	TH229
205.33	8.	158.82	1.01	3.030E-02	205.33	5.010	PBC<MDA	U235
210.85	2.	889.61	1.02	2.980E-02	210.85	2.990	PBC<MDA	TH229
227.00	11.	104.27	1.03	2.839E-02	227.00	6.300	PBC<MDA	Cf251
235.97	13.	175.90	1.04	2.764E-02	235.97	12.300	PBC<MDA	TH227
238.56	74.	18.48	0.89	2.743E-02	238.63	43.300	3.466E+00	PB212
241.90	13.	172.38	1.05	2.716E-02	242.00	7.430	PBC<MDA	PB214
244.69	12.	179.14	1.05	2.695E-02	244.69	7.580	PBC<MDA	EU152
256.24	3.	449.74	1.06	2.608E-02	256.24	7.000	PBC<MDA	TH227
263.70	11.	95.61	1.07	2.554E-02	263.70	0.006	PBC<MDA	Cd113m
279.20	9.	152.68	1.09	2.449E-02	279.20	81.460	PBC<MDA	Hg203
294.59	48.	24.21	0.63	2.350E-02	295.09	19.300	5.839E+00	PB214
296.00	11.	195.80	1.10	2.345E-02	296.00	79.000	PBC<MDA	TL210
300.03	11.	199.75	1.11	2.321E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.058E+01	PA231
					300.18	6.200	4.200E+00	PA233
300.07	10.	230.60	1.11	2.321E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	9.365E+00	PA231
					300.18	6.200	3.717E+00	PA233
328.76	12.	90.18	1.13	2.165E-02	328.76	20.300	PBC<MDA	La140
333.44	10.	112.91	1.14	2.142E-02	333.44	15.510	PBC<MDA	Cf249
337.96	24.	38.19	1.45	2.118E-02	338.32	12.010	5.241E+00	AC228
340.57	8.	144.90	1.15	2.108E-02	340.57	46.900	PBC<MDA	Cs136
344.29	8.	152.84	1.15	2.090E-02	344.29	26.500	PBC<MDA	EU152
345.83	5.	237.38	1.15	2.083E-02	345.83	15.070	PBC<MDA	HF181
351.60	65.	17.69	1.43	2.055E-02	351.93	37.600	4.664E+00	PB214
364.48	5.	211.97	1.17	2.001E-02	364.48	81.700	PBC<MDA	I131
387.95	3.	429.42	1.19	1.907E-02	387.95	66.000	PBC<MDA	Cf249
433.94	7.	98.12	1.24	1.751E-02	433.94	90.480	PBC<MDA	AG108M
487.02	8.	120.42	1.29	1.604E-02	487.02	45.500	PBC<MDA	La140
497.05	17.	33.45	1.30	1.580E-02	497.05	90.900	6.576E-01	RU103
511.86	81.	13.58	2.56	1.546E-02	511.86	20.000	1.456E+01	RH106
531.00	8.	98.39	1.33	1.504E-02	531.00	13.000	PBC<MDA	Nd147
569.70	4.	181.05	1.37	1.427E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.819E+00	PA234
					569.70	97.740	1.527E-01	BI207
569.76	9.	73.04	1.37	1.428E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.350E+00	PA234
					569.70	97.740	3.650E-01	BI207
583.02	33.	28.29	1.38	1.403E-02	583.02	84.500	1.546E+00	TL208
600.50	11.	129.95	1.40	1.373E-02	600.50	17.860	PBC<MDA	SB125
602.73	11.	136.65	1.40	1.369E-02	602.73	98.260	PBC<MDA	SB124
604.71	11.	139.04	1.40	1.366E-02	604.71	97.620	PBC<MDA	CS134
609.31	11.	145.06	1.41	1.358E-02	609.31	46.090	PBC<MDA	BI214
610.30	11.	151.14	1.41	1.357E-02	610.30	5.750	PBC<MDA	RU103
618.06	10.	77.74	1.41	1.344E-02	618.06	99.100	PBC<MDA	PM144
635.89	2.	264.58	1.43	1.317E-02	635.89	11.310	PBC<MDA	SB125
661.58	63.	17.94	1.04	1.279E-02	661.66	85.210	3.195E+00	CS137

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
727.17	6.	142.07	1.52	1.194E-02	727.17	7.550	PBC<MDA	BI212
735.72	1.	979.80	1.52	1.184E-02	735.72	22.500	PBC<MDA	PM146
763.94	2.	424.26	1.55	1.152E-02	763.94	22.280	PBC<MDA	AG110M
766.41	9.	76.65	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.537E+02	PA234M
795.87	8.	83.22	1.58	1.119E-02	795.87	85.530	PBC<MDA	CS134
799.60	6.	109.08	1.58	1.115E-02	799.60	98.960	PBC<MDA	TL210
801.95	6.	127.93	1.58	1.113E-02	801.95	8.690	PBC<MDA	CS134
810.78	8.	86.42	1.59	1.104E-02	810.78	99.460	PBC<MDA	CO58
815.77	1.	635.02	1.60	1.099E-02	815.77	23.280	PBC<MDA	La140
834.85	1.	692.82	1.61	1.081E-02	834.85	99.980	PBC<MDA	MN54
846.77	4.	180.85	1.63	1.070E-02	846.77	99.935	PBC<MDA	Co56
860.56	10.	31.62	1.64	1.057E-02	860.56	12.420	4.230E+00	TL208
871.10	13.	27.74	1.65	1.048E-02	871.10	99.890	6.898E-01	NB94
883.24	6.	151.08	1.66	1.038E-02	883.24	9.600	PBC<MDA	PA234
910.75	39.	16.01	1.06	1.015E-02	911.07	29.000	7.363E+00	AC228
946.30	4.	218.66	1.72	9.873E-03	946.02	13.400	PBC<MDA	PA234
968.26	12.	83.38	1.74	9.703E-03	968.97	17.460	PBC<MDA	AC228
996.33	6.	83.99	1.76	9.508E-03	996.33	10.600	PBC<MDA	EU154
1001.00	6.	101.37	1.76	9.476E-03	1001.00	0.837	PBC<MDA	PA234M
1004.77	2.	308.84	1.77	9.450E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	6.	92.99	1.80	9.228E-03	1037.84	14.130	PBC<MDA	Co56
1048.07	3.	213.44	1.81	9.162E-03	1048.07	80.000	PBC<MDA	Cs136
1050.36	6.	80.99	1.81	9.147E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	6.	101.72	1.82	9.063E-03	1063.66	74.500	PBC<MDA	BI207
1099.25	2.	324.82	1.85	8.846E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	22.	29.88	1.86	8.770E-03	1112.07	13.644	1.044E+01	EU152
1115.55	6.	154.42	1.87	8.750E-03	1115.55	50.600	PBC<MDA	ZN65
1221.41	2.	488.62	1.96	8.175E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	4.	221.56	1.97	8.090E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	3.	114.89	2.00	7.914E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	6.650E-01	EU154
1332.50	10.	31.62	2.05	7.647E-03	1332.50	99.980	7.266E-01	CO60
1408.00	8.	35.36	2.12	7.324E-03	1408.00	21.005	2.889E+00	EU152
1460.57	142.	8.39	2.45	7.112E-03	1460.83	10.670	1.040E+02	K40
1764.49	12.	28.87	2.40	6.075E-03	1764.49	15.400	7.126E+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	
308.05	77.12	76.	48.	1.412E+03	35.90	0.697	-	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_Rev15.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	186.62	46.75	68.	21.	0.012	65.08	1.090s
TH-227	200.18	50.14	165.	-12.	-0.007	154.11	0.855s
AM-241	237.74	59.54	67.	13.	0.007	111.55	0.865s
TH-234	252.74	63.29	195.	-9.	-0.005	226.87	0.868
Sn-126	256.71	64.28	211.	12.	0.007	175.25	0.869s
BA-133	323.50	80.99	80.	30.	0.017	56.11	0.887s
Np-237	345.49	86.49	272.	12.	0.007	198.53	0.892s
EU-155	345.70	86.54	284.	0.	0.000	1000.00	0.892
Sn-126	347.29	86.94	284.	0.	0.000	1000.00	0.892
Sn-126	349.81	87.57	284.	0.	0.000	1000.00	0.893
Cd-109	351.68	88.04	285.	-17.	-0.009	144.90	0.894
TH-234	369.87	92.59	163.	-41.	-0.023	37.30	0.898s
AC-228	372.91	93.35	96.	15.	0.008	96.04	0.899s
Gd-153	389.50	97.50	230.	4.	0.002	538.52	0.903s
Np-239	397.50	99.50	200.	14.	0.008	141.25	0.905s
Gd-153	412.29	103.20	214.	3.	0.001	802.51	0.909
Np-239	414.29	103.70	217.	0.	0.000	1000.00	0.909s
EU-155	420.73	105.31	217.	0.	0.000	1000.00	0.911
Np-239	424.00	106.13	192.	14.	0.008	144.40	0.912s
EU-152	486.56	121.78	115.	-4.	-0.002	382.43	0.928s
CO-57	487.69	122.06	74.	14.	0.008	90.36	0.928s
EU-154	491.84	123.10	114.	-15.	-0.008	102.53	0.929s
PA-234	524.60	131.29	112.	13.	0.007	122.17	0.938s
HF-181	531.51	133.02	218.	13.	0.007	167.41	0.939s
CE-144	533.57	133.54	230.	13.	0.007	171.97	0.940s
HF-181	544.61	136.30	243.	13.	0.007	176.00	0.943s
CO-57	545.30	136.47	220.	12.	0.007	179.82	0.943s
Tc-99m	561.44	140.51	231.	12.	0.007	183.69	0.947s
U-235	574.53	143.79	243.	12.	0.007	187.53	0.950
CE-141	581.15	145.44	213.	10.	0.006	199.68	0.952s
Ba-140	649.99	162.66	63.	11.	0.006	110.03	0.969s
U-235	652.87	163.38	93.	-3.	-0.002	436.95	0.970
CE-139	662.76	165.85	90.	0.	0.000	1000.00	0.973s
Cf-251	705.72	176.60	62.	-2.	-0.001	636.40	0.983s
U-235	742.18	185.72	71.	8.	0.005	183.60	0.992
TH-229	773.32	193.51	62.	2.	0.001	889.61	1.000s
U-235	820.59	205.33	48.	8.	0.005	158.82	1.012s
TH-229	842.65	210.85	62.	2.	0.001	889.61	1.018s
Cf-251	907.22	227.00	33.	11.	0.006	104.27	1.034
TH-227	943.09	235.97	237.	13.	0.007	175.90	1.043s
PB-212	953.73	238.63	36.	89.	0.049	14.29	1.045D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	967.18	242.00	230.	13.	0.007	172.38	1.049s
EU-152	977.96	244.69	230.	12.	0.007	179.14	1.051s
TH-227	1024.13	256.24	40.	3.	0.001	449.74	1.063
Cd-113m	1053.96	263.70	45.	11.	0.006	95.61	1.070s
BI-210M	1062.48	265.83	91.	-15.	-0.008	93.91	1.072s
TL-208	1108.27	277.28	91.	-16.	-0.009	90.35	1.084s
Hg-203	1115.93	279.20	81.	9.	0.005	152.68	1.086s
I-131	1136.32	284.30	40.	-2.	-0.001	513.39	1.091s
PB-214	1177.45	294.59	18.	48.	0.026	24.21	0.634s
TL-210	1183.11	296.00	220.	11.	0.006	195.80	1.102s
PB-212	1199.22	300.03	231.	11.	0.006	199.75	1.106
PA-231	1199.38	300.07	241.	10.	0.005	230.60	1.106s
PA-233	1199.82	300.18	251.	0.	0.000	1000.00	1.107s
PA-231	1209.70	302.65	251.	0.	0.000	1000.00	1.109
BA-133	1210.50	302.85	251.	0.	0.000	1000.00	1.109s
Ba-140	1218.49	304.85	251.	0.	0.000	1000.00	1.111s
BI-210M	1218.68	304.90	251.	0.	0.000	1000.00	1.111
Ir-192	1232.85	308.44	251.	0.	0.000	1000.00	1.115s
PA-233	1247.13	312.01	251.	0.	0.000	1000.00	1.118s
Ir-192	1265.04	316.49	251.	0.	0.000	1000.00	1.123s
CR-51	1279.41	320.08	271.	-12.	-0.007	200.43	1.126s
La-140	1314.10	328.76	51.	12.	0.007	90.18	1.135s
Cf-249	1332.81	333.44	61.	10.	0.006	112.91	1.139s
AC-228	1350.89	337.96	15.	24.	0.013	38.19	1.450s
Cs-136	1361.32	340.57	63.	8.	0.004	144.90	1.146s
EU-152	1376.18	344.29	71.	8.	0.004	152.84	1.150s
HF-181	1382.35	345.83	79.	5.	0.003	237.38	1.151s
PB-214	1405.42	351.60	18.	65.	0.036	17.69	1.430s
BA-133	1423.02	356.00	156.	-13.	-0.007	134.87	1.162s
I-131	1456.95	364.48	28.	5.	0.003	211.97	1.170s
BA-133	1534.35	383.84	93.	-13.	-0.007	108.17	1.189s
Cf-249	1550.79	387.95	85.	3.	0.002	429.42	1.193s
SN-113	1565.74	391.69	113.	-14.	-0.008	112.12	1.196s
SB-125	1710.45	427.88	36.	-13.	-0.007	95.64	1.232s
AG-108M	1734.69	433.94	12.	7.	0.004	98.12	1.238s
PM-146	1814.45	453.88	36.	-12.	-0.007	102.06	1.257s
SB-125	1852.39	463.37	51.	-4.	-0.002	238.71	1.266
BE-7	1909.29	477.60	72.	-6.	-0.004	194.02	1.280s
La-140	1946.98	487.02	21.	8.	0.004	120.42	1.289s
RU-103	1987.11	497.05	4.	17.	0.009	33.45	1.298s
RH-106	2046.35	511.86	20.	81.	0.045	13.58	2.563s
Kr-85	2054.81	513.98	123.	-11.	-0.006	143.25	1.315s
Nd-147	2122.88	531.00	13.	8.	0.004	98.39	1.331s
Ba-140	2147.92	537.26	22.	-6.	-0.003	172.86	1.337s
CS-134	2251.82	563.24	35.	-9.	-0.005	142.77	1.362s
PA-234	2276.75	569.47	18.	9.	0.005	73.04	1.368s
BI-207	2277.68	569.70	22.	4.	0.002	181.05	1.368s
TL-208	2330.96	583.02	13.	33.	0.018	28.29	1.381s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	2400.87	600.50	94.	11.	0.006	129.95	1.397s
SB-124	2409.79	602.73	105.	11.	0.006	136.65	1.399s
CS-134	2417.71	604.71	109.	11.	0.006	139.04	1.401s
BI-214	2436.11	609.31	120.	11.	0.006	145.06	1.405s
RU-103	2440.06	610.30	131.	11.	0.006	151.14	1.406s
PM-144	2471.12	618.06	23.	10.	0.005	77.74	1.414s
SB-125	2542.43	635.89	13.	2.	0.001	264.58	1.430s
I-131	2546.77	636.97	23.	-6.	-0.003	126.03	1.432s
AG-110M	2629.92	657.76	115.	-13.	-0.007	116.95	1.451s
CS-137	2645.20	661.58	10.	63.	0.035	17.94	1.042s
PM-144	2785.05	696.54	33.	-8.	-0.004	162.22	1.487s
NB-94	2809.41	702.63	33.	-10.	-0.005	129.48	1.493s
SB-124	2890.04	722.79	37.	-3.	-0.001	326.92	1.512s
AG-108M	2890.65	722.94	39.	0.	0.000	1000.00	1.512s
EU-154	2892.34	723.36	39.	0.	0.000	1000.00	1.512s
ZR-95	2895.69	724.20	39.	0.	0.000	1000.00	1.513s
BI-212	2907.58	727.17	33.	6.	0.003	142.07	1.516s
PM-146	2941.78	735.72	9.	1.	0.000	979.80	1.524s
PM-146	2987.55	747.16	23.	-4.	-0.002	241.30	1.535s
ZR-95	3025.83	756.73	23.	-6.	-0.004	166.60	1.543s
AG-110M	3054.69	763.94	35.	2.	0.001	424.26	1.550s
NB-95	3062.08	765.79	37.	0.	0.000	1000.00	1.552s
PA-234M	3064.57	766.41	21.	9.	0.005	76.65	1.552s
EU-152	3114.61	778.92	28.	-13.	-0.007	88.62	1.564s
BI-212	3140.62	785.42	37.	-12.	-0.007	108.88	1.570s
CS-134	3182.43	795.87	17.	8.	0.004	83.22	1.579s
TL-210	3197.35	799.60	15.	6.	0.003	109.08	1.583s
CS-134	3206.76	801.95	22.	6.	0.003	127.93	1.585s
CO-58	3242.06	810.78	19.	8.	0.004	86.42	1.593s
La-140	3262.05	815.77	27.	1.	0.001	635.02	1.598s
MN-54	3338.38	834.85	19.	1.	0.001	692.82	1.615s
Co-56	3386.08	846.77	10.	4.	0.002	180.85	1.626s
TL-208	3441.27	860.56	0.	10.	0.006	31.62	1.638s
NB-94	3483.41	871.10	0.	13.	0.007	27.74	1.648s
EU-154	3491.95	873.23	26.	-8.	-0.005	95.55	1.650s
PA-234	3521.16	880.53	38.	-10.	-0.005	94.83	1.657s
PA-234	3532.00	883.24	41.	6.	0.003	151.08	1.659s
AG-110M	3537.78	884.68	35.	0.	0.000	1000.00	1.660s
Sc-46	3556.17	889.28	47.	-11.	-0.006	94.36	1.664
Y-88	3591.22	898.04	30.	-10.	-0.006	124.50	1.672s
AC-228	3642.08	910.75	0.	39.	0.022	16.01	1.062s
AG-110M	3749.09	937.49	35.	-13.	-0.007	103.82	1.708s
PA-234	3783.21	946.02	15.	4.	0.002	218.66	1.716s
EU-152	3855.60	964.11	39.	-12.	-0.007	79.06	1.732s
AC-228	3875.05	968.97	45.	12.	0.007	83.38	1.736s
EU-154	3984.54	996.33	10.	6.	0.003	83.99	1.761s
PA-234M	4003.22	1001.00	16.	6.	0.003	101.37	1.765s
EU-154	4018.33	1004.77	23.	2.	0.001	308.84	1.768s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Co-56	4150.66	1037.84	5.	6.	0.003	92.99	1.798s
Cs-136	4191.60	1048.07	19.	3.	0.002	213.44	1.807s
RH-106	4200.76	1050.36	10.	6.	0.003	80.99	1.809s
BI-207	4253.99	1063.66	5.	6.	0.003	101.72	1.820s
Ga-68	4308.98	1077.40	16.	-4.	-0.002	232.74	1.833s
FE-59	4396.44	1099.25	11.	2.	0.001	324.82	1.852s
EU-152	4447.76	1112.07	11.	22.	0.012	29.88	1.863s
ZN-65	4461.66	1115.55	33.	6.	0.003	154.42	1.866s
BI-214	4480.63	1120.29	39.	0.	0.000	1000.00	1.870s
Sc-46	4481.68	1120.55	39.	0.	0.000	1000.00	1.870s
CO-60	4692.57	1173.24	16.	-2.	-0.001	460.07	1.916s
Ta-182	4755.86	1189.05	16.	-4.	-0.002	232.74	1.930s
Ta-182	4885.39	1221.41	17.	2.	0.001	488.62	1.957s
Co-56	4952.92	1238.28	11.	4.	0.002	221.56	1.972s
NA-22	5098.03	1274.53	6.	3.	0.002	114.89	2.003s
EU-154	5098.08	1274.54	9.	0.	0.000	1000.00	2.003s
FE-59	5166.35	1291.60	23.	-9.	-0.005	133.23	2.017s
TL-210	5252.04	1313.00	17.	-7.	-0.004	143.21	2.036s
CO-60	5330.11	1332.50	0.	10.	0.006	31.62	2.052s
AG-110M	5537.48	1384.30	6.	-2.	-0.001	343.80	2.096s
EU-152	5632.39	1408.00	0.	8.	0.004	35.36	2.115s
K-40	5842.86	1460.57	0.	142.	0.079	8.39	2.449
La-140	6386.02	1596.21	0.	0.	0.000	1000.00	2.269s
SB-124	6765.58	1690.98	6.	-2.	-0.001	275.72	2.345s
BI-214	7060.00	1764.49	0.	12.	0.007	28.87	2.403s
Co-56	7087.48	1771.35	12.	0.	0.000	1000.00	2.408s
Y-88	7346.69	1836.06	7.	-4.	-0.002	186.97	2.459s

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	-2.0541E+00				5.31E+01	
			477.60	-2.054E+00	?(	1.373E+01 1.94E+02 1.05E+01	G
NA-22	C	2.3414E-01				9.50E+02	
			1274.53	2.341E-01	?(	9.696E-01 1.15E+02 9.99E+01	G
K-40	N	1.0396E+02				4.66E+11	
			1460.83	1.040E+02	(	5.395E+00 8.39E+00 1.07E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sc-46	F -5.8295E-01					8.38E+01	
		889.28	-5.829E-01	?(	1.862E+00	9.44E+01	1.00E+02 G
		1120.55	0.000E+00	+	2.027E+00	1.00E+03	1.00E+02 G
CR-51	F -2.9697E+00					2.77E+01	
		320.08	-2.970E+00	?(	2.009E+01	2.00E+02	9.94E+00 G
MN-54	C 6.8550E-02					3.12E+02	
		834.85	6.855E-02	&(	1.174E+00	6.93E+02	1.00E+02 G
FE-59	F 2.5938E-01					4.45E+01	
		1099.25	2.594E-01	?(	1.993E+00	3.25E+02	5.65E+01 G
		1291.60	-1.423E+00	+	4.087E+00	1.33E+02	4.32E+01 G
Co-56	C 4.6406E-01					7.73E+01	
		846.77	2.079E-01	?(	9.066E-01	1.81E+02	9.99E+01 G
		1238.28	3.811E-01	?(	1.912E+00	2.22E+02	6.61E+01 G
		1037.84	2.664E+00	?(	5.740E+00	9.30E+01	1.41E+01 G
		1771.35	0.000E+00	-	1.117E+01	1.00E+03	1.55E+01 A
CO-57	C 4.0447E-01					2.72E+02	
		122.06	2.450E-01	?(	7.443E-01	9.04E+01	8.56E+01 G
		136.47	1.683E+00	?(	1.022E+01	1.80E+02	1.07E+01 G
CO-58	C 3.9641E-01					7.09E+01	
		810.78	3.964E-01	&(	1.165E+00	8.64E+01	9.95E+01 G
CO-60	F 7.2664E-01					1.93E+03	
		1332.50	7.266E-01	?(	5.355E-01	3.16E+01	1.00E+02 G
		1173.24	-1.320E-01	-	1.409E+00	4.60E+02	9.99E+01 G
ZN-65	F 6.9185E-01					2.44E+02	
		1115.55	6.919E-01	?(	3.724E+00	1.54E+02	5.06E+01 G
NB-94	I 1.2660E-01					7.41E+06	
		702.63	-4.481E-01	?(	1.360E+00	1.29E+02	9.79E+01 G
		871.10	6.898E-01	?(	3.911E-01	2.77E+01	9.99E+01 G
ZR-95	I -5.5684E-01					6.40E+01	
		756.73	-5.568E-01	?(	2.217E+00	1.67E+02	5.45E+01 G
		724.20	0.000E+00	+	3.355E+00	1.00E+03	4.42E+01 G
RU-103	I 6.5758E-01					3.93E+01	
		497.05	6.576E-01	&(	4.653E-01	3.34E+01	9.09E+01 G
		610.30	7.786E+00	+	3.992E+01	1.51E+02	5.75E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RH-106	I	3.4457E+00					3.74E+02	
			621.92	1.394E-01	%(	1.309E+01	2.61E+03	9.93E+00 G
			1050.36	2.449E+01	?(	6.744E+01	8.10E+01	1.56E+00 G
			511.86	1.456E+01		4.232E+00	1.36E+01	2.00E+01 GA
AG-108M	C	2.6128E-01					1.53E+05	
			433.94	2.613E-01	?(	6.611E-01	9.81E+01	9.05E+01 G
			722.94	0.000E+00	-	1.629E+00	1.00E+03	9.08E+01 G
			614.28	4.797E-04	%	2.667E+00	1.61E+05	8.98E+01 G
AG-110M	F	1.0154E-01					2.50E+02	
			884.68	0.000E+00	?(	2.233E+00	1.00E+03	7.27E+01 G
			657.76	-6.100E-01	+	2.409E+00	1.17E+02	9.46E+01 G
			937.49	-2.115E+00	+	4.926E+00	1.04E+02	3.44E+01 G
			1384.30	-5.136E-01	+	4.253E+00	3.44E+02	2.43E+01 G
			763.94	4.328E-01	?(	6.552E+00	4.24E+02	2.23E+01 G
SN-113	F	-6.3235E-01					1.15E+02	
			391.69	-6.324E-01	?(	2.392E+00	1.12E+02	6.40E+01 G
SB-124	F	4.4917E-01					6.02E+01	
			602.73	4.492E-01	?(	2.084E+00	1.37E+02	9.83E+01 G
			1690.98	-4.304E-01	+	2.663E+00	2.76E+02	4.78E+01 G
			722.79	-1.143E+00	+	1.325E+01	3.27E+02	1.08E+01 G
SB-125	I	2.0546E-01					1.01E+03	
			427.88	-1.362E+00	&(	3.253E+00	9.56E+01	2.96E+01 G
			600.50	2.461E+00	&(	1.086E+01	1.30E+02	1.79E+01 G
			635.89	7.462E-01	?(	7.280E+00	2.65E+02	1.13E+01 G
			463.37	-1.380E+00	+	1.150E+01	2.39E+02	1.05E+01 G
I-131	I	1.6995E-01					8.02E+00	
			364.48	1.699E-01	?(	9.302E-01	2.12E+02	8.17E+01 G
			284.30	-8.738E-01	+	1.210E+01	5.13E+02	6.14E+00 G
			636.97	-3.339E+00	&	1.467E+01	1.26E+02	7.17E+00 G
Gd-153	F	1.9116E-01					2.42E+02	
			97.50	2.011E-01	&(	3.690E+00	5.39E+02	3.00E+01 G
			103.20	1.774E-01	?(	4.863E+00	8.03E+02	2.18E+01 G
Ga-68	C	-8.8150E+00					4.71E-02	
			1077.40	-8.815E+00	?(	4.705E+01	2.33E+02	3.30E+00 G
Tc-99m	I	2.1005E-01					2.51E-01	
			140.51	2.101E-01	&(	1.303E+00	1.84E+02	8.93E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BA-133	F	-5.8842E-01					3.85E+03	
			356.00	-5.884E-01	&(	2.680E+00	1.35E+02	6.20E+01 G
			302.85	0.000E+00	+	1.007E+01	1.00E+03	1.83E+01 G
			383.84	-4.222E+00	+	1.542E+01	1.08E+02	8.94E+00 GA
			80.99	1.412E+00	&	2.089E+00	5.61E+01	3.41E+01 GA
CS-134	I	5.7541E-01					7.54E+02	
			795.87	4.509E-01	&(	1.273E+00	8.32E+01	8.55E+01 G
			604.71	4.538E-01	?(	2.142E+00	1.39E+02	9.76E+01 G
			569.32	-1.265E-01	%	6.867E+00	1.49E+03	1.54E+01 G
			801.95	3.167E+00	?(	1.415E+01	1.28E+02	8.69E+00 G
			563.24	-4.006E+00	+	1.393E+01	1.43E+02	8.35E+00 G
CS-137	I	3.1947E+00					1.10E+04	
			661.66	3.195E+00	@(	9.018E-01	1.79E+01	8.52E+01 G
Ba-140	I	-1.2720E-01					1.28E+01	
			537.26	-8.659E-01	?(	3.728E+00	1.73E+02	2.44E+01 G
			162.66	2.769E+00	?(	1.035E+01	1.10E+02	6.22E+00 G
			304.85	0.000E+00	+	4.323E+01	1.00E+03	4.29E+00 G
La-140	I	3.4355E-01					1.28E+01	
			1596.21	0.000E+00	?(	6.487E-01	1.00E+03	9.54E+01 G
			487.02	5.961E-01	?(	1.838E+00	1.20E+02	4.55E+01 G
			328.76	1.495E+00	&(	4.549E+00	9.02E+01	2.03E+01 G
			815.77	2.532E-01	&(	5.830E+00	6.35E+02	2.33E+01 G
CE-141	I	3.3619E-01					3.25E+01	
			145.44	3.362E-01	&(	2.273E+00	2.00E+02	4.82E+01 G
CE-144	I	1.7266E+00					2.85E+02	
			133.54	1.727E+00	?(	1.002E+01	1.72E+02	1.11E+01 G
PM-144	C	2.6938E-02					3.63E+02	
			696.54	-3.492E-01	?(	1.337E+00	1.62E+02	9.90E+01 G
			618.06	4.027E-01	?(	1.052E+00	7.77E+01	9.91E+01 G
EU-152	F	2.3945E+00					4.94E+03	
			121.78	-2.087E-01	?(	2.749E+00	3.82E+02	2.86E+01 G
			344.29	8.018E-01	&(	4.200E+00	1.53E+02	2.65E+01 G
			1112.07	1.044E+01	?(	8.542E+00	2.99E+01	1.36E+01 G
			778.92	-5.033E+00	+	1.034E+01	8.86E+01	1.29E+01 G
			964.11	-4.687E+00	+	1.243E+01	7.91E+01	1.46E+01 G
			244.69	3.296E+00	?(	1.994E+01	1.79E+02	7.58E+00 G
			1408.00	2.889E+00	?	2.662E+00	3.54E+01	2.10E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	3.7758E-01					3.14E+03	
			123.10	-5.574E-01	?(	1.922E+00	1.03E+02	4.08E+01 G
			1274.54	0.000E+00	+	3.329E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	7.320E+00	1.00E+03	2.02E+01 G
			873.23	-3.512E+00	+	1.146E+01	9.55E+01	1.23E+01 G
			1004.77	7.305E-01	?(	8.142E+00	3.09E+02	1.80E+01 G
			996.33	3.376E+00	?(	9.684E+00	8.40E+01	1.06E+01 G
HF-181	F	3.9217E-01					4.24E+01	
			482.00	4.979E-02	%(	1.786E+00	1.02E+03	8.05E+01 G
			133.02	4.416E-01	?(	2.496E+00	1.67E+02	4.33E+01 G
			345.83	9.508E-01	?(	7.793E+00	2.37E+02	1.51E+01 G
			136.30	3.299E+00	?(	1.959E+01	1.76E+02	5.85E+00 G
Ta-182	F	2.7107E-01					1.14E+02	
			1121.30	9.132E-02	%(	5.844E+00	1.78E+03	3.49E+01 G
			1221.41	5.034E-01	?(	5.518E+00	4.89E+02	2.70E+01 G
			1189.05	-1.644E+00	+	8.777E+00	2.33E+02	1.62E+01 G
Hg-203	F	2.3751E-01					4.66E+01	
			279.20	2.375E-01	&(	1.240E+00	1.53E+02	8.15E+01 G
TL-208	N	1.5462E+00					6.98E+02	
			583.02	1.546E+00	(	9.142E-01	2.83E+01	8.45E+01 G
			277.28	-5.554E+00	-	1.684E+01	9.04E+01	6.31E+00 G
			860.56	4.230E+00	&	3.118E+00	3.16E+01	1.24E+01 G
PM-146	C	-6.0611E-01					2.02E+03	
			453.88	-6.061E-01	?(	1.549E+00	1.02E+02	6.50E+01 G
			747.16	-6.047E-01	+	3.519E+00	2.41E+02	3.40E+01 G
			735.72	1.390E-01	+	3.534E+00	9.80E+02	2.25E+01 G
Y-88	F	-3.5005E-01					1.07E+02	
			1836.06	-3.501E-01	?(	1.407E+00	1.87E+02	9.92E+01 G
			898.04	-5.783E-01	+	1.633E+00	1.24E+02	9.37E+01 G
Cd-113m		3.8140E+03					5.33E+03	
			263.70	3.814E+03	?(	1.236E+04	9.56E+01	6.00E-03 K
Cd-109	F	-6.8436E+00					4.53E+02	
			88.04	-6.844E+00	?(	3.332E+01	1.45E+02	3.79E+00 G
Cf-251	T	-2.3089E-01					3.28E+05	
			176.60	-2.309E-01	?(	3.909E+00	6.36E+02	1.70E+01 G
			227.00	3.348E+00		9.158E+00	1.04E+02	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	4.3311E-01					1.28E+05	
			387.95	1.353E-01	?(	2.016E+00	4.29E+02	6.60E+01 G
			333.44	1.701E+00	?(	6.531E+00	1.13E+02	1.55E+01 G
Sn-126		2.2583E+00					3.65E+07	
			87.57	0.000E+00	&	3.367E+00	1.00E+03	3.75E+01 GA
			64.28	2.258E+00	?(	1.338E+01	1.75E+02	9.70E+00 G
			86.94	0.000E+00	-	1.400E+01	1.00E+03	9.04E+00 GA
PB-210	N	1.5536E+01					8.14E+03	
			46.54	1.554E+01	(P	2.970E+01	6.51E+01	4.25E+00 G
PB-212	N	4.1641E+00					6.98E+02	
			238.63	4.164E+00	(P	1.428E+00	1.43E+01	4.33E+01 G
			300.03	7.937E+00	+	5.361E+01	2.00E+02	3.28E+00 GA
PB-214	N	5.0625E+00					5.84E+05	
			351.93	4.664E+00	*(P	1.621E+00	1.77E+01	3.76E+01 G
			295.09	5.839E+00	*(	2.776E+00	2.42E+01	1.93E+01 G
			242.00	3.475E+00	-	2.022E+01	1.72E+02	7.43E+00 GA
BI-207	C	4.6625E-01					1.18E+04	
			1063.66	4.663E-01	?(	1.108E+00	1.02E+02	7.45E+01 G
			569.70	1.527E-01	-	9.816E-01	1.81E+02	9.77E+01 G
BI-212	N	3.6971E+00					6.98E+02	
			727.17	3.697E+00	?(	1.825E+01	1.42E+02	7.55E+00 G
			785.42	-4.739E+01	+	1.198E+02	1.09E+02	1.28E+00 GA
U-235	N	2.1077E+00					2.57E+11	
			143.79	1.677E+00	?(	1.062E+01	1.88E+02	1.10E+01 G
			205.33	3.050E+00	?(	1.277E+01	1.59E+02	5.01E+00 G
			163.38	-1.005E+00	+	1.521E+01	4.37E+02	5.08E+00 G
			185.72	2.643E-01	- P	1.341E+00	1.84E+02	5.40E+01 GA
BI-214	N	2.5113E+00					5.84E+05	
			609.31	9.695E-01	(	4.773E+00	1.45E+02	4.61E+01 G
			1120.29	0.000E+00	-	1.342E+01	1.00E+03	1.51E+01 G
			1764.49	7.126E+00	?(	4.376E+00	2.89E+01	1.54E+01 G
BI-210M	T	-6.5227E-01					1.10E+09	
			265.83	-6.523E-01	?(	2.059E+00	9.39E+01	5.00E+01 G
			304.90	0.000E+00	&	6.624E+00	1.00E+03	2.80E+01 G
AC-228	N	7.3633E+00					2.10E+03	
			911.07	7.363E+00	(	1.391E+00	1.60E+01	2.90E+01 G
			968.97	3.960E+00	-	1.110E+01	8.34E+01	1.75E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			338.32	5.241E+00	-	4.533E+00	3.82E+01	1.20E+01 G
			93.35	4.105E+00	-	1.326E+01	9.60E+01	5.56E+00 XA
TH-227	N	1.6015E+00					7.95E+03	
			256.24	8.115E-01	?(	9.831E+00	4.50E+02	7.00E+00 G
			235.97	2.051E+00	?(	1.218E+01	1.76E+02	1.23E+01 G
			50.14	-3.799E+00	+	1.981E+01	1.54E+02	8.00E+00 G
TH-229	N	8.1949E-01					2.68E+06	
			193.51	6.701E-01	&(	1.588E+01	8.90E+02	4.40E+00 G
			210.85	1.039E+00	?(	2.463E+01	8.90E+02	2.99E+00 G
TH-234	N	-1.1229E+01					1.63E+12	
			92.59	-1.123E+01	(P	1.702E+01	3.73E+01	5.58E+00 G
			63.29	-4.235E+00	+ P	3.322E+01	2.27E+02	3.81E+00 G
PA-231	N	4.3140E+00					1.20E+07	
			302.65	0.000E+00	?(	6.404E+01	1.00E+03	2.88E+00 G
			300.07	9.365E+00	&(	7.310E+01	2.31E+02	2.46E+00 G
PA-234	N	2.2476E+00					1.63E+12	
			131.29	1.057E+00	&(	4.369E+00	1.22E+02	1.80E+01 G
			946.02	1.680E+00	?(	8.716E+00	2.19E+02	1.34E+01 G
			569.47	4.350E+00	?(	1.062E+01	7.30E+01	8.20E+00 G
			883.24	3.477E+00	&(	1.820E+01	1.51E+02	9.60E+00 G
			880.53	-8.666E+00	+	2.790E+01	9.48E+01	6.00E+00 GA
PA-234M	N	7.1764E+01					1.63E+12	
			1001.00	4.300E+01	?(	1.507E+02	1.01E+02	8.37E-01 G
			766.41	1.537E+02	?(	3.955E+02	7.66E+01	2.94E-01 G
AM-241	T	7.3794E-01					1.58E+05	
			59.54	7.379E-01	(	2.239E+00	1.12E+02	3.59E+01 G
Np-237	F	1.4154E+00					2.14E+06	
			86.49	1.415E+00	&(	9.482E+00	1.99E+02	1.31E+01 G
Cs-136	F	1.8019E-01					1.30E+01	
			818.50	1.689E-02	%(	1.402E+00	2.28E+03	1.00E+02 G
			1048.07	2.274E-01	?(	1.745E+00	2.13E+02	8.00E+01 G
			340.57	4.479E-01	?(	2.226E+00	1.45E+02	4.69E+01 G
Np-239	T	9.0683E-01					2.36E+00	
			103.70	0.000E+00	-	4.442E+00	1.00E+03	2.40E+01 X
			106.13	9.068E-01	?(	4.417E+00	1.44E+02	2.27E+01 G
			99.50	1.444E+00	&	6.875E+00	1.41E+02	1.50E+01 X

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Nd-147       2.2775E+00                                        1.11E+01
                           531.00 2.277E+00 ?(  5.545E+00 9.84E+01 1.30E+01 G
                            91.10-2.415E-02 %   4.287E+00 5.20E+03 2.83E+01 G

TL-210   N   2.9837E-01                                        5.84E+05
                           799.60 2.771E-01 ?(  1.053E+00 1.09E+02 9.90E+01 G
                           296.00 3.250E-01 ?(  2.153E+00 1.96E+02 7.90E+01 G
                          1313.00-2.394E+00 +   7.498E+00 1.43E+02 2.10E+01 GA

Kr-85    I  -9.3866E+01                                        3.92E+03
                           513.98-9.387E+01 ?(  4.561E+02 1.43E+02 4.30E-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	165.	-12.	-0.007	154.11	-3.799E+00	
AM-241	59.54	67.	13.	0.007	111.55	7.379E-01	
TH-234	63.29	195.	-9.	-0.005	226.87	-4.235E+00	P
Sn-126	64.28	211.	12.	0.007	175.25	2.258E+00	
BA-133	80.99	80.	30.	0.017	56.11	1.412E+00	
Np-237	86.49	272.	12.	0.007	198.53	1.415E+00	
Cd-109	88.04	285.	-17.	-0.009	144.90	-6.844E+00	
TH-234	92.59	163.	-41.	-0.023	37.30	-1.123E+01	P
Gd-153	97.50	230.	4.	0.002	538.52	2.011E-01	
Np-239	99.50	200.	14.	0.008	141.25	1.444E+00	
Gd-153	103.20	214.	3.	0.001	802.51	1.774E-01	
Np-239	106.13	192.	14.	0.008	144.40	9.068E-01	
EU-152	121.78	115.	-4.	-0.002	382.43	-2.087E-01	
CO-57	122.06	74.	14.	0.008	90.36	2.450E-01	
EU-154	123.10	114.	-15.	-0.008	102.53	-5.574E-01	
HF-181	133.02	218.	13.	0.007	167.41	4.416E-01	
CE-144	133.54	230.	13.	0.007	171.97	1.727E+00	
HF-181	136.30	243.	13.	0.007	176.00	3.299E+00	
CO-57	136.47	220.	12.	0.007	179.82	1.683E+00	
Tc-99m	140.51	231.	12.	0.007	183.69	2.101E-01	
U-235	143.79	243.	12.	0.007	187.53	1.677E+00	
CE-141	145.44	213.	10.	0.006	199.68	3.362E-01	
Ba-140	162.66	63.	11.	0.006	110.03	2.769E+00	
U-235	163.38	93.	-3.	-0.002	436.95	-1.005E+00	
Cf-251	176.60	62.	-2.	-0.001	636.40	-2.309E-01	
U-235	185.72	71.	8.	0.005	183.60	2.643E-01	P
TH-229	193.51	62.	2.	0.001	889.61	6.701E-01	
U-235	205.33	48.	8.	0.005	158.82	3.050E+00	
TH-229	210.85	62.	2.	0.001	889.61	1.039E+00	
Cf-251	227.00	33.	11.	0.006	104.27	3.348E+00	
TH-227	235.97	237.	13.	0.007	175.90	2.051E+00	
EU-152	244.69	230.	12.	0.007	179.14	3.296E+00	
TH-227	256.24	40.	3.	0.001	449.74	8.115E-01	
Cd-113m	263.70	45.	11.	0.006	95.61	3.814E+03	
BI-210M	265.83	91.	-15.	-0.008	93.91	-6.523E-01	
Hg-203	279.20	81.	9.	0.005	152.68	2.375E-01	
I-131	284.30	40.	-2.	-0.001	513.39	-8.738E-01	
TL-210	296.00	220.	11.	0.006	195.80	3.250E-01	
PA-231	300.07	241.	10.	0.005	230.60	9.365E+00	
CR-51	320.08	271.	-12.	-0.007	200.43	-2.970E+00	
La-140	328.76	51.	12.	0.007	90.18	1.495E+00	
Cf-249	333.44	61.	10.	0.006	112.91	1.701E+00	
Cs-136	340.57	63.	8.	0.004	144.90	4.479E-01	
EU-152	344.29	71.	8.	0.004	152.84	8.018E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	345.83	79.	5.	0.003	237.38	9.508E-01	
BA-133	356.00	156.	-13.	-0.007	134.87	-5.884E-01	
I-131	364.48	28.	5.	0.003	211.97	1.699E-01	
BA-133	383.84	93.	-13.	-0.007	108.17	-4.222E+00	
Cf-249	387.95	85.	3.	0.002	429.42	1.353E-01	
SN-113	391.69	113.	-14.	-0.008	112.12	-6.324E-01	
SB-125	427.88	36.	-13.	-0.007	95.64	-1.362E+00	
AG-108M	433.94	12.	7.	0.004	98.12	2.613E-01	
PM-146	453.88	36.	-12.	-0.007	102.06	-6.061E-01	
SB-125	463.37	51.	-4.	-0.002	238.71	-1.380E+00	
BE-7	477.60	72.	-6.	-0.004	194.02	-2.054E+00	
La-140	487.02	21.	8.	0.004	120.42	5.961E-01	
RH-106	511.86	20.	81.	0.045	13.58	1.456E+01	
Kr-85	513.98	123.	-11.	-0.006	143.25	-9.387E+01	
Nd-147	531.00	13.	8.	0.004	98.39	2.277E+00	
Ba-140	537.26	22.	-6.	-0.003	172.86	-8.659E-01	
CS-134	563.24	35.	-9.	-0.005	142.77	-4.006E+00	
BI-207	569.70	22.	4.	0.002	181.05	1.527E-01	
SB-125	600.50	94.	11.	0.006	129.95	2.461E+00	
SB-124	602.73	105.	11.	0.006	136.65	4.492E-01	
CS-134	604.71	109.	11.	0.006	139.04	4.538E-01	
BI-214	609.31	120.	11.	0.006	145.06	9.695E-01	
PM-144	618.06	23.	10.	0.005	77.74	4.027E-01	
SB-125	635.89	13.	2.	0.001	264.58	7.462E-01	
I-131	636.97	23.	-6.	-0.003	126.03	-3.339E+00	
AG-110M	657.76	115.	-13.	-0.007	116.95	-6.100E-01	
PM-144	696.54	33.	-8.	-0.004	162.22	-3.492E-01	
NB-94	702.63	33.	-10.	-0.005	129.48	-4.481E-01	
SB-124	722.79	37.	-3.	-0.001	326.92	-1.143E+00	
BI-212	727.17	33.	6.	0.003	142.07	3.697E+00	
PM-146	735.72	9.	1.	0.000	979.80	1.390E-01	
PM-146	747.16	23.	-4.	-0.002	241.30	-6.047E-01	
ZR-95	756.73	23.	-6.	-0.004	166.60	-5.568E-01	
AG-110M	763.94	35.	2.	0.001	424.26	4.328E-01	
PA-234M	766.41	21.	9.	0.005	76.65	1.537E+02	
EU-152	778.92	28.	-13.	-0.007	88.62	-5.033E+00	
BI-212	785.42	37.	-12.	-0.007	108.88	-4.739E+01	
CS-134	795.87	17.	8.	0.004	83.22	4.509E-01	
TL-210	799.60	15.	6.	0.003	109.08	2.771E-01	
CS-134	801.95	22.	6.	0.003	127.93	3.167E+00	
CO-58	810.78	19.	8.	0.004	86.42	3.964E-01	
La-140	815.77	27.	1.	0.001	635.02	2.532E-01	
MN-54	834.85	19.	1.	0.001	692.82	6.855E-02	
Co-56	846.77	10.	4.	0.002	180.85	2.079E-01	
NB-94	871.10	0.	13.	0.007	27.74	6.898E-01	
EU-154	873.23	26.	-8.	-0.005	95.55	-3.512E+00	
Sc-46	889.28	47.	-11.	-0.006	94.36	-5.829E-01	
Y-88	898.04	30.	-10.	-0.006	124.50	-5.783E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-110M	937.49	35.	-13.	-0.007	103.82	-2.115E+00	
EU-152	964.11	39.	-12.	-0.007	79.06	-4.687E+00	
EU-154	996.33	10.	6.	0.003	83.99	3.376E+00	
PA-234M	1001.00	16.	6.	0.003	101.37	4.300E+01	
EU-154	1004.77	23.	2.	0.001	308.84	7.305E-01	
Co-56	1037.84	5.	6.	0.003	92.99	2.664E+00	
Cs-136	1048.07	19.	3.	0.002	213.44	2.274E-01	
RH-106	1050.36	10.	6.	0.003	80.99	2.449E+01	
BI-207	1063.66	5.	6.	0.003	101.72	4.663E-01	
Ga-68	1077.40	16.	-4.	-0.002	232.74	-8.815E+00	
FE-59	1099.25	11.	2.	0.001	324.82	2.594E-01	
EU-152	1112.07	11.	22.	0.012	29.88	1.044E+01	
Ta-182	1189.05	16.	-4.	-0.002	232.74	-1.644E+00	
Ta-182	1221.41	17.	2.	0.001	488.62	5.034E-01	
Co-56	1238.28	11.	4.	0.002	221.56	3.811E-01	
NA-22	1274.53	6.	3.	0.002	114.89	2.341E-01	
FE-59	1291.60	23.	-9.	-0.005	133.23	-1.423E+00	
TL-210	1313.00	17.	-7.	-0.004	143.21	-2.394E+00	
AG-110M	1384.30	6.	-2.	-0.001	343.80	-5.136E-01	
EU-152	1408.00	0.	8.	0.004	35.36	2.889E+00	
SB-124	1690.98	6.	-2.	-0.001	275.72	-4.304E-01	
BI-214	1764.49	0.	12.	0.007	28.87	7.126E+00	
Y-88	1836.06	7.	-4.	-0.002	186.97	-3.501E-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	-2.0541E+00	-2.0541E+00	1.940E+02%	1.37E+01
NA-22	#A	2.3414E-01	2.3414E-01	1.149E+02%	9.70E-01
K-40		1.0396E+02	1.0396E+02	8.392E+00%	5.40E+00
Sc-46	#A	-5.8294E-01	-5.8295E-01	9.436E+01%	1.86E+00
CR-51	#A	-2.9696E+00	-2.9697E+00	2.004E+02%	2.01E+01
MN-54	#A	6.8550E-02	6.8550E-02	6.928E+02%	1.17E+00
FE-59	#A	2.5938E-01	2.5938E-01	3.248E+02%	1.99E+00
Co-56	#A	4.6406E-01	4.6406E-01	9.299E+01%	9.07E-01
CO-57	#A	4.0447E-01	4.0447E-01	9.036E+01%	7.44E-01
CO-58	#A	3.9640E-01	3.9641E-01	8.642E+01%	1.16E+00
CO-60	#	7.2664E-01	7.2664E-01	3.162E+01%	5.36E-01
ZN-65	#A	6.9185E-01	6.9185E-01	1.544E+02%	3.72E+00
NB-94	#A	1.2660E-01	1.2660E-01	2.774E+01%	1.36E+00
ZR-95	#A	-5.5684E-01	-5.5684E-01	1.666E+02%	2.22E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.50E+00
RU-103	#	6.5757E-01	6.5758E-01	3.345E+01%	4.65E-01
RH-106	#A	3.4457E+00	3.4457E+00	8.099E+01%	1.31E+01

AG-108M#A	2.6128E-01	2.6128E-01	9.812E+01%	6.61E-01
AG-110M#A	1.0154E-01	1.0154E-01	4.243E+02%	2.23E+00
SN-113 #A	-6.3235E-01	-6.3235E-01	1.121E+02%	2.39E+00
SB-124 #A	4.4916E-01	4.4917E-01	1.366E+02%	2.08E+00
SB-125 #A	2.0546E-01	2.0546E-01	9.564E+01%	3.25E+00
I-131 #A	1.6993E-01	1.6995E-01	2.120E+02%	9.30E-01
Gd-153 #A	1.9116E-01	1.9116E-01	4.832E+02%	3.69E+00
Ga-68 #A	-8.7105E+00	-8.8150E+00	2.327E+02%	4.71E+01
Tc-99m #A	2.0958E-01	2.1005E-01	1.837E+02%	1.30E+00
BA-133 #A	-5.8842E-01	-5.8842E-01	1.349E+02%	2.68E+00
CS-134 #A	5.7540E-01	5.7541E-01	6.882E+01%	1.27E+00
CS-137 #	3.1947E+00	3.1947E+00	1.794E+01%	9.02E-01
CE-139 #A	0.0000E+00	0.0000E+00	1.000E+03%	9.58E-01
Ba-140 #A	-1.2719E-01	-1.2720E-01	1.025E+02%	3.73E+00
La-140 #A	3.4353E-01	3.4355E-01	9.018E+01%	6.49E-01
CE-141 #A	3.3619E-01	3.3619E-01	1.997E+02%	2.27E+00
CE-144 #A	1.7266E+00	1.7266E+00	1.720E+02%	1.00E+01
PM-144 #A	2.6938E-02	2.6938E-02	7.774E+01%	1.34E+00
EU-152 #A	2.3945E+00	2.3945E+00	2.988E+01%	2.75E+00
EU-154 #A	3.7758E-01	3.7758E-01	8.399E+01%	1.92E+00
EU-155 #A	0.0000E+00	0.0000E+00	7.071E+02%	5.02E+00
HF-181 #A	3.9217E-01	3.9217E-01	1.674E+02%	1.79E+00
Ta-182 #A	2.7106E-01	2.7107E-01	4.886E+02%	5.84E+00
Hg-203 #A	2.3751E-01	2.3751E-01	1.527E+02%	1.24E+00
TL-208 #	1.5462E+00	1.5462E+00	2.829E+01%	9.14E-01
PM-146 #A	-6.0611E-01	-6.0611E-01	1.021E+02%	1.55E+00
Y-88 #A	-3.5005E-01	-3.5005E-01	1.870E+02%	1.41E+00
Cd-113m#A	3.8140E+03	3.8140E+03	9.561E+01%	1.24E+04
Cd-109 #A	-6.8436E+00	-6.8436E+00	1.449E+02%	3.33E+01
Cf-251 #A	-2.3089E-01	-2.3089E-01	6.364E+02%	3.91E+00
Cf-249 #A	4.3311E-01	4.3311E-01	1.129E+02%	2.02E+00
Sn-126 #A	2.2583E+00	2.2583E+00	1.753E+02%	1.34E+01
PB-210 #A	1.5536E+01	1.5536E+01	6.508E+01%	2.97E+01
PB-212	4.1641E+00	4.1641E+00	1.429E+01%	1.43E+00
PB-214 #	5.0625E+00	5.0625E+00	1.499E+01%	1.62E+00
BI-207 #A	4.6625E-01	4.6625E-01	1.017E+02%	1.11E+00
BI-212 #A	3.6971E+00	3.6971E+00	1.421E+02%	1.82E+01
U-235 #A	2.1077E+00	2.1077E+00	1.229E+02%	1.06E+01
BI-214 #A	2.5113E+00	2.5113E+00	2.887E+01%	4.77E+00
BI-210M#A	-6.5227E-01	-6.5227E-01	9.391E+01%	2.06E+00
AC-228	7.3633E+00	7.3633E+00	1.601E+01%	1.39E+00
TH-227 #A	1.6015E+00	1.6015E+00	1.759E+02%	9.83E+00
TH-229 #A	8.1949E-01	8.1949E-01	6.290E+02%	1.59E+01
TH-234 #A	-1.1229E+01	-1.1229E+01	3.730E+01%	1.70E+01
PA-231 #A	4.3140E+00	4.3140E+00	2.306E+02%	6.40E+01
PA-233 #A	0.0000E+00	0.0000E+00	7.071E+02%	5.24E+00
PA-234 #A	2.2476E+00	2.2476E+00	7.304E+01%	4.37E+00
PA-234M#A	7.1764E+01	7.1764E+01	6.354E+01%	1.51E+02
AM-241 #A	7.3794E-01	7.3794E-01	1.115E+02%	2.24E+00

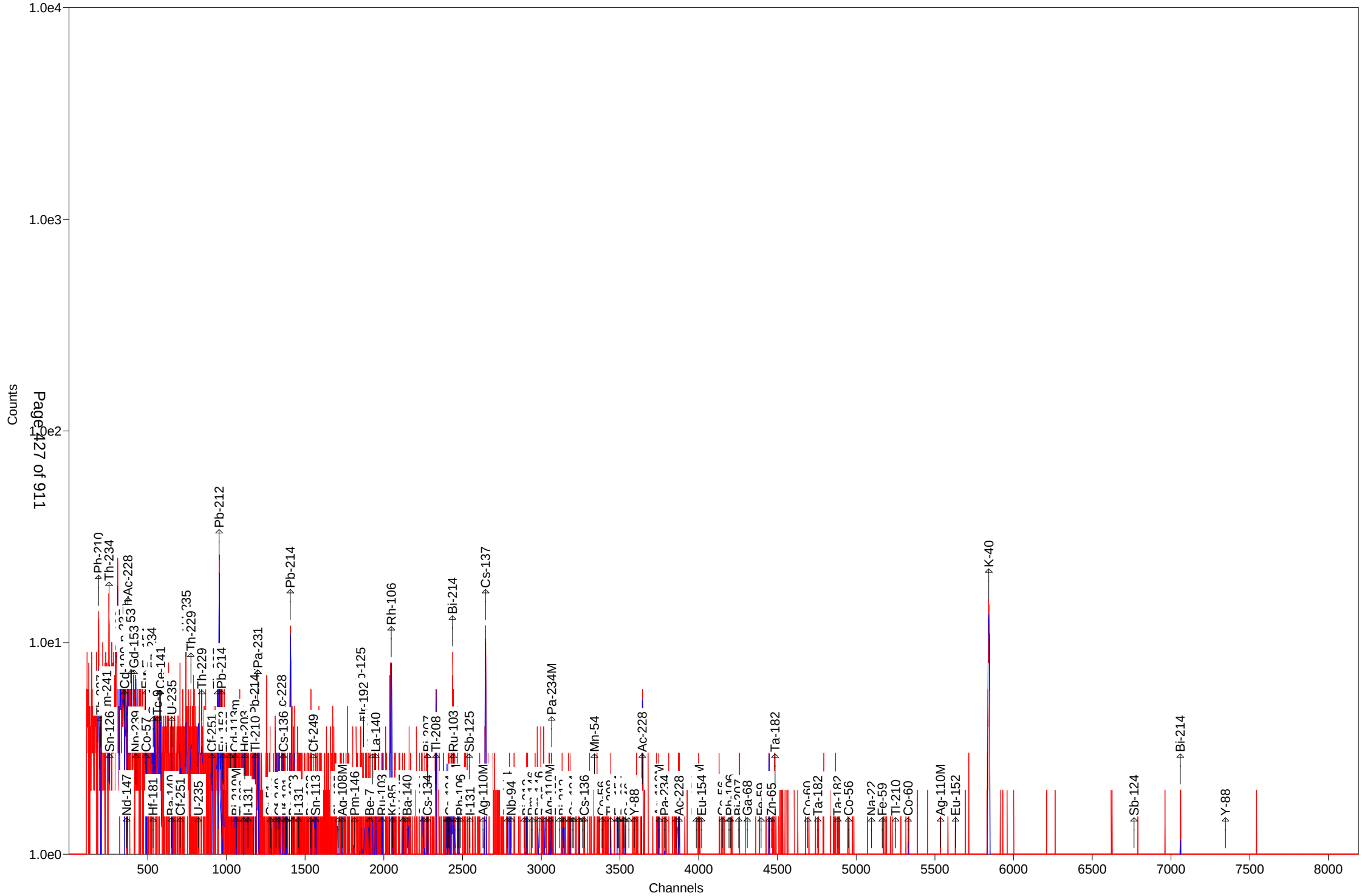
Np-237	#A	1.4154E+00	1.4154E+00	1.985E+02%	9.48E+00
Ir-192	#A	0.0000E+00	0.0000E+00	7.071E+02%	2.19E+00
Cs-136	#A	1.8018E-01	1.8019E-01	1.449E+02%	1.40E+00
Np-239	#A	9.0662E-01	9.0683E-01	1.444E+02%	4.42E+00
Nd-147	#A	2.2774E+00	2.2775E+00	9.839E+01%	5.54E+00
TL-210	#A	2.9837E-01	2.9837E-01	1.091E+02%	1.05E+00
Kr-85	#A	-9.3866E+01	-9.3866E+01	1.433E+02%	4.56E+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 (25.1 to 1999.1 keV) 1.393E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 1.3927634E+02 Bq/Sample

412881_Gamma_180-86110-B-5-A. 12_Gamma_20190306.spc.



Test America St. Louis Spectrum ID: 8_Gamma_20190269

Sample Description: 412881_Gamma_180-86110-A-7-A
Detector: Detector # 8
Batch ID: 412881
Work Order Number: Gamma
Lot Number: 180-86110-A-7-A

Decay to Time: 2/20/2019 09:35 Live Time: 1800 sec
Acquisition Time: 2/20/2019 09:36:06 Real Time: 1842 sec
Analysis Time: 2/20/2019 10:07 Dead Time: 2.30 %
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_Rev15.lib
Bkgd Correction File: 8_2019-01-20_1045.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	3.460E+00	105.9	3.666E+00	3.670E+00	1.245E+01
NA-22	5.340E-02	505.0	2.697E-01	2.697E-01	1.079E+00
K-40	1.035E+02	9.3	9.622E+00	1.098E+01	9.546E+00
Sc-46	1.137E-01	116.3	1.323E-01	1.324E-01	2.432E+00
CR-51	-3.856E+00	60.5	2.331E+00	2.340E+00	2.419E+01
MN-54	5.210E-01	103.5	5.393E-01	5.399E-01	1.275E+00
FE-59	4.369E-01	153.8	6.721E-01	6.724E-01	2.177E+00
Co-56	-4.486E-01	94.2	4.227E-01	4.233E-01	1.550E+00
CO-57	-3.686E-01	87.3	3.217E-01	3.223E-01	1.072E+00
CO-58	-7.245E-01	86.6	6.272E-01	6.283E-01	2.108E+00
CO-60	5.860E-01	55.5	3.254E-01	3.267E-01	9.970E-01
ZN-65	0.000E+00	1.#INF	1.995E-01	1.995E-01	4.693E+00
NB-94	3.601E-01	96.2	3.464E-01	3.469E-01	8.362E-01
ZR-95	2.221E-01	285.3	6.337E-01	6.338E-01	1.622E+00
NB-95	0.000E+00	1.#INF	5.202E-02	5.202E-02	1.655E+00
RU-103	-5.365E-02	782.5	4.198E-01	4.198E-01	1.134E+00
RH-106	-5.357E+00	86.9	4.656E+00	4.665E+00	1.568E+01
AG-108M	-4.913E-01	106.6	5.237E-01	5.243E-01	1.254E+00
AG-110M	2.064E+00	21.0	4.345E-01	4.471E-01	3.191E+00
SN-113	-5.847E-01	28.0	1.638E-01	1.665E-01	2.496E+00
SB-124	3.696E-01	225.7	8.341E-01	8.344E-01	2.834E+00
SB-125	2.616E+00	23.8	6.236E-01	6.377E-01	3.802E+00
I-131	9.421E-02	229.7	2.164E-01	2.165E-01	1.114E+00
Gd-153	-1.215E+00	162.8	1.978E+00	1.979E+00	6.593E+00
Ga-68	1.979E+01	93.8	1.857E+01	1.860E+01	4.317E+01
Tc-99m	0.000E+00	1.#INF	1.841E-01	1.841E-01	1.862E+00
BA-133	-6.707E-01	146.1	9.796E-01	9.802E-01	3.298E+00
CS-134	9.164E-01	49.6	4.541E-01	4.565E-01	1.398E+00
CS-137	-6.643E-01	100.8	6.696E-01	6.705E-01	2.235E+00
CE-139	3.497E-01	101.6	3.553E-01	3.568E-01	1.191E+00
Ba-140	3.214E+00	43.0	1.384E+00	1.393E+00	2.730E+00
La-140	-6.719E-01	92.9	6.244E-01	6.254E-01	2.238E+00
CE-141	-7.638E-01	146.5	1.119E+00	1.120E+00	3.735E+00

CE-144	-2.137E+00	195.5	4.177E+00	4.179E+00	1.400E+01
PM-144	1.888E-01	121.4	2.292E-01	2.294E-01	1.130E+00
EU-152	1.315E+00	91.0	1.196E+00	1.198E+00	2.788E+00
EU-154	3.753E-01	62.5	2.345E-01	2.353E-01	2.171E+00
EU-155	1.680E+00	159.2	2.674E+00	2.676E+00	8.916E+00
HF-181	6.805E-01	113.0	7.689E-01	7.697E-01	1.777E+00
Ta-182	4.895E-01	238.8	1.169E+00	1.169E+00	6.811E+00
Hg-203	5.151E-02	760.1	3.915E-01	3.915E-01	1.360E+00
TL-208	4.820E+00	11.9	5.721E-01	6.243E-01	8.934E-01
PM-146	8.649E-02	679.0	5.872E-01	5.872E-01	1.472E+00
Y-88	1.597E-01	95.3	1.522E-01	1.524E-01	8.180E-01
Cd-113m	-3.283E+03	152.8	5.015E+03	5.019E+03	1.711E+04
Cd-109	-9.889E+00	174.7	1.728E+01	1.728E+01	5.757E+01
Cf-251	-4.723E-01	395.0	1.865E+00	1.866E+00	4.872E+00
Cf-249	6.869E-01	103.4	7.101E-01	7.110E-01	1.411E+00
Sn-126	-4.637E+00	117.5	5.448E+00	5.454E+00	1.819E+01
PB-210	-9.126E+00	169.0	1.543E+01	1.543E+01	5.195E+01
PB-212	1.547E+01	6.3	9.769E-01	1.398E+00	1.702E+00
PB-214	1.136E+01	7.9	8.960E-01	1.073E+00	1.623E+00
BI-207	-9.575E-03	167.5	1.604E-02	1.605E-02	1.639E+00
BI-212	8.412E+00	95.1	8.001E+00	8.013E+00	2.698E+01
U-235	-4.309E+00	129.4	5.578E+00	5.583E+00	1.575E+01
BI-214	8.726E+00	12.6	1.100E+00	1.190E+00	1.835E+00
BI-210M	-4.123E-02	2237.8	9.227E-01	9.227E-01	2.232E+00
AC-228	1.611E+01	8.9	1.436E+00	1.655E+00	1.527E+00
TH-227	5.451E-01	71.8	3.916E-01	3.930E-01	1.389E+01
TH-229	-1.428E+00	187.0	2.670E+00	2.672E+00	1.781E+01
TH-234	1.732E+01	31.3	5.427E+00	5.512E+00	1.778E+01
PA-231	0.000E+00	1.#INF	5.743E+00	5.744E+00	7.830E+01
PA-233	0.000E+00	1.#INF	3.104E-01	3.104E-01	6.417E+00
PA-234	-2.030E-01	97.1	1.972E-01	1.975E-01	8.219E+00
PA-234M	-2.495E+01	183.8	4.584E+01	4.586E+01	2.450E+02
AM-241	-1.089E+00	120.5	1.312E+00	1.314E+00	5.421E+00
Np-237	2.194E+00	212.1	4.653E+00	4.655E+00	1.554E+01
Ir-192	0.000E+00	1.#INF	5.806E-02	5.806E-02	2.684E+00
Cs-136	6.118E-01	108.4	6.629E-01	6.638E-01	2.352E+00
Np-239	-1.268E+00	198.8	2.521E+00	2.522E+00	8.416E+00
Nd-147	-1.081E+00	264.3	2.858E+00	2.859E+00	7.195E+00
TL-210	1.037E-01	406.6	4.216E-01	4.216E-01	1.514E+00
Kr-85	-8.192E+01	172.4	1.412E+02	1.413E+02	4.805E+02
Total	2.301E+02				

Analyst: kody Saulters

Sample description
412881_Gamma_180-86110-A-7-A

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20190269.An1

Acquisition information
Start time: 2/20/2019 9:36:06 AM
Live time: 1800
Real time: 1842
Dead time: 2.30 %
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_Rev15.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	2/20/2019 9:35:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2019-01-20_1045.PBC 1/20/2019 10:45:13 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1149

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
50.14	20.	104.28	1.01	2.267E-02	50.14	8.000	PBC<MDA	TH227
63.49	70.	31.33	1.49	3.093E-02	63.29	3.810	3.300E+01	TH234
74.78	110.	16.62	1.03	3.616E-02				
77.16	215.	9.84	1.04	3.701E-02				
86.49	20.	212.09	1.04	3.959E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	9.359E-01	EU155
					86.94	9.040	3.172E+00	Sn126
90.03	46.	28.46	0.88	4.030E-02				
92.57	27.	81.02	1.05	4.072E-02	92.59	5.584	PBC<MDA	TH234
105.31	27.	159.18	1.06	4.185E-02	105.31	21.200	PBC<MDA	EU155
121.78	19.	91.96	1.07	4.148E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.028E-01	CO57
162.66	20.	97.88	1.10	3.593E-02	162.66	6.220	PBC<MDA	Ba140
163.38	5.	448.51	1.10	3.580E-02	163.38	5.080	PBC<MDA	U235
165.85	18.	101.58	1.10	3.629E-02	165.85	79.900	PBC<MDA	CE139
185.96	94.	15.01	1.24	3.326E-02	185.72	54.000	PBC<MDA	U235
210.85	3.	655.18	1.14	3.020E-02	210.85	2.990	PBC<MDA	TH229
235.97	16.	213.21	1.16	2.768E-02	235.97	12.300	PBC<MDA	TH227
238.67	294.	8.14	0.92	2.744E-02	238.63	43.300	1.373E+01	PB212
242.08	51.	27.22	1.16	2.714E-02	242.00	7.430	1.406E+01	PB214
277.85	28.	36.34	2.69	2.440E-02	277.28	6.310	1.028E+01	TL208
279.20	2.	760.06	1.19	2.427E-02	279.20	81.460	PBC<MDA	Hg203

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
284.30	6.	229.73	1.19	2.393E-02	284.30	6.140	PBC<MDA	I131
295.23	100.	12.08	1.20	2.324E-02	295.09	19.300	1.234E+01	PB214
300.17	35.	26.12	1.20	2.294E-02	300.03	3.280	2.554E+01	PB212
					300.07	2.460	3.405E+01	PA231
					300.18	6.200	PBC<MDA	PA233
328.76	11.	174.09	1.23	2.133E-02	328.76	20.300	PBC<MDA	La140
333.44	11.	178.62	1.23	2.110E-02	333.44	15.510	PBC<MDA	Cf249
338.44	74.	15.83	0.91	2.085E-02	338.32	12.010	1.636E+01	AC228
340.57	11.	182.75	1.23	2.074E-02	340.57	46.900	PBC<MDA	Cs136
344.29	11.	187.10	1.24	2.057E-02	344.29	26.500	PBC<MDA	EU152
345.83	11.	189.69	1.24	2.049E-02	345.83	15.070	PBC<MDA	HF181
352.02	148.	10.15	1.01	2.020E-02	351.93	37.600	1.086E+01	PB214
387.95	9.	104.11	1.27	1.869E-02	387.95	66.000	PBC<MDA	Cf249
453.88	2.	678.97	1.32	1.647E-02	453.88	65.000	PBC<MDA	PM146
463.37	44.	23.84	1.32	1.620E-02	463.37	10.470	1.442E+01	SB125
477.60	10.	105.95	1.33	1.580E-02	477.60	10.520	PBC<MDA	BE7
482.00	10.	122.83	1.34	1.569E-02	482.00	80.500	PBC<MDA	HF181
510.76	95.	10.26	0.32	1.494E-02	511.86	20.000	1.767E+01	RH106
537.26	17.	43.04	1.37	1.436E-02	537.26	24.390	2.749E+00	Ba140
563.24	14.	49.55	1.39	1.381E-02	563.24	8.350	PBC<MDA	CS134
569.32	5.	122.47	1.40	1.369E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.640E+00	PA234
					569.70	97.740	2.216E-01	BI207
569.70	4.	173.37	1.40	1.368E-02	569.32	15.380	1.012E+00	CS134
					569.47	8.200	1.898E+00	PA234
					569.70	97.740	1.593E-01	BI207
582.87	101.	11.87	1.56	1.342E-02	583.02	84.500	4.942E+00	TL208
600.50	8.	240.55	1.42	1.310E-02	600.50	17.860	PBC<MDA	SB125
602.73	9.	225.66	1.42	1.306E-02	602.73	98.260	PBC<MDA	SB124
604.71	9.	230.57	1.42	1.303E-02	604.71	97.620	PBC<MDA	CS134
609.35	94.	12.61	1.25	1.294E-02	609.31	46.090	8.726E+00	BI214
610.30	9.	234.99	1.42	1.293E-02	610.30	5.750	PBC<MDA	RU103
618.06	7.	121.38	1.43	1.279E-02	618.06	99.100	PBC<MDA	PM144
635.89	9.	67.90	1.44	1.250E-02	635.89	11.310	PBC<MDA	SB125
696.54	1.	648.54	1.48	1.158E-02	696.54	99.000	PBC<MDA	PM144
702.63	7.	96.21	1.48	1.150E-02	702.63	97.900	PBC<MDA	NB94
726.77	13.	95.11	1.50	1.118E-02	727.17	7.550	PBC<MDA	BI212
756.73	2.	285.34	1.52	1.081E-02	756.73	54.460	PBC<MDA	ZR95
763.94	32.	21.05	1.52	1.072E-02	763.94	22.280	7.479E+00	AG110M
778.92	4.	204.63	1.53	1.055E-02	778.92	12.940	PBC<MDA	EU152
785.01	5.	232.52	1.54	1.048E-02	785.42	1.280	PBC<MDA	BI212
795.87	8.	86.28	1.54	1.036E-02	795.87	85.530	PBC<MDA	CS134
799.60	2.	406.59	1.55	1.032E-02	799.60	98.960	PBC<MDA	TL210
801.95	8.	103.38	1.55	1.030E-02	801.95	8.690	PBC<MDA	CS134
818.50	11.	116.46	1.56	1.012E-02	818.50	100.000	PBC<MDA	Cs136
834.85	9.	103.51	1.57	9.955E-03	834.85	99.980	PBC<MDA	MN54
860.42	9.	123.02	1.59	9.703E-03	860.56	12.420	PBC<MDA	TL208
884.68	11.	104.90	1.60	9.480E-03	884.68	72.680	PBC<MDA	AG110M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
898.04	5.	95.31	1.61	9.360E-03	898.04	93.700	PBC<MDA	Y88
911.30	70.	11.95	0.75	9.247E-03	911.07	29.000	1.450E+01	AC228
946.02	4.	132.68	1.64	8.957E-03	946.02	13.400	PBC<MDA	PA234
969.00	51.	17.92	1.65	8.776E-03	968.97	17.460	1.861E+01	AC228
1001.00	-3.	183.78	1.67	8.537E-03	1001.00	0.837	PBC<MDA	PA234M
1004.77	8.	92.50	1.67	8.509E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	2.	404.55	1.69	8.278E-03	1037.84	14.130	PBC<MDA	Co56
1050.00	2.	424.26	1.70	8.193E-03	1050.36	1.560	PBC<MDA	RH106
1077.40	8.	93.82	1.72	8.017E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	2.	354.73	1.73	7.881E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	4.	217.11	1.74	7.803E-03	1112.07	13.644	PBC<MDA	EU152
1119.51	6.	133.84	1.74	7.754E-03	1120.29	15.100	PBC<MDA	BI214
1120.55	8.	116.34	1.74	7.752E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.564E+00	Ta182
1189.05	3.	238.82	1.78	7.367E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	4.	242.90	1.81	7.114E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	1.	504.98	1.83	6.939E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.517E-01	EU154
1291.60	4.	153.85	1.84	6.860E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	7.	55.53	1.86	6.678E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	2.	324.35	1.88	6.460E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	1.	796.87	1.90	6.366E-03	1408.00	21.005	PBC<MDA	EU152
1460.69	123.	9.29	1.66	6.165E-03	1460.83	10.670	1.035E+02	K40
1764.39	8.	85.69	2.07	5.226E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	7.	96.46	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
298.91	74.79	111.	110.	3.035E+03	16.62	1.034	- sD
308.46	77.17	117.	215.	5.816E+03	9.84	1.036	- D
359.83	90.03	63.	64.	1.598E+03	21.38	1.046	- sD
743.66	185.96	30.	94.	2.826E+03	15.01	1.240	- 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_Rev15.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	273.	-14.	-0.008	169.03	1.012s
TH-227	200.36	50.14	200.	20.	0.011	104.28	1.015s
AM-241	237.95	59.54	444.	-20.	-0.011	120.53	1.022s
TH-234	253.76	63.49	119.	70.	0.039	31.33	1.491s
Sn-126	256.93	64.28	435.	-25.	-0.014	117.50	1.026s
BA-133	323.77	80.99	831.	-30.	-0.017	137.08	1.039
Np-237	345.77	86.49	934.	20.	0.011	212.09	1.043s
EU-155	345.98	86.54	954.	0.	0.000	1000.00	1.043s
Sn-126	347.57	86.94	1147.	-27.	-0.015	179.02	1.044s
Sn-126	350.09	87.57	1120.	-27.	-0.015	176.87	1.044s
Cd-109	351.97	88.04	1093.	-27.	-0.015	174.69	1.044s
Nd-147	364.21	91.10	1066.	-27.	-0.015	172.17	1.047s
TH-234	370.17	92.59	226.	27.	0.015	81.02	1.048D
AC-228	373.21	93.35	988.	-27.	-0.015	165.51	1.049s
Gd-153	389.81	97.50	961.	-27.	-0.015	162.76	1.052s
Np-239	397.81	99.50	936.	-24.	-0.013	185.17	1.053s
Gd-153	412.62	103.20	960.	0.	0.000	1000.00	1.056s
Np-239	414.62	103.70	960.	0.	0.000	1000.00	1.057s
EU-155	421.07	105.31	898.	27.	0.015	159.18	1.058s
Np-239	424.34	106.13	919.	-22.	-0.012	198.76	1.058s
EU-152	486.94	121.78	148.	19.	0.011	91.96	1.071
CO-57	488.06	122.06	199.	-24.	-0.013	87.27	1.071
EU-154	492.22	123.10	184.	-24.	-0.013	84.03	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.	-17.	-0.010	195.45	1.080s
HF-181	545.02	136.30	575.	0.	0.000	1000.00	1.082s
CO-57	545.72	136.47	575.	0.	0.000	1000.00	1.082s
Tc-99m	561.86	140.51	575.	0.	0.000	1000.00	1.085s
U-235	574.97	143.79	646.	-33.	-0.018	129.45	1.087s
CE-141	581.59	145.44	695.	-26.	-0.014	146.52	1.089s
Ba-140	650.47	162.66	187.	20.	0.011	97.88	1.102s
U-235	653.35	163.38	210.	5.	0.003	448.51	1.102s
CE-139	663.24	165.85	163.	18.	0.010	101.58	1.104s
Cf-251	706.23	176.60	110.	-5.	-0.003	394.97	1.112s
U-235	742.71	185.72	206.	-46.	-0.026	43.31	1.119s
TH-229	773.87	193.51	84.	-9.	-0.005	186.96	1.125s
U-235	821.17	205.33	81.	-4.	-0.002	527.07	1.134
TH-229	843.24	210.85	100.	3.	0.002	655.18	1.138s
Cf-251	907.84	227.00	100.	-19.	-0.011	105.57	1.151
TH-227	943.73	235.97	544.	16.	0.009	213.21	1.157s
PB-212	954.37	238.63	52.	331.	0.184	6.32	1.159D
PB-214	967.84	242.00	71.	51.	0.028	27.22	1.162D
EU-152	978.62	244.69	690.	-22.	-0.012	171.82	1.164s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-227	1024.81	256.24	84.	-19.	-0.010	98.82	1.172s
Cd-113m	1054.65	263.70	90.	-9.	-0.005	152.75	1.178s
TL-208	1111.26	277.85	22.	28.	0.016	36.34	2.692s
Hg-203	1116.66	279.20	96.	2.	0.001	760.06	1.189s
I-131	1137.05	284.30	48.	6.	0.003	229.73	1.193s
PB-214	1180.22	295.09	22.	100.	0.055	12.08	1.201D
PB-212	1199.98	300.03	23.	35.	0.019	26.12	1.205D
PA-231	1200.14	300.07	371.	0.	0.000	1000.00	1.205s
PA-233	1200.58	300.18	371.	0.	0.000	1000.00	1.205s
PA-231	1210.46	302.65	371.	0.	0.000	1000.00	1.207s
BA-133	1211.27	302.85	371.	0.	0.000	1000.00	1.207s
Ba-140	1219.26	304.85	371.	0.	0.000	1000.00	1.208s
BI-210M	1219.45	304.90	371.	0.	0.000	1000.00	1.208s
Ir-192	1233.62	308.44	371.	0.	0.000	1000.00	1.211s
PA-233	1247.91	312.01	371.	0.	0.000	1000.00	1.214s
Ir-192	1265.82	316.49	371.	0.	0.000	1000.00	1.217s
CR-51	1280.20	320.08	387.	-15.	-0.008	60.45	1.219s
La-140	1314.91	328.76	187.	11.	0.006	174.09	1.226s
Cf-249	1333.63	333.44	198.	11.	0.006	178.62	1.229s
AC-228	1353.64	338.44	16.	74.	0.041	15.83	0.911s
Cs-136	1362.15	340.57	210.	11.	0.006	182.75	1.234s
EU-152	1377.01	344.29	221.	11.	0.006	187.10	1.237s
HF-181	1383.19	345.83	228.	11.	0.006	189.69	1.238s
PB-214	1407.96	352.02	18.	148.	0.083	10.15	1.012
BA-133	1423.87	356.00	232.	-15.	-0.008	146.06	1.245s
I-131	1457.81	364.48	40.	-2.	-0.001	623.16	1.252s
BA-133	1535.24	383.84	115.	-15.	-0.008	107.25	1.266s
Cf-249	1551.68	387.95	38.	9.	0.005	104.11	1.269s
SN-113	1566.64	391.69	118.	-12.	-0.007	28.02	1.271s
SB-125	1711.39	427.88	48.	-13.	-0.007	107.97	1.297s
AG-108M	1735.64	433.94	48.	-14.	-0.008	106.61	1.301s
PM-146	1815.41	453.88	30.	2.	0.001	678.97	1.315s
SB-125	1853.36	463.37	33.	44.	0.024	23.84	1.322s
Ir-192	1872.14	468.06	98.	-12.	-0.007	118.08	1.325s
BE-7	1910.28	477.60	55.	10.	0.006	105.95	1.332s
HF-181	1927.89	482.00	65.	10.	0.005	122.83	1.335s
La-140	1947.98	487.02	84.	-10.	-0.006	133.42	1.339s
RU-103	1988.12	497.05	30.	-1.	-0.001	782.52	1.346s
RH-106	2042.96	510.76	0.	95.	0.053	10.26	0.317s
Kr-85	2055.83	513.98	128.	-9.	-0.005	172.41	1.357s
Nd-147	2123.91	531.00	22.	-4.	-0.002	264.34	1.369s
Ba-140	2148.95	537.26	10.	17.	0.010	43.04	1.373s
CS-134	2252.86	563.24	9.	14.	0.008	49.55	1.391s
CS-134	2277.20	569.32	19.	5.	0.003	122.47	1.395s
PA-234	2277.80	569.47	28.	-4.	-0.002	201.23	1.395s
BI-207	2278.73	569.70	20.	4.	0.002	173.37	1.396s
TL-208	2331.38	582.87	11.	101.	0.056	11.87	1.562
SB-125	2401.92	600.50	175.	8.	0.004	240.55	1.416s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-124	2410.85	602.73	181.	9.	0.005	225.66	1.418s
CS-134	2418.76	604.71	190.	9.	0.005	230.57	1.419s
BI-214	2437.34	609.35	13.	94.	0.052	12.61	1.253
RU-103	2441.12	610.30	198.	9.	0.005	234.99	1.423s
PM-144	2472.18	618.06	33.	7.	0.004	121.38	1.428s
RH-106	2487.60	621.92	50.	-12.	-0.007	86.92	1.431s
SB-125	2543.49	635.89	13.	9.	0.005	67.90	1.440s
I-131	2547.83	636.97	35.	-5.	-0.003	190.31	1.441s
AG-110M	2630.98	657.76	52.	-13.	-0.007	81.31	1.455
CS-137	2646.58	661.66	69.	-12.	-0.007	100.80	1.457s
PM-144	2786.11	696.54	20.	1.	0.001	648.54	1.480s
NB-94	2810.46	702.63	9.	7.	0.004	96.21	1.484s
SB-124	2891.09	722.79	60.	-8.	-0.004	146.99	1.497s
AG-108M	2891.70	722.94	52.	0.	0.000	1000.00	1.498s
EU-154	2893.39	723.36	52.	0.	0.000	1000.00	1.498s
ZR-95	2896.74	724.20	67.	-14.	-0.008	88.10	1.498s
BI-212	2908.63	727.17	67.	13.	0.007	95.11	1.500s
PM-146	2942.83	735.72	19.	-4.	-0.002	225.19	1.506s
ZR-95	3026.87	756.73	10.	2.	0.001	285.34	1.519s
AG-110M	3055.73	763.94	7.	32.	0.018	21.05	1.524
NB-95	3063.11	765.79	39.	0.	0.000	1000.00	1.525s
PA-234M	3065.60	766.41	51.	-9.	-0.005	114.94	1.526s
EU-152	3115.64	778.92	14.	4.	0.002	204.63	1.534s
BI-212	3141.64	785.42	23.	5.	0.003	232.52	1.538s
CS-134	3183.44	795.87	18.	8.	0.004	86.28	1.544s
TL-210	3198.36	799.60	29.	2.	0.001	406.59	1.547s
CS-134	3207.77	801.95	27.	8.	0.004	103.38	1.548s
CO-58	3243.06	810.78	59.	-13.	-0.007	86.57	1.554
La-140	3263.04	815.77	72.	-12.	-0.007	106.23	1.557s
Cs-136	3273.97	818.50	74.	11.	0.006	116.46	1.559s
MN-54	3339.36	834.85	19.	9.	0.005	103.51	1.569
Co-56	3387.05	846.77	28.	-11.	-0.006	94.24	1.577s
TL-208	3442.23	860.56	23.	9.	0.005	123.02	1.585s
NB-94	3484.36	871.10	18.	-6.	-0.003	118.53	1.592s
EU-154	3492.89	873.23	24.	0.	0.000	1000.00	1.593s
PA-234	3522.10	880.53	64.	-14.	-0.008	87.47	1.598s
PA-234	3532.94	883.24	78.	-14.	-0.008	95.40	1.599s
AG-110M	3538.71	884.68	63.	11.	0.006	104.90	1.600s
Sc-46	3557.10	889.28	69.	-5.	-0.003	221.05	1.603s
Y-88	3592.14	898.04	5.	5.	0.003	95.31	1.608s
AC-228	3645.19	911.30	0.	70.	0.039	11.95	0.750s
AG-110M	3749.96	937.49	20.	-5.	-0.003	201.66	1.633s
PA-234	3784.07	946.02	5.	4.	0.002	132.68	1.638s
EU-152	3856.43	964.11	38.	0.	0.000	1000.00	1.649s
AC-228	3875.88	968.97	17.	51.	0.029	17.92	1.652
EU-154	3985.31	996.33	32.	-4.	-0.002	232.99	1.668s
PA-234M	4003.99	1001.00	38.	-3.	-0.002	183.78	1.671s
EU-154	4019.10	1004.77	25.	8.	0.005	92.50	1.673s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Co-56	4151.36	1037.84	10.	2.	0.001	404.55	1.693s
Cs-136	4192.29	1048.07	15.	0.	0.000	1000.00	1.698s
RH-106	4201.45	1050.36	20.	2.	0.001	424.26	1.700s
BI-207	4254.65	1063.66	11.	-3.	-0.001	286.77	1.708s
Ga-68	4309.61	1077.40	10.	8.	0.004	93.82	1.716s
FE-59	4397.02	1099.25	10.	2.	0.001	354.73	1.728s
EU-152	4448.32	1112.07	39.	4.	0.002	217.11	1.736s
ZN-65	4462.20	1115.55	43.	0.	0.000	1000.00	1.738s
BI-214	4481.17	1120.29	29.	6.	0.003	133.84	1.740s
Sc-46	4482.22	1120.55	35.	8.	0.004	116.34	1.740s
Ta-182	4756.23	1189.05	10.	3.	0.002	238.82	1.779s
Ta-182	4885.67	1221.41	27.	-9.	-0.005	62.47	1.797s
Co-56	4953.16	1238.28	22.	4.	0.002	242.90	1.806s
NA-22	5098.16	1274.53	5.	1.	0.000	504.98	1.826s
EU-154	5098.20	1274.54	6.	0.	0.000	1000.00	1.826s
FE-59	5166.43	1291.60	5.	4.	0.002	153.85	1.835s
TL-210	5252.05	1313.00	16.	-8.	-0.004	119.02	1.847s
CO-60	5330.06	1332.50	4.	7.	0.004	55.53	1.857s
AG-110M	5537.25	1384.30	5.	2.	0.001	324.35	1.884s
EU-152	5632.07	1408.00	5.	1.	0.000	796.87	1.896s
K-40	5842.85	1460.69	3.	123.	0.068	9.29	1.658
La-140	6384.93	1596.21	17.	-11.	-0.006	92.93	1.990s
SB-124	6764.03	1690.98	0.	0.	0.000	1000.00	2.034s
BI-214	7058.07	1764.49	21.	8.	0.005	85.69	2.067s
Co-56	7085.51	1771.35	20.	7.	0.004	96.46	2.070s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	3.4602E+00				5.31E+01	
			477.60	3.460E+00	(	1.245E+01 1.06E+02 1.05E+01	G
NA-22	C	5.3404E-02				9.50E+02	
			1274.53	5.340E-02	?(	1.079E+00 5.05E+02 9.99E+01	G
K-40	N	1.0354E+02				4.66E+11	
			1460.83	1.035E+02	(P	9.546E+00 9.29E+00 1.07E+01	G
Sc-46	F	1.1371E-01				8.38E+01	
			889.28	-3.180E-01	?(	2.432E+00 2.21E+02 1.00E+02	G
			1120.55	5.454E-01	?(	2.181E+00 1.16E+02 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	-3.8564E+00					2.77E+01	
			320.08	-3.856E+00	?(P	2.419E+01	6.05E+01	9.94E+00 G
MN-54	C	5.2099E-01					3.12E+02	
			834.85	5.210E-01	&(	1.275E+00	1.04E+02	1.00E+02 G
FE-59	F	4.3686E-01					4.45E+01	
			1099.25	2.495E-01	?(	2.177E+00	3.55E+02	5.65E+01 G
			1291.60	6.819E-01	?(P	2.531E+00	1.54E+02	4.32E+01 G
Co-56	C	-4.4856E-01					7.73E+01	
			846.77	-6.301E-01	?(P	1.550E+00	9.42E+01	9.99E+01 G
			1238.28	5.223E-01	+ P	2.879E+00	2.43E+02	6.61E+01 G
			1037.84	8.356E-01	?(P	8.370E+00	4.05E+02	1.41E+01 G
			1771.35	4.960E+00	?	1.641E+01	9.65E+01	1.55E+01 A
CO-57	C	-3.6860E-01					2.72E+02	
			122.06	-3.686E-01	(	1.072E+00	8.73E+01	8.56E+01 G
			136.47	0.000E+00	+	1.488E+01	1.00E+03	1.07E+01 G
CO-58	C	-7.2449E-01					7.09E+01	
			810.78	-7.245E-01	?(	2.108E+00	8.66E+01	9.95E+01 G
CO-60	F	5.8596E-01					1.93E+03	
			1332.50	5.860E-01	?(P	9.970E-01	5.55E+01	1.00E+02 G
			1173.24	3.233E-02	% P	1.159E+00	1.26E+03	9.99E+01 G
NB-94	I	3.6007E-01					7.41E+06	
			702.63	3.601E-01	?(	8.362E-01	9.62E+01	9.79E+01 G
			871.10	-3.185E-01	-	1.318E+00	1.19E+02	9.99E+01 G
ZR-95	I	2.2209E-01					6.40E+01	
			756.73	2.221E-01	?(P	1.622E+00	2.85E+02	5.45E+01 G
			724.20	-1.547E+00	+	4.579E+00	8.81E+01	4.42E+01 G
RU-103	I	-5.3650E-02					3.93E+01	
			497.05	-5.365E-02	?(P	1.134E+00	7.83E+02	9.09E+01 G
			610.30	6.405E+00	?	5.109E+01	2.35E+02	5.75E+00 GA
RH-106	I	-5.3568E+00					3.74E+02	
			621.92	-5.357E+00	?(	1.568E+01	8.69E+01	9.93E+00 G
			1050.36	6.520E+00	+	1.012E+02	4.24E+02	1.56E+00 G
			511.86	1.767E+01		1.371E+00	1.03E+01	2.00E+01 GA
AG-108M	C	-4.9128E-01					1.53E+05	
			433.94	-4.913E-01	?(	1.254E+00	1.07E+02	9.05E+01 G
			722.94	0.000E+00	+	1.977E+00	1.00E+03	9.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			614.28	4.726E-02	%	3.355E+00	2.07E+03	8.98E+01 G
AG-110M	F	2.0643E+00					2.50E+02	
			884.68	8.972E-01	?(	3.191E+00	1.05E+02	7.27E+01 G
			657.76	-6.465E-01	-	1.762E+00	8.13E+01	9.46E+01 G
			937.49	-8.957E-01	+	4.219E+00	2.02E+02	3.44E+01 G
			1384.30	5.901E-01	?(	4.769E+00	3.24E+02	2.43E+01 G
			763.94	7.479E+00	?(	3.462E+00	2.10E+01	2.23E+01 G
SN-113	F	-5.8465E-01					1.15E+02	
			391.69	-5.847E-01	?(P	2.496E+00	2.80E+01	6.40E+01 G
SB-124	F	3.6964E-01					6.02E+01	
			602.73	3.696E-01	?(	2.834E+00	2.26E+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	+	1.771E+01	1.47E+02	1.08E+01 G
SB-125	I	2.6161E+00					1.01E+03	
			427.88	-1.412E+00	?(	3.802E+00	1.08E+02	2.96E+01 G
			600.50	1.868E+00	&(P	1.528E+01	2.41E+02	1.79E+01 G
			635.89	3.409E+00	?(	7.671E+00	6.79E+01	1.13E+01 G
			463.37	1.442E+01	&(P	9.654E+00	2.38E+01	1.05E+01 G
I-131	I	9.4214E-02					8.02E+00	
			364.48	-6.921E-02	&(	1.114E+00	6.23E+02	8.17E+01 G
			284.30	2.269E+00	&(	1.323E+01	2.30E+02	6.14E+00 G
			636.97	-2.798E+00	&	1.868E+01	1.90E+02	7.17E+00 G
Gd-153	F	-1.2152E+00					2.42E+02	
			97.50	-1.215E+00	?(	6.593E+00	1.63E+02	3.00E+01 G
			103.20	0.000E+00	+	8.977E+00	1.00E+03	2.18E+01 G
Ga-68	C	1.9794E+01					4.71E-02	
			1077.40	1.979E+01	&(	4.317E+01	9.38E+01	3.30E+00 G
BA-133	F	-6.7070E-01					3.85E+03	
			356.00	-6.707E-01	?(	3.298E+00	1.46E+02	6.20E+01 G
			302.85	0.000E+00	+	1.231E+01	1.00E+03	1.83E+01 G
			383.84	-4.810E+00	+	1.738E+01	1.07E+02	8.94E+00 GA
			80.99	-1.281E+00	+	5.851E+00	1.37E+02	3.41E+01 GA
CS-134	I	9.1637E-01					7.54E+02	
			795.87	4.760E-01	?(	1.398E+00	8.63E+01	8.55E+01 G
			604.71	3.734E-01	?(	2.924E+00	2.31E+02	9.76E+01 G
			569.32	1.407E+00	?(	6.028E+00	1.22E+02	1.54E+01 G
			801.95	4.727E+00	&(	1.676E+01	1.03E+02	8.69E+00 G
			563.24	6.905E+00	?(	7.915E+00	4.96E+01	8.35E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-137	I	-6.6430E-01					1.10E+04	
			661.66	-6.643E-01	?(P	2.235E+00	1.01E+02	8.52E+01 G
CE-139	F	3.4975E-01					1.38E+02	
			165.85	3.497E-01	?(P	1.191E+00	1.02E+02	7.99E+01 G
Ba-140	I	3.2142E+00					1.28E+01	
			537.26	2.749E+00	?(P	2.730E+00	4.30E+01	2.44E+01 G
			162.66	5.039E+00	?(	1.650E+01	9.79E+01	6.22E+00 G
			304.85	0.000E+00	-	5.287E+01	1.00E+03	4.29E+00 G
La-140	I	-6.7192E-01					1.28E+01	
			1596.21	-1.123E+00	?(	2.238E+00	9.29E+01	9.54E+01 G
			487.02	-7.850E-01	+	3.566E+00	1.33E+02	4.55E+01 G
			328.76	1.446E+00	&(	8.522E+00	1.74E+02	2.03E+01 G
			815.77	-2.767E+00	&	9.949E+00	1.06E+02	2.33E+01 G
CE-141	I	-7.6383E-01					3.25E+01	
			145.44	-7.638E-01	?(	3.735E+00	1.47E+02	4.82E+01 G
CE-144	I	-2.1373E+00					2.85E+02	
			133.54	-2.137E+00	?(	1.400E+01	1.95E+02	1.11E+01 G
PM-144	C	1.8883E-01					3.63E+02	
			696.54	6.981E-02	&(P	1.130E+00	6.49E+02	9.90E+01 G
			618.06	3.077E-01	?(	1.289E+00	1.21E+02	9.91E+01 G
EU-152	F	1.3148E+00					4.94E+03	
			121.78	9.064E-01	(	2.788E+00	9.20E+01	2.86E+01 G
			344.29	1.160E+00	?(	7.337E+00	1.87E+02	2.65E+01 G
			1112.07	2.174E+00	?(	1.657E+01	2.17E+02	1.36E+01 G
			778.92	1.628E+00	?(	8.197E+00	2.05E+02	1.29E+01 G
			964.11	0.000E+00	-	1.351E+01	1.00E+03	1.46E+01 G
			244.69	-5.934E+00	+	3.407E+01	1.72E+02	7.58E+00 G
			1408.00	2.770E-01	-	5.597E+00	7.97E+02	2.10E+01 GA
EU-154	I	3.7531E-01					3.14E+03	
			123.10	-7.755E-01	&(	2.171E+00	8.40E+01	4.08E+01 G
			1274.54	0.000E+00	+	3.213E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	8.888E+00	1.00E+03	2.02E+01 G
			873.23	0.000E+00	&	1.206E+01	1.00E+03	1.23E+01 G
			1004.77	2.982E+00	?(	9.401E+00	9.25E+01	1.80E+01 G
			996.33	-2.140E+00	+	1.765E+01	2.33E+02	1.06E+01 G
EU-155	I	1.6800E+00					1.81E+03	
			105.31	1.680E+00	?(P	8.916E+00	1.59E+02	2.12E+01 G
			86.54	0.000E+00	&	6.700E+00	1.00E+03	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	6.8051E-01					4.24E+01	
			482.00	4.244E-01	*(	1.777E+00	1.23E+02	8.05E+01 G
			133.02	-7.247E-01	+	3.507E+00	1.45E+02	4.33E+01 G
			345.83	2.049E+00	&(	1.314E+01	1.90E+02	1.51E+01 G
			136.30	0.000E+00	&	2.716E+01	1.00E+03	5.85E+00 G
Ta-182	F	4.8948E-01					1.14E+02	
			1121.30	6.848E-02	%(	6.811E+00	2.78E+03	3.49E+01 G
			1221.41	-2.527E+00	+ P	7.675E+00	6.25E+01	2.70E+01 G
			1189.05	1.396E+00	?(	8.121E+00	2.39E+02	1.62E+01 G
Hg-203	F	5.1511E-02					4.66E+01	
			279.20	5.151E-02	?(	1.360E+00	7.60E+02	8.15E+01 G
TL-208	N	4.8203E+00					6.98E+02	
			583.02	4.942E+00	(P	8.934E-01	1.19E+01	8.45E+01 G
			277.28	1.028E+01	+	8.952E+00	3.63E+01	6.31E+00 G
			860.56	3.995E+00	?(	1.163E+01	1.23E+02	1.24E+01 G
PM-146	C	8.6487E-02					2.02E+03	
			453.88	8.649E-02	?(	1.472E+00	6.79E+02	6.50E+01 G
			747.16	1.065E-02	% P	3.437E+00	1.29E+04	3.40E+01 G
			735.72	-9.324E-01	+ P	5.157E+00	2.25E+02	2.25E+01 G
Y-88	F	1.5965E-01					1.07E+02	
			1836.06	-1.476E-02	%(P	8.180E-01	5.41E+03	9.92E+01 G
			898.04	3.443E-01	?(P	8.199E-01	9.53E+01	9.37E+01 G
Cd-113m		-3.2828E+03					5.33E+03	
			263.70	-3.283E+03	?(	1.711E+04	1.53E+02	6.00E-03 K
Cd-109	F	-9.8889E+00					4.53E+02	
			88.04	-9.889E+00	&(	5.757E+01	1.75E+02	3.79E+00 G
Cf-251	T	-4.7227E-01					3.28E+05	
			176.60	-4.723E-01	&(	4.872E+00	3.95E+02	1.70E+01 G
			227.00	-5.873E+00	+	1.524E+01	1.06E+02	6.30E+00 GA
Cf-249	T	6.8691E-01					1.28E+05	
			387.95	3.972E-01	?(	1.411E+00	1.04E+02	6.60E+01 G
			333.44	1.920E+00	?(	1.160E+01	1.79E+02	1.55E+01 G
Sn-126		-4.6372E+00					3.65E+07	
			87.57	-1.001E+00	+	5.903E+00	1.77E+02	3.75E+01 GA
			64.28	-4.637E+00	?(	1.819E+01	1.17E+02	9.70E+00 G
			86.94	-4.167E+00	+	2.486E+01	1.79E+02	9.04E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	-9.1256E+00					8.14E+03	
			46.54	-9.126E+00	*(	5.195E+01	1.69E+02	4.25E+00 G
PB-212	N	1.5467E+01					6.98E+02	
			238.63	1.547E+01	(P	1.702E+00	6.32E+00	4.33E+01 G
			300.03	2.554E+01	+ P	1.866E+01	2.61E+01	3.28E+00 GA
PB-214	N	1.1359E+01					5.84E+05	
			351.93	1.086E+01	(	1.623E+00	1.02E+01	3.76E+01 G
			295.09	1.234E+01	(P	3.069E+00	1.21E+01	1.93E+01 G
			242.00	1.406E+01		1.156E+01	2.72E+01	7.43E+00 GA
BI-207	C	-9.5754E-03					1.18E+04	
			1063.66	-2.311E-01	?(P	1.639E+00	2.87E+02	7.45E+01 G
			569.70	1.593E-01	?(	9.820E-01	1.73E+02	9.77E+01 G
BI-212	N	8.4123E+00					6.98E+02	
			727.17	8.412E+00	?(	2.698E+01	9.51E+01	7.55E+00 G
			785.42	1.868E+01	? P	1.048E+02	2.33E+02	1.28E+00 GA
U-235	N	-4.3093E+00					2.57E+11	
			143.79	-4.309E+00	(P	1.575E+01	1.29E+02	1.10E+01 G
			205.33	-1.369E+00	+ P	1.604E+01	5.27E+02	5.01E+00 G
			163.38	1.407E+00	+ P	2.147E+01	4.49E+02	5.08E+00 G
			185.72	-1.430E+00	+ P	2.150E+00	4.33E+01	5.40E+01 GA
BI-214	N	8.7255E+00					5.84E+05	
			609.31	8.726E+00	(P	1.835E+00	1.26E+01	4.61E+01 G
			1120.29	2.862E+00	- P	1.327E+01	1.34E+02	1.51E+01 G
			1764.49	5.779E+00	- P	1.677E+01	8.57E+01	1.54E+01 G
BI-210M	T	-4.1230E-02					1.10E+09	
			265.83	-4.123E-02	%(P	2.232E+00	2.24E+03	5.00E+01 G
			304.90	0.000E+00	+	8.101E+00	1.00E+03	2.80E+01 G
AC-228	N	1.6112E+01					2.10E+03	
			911.07	1.450E+01	(	1.527E+00	1.20E+01	2.90E+01 G
			968.97	1.861E+01	?(	7.880E+00	1.79E+01	1.75E+01 G
			338.32	1.636E+01	(P	4.765E+00	1.58E+01	1.20E+01 G
			93.35	-6.616E+00	-	3.650E+01	1.66E+02	5.56E+00 XA
TH-227	N	5.4515E-01					7.95E+03	
			256.24	-5.710E+00	?(	1.389E+01	9.88E+01	7.00E+00 G
			235.97	2.542E+00	+	1.818E+01	2.13E+02	1.23E+01 G
			50.14	6.018E+00	?(	2.102E+01	1.04E+02	8.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	-1.4281E+00					2.68E+06	
			193.51	-3.653E+00	?(	1.781E+01	1.87E+02	4.40E+00 G
			210.85	1.846E+00	&(	3.034E+01	6.55E+02	2.99E+00 G
TH-234	N	1.7324E+01					1.63E+12	
			92.59	6.631E+00	(P	1.778E+01	8.10E+01	5.58E+00 G
			63.29	3.300E+01	(P	2.524E+01	3.13E+01	3.81E+00 G
PA-234	N	-2.0305E-01					1.63E+12	
			131.29	-1.733E+00	&(	8.219E+00	1.42E+02	1.80E+01 G
			946.02	1.852E+00	?(	6.078E+00	1.33E+02	1.34E+01 G
			569.47	-1.898E+00	&	1.351E+01	2.01E+02	8.20E+00 G
			883.24	-8.303E+00	+	2.668E+01	9.54E+01	9.60E+00 G
			880.53	-1.324E+01	&	3.891E+01	8.75E+01	6.00E+00 GA
PA-234M	N	-2.4945E+01					1.63E+12	
			1001.00	-2.495E+01	?(P	2.450E+02	1.84E+02	8.37E-01 G
			766.41	-1.623E+02	+	6.368E+02	1.15E+02	2.94E-01 G
AM-241	T	-1.0889E+00					1.58E+05	
			59.54	-1.089E+00	(P	5.421E+00	1.21E+02	3.59E+01 G
Np-237	F	2.1940E+00					2.14E+06	
			86.49	2.194E+00	&(	1.554E+01	2.12E+02	1.31E+01 G
Cs-136	F	6.1178E-01					1.30E+01	
			818.50	5.946E-01	?(	2.352E+00	1.16E+02	1.00E+02 G
			1048.07	0.000E+00	-	1.756E+00	1.00E+03	8.00E+01 G
			340.57	6.483E-01	?(	4.007E+00	1.83E+02	4.69E+01 G
Np-239	T	-1.2682E+00					2.36E+00	
			103.70	0.000E+00	+	8.151E+00	1.00E+03	2.40E+01 X
			106.13	-1.268E+00	?(	8.416E+00	1.99E+02	2.27E+01 G
			99.50	-2.099E+00	&	1.297E+01	1.85E+02	1.50E+01 X
Nd-147		-1.0812E+00					1.11E+01	
			531.00	-1.081E+00	?(	7.195E+00	2.64E+02	1.30E+01 G
			91.10	-1.309E+00	+	7.511E+00	1.72E+02	2.83E+01 G
TL-210	N	1.0369E-01					5.84E+05	
			799.60	1.037E-01	?(	1.514E+00	4.07E+02	9.90E+01 G
			296.00	7.237E-02	%	2.796E+00	1.14E+03	7.90E+01 G
			1313.00	-3.129E+00	+	8.351E+00	1.19E+02	2.10E+01 GA
Kr-85	I	-8.1918E+01					3.92E+03	
			513.98	-8.192E+01	?(	4.805E+02	1.72E+02	4.30E-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	273.	-14.	-0.008	169.03	-9.126E+00	
TH-227	50.14	200.	20.	0.011	104.28	6.018E+00	
AM-241	59.54	444.	-20.	-0.011	120.53	-1.089E+00	P
Sn-126	64.28	435.	-25.	-0.014	117.50	-4.637E+00	
BA-133	80.99	831.	-30.	-0.017	137.08	-1.281E+00	
Np-237	86.49	934.	20.	0.011	212.09	2.194E+00	
Sn-126	86.94	1147.	-27.	-0.015	179.02	-4.167E+00	
Sn-126	87.57	1120.	-27.	-0.015	176.87	-1.001E+00	
Cd-109	88.04	1093.	-27.	-0.015	174.69	-9.889E+00	
Nd-147	91.10	1066.	-27.	-0.015	172.17	-1.309E+00	
Gd-153	97.50	961.	-27.	-0.015	162.76	-1.215E+00	
Np-239	99.50	936.	-24.	-0.013	185.17	-2.099E+00	
EU-155	105.31	898.	27.	0.015	159.18	1.680E+00	P
Np-239	106.13	919.	-22.	-0.012	198.76	-1.268E+00	
EU-152	121.78	148.	19.	0.011	91.96	9.064E-01	
CO-57	122.06	199.	-24.	-0.013	87.27	-3.686E-01	
EU-154	123.10	184.	-24.	-0.013	84.03	-7.755E-01	
PA-234	131.29	512.	-23.	-0.013	141.91	-1.733E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	133.02	535.	-23.	-0.013	144.79	-7.247E-01	
CE-144	133.54	557.	-17.	-0.010	195.45	-2.137E+00	
U-235	143.79	646.	-33.	-0.018	129.45	-4.309E+00	P
CE-141	145.44	695.	-26.	-0.014	146.52	-7.638E-01	
U-235	163.38	210.	5.	0.003	448.51	1.407E+00	P
CE-139	165.85	163.	18.	0.010	101.58	3.497E-01	P
Cf-251	176.60	110.	-5.	-0.003	394.97	-4.723E-01	
U-235	185.72	206.	-46.	-0.026	43.31	-1.430E+00	P
TH-229	193.51	84.	-9.	-0.005	186.96	-3.653E+00	
U-235	205.33	81.	-4.	-0.002	527.07	-1.369E+00	P
TH-229	210.85	100.	3.	0.002	655.18	1.846E+00	
Cf-251	227.00	100.	-19.	-0.011	105.57	-5.873E+00	
TH-227	235.97	544.	16.	0.009	213.21	2.542E+00	
EU-152	244.69	690.	-22.	-0.012	171.82	-5.934E+00	
TH-227	256.24	84.	-19.	-0.010	98.82	-5.710E+00	
Cd-113m	263.70	90.	-9.	-0.005	152.75	-3.283E+03	
Hg-203	279.20	96.	2.	0.001	760.06	5.151E-02	
I-131	284.30	48.	6.	0.003	229.73	2.269E+00	
CR-51	320.08	387.	-15.	-0.008	60.45	-3.856E+00	P
La-140	328.76	187.	11.	0.006	174.09	1.446E+00	
Cf-249	333.44	198.	11.	0.006	178.62	1.920E+00	
Cs-136	340.57	210.	11.	0.006	182.75	6.483E-01	
EU-152	344.29	221.	11.	0.006	187.10	1.160E+00	
HF-181	345.83	228.	11.	0.006	189.69	2.049E+00	
BA-133	356.00	232.	-15.	-0.008	146.06	-6.707E-01	
I-131	364.48	40.	-2.	-0.001	623.16	-6.921E-02	
BA-133	383.84	115.	-15.	-0.008	107.25	-4.810E+00	
Cf-249	387.95	38.	9.	0.005	104.11	3.972E-01	
SN-113	391.69	118.	-12.	-0.007	28.02	-5.847E-01	P
SB-125	427.88	48.	-13.	-0.007	107.97	-1.412E+00	
AG-108M	433.94	48.	-14.	-0.008	106.61	-4.913E-01	
PM-146	453.88	30.	2.	0.001	678.97	8.649E-02	
SB-125	463.37	33.	44.	0.024	23.84	1.442E+01	P
Ir-192	468.06	98.	-12.	-0.007	118.08	-8.147E-01	
BE-7	477.60	55.	10.	0.006	105.95	3.460E+00	
HF-181	482.00	65.	10.	0.005	122.83	4.244E-01	
La-140	487.02	84.	-10.	-0.006	133.42	-7.850E-01	
RU-103	497.05	30.	-1.	-0.001	782.52	-5.365E-02	P
Kr-85	513.98	128.	-9.	-0.005	172.41	-8.192E+01	
Nd-147	531.00	22.	-4.	-0.002	264.34	-1.081E+00	
CS-134	563.24	9.	14.	0.008	49.55	6.905E+00	
CS-134	569.32	19.	5.	0.003	122.47	1.407E+00	
PA-234	569.47	28.	-4.	-0.002	201.23	-1.898E+00	
BI-207	569.70	20.	4.	0.002	173.37	1.593E-01	
SB-125	600.50	175.	8.	0.004	240.55	1.868E+00	P
SB-124	602.73	181.	9.	0.005	225.66	3.696E-01	
CS-134	604.71	190.	9.	0.005	230.57	3.734E-01	
RU-103	610.30	198.	9.	0.005	234.99	6.405E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-144	618.06	33.	7.	0.004	121.38	3.077E-01	
SB-125	635.89	13.	9.	0.005	67.90	3.409E+00	
I-131	636.97	35.	-5.	-0.003	190.31	-2.798E+00	
AG-110M	657.76	52.	-13.	-0.007	81.31	-6.465E-01	
CS-137	661.66	69.	-12.	-0.007	100.80	-6.643E-01	P
PM-144	696.54	20.	1.	0.001	648.54	6.981E-02	P
NB-94	702.63	9.	7.	0.004	96.21	3.601E-01	
SB-124	722.79	60.	-8.	-0.004	146.99	-3.508E+00	
ZR-95	724.20	67.	-14.	-0.008	88.10	-1.547E+00	
PM-146	735.72	19.	-4.	-0.002	225.19	-9.324E-01	P
ZR-95	756.73	10.	2.	0.001	285.34	2.221E-01	P
AG-110M	763.94	7.	32.	0.018	21.05	7.479E+00	
PA-234M	766.41	51.	-9.	-0.005	114.94	-1.623E+02	
EU-152	778.92	14.	4.	0.002	204.63	1.628E+00	
CS-134	795.87	18.	8.	0.004	86.28	4.760E-01	
TL-210	799.60	29.	2.	0.001	406.59	1.037E-01	
CS-134	801.95	27.	8.	0.004	103.38	4.727E+00	
CO-58	810.78	59.	-13.	-0.007	86.57	-7.245E-01	
La-140	815.77	72.	-12.	-0.007	106.23	-2.767E+00	
Cs-136	818.50	74.	11.	0.006	116.46	5.946E-01	
MN-54	834.85	19.	9.	0.005	103.51	5.210E-01	
Co-56	846.77	28.	-11.	-0.006	94.24	-6.301E-01	P
NB-94	871.10	18.	-6.	-0.003	118.53	-3.185E-01	
PA-234	880.53	64.	-14.	-0.008	87.47	-1.324E+01	
PA-234	883.24	78.	-14.	-0.008	95.40	-8.303E+00	
AG-110M	884.68	63.	11.	0.006	104.90	8.972E-01	
Sc-46	889.28	69.	-5.	-0.003	221.05	-3.180E-01	
Y-88	898.04	5.	5.	0.003	95.31	3.443E-01	P
AG-110M	937.49	20.	-5.	-0.003	201.66	-8.957E-01	
PA-234	946.02	5.	4.	0.002	132.68	1.852E+00	
EU-154	996.33	32.	-4.	-0.002	232.99	-2.140E+00	
PA-234M	1001.00	38.	-3.	-0.002	183.78	-2.495E+01	P
EU-154	1004.77	25.	8.	0.005	92.50	2.982E+00	
Co-56	1037.84	10.	2.	0.001	404.55	8.356E-01	P
BI-207	1063.66	11.	-3.	-0.001	286.77	-2.311E-01	P
Ga-68	1077.40	10.	8.	0.004	93.82	1.979E+01	
FE-59	1099.25	10.	2.	0.001	354.73	2.495E-01	
EU-152	1112.07	39.	4.	0.002	217.11	2.174E+00	
Sc-46	1120.55	35.	8.	0.004	116.34	5.454E-01	
Ta-182	1189.05	10.	3.	0.002	238.82	1.396E+00	
Ta-182	1221.41	27.	-9.	-0.005	62.47	-2.527E+00	P
Co-56	1238.28	22.	4.	0.002	242.90	5.223E-01	P
NA-22	1274.53	5.	1.	0.000	504.98	5.340E-02	
FE-59	1291.60	5.	4.	0.002	153.85	6.819E-01	P
TL-210	1313.00	16.	-8.	-0.004	119.02	-3.129E+00	
CO-60	1332.50	4.	7.	0.004	55.53	5.860E-01	P
AG-110M	1384.30	5.	2.	0.001	324.35	5.901E-01	
EU-152	1408.00	5.	1.	0.000	796.87	2.770E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	1596.21	17.	-11.	-0.006	92.93	-1.123E+00	
Co-56	1771.35	20.	7.	0.004	96.46	4.960E+00	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	3.4601E+00	3.4602E+00	1.059E+02%	1.25E+01
NA-22	#A	5.3404E-02	5.3404E-02	5.050E+02%	1.08E+00
K-40		1.0354E+02	1.0354E+02	9.293E+00%	9.55E+00
Sc-46	#A	1.1371E-01	1.1371E-01	1.163E+02%	2.43E+00
CR-51	#A	-3.8563E+00	-3.8564E+00	6.045E+01%	2.42E+01
MN-54	#A	5.2099E-01	5.2099E-01	1.035E+02%	1.28E+00
FE-59	#A	4.3686E-01	4.3686E-01	1.538E+02%	2.18E+00
Co-56	#A	-4.4855E-01	-4.4856E-01	9.424E+01%	1.55E+00
CO-57	#A	-3.6860E-01	-3.6860E-01	8.727E+01%	1.07E+00
CO-58	#A	-7.2449E-01	-7.2449E-01	8.657E+01%	2.11E+00
CO-60	#A	5.8596E-01	5.8596E-01	5.553E+01%	9.97E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.69E+00
NB-94	#A	3.6007E-01	3.6007E-01	9.621E+01%	8.36E-01
ZR-95	#A	2.2209E-01	2.2209E-01	2.853E+02%	1.62E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.65E+00
RU-103	#A	-5.3650E-02	-5.3650E-02	7.825E+02%	1.13E+00
RH-106	A	-5.3568E+00	-5.3568E+00	8.692E+01%	1.57E+01
AG-108M	#A	-4.9128E-01	-4.9128E-01	1.066E+02%	1.25E+00
AG-110M	#A	2.0643E+00	2.0643E+00	2.105E+01%	3.19E+00
SN-113	#A	-5.8465E-01	-5.8465E-01	2.802E+01%	2.50E+00
SB-124	#A	3.6964E-01	3.6964E-01	2.257E+02%	2.83E+00
SB-125	#A	2.6161E+00	2.6161E+00	2.384E+01%	3.80E+00
I-131	#A	9.4207E-02	9.4214E-02	2.297E+02%	1.11E+00
Gd-153	#A	-1.2152E+00	-1.2152E+00	1.628E+02%	6.59E+00
Ga-68	#A	1.9573E+01	1.9794E+01	9.382E+01%	4.32E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.86E+00
BA-133	#A	-6.7070E-01	-6.7070E-01	1.461E+02%	3.30E+00
CS-134	#A	9.1637E-01	9.1637E-01	4.955E+01%	1.40E+00
CS-137	#A	-6.6430E-01	-6.6430E-01	1.008E+02%	2.23E+00
CE-139	#A	3.4974E-01	3.4975E-01	1.016E+02%	1.19E+00
Ba-140	#	3.2141E+00	3.2142E+00	4.304E+01%	2.73E+00
La-140	#A	-6.7189E-01	-6.7192E-01	9.293E+01%	2.24E+00
CE-141	#A	-7.6382E-01	-7.6383E-01	1.465E+02%	3.73E+00
CE-144	#A	-2.1373E+00	-2.1373E+00	1.955E+02%	1.40E+01
PM-144	#A	1.8883E-01	1.8883E-01	1.214E+02%	1.13E+00
EU-152	#A	1.3148E+00	1.3148E+00	9.099E+01%	2.79E+00
EU-154	#A	3.7531E-01	3.7531E-01	6.248E+01%	2.17E+00
EU-155	#A	1.6800E+00	1.6800E+00	1.592E+02%	8.92E+00

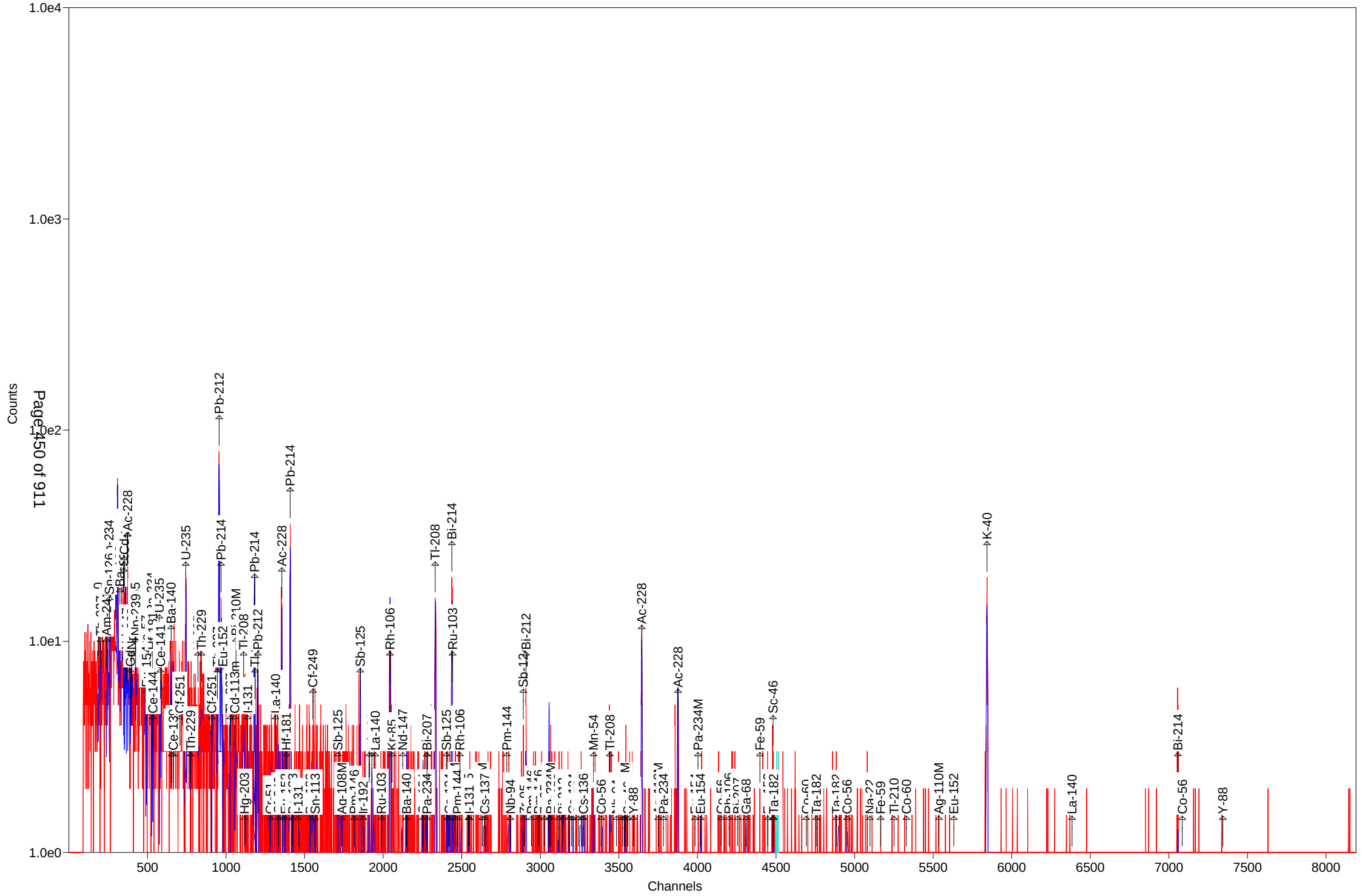
HF-181 #A	6.8050E-01	6.8051E-01	1.130E+02%		1.78E+00
Ta-182 #A	4.8948E-01	4.8948E-01	2.388E+02%		6.81E+00
Hg-203 #A	5.1511E-02	5.1511E-02	7.601E+02%		1.36E+00
TL-208	4.8203E+00	4.8203E+00	1.187E+01%		8.93E-01
PM-146 #A	8.6487E-02	8.6487E-02	6.790E+02%		1.47E+00
Y-88 #A	1.5965E-01	1.5965E-01	9.531E+01%		8.18E-01
Cd-113m#A	-3.2828E+03	-3.2828E+03	1.528E+02%		1.71E+04
Cd-109 #A	-9.8889E+00	-9.8889E+00	1.747E+02%		5.76E+01
Cf-251 #A	-4.7227E-01	-4.7227E-01	3.950E+02%		4.87E+00
Cf-249 #A	6.8691E-01	6.8691E-01	1.034E+02%		1.41E+00
Sn-126 #A	-4.6372E+00	-4.6372E+00	1.175E+02%		1.82E+01
PB-210 #A	-9.1256E+00	-9.1256E+00	1.690E+02%		5.20E+01
PB-212	1.5467E+01	1.5467E+01	6.316E+00%		1.70E+00
PB-214	1.1359E+01	1.1359E+01	7.888E+00%		1.62E+00
BI-207 #A	-9.5754E-03	-9.5754E-03	1.675E+02%		1.64E+00
BI-212 #A	8.4123E+00	8.4123E+00	9.511E+01%		2.70E+01
U-235 #A	-4.3093E+00	-4.3093E+00	1.294E+02%		1.57E+01
BI-214	8.7255E+00	8.7255E+00	1.261E+01%		1.83E+00
BI-210M#A	-4.1230E-02	-4.1230E-02	2.238E+03%		2.23E+00
AC-228	1.6112E+01	1.6112E+01	8.912E+00%		1.53E+00
TH-227 #A	5.4515E-01	5.4515E-01	7.183E+01%		1.39E+01
TH-229 #A	-1.4281E+00	-1.4281E+00	1.870E+02%		1.78E+01
TH-234 A	1.7324E+01	1.7324E+01	3.133E+01%		1.78E+01
PA-231 #A	0.0000E+00	0.0000E+00	7.071E+02%		7.83E+01
PA-233 #A	0.0000E+00	0.0000E+00	7.071E+02%		6.42E+00
PA-234 #A	-2.0305E-01	-2.0305E-01	9.714E+01%		8.22E+00
PA-234M#A	-2.4945E+01	-2.4945E+01	1.838E+02%		2.45E+02
AM-241 #A	-1.0889E+00	-1.0889E+00	1.205E+02%		5.42E+00
Np-237 #A	2.1940E+00	2.1940E+00	2.121E+02%		1.55E+01
Ir-192 #A	0.0000E+00	0.0000E+00	7.071E+02%		2.68E+00
Cs-136 #A	6.1176E-01	6.1178E-01	1.084E+02%		2.35E+00
Np-239 #A	-1.2679E+00	-1.2682E+00	1.988E+02%		8.42E+00
Nd-147 #A	-1.0811E+00	-1.0812E+00	2.643E+02%		7.19E+00
TL-210 #A	1.0369E-01	1.0369E-01	4.066E+02%		1.51E+00
Kr-85 #A	-8.1918E+01	-8.1918E+01	1.724E+02%		4.81E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 1.600E+02 Bq/Sample
Total Decayed Activity (37.5 to 2000.0 keV) 1.6002411E+02 Bq/Sample

412881_Gamma_180-86110-A-7-A. 8_Gamma_20190269.spc.



Test America St. Louis Spectrum ID: 7_Gamma_20190290

Sample Description: 412881_Gamma_180-86110-A-8-A
Detector: Detector # 7
Batch ID: 412881
Work Order Number: Gamma
Lot Number: 180-86110-A-8-A

Decay to Time: 2/20/2019 09:37 Live Time: 1800 sec
Acquisition Time: 2/20/2019 09:37:38 Real Time: 1805 sec
Analysis Time: 2/20/2019 10:08 Dead Time: 0.29 %
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_Rev15.lib
Bkgd Correction File: 7_2019-01-20_1017.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	-1.949E+00	199.5	3.888E+00	3.889E+00	1.331E+01
NA-22	4.581E-01	62.4	2.861E-01	2.870E-01	9.266E-01
K-40	9.881E+01	8.7	8.594E+00	9.971E+00	7.961E+00
Sc-46	1.039E-01	66.5	6.905E-02	6.926E-02	1.888E+00
CR-51	3.017E+00	99.3	2.996E+00	3.000E+00	1.007E+01
MN-54	-2.929E-01	148.4	4.348E-01	4.350E-01	1.261E+00
FE-59	3.496E-01	148.0	5.175E-01	5.178E-01	1.867E+00
Co-56	5.057E-01	106.4	5.379E-01	5.386E-01	9.416E-01
CO-57	-3.473E-02	556.8	1.934E-01	1.934E-01	6.652E-01
CO-58	4.036E-01	90.9	3.670E-01	3.676E-01	1.247E+00
CO-60	-7.175E-01	59.4	4.259E-01	4.274E-01	1.760E+00
ZN-65	-1.504E+00	99.2	1.492E+00	1.493E+00	5.034E+00
NB-94	6.684E-02	619.7	4.142E-01	4.142E-01	1.011E+00
ZR-95	2.512E-01	286.7	7.203E-01	7.204E-01	1.762E+00
NB-95	0.000E+00	1.#INF	2.166E-01	2.166E-01	1.413E+00
RU-103	-6.370E-02	525.2	3.345E-01	3.345E-01	8.431E-01
RH-106	6.431E+00	80.2	5.156E+00	5.167E+00	2.316E+01
AG-108M	-6.305E-02	872.9	5.504E-01	5.504E-01	8.743E-01
AG-110M	1.598E+00	25.7	4.102E-01	4.182E-01	1.624E+00
SN-113	4.050E-01	118.9	4.815E-01	4.819E-01	1.634E+00
SB-124	-4.496E-01	179.6	8.074E-01	8.077E-01	2.723E+00
SB-125	2.285E-02	69.6	1.590E-02	1.595E-02	3.117E+00
I-131	2.520E-01	84.9	2.140E-01	2.144E-01	1.018E+00
Gd-153	-9.454E-02	1097.3	1.037E+00	1.037E+00	3.504E+00
Ga-68	-8.843E+00	247.0	2.184E+01	2.185E+01	4.945E+01
Tc-99m	-2.714E-01	116.3	3.157E-01	3.161E-01	1.056E+00
BA-133	-5.986E-01	148.4	8.884E-01	8.889E-01	2.983E+00
CS-134	1.081E+00	56.9	6.146E-01	6.171E-01	1.124E+00
CS-137	1.273E-01	326.6	4.157E-01	4.158E-01	1.465E+00
CE-139	-3.060E-01	101.7	3.112E-01	3.125E-01	1.041E+00
Ba-140	-1.398E+00	119.7	1.674E+00	1.675E+00	4.042E+00
La-140	4.688E-01	79.9	3.744E-01	3.752E-01	1.630E+00
CE-141	4.676E-01	166.9	7.804E-01	7.807E-01	2.609E+00

CE-144	0.000E+00	1.#INF	7.456E-01	7.456E-01	8.563E+00
PM-144	3.524E-01	94.7	3.338E-01	3.343E-01	7.928E-01
EU-152	8.641E-01	206.2	1.782E+00	1.782E+00	2.320E+00
EU-154	1.243E+00	98.3	1.222E+00	1.224E+00	1.464E+00
EU-155	-1.120E+00	102.6	1.149E+00	1.151E+00	4.593E+00
HF-181	0.000E+00	1.#INF	1.980E-01	1.981E-01	1.811E+00
Ta-182	2.058E+00	58.6	1.205E+00	1.210E+00	5.152E+00
Hg-203	-2.667E-01	127.4	3.399E-01	3.402E-01	1.150E+00
TL-208	5.176E+00	10.8	5.599E-01	6.209E-01	8.329E-01
PM-146	-6.422E-01	124.2	7.978E-01	7.985E-01	1.446E+00
Y-88	-1.262E-01	476.6	6.013E-01	6.014E-01	1.366E+00
Cd-113m	3.282E+03	83.1	2.727E+03	2.735E+03	9.172E+03
Cd-109	4.676E+00	229.4	1.073E+01	1.073E+01	3.590E+01
Cf-251	-1.199E+00	133.8	1.604E+00	1.608E+00	4.121E+00
Cf-249	4.058E-01	127.0	5.154E-01	5.158E-01	1.714E+00
Sn-126	3.011E+00	109.7	3.303E+00	3.307E+00	1.105E+01
PB-210	1.640E+00	698.6	1.146E+01	1.146E+01	3.897E+01
PB-212	1.225E+01	7.1	8.677E-01	1.175E+00	1.946E+00
PB-214	1.087E+01	7.7	8.418E-01	1.014E+00	1.917E+00
BI-207	5.359E-01	113.0	6.057E-01	6.063E-01	1.387E+00
BI-212	-3.574E-01	1893.4	6.767E+00	6.767E+00	2.371E+01
U-235	-2.139E+00	36.2	7.739E-01	7.815E-01	1.203E+01
BI-214	1.043E+01	9.8	1.017E+00	1.152E+00	1.370E+00
BI-210M	3.747E-01	106.5	3.990E-01	3.996E-01	1.352E+00
AC-228	1.661E+01	8.5	1.407E+00	1.643E+00	1.286E+00
TH-227	2.548E+00	122.9	3.133E+00	3.137E+00	1.020E+01
TH-229	-4.135E+00	153.8	6.359E+00	6.367E+00	1.612E+01
TH-234	3.648E+00	59.8	2.182E+00	2.191E+00	2.439E+01
PA-231	9.768E+00	188.7	1.843E+01	1.844E+01	6.192E+01
PA-233	6.244E-01	185.5	1.158E+00	1.159E+00	5.189E+00
PA-234	9.712E-01	95.5	9.272E-01	9.286E-01	5.120E+00
PA-234M	-1.036E+02	85.8	8.888E+01	8.903E+01	2.977E+02
AM-241	8.223E-01	137.1	1.127E+00	1.128E+00	3.025E+00
Np-237	4.017E-01	806.7	3.240E+00	3.240E+00	1.088E+01
Ir-192	-5.804E-03	86.1	4.996E-03	5.008E-03	1.641E+00
Cs-136	2.249E-02	1737.8	3.908E-01	3.908E-01	1.405E+00
Np-239	-8.513E-01	154.1	1.312E+00	1.313E+00	4.395E+00
Nd-147	2.445E+00	96.8	2.367E+00	2.371E+00	5.757E+00
TL-210	1.031E-01	355.1	3.662E-01	3.663E-01	1.307E+00
Kr-85	-2.311E+00	4865.1	1.124E+02	1.124E+02	3.890E+02
Total	3.489E+03				

Analyst: kody Saulters

Sample description
412881_Gamma_180-86110-A-8-A

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20190290.An1

Acquisition information
Start time: 2/20/2019 9:37:38 AM
Live time: 1800
Real time: 1805
Dead time: 0.29 %
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_Rev15.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	2/20/2019 9:37:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2019-01-20_1017.PBC 1/20/2019 10:17:25 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 14 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0919

***** 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	3.	698.60	0.84	2.483E-02	46.54	4.250	PBC<MDA	PB210
50.14	17.	122.93	0.84	2.841E-02	50.14	8.000	PBC<MDA	TH227
59.54	20.	137.09	0.85	3.701E-02	59.54	35.900	PBC<MDA	AM241
63.29	40.	59.80	0.85	4.005E-02	63.29	3.810	PBC<MDA	TH234
64.28	21.	109.71	0.86	4.080E-02	64.28	9.700	PBC<MDA	Sn126
74.68	136.	16.87	0.87	4.762E-02				
77.21	220.	11.00	0.87	4.895E-02				
86.49	5.	806.72	0.88	5.279E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.713E-01	EU155
88.04	17.	229.41	0.88	5.329E-02	88.04	3.790	PBC<MDA	Cd109
93.00	131.	20.98	1.61	5.470E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	2.393E+01	AC228
121.78	5.	392.43	0.92	5.608E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	5.789E-02	CO57
123.10	14.	127.38	0.92	5.596E-02	123.10	40.790	PBC<MDA	EU154
145.44	21.	166.87	0.94	5.237E-02	145.44	48.200	PBC<MDA	CE141
162.79	8.	255.39	0.96	4.826E-02	162.66	6.220	PBC<MDA	Ba140
					163.38	5.080	PBC<MDA	U235
185.94	71.	29.64	1.65	4.443E-02	185.72	54.000	1.644E+00	U235
205.33	6.	301.85	1.01	4.086E-02	205.33	5.010	PBC<MDA	U235
227.06	3.	540.14	1.03	3.757E-02	227.00	6.300	PBC<MDA	Cf251
235.97	18.	203.45	1.04	3.636E-02	235.97	12.300	PBC<MDA	TH227

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
238.59	375.	7.40	1.40	3.602E-02	238.63	43.300	1.337E+01	PB212
242.00	18.	195.19	1.04	3.560E-02	242.00	7.430	PBC<MDA	PB214
244.69	17.	206.17	1.05	3.526E-02	244.69	7.580	PBC<MDA	EU152
256.24	5.	331.36	1.06	3.392E-02	256.24	7.000	PBC<MDA	TH227
263.70	12.	83.10	1.07	3.310E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	11.	106.49	1.07	3.288E-02	265.83	50.000	PBC<MDA	BI210M
277.48	36.	37.78	0.30	3.172E-02	277.28	6.310	1.008E+01	TL208
295.49	120.	11.43	1.48	3.009E-02	295.09	19.300	1.146E+01	PB214
					296.00	79.000	2.808E+00	TL210
300.18	15.	185.51	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
302.65	15.	188.67	1.11	2.945E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.536E+00	BA133
320.08	15.	99.30	1.13	2.807E-02	320.08	9.940	PBC<MDA	CR51
328.76	15.	79.86	1.13	2.744E-02	328.76	20.300	PBC<MDA	La140
333.44	12.	127.02	1.14	2.711E-02	333.44	15.510	PBC<MDA	Cf249
338.36	87.	14.43	1.55	2.677E-02	338.32	12.010	1.506E+01	AC228
351.88	185.	10.45	1.06	2.588E-02	351.93	37.600	1.057E+01	PB214
383.84	12.	108.27	1.19	2.402E-02	383.84	8.940	PBC<MDA	BA133
387.95	4.	389.85	1.19	2.380E-02	387.95	66.000	PBC<MDA	Cf249
391.69	11.	118.88	1.20	2.360E-02	391.69	64.000	PBC<MDA	SN113
463.37	12.	82.51	1.27	2.040E-02	463.37	10.470	PBC<MDA	SB125
468.06	11.	101.84	1.27	2.022E-02	468.06	51.750	PBC<MDA	Ir192
487.02	10.	140.57	1.29	1.954E-02	487.02	45.500	PBC<MDA	La140
511.86	75.	18.04	2.56	1.870E-02	511.86	20.000	1.119E+01	RH106
531.00	10.	96.80	1.33	1.811E-02	531.00	13.000	PBC<MDA	Nd147
563.24	12.	94.30	1.36	1.720E-02	563.24	8.350	PBC<MDA	CS134
569.57	4.	299.91	1.37	1.704E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	PBC<MDA	PA234
					569.70	97.740	PBC<MDA	BI207
583.17	131.	10.82	1.38	1.669E-02	583.02	84.500	5.176E+00	TL208
609.20	139.	9.75	1.57	1.605E-02	609.31	46.090	1.043E+01	BI214
621.92	11.	174.73	1.42	1.576E-02	621.92	9.930	PBC<MDA	RH106
636.97	11.	84.92	1.43	1.543E-02	636.97	7.170	PBC<MDA	I131
661.66	3.	326.64	1.46	1.492E-02	661.66	85.210	PBC<MDA	CS137
696.54	9.	94.72	1.49	1.426E-02	696.54	99.000	PBC<MDA	PM144
702.63	2.	619.68	1.49	1.415E-02	702.63	97.900	PBC<MDA	NB94
756.73	3.	286.72	1.54	1.325E-02	756.73	54.460	PBC<MDA	ZR95
763.94	29.	25.66	1.55	1.314E-02	763.94	22.280	5.568E+00	AG110M
795.87	11.	60.11	1.58	1.266E-02	795.87	85.530	PBC<MDA	CS134
799.60	2.	355.08	1.58	1.261E-02	799.60	98.960	PBC<MDA	TL210
801.95	5.	128.83	1.58	1.258E-02	801.95	8.690	PBC<MDA	CS134
810.78	9.	90.95	1.59	1.246E-02	810.78	99.460	PBC<MDA	CO58
846.77	6.	144.57	1.62	1.198E-02	846.77	99.935	PBC<MDA	Co56
860.58	10.	94.18	1.63	1.181E-02	860.56	12.420	PBC<MDA	TL208
873.23	9.	106.89	1.64	1.166E-02	873.23	12.270	PBC<MDA	EU154
880.53	6.	104.85	1.65	1.157E-02	880.53	6.000	PBC<MDA	PA234

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
883.24	6.	107.19	1.65	1.154E-02	883.24	9.600	PBC<MDA	PA234
884.68	6.	122.29	1.65	1.152E-02	884.68	72.680	PBC<MDA	AG110M
911.07	94.	10.44	2.23	1.122E-02	911.07	29.000	1.604E+01	AC228
946.15	5.	147.08	1.70	1.085E-02	946.02	13.400	PBC<MDA	PA234
968.20	62.	18.12	2.49	1.062E-02	968.97	17.460	1.864E+01	AC228
1004.77	12.	104.37	1.75	1.027E-02	1004.77	18.010	PBC<MDA	EU154
1037.84	1.	857.32	1.78	9.978E-03	1037.84	14.130	PBC<MDA	Co56
1050.36	6.	80.18	1.79	9.871E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	7.	113.03	1.80	9.759E-03	1063.66	74.500	PBC<MDA	BI207
1099.25	1.	596.99	1.83	9.472E-03	1099.25	56.500	PBC<MDA	FE59
1119.96	11.	112.54	1.85	9.311E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	13.	87.60	1.85	9.309E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	7.659E-01	Sc46
					1121.30	34.900	2.196E+00	Ta182
1121.30	11.	80.59	1.85	9.303E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.902E+00	Ta182
1173.24	3.	308.52	1.89	8.929E-03	1173.24	99.900	PBC<MDA	CO60
1221.41	9.	84.99	1.92	8.608E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	9.	106.38	1.94	8.501E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	7.	62.45	1.96	8.280E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.301E+00	EU154
1274.54	2.	340.90	1.96	8.280E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	2.879E-01	EU154
1291.60	4.	148.05	1.98	8.180E-03	1291.60	43.200	PBC<MDA	FE59
1313.00	4.	137.50	1.99	8.059E-03	1313.00	21.000	PBC<MDA	TL210
1408.00	9.	33.33	2.06	7.560E-03	1408.00	21.005	3.149E+00	EU152
1460.50	139.	8.70	1.30	7.309E-03	1460.83	10.670	9.881E+01	K40
1596.21	2.	424.26	2.19	6.737E-03	1596.21	95.400	PBC<MDA	La140
1764.46	24.	21.49	3.25	6.141E-03	1764.49	15.400	1.438E+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	
298.29	74.73	195.	136.	2.855E+03	16.87	0.867	-	sD
308.40	77.26	184.	220.	4.502E+03	11.00	0.870	-	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_Rev15.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.71	46.54	234.	3.	0.002	698.60	0.836s
TH-227	200.12	50.14	217.	17.	0.010	122.93	0.840
AM-241	237.70	59.54	223.	20.	0.011	137.09	0.850s
TH-234	252.71	63.29	261.	40.	0.022	59.80	0.854s
Sn-126	256.68	64.28	266.	21.	0.012	109.71	0.856
BA-133	323.52	80.99	1039.	-29.	-0.016	158.37	0.874s
Np-237	345.53	86.49	811.	5.	0.003	806.72	0.880s
EU-155	345.74	86.54	816.	0.	0.000	1000.00	0.880s
Sn-126	347.33	86.94	816.	0.	0.000	1000.00	0.880s
Sn-126	349.85	87.57	816.	0.	0.000	1000.00	0.881s
Cd-109	351.73	88.04	752.	17.	0.009	229.41	0.881s
Nd-147	363.97	91.10	769.	0.	0.000	1000.00	0.885s
TH-234	369.93	92.59	789.	-20.	-0.011	120.42	0.886s
AC-228	371.57	93.00	156.	131.	0.073	20.98	1.615s
Np-239	397.57	99.50	485.	0.	0.000	1000.00	0.894s
Gd-153	412.38	103.20	485.	0.	0.000	1000.00	0.898s
Np-239	414.38	103.70	485.	0.	0.000	1000.00	0.898
EU-155	420.83	105.31	425.	-24.	-0.013	102.61	0.900
Np-239	424.10	106.13	448.	-20.	-0.011	154.14	0.901s
EU-152	486.70	121.78	190.	5.	0.003	392.43	0.918
CO-57	487.83	122.06	138.	-3.	-0.002	556.78	0.918
EU-154	491.98	123.10	152.	14.	0.008	127.38	0.919
PA-234	524.77	131.29	360.	-18.	-0.010	150.92	0.928s
HF-181	531.68	133.02	378.	0.	0.000	1000.00	0.930s
CE-144	533.74	133.54	378.	0.	0.000	1000.00	0.930s
HF-181	544.79	136.30	378.	0.	0.000	1000.00	0.933
CO-57	545.48	136.47	391.	-24.	-0.013	116.97	0.933
Tc-99m	561.63	140.51	334.	-23.	-0.013	116.31	0.938s
U-235	574.73	143.79	690.	-22.	-0.012	36.18	0.941s
CE-141	581.35	145.44	618.	21.	0.012	166.87	0.943s
Ba-140	650.24	162.66	231.	-7.	-0.004	324.50	0.961
U-235	653.11	163.38	229.	8.	0.005	255.39	0.962
CE-139	663.01	165.85	228.	-21.	-0.012	101.69	0.965s
Cf-251	706.00	176.60	143.	-17.	-0.009	133.82	0.976s
U-235	743.35	185.94	93.	71.	0.039	29.64	1.646s
TH-229	773.64	193.51	125.	-14.	-0.008	153.76	0.994
U-235	820.94	205.33	88.	6.	0.003	301.85	1.007
TH-229	843.01	210.85	154.	-7.	-0.004	333.81	1.012s
Cf-251	907.62	227.00	92.	3.	0.002	540.14	1.029s
TH-227	943.50	235.97	666.	18.	0.010	203.45	1.039s
PB-212	954.15	238.63	124.	344.	0.191	7.08	1.041D
PB-214	967.61	242.00	619.	18.	0.010	195.19	1.045
EU-152	978.39	244.69	584.	17.	0.009	206.17	1.048s
TH-227	1024.59	256.24	77.	5.	0.003	331.36	1.060s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cd-113m	1054.43	263.70	42.	12.	0.007	83.10	1.067s
BI-210M	1062.96	265.83	64.	11.	0.006	106.49	1.070s
TL-208	1109.54	277.48	40.	36.	0.020	37.78	0.296s
Hg-203	1116.44	279.20	117.	-12.	-0.007	127.43	1.083s
I-131	1136.83	284.30	59.	-6.	-0.003	206.11	1.089s
PB-214	1181.60	295.49	18.	120.	0.067	11.43	1.475s
TL-210	1183.64	296.00	514.	-17.	-0.009	193.68	1.101s
PB-212	1199.76	300.03	497.	-17.	-0.009	189.89	1.105s
PA-231	1199.92	300.07	480.	-17.	-0.009	186.72	1.105s
PA-233	1200.36	300.18	373.	15.	0.008	185.51	1.105s
PA-231	1210.24	302.65	388.	15.	0.008	188.67	1.107s
Ba-140	1219.04	304.85	404.	0.	0.000	1000.00	1.110
BI-210M	1219.23	304.90	404.	0.	0.000	1000.00	1.110
Ir-192	1233.41	308.44	404.	0.	0.000	1000.00	1.113s
Ir-192	1265.61	316.49	227.	-16.	-0.009	138.83	1.122s
CR-51	1279.99	320.08	106.	15.	0.008	99.30	1.125s
La-140	1314.69	328.76	61.	15.	0.008	79.86	1.134s
Cf-249	1333.41	333.44	111.	12.	0.007	127.02	1.139s
AC-228	1353.10	338.36	20.	87.	0.048	14.43	1.552s
Cs-136	1361.93	340.57	218.	-15.	-0.009	137.80	1.146s
EU-152	1376.80	344.29	184.	-3.	-0.001	480.60	1.150s
HF-181	1382.97	345.83	221.	-17.	-0.009	129.66	1.151s
PB-214	1407.20	351.88	44.	185.	0.103	10.45	1.065s
BA-133	1423.66	356.00	315.	-17.	-0.010	148.40	1.162s
I-131	1457.59	364.48	56.	-8.	-0.004	186.53	1.170s
BA-133	1535.03	383.84	84.	12.	0.007	108.27	1.189s
Cf-249	1551.47	387.95	96.	4.	0.002	389.85	1.193
SN-113	1566.43	391.69	80.	11.	0.006	118.88	1.197
SB-125	1711.18	427.88	52.	-13.	-0.007	112.09	1.233s
AG-108M	1735.43	433.94	36.	-2.	-0.001	872.91	1.239s
PM-146	1815.20	453.88	48.	-16.	-0.009	124.24	1.258s
SB-125	1853.15	463.37	47.	12.	0.007	82.51	1.268s
Ir-192	1871.93	468.06	55.	11.	0.006	101.84	1.272s
BE-7	1910.07	477.60	103.	-7.	-0.004	199.48	1.282s
HF-181	1927.68	482.00	111.	0.	0.000	1000.00	1.286s
La-140	1947.77	487.02	100.	10.	0.006	140.57	1.291s
RU-103	1987.91	497.05	26.	-2.	-0.001	525.20	1.301
RH-106	2047.15	511.86	55.	75.	0.042	18.04	2.565s
Nd-147	2123.70	531.00	22.	10.	0.006	96.80	1.333s
Ba-140	2148.74	537.26	39.	-11.	-0.006	119.74	1.339s
CS-134	2252.65	563.24	26.	12.	0.006	94.30	1.364s
CS-134	2276.99	569.32	61.	-11.	-0.006	104.84	1.369s
PA-234	2277.59	569.47	68.	4.	0.002	299.91	1.370s
TL-208	2332.37	583.17	16.	131.	0.073	10.82	1.380
SB-125	2401.71	600.50	274.	-13.	-0.007	184.11	1.399s
SB-124	2410.64	602.73	261.	-13.	-0.007	179.57	1.401s
BI-214	2436.52	609.20	11.	139.	0.077	9.75	1.575s
RU-103	2440.91	610.30	273.	-13.	-0.007	182.47	1.408s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-108M	2456.84	614.28	260.	-13.	-0.007	180.23	1.412s
PM-144	2471.96	618.06	247.	0.	0.000	1000.00	1.415s
RH-106	2487.38	621.92	180.	11.	0.006	174.73	1.419s
SB-125	2543.28	635.89	42.	-14.	-0.008	100.33	1.432s
I-131	2547.62	636.97	39.	11.	0.006	84.92	1.433s
AG-110M	2630.77	657.76	37.	-2.	-0.001	376.07	1.452s
CS-137	2646.36	661.66	44.	3.	0.002	326.64	1.455s
PM-144	2785.90	696.54	14.	9.	0.005	94.72	1.487s
NB-94	2810.25	702.63	23.	2.	0.001	619.68	1.493s
SB-124	2890.87	722.79	75.	-5.	-0.003	249.00	1.511s
AG-108M	2891.48	722.94	80.	0.	0.000	1000.00	1.511s
ZR-95	2896.52	724.20	78.	0.	0.000	1000.00	1.512s
PM-146	2942.61	735.72	19.	-1.	-0.001	980.08	1.523
PM-146	2988.37	747.16	24.	-3.	-0.002	326.19	1.533s
ZR-95	3026.65	756.73	19.	3.	0.002	286.72	1.541s
AG-110M	3055.51	763.94	14.	29.	0.016	25.66	1.548s
NB-95	3062.89	765.79	43.	0.	0.000	1000.00	1.549s
PA-234M	3065.38	766.41	66.	-13.	-0.007	91.51	1.550s
EU-152	3115.41	778.92	19.	-1.	-0.001	762.54	1.561s
BI-212	3141.41	785.42	23.	-1.	-0.001	773.39	1.567s
CS-134	3183.22	795.87	17.	11.	0.006	60.11	1.576s
TL-210	3198.14	799.60	33.	2.	0.001	355.08	1.579s
CS-134	3207.54	801.95	22.	5.	0.003	128.83	1.581s
CO-58	3242.84	810.78	29.	9.	0.005	90.95	1.589s
La-140	3262.82	815.77	34.	-1.	-0.001	839.78	1.593s
MN-54	3339.13	834.85	28.	-6.	-0.004	148.44	1.610s
Co-56	3386.82	846.77	14.	6.	0.003	144.57	1.620s
TL-208	3442.00	860.56	15.	10.	0.005	94.18	1.632s
NB-94	3484.13	871.10	36.	-14.	-0.008	66.35	1.641s
EU-154	3492.66	873.23	40.	9.	0.005	106.89	1.643s
PA-234	3521.86	880.53	15.	6.	0.003	104.85	1.649s
PA-234	3532.70	883.24	16.	6.	0.003	107.19	1.652s
AG-110M	3538.47	884.68	22.	6.	0.003	122.29	1.653s
Sc-46	3556.86	889.28	61.	-12.	-0.006	99.98	1.657s
Y-88	3591.90	898.04	35.	-14.	-0.008	67.16	1.664s
AC-228	3644.03	911.07	1.	94.	0.052	10.44	2.229s
AG-110M	3749.71	937.49	25.	-3.	-0.002	370.93	1.697s
PA-234	3783.82	946.02	10.	5.	0.003	147.08	1.704s
EU-152	3856.18	964.11	87.	-8.	-0.005	165.42	1.719s
AC-228	3872.54	968.20	11.	62.	0.035	18.12	2.489s
EU-154	3985.06	996.33	71.	-16.	-0.009	78.36	1.746s
PA-234M	4003.73	1001.00	87.	-16.	-0.009	85.76	1.750s
EU-154	4018.84	1004.77	75.	12.	0.007	104.37	1.753s
Co-56	4151.10	1037.84	15.	1.	0.001	857.32	1.780s
Cs-136	4192.02	1048.07	20.	-2.	-0.001	257.68	1.788s
RH-106	4201.18	1050.36	9.	6.	0.003	80.18	1.790s
BI-207	4254.38	1063.66	11.	7.	0.004	113.03	1.801s
Ga-68	4309.34	1077.40	21.	-4.	-0.002	246.99	1.812s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
FE-59	4396.74	1099.25	11.	1.	0.001	596.99	1.829s
EU-152	4448.04	1112.07	87.	-13.	-0.007	106.89	1.839s
ZN-65	4461.92	1115.55	74.	-13.	-0.007	99.16	1.842s
BI-214	4480.88	1120.29	71.	11.	0.006	112.54	1.845s
Sc-46	4481.94	1120.55	57.	13.	0.007	87.60	1.846s
Ta-182	4484.94	1121.30	35.	11.	0.006	80.59	1.846s
CO-60	4692.68	1173.24	16.	3.	0.002	308.52	1.886s
Ta-182	4755.93	1189.05	32.	-12.	-0.007	110.97	1.899s
Ta-182	4885.37	1221.41	11.	9.	0.005	84.99	1.923s
Co-56	4952.84	1238.28	16.	9.	0.005	106.38	1.936
NA-22	5097.84	1274.53	6.	7.	0.004	62.45	1.963s
EU-154	5097.88	1274.54	12.	2.	0.001	340.90	1.963s
FE-59	5166.10	1291.60	6.	4.	0.002	148.05	1.975s
TL-210	5251.71	1313.00	6.	4.	0.002	137.50	1.991s
CO-60	5329.71	1332.50	23.	-10.	-0.006	59.36	2.005s
EU-152	5631.70	1408.00	0.	9.	0.005	33.33	2.059s
K-40	5841.68	1460.50	3.	139.	0.077	8.70	1.298s
La-140	6384.49	1596.21	12.	2.	0.001	424.26	2.185s
BI-214	7057.42	1764.46	2.	24.	0.014	21.49	3.250s
Co-56	7084.99	1771.35	36.	-6.	-0.003	161.09	2.294s
Y-88	7343.81	1836.06	6.	-1.	-0.001	476.64	2.332s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.9489E+00				5.31E+01	
			477.60	-1.949E+00	?(	1.331E+01 1.99E+02 1.05E+01	G
NA-22	C	4.5809E-01				9.50E+02	
			1274.53	4.581E-01	?(	9.266E-01 6.24E+01 9.99E+01	G
K-40	N	9.8810E+01				4.66E+11	
			1460.83	9.881E+01	(P	7.961E+00 8.70E+00 1.07E+01	G
Sc-46	F	1.0390E-01				8.38E+01	
			889.28	-5.582E-01	?(	1.888E+00 1.00E+02 1.00E+02	G
			1120.55	7.659E-01	?(	2.257E+00 8.76E+01 1.00E+02	G
CR-51	F	3.0166E+00				2.77E+01	
			320.08	3.017E+00	?(	1.007E+01 9.93E+01 9.94E+00	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C	-2.9289E-01					3.12E+02	
			834.85	-2.929E-01	?(P	1.261E+00	1.48E+02	1.00E+02 G
FE-59	F	3.4957E-01					4.45E+01	
			1099.25	1.308E-01	?(P	1.867E+00	5.97E+02	5.65E+01 G
			1291.60	6.357E-01	?(P	2.214E+00	1.48E+02	4.32E+01 G
Co-56	C	5.0567E-01					7.73E+01	
			846.77	2.672E-01	?(P	9.416E-01	1.45E+02	9.99E+01 G
			1238.28	8.902E-01	?(	2.112E+00	1.06E+02	6.61E+01 G
			1037.84	3.940E-01	?(	8.180E+00	8.57E+02	1.41E+01 G
			1771.35	-3.226E+00	+	1.810E+01	1.61E+02	1.55E+01 A
CO-57	C	-3.4734E-02					2.72E+02	
			122.06	-3.473E-02	&(	6.652E-01	5.57E+02	8.56E+01 G
			136.47	-2.335E+00	+	9.125E+00	1.17E+02	1.07E+01 G
CO-58	C	4.0358E-01					7.09E+01	
			810.78	4.036E-01	&(	1.247E+00	9.09E+01	9.95E+01 G
CO-60	F	-7.1746E-01					1.93E+03	
			1332.50	-7.175E-01	?(P	1.760E+00	5.94E+01	1.00E+02 G
			1173.24	1.869E-01	+	1.330E+00	3.09E+02	9.99E+01 G
ZN-65	F	-1.5042E+00					2.44E+02	
			1115.55	-1.504E+00	?(	5.034E+00	9.92E+01	5.06E+01 G
NB-94	I	6.6840E-02					7.41E+06	
			702.63	6.684E-02	?(	1.011E+00	6.20E+02	9.79E+01 G
			871.10	-6.654E-01	&	1.460E+00	6.63E+01	9.99E+01 G
ZR-95	I	2.5121E-01					6.40E+01	
			756.73	2.512E-01	&(P	1.762E+00	2.87E+02	5.45E+01 G
			724.20	0.000E+00	-	3.999E+00	1.00E+03	4.42E+01 G
RU-103	I	-6.3695E-02					3.93E+01	
			497.05	-6.370E-02	?(	8.431E-01	5.25E+02	9.09E+01 G
			610.30	-7.807E+00	+	4.803E+01	1.82E+02	5.75E+00 GA
RH-106	I	6.4309E+00					3.74E+02	
			621.92	3.914E+00	?(	2.316E+01	1.75E+02	9.93E+00 G
			1050.36	2.245E+01	?(	6.114E+01	8.02E+01	1.56E+00 G
			511.86	1.119E+01	?	5.519E+00	1.80E+01	2.00E+01 GA
AG-108M	C	-6.3050E-02					1.53E+05	
			433.94	-6.305E-02	?(P	8.743E-01	8.73E+02	9.05E+01 G
			722.94	0.000E+00	+	1.968E+00	1.00E+03	9.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			614.28	-4.967E-01	+	3.019E+00	1.80E+02	8.98E+01 G
AG-110M	F	1.5982E+00					2.50E+02	
			884.68	3.812E-01	?(	1.624E+00	1.22E+02	7.27E+01 G
			657.76	-9.130E-02	&	1.220E+00	3.76E+02	9.46E+01 G
			937.49	-4.435E-01	+	3.846E+00	3.71E+02	3.44E+01 G
			1384.30	-9.929E-02	%	5.480E+00	2.37E+03	2.43E+01 G
			763.94	5.568E+00	?(	3.785E+00	2.57E+01	2.23E+01 G
SN-113	F	4.0501E-01					1.15E+02	
			391.69	4.050E-01	?(	1.634E+00	1.19E+02	6.40E+01 G
SB-124	F	-4.4961E-01					6.02E+01	
			602.73	-4.496E-01	?(	2.723E+00	1.80E+02	9.83E+01 G
			1690.98	-1.783E-02	% P	1.341E+00	1.23E+04	4.78E+01 G
			722.79	-1.862E+00	+	1.604E+01	2.49E+02	1.08E+01 G
SB-125	I	2.2854E-02					1.01E+03	
			427.88	-1.116E+00	?(	3.117E+00	1.12E+02	2.96E+01 G
			600.50	-2.462E+00	+	1.528E+01	1.84E+02	1.79E+01 G
			635.89	-4.296E+00	+ P	1.040E+01	1.00E+02	1.13E+01 G
			463.37	3.242E+00	@(	8.984E+00	8.25E+01	1.05E+01 G
I-131	I	2.5200E-01					8.02E+00	
			364.48	-2.166E-01	?(	1.018E+00	1.87E+02	8.17E+01 G
			284.30	-1.672E+00	+ P	1.120E+01	2.06E+02	6.14E+00 G
			636.97	5.592E+00	?(	1.600E+01	8.49E+01	7.17E+00 G
Gd-153	F	-9.4543E-02					2.42E+02	
			97.50	-9.454E-02	%(	3.504E+00	1.10E+03	3.00E+01 G
			103.20	0.000E+00	+	4.774E+00	1.00E+03	2.18E+01 G
Ga-68	C	-8.8426E+00					4.71E-02	
			1077.40	-8.843E+00	&(	4.945E+01	2.47E+02	3.30E+00 G
Tc-99m	I	-2.7144E-01					2.51E-01	
			140.51	-2.714E-01	&(	1.056E+00	1.16E+02	8.93E+01 G
BA-133	F	-5.9864E-01					3.85E+03	
			356.00	-5.986E-01	&(	2.983E+00	1.48E+02	6.20E+01 G
			302.85	9.047E-02	%	9.915E+00	3.23E+03	1.83E+01 G
			383.84	3.210E+00	*	1.175E+01	1.08E+02	8.94E+00 GA
			80.99	-9.326E-01	&	4.920E+00	1.58E+02	3.41E+01 GA
CS-134	I	1.0807E+00					7.54E+02	
			795.87	5.736E-01	?(	1.124E+00	6.01E+01	8.55E+01 G
			604.71	-4.977E-02	&	2.682E+00	1.58E+03	9.76E+01 G
			569.32	-2.332E+00	-	8.290E+00	1.05E+02	1.54E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			801.95	2.794E+00	?(	1.257E+01	1.29E+02	8.69E+00 G
			563.24	4.493E+00	*(	1.024E+01	9.43E+01	8.35E+00 G
CS-137	I	1.2727E-01					1.10E+04	
			661.66	1.273E-01	?(P	1.465E+00	3.27E+02	8.52E+01 G
CE-139	F	-3.0598E-01					1.38E+02	
			165.85	-3.060E-01	?(	1.041E+00	1.02E+02	7.99E+01 G
Ba-140	I	-1.3976E+00					1.28E+01	
			537.26	-1.398E+00	?(	4.042E+00	1.20E+02	2.44E+01 G
			162.66	-1.229E+00	+	1.355E+01	3.24E+02	6.22E+00 G
			304.85	0.000E+00	+	4.265E+01	1.00E+03	4.29E+00 G
La-140	I	4.6878E-01					1.28E+01	
			1596.21	1.729E-01	?(	1.630E+00	4.24E+02	9.54E+01 G
			487.02	6.459E-01	?(	3.087E+00	1.41E+02	4.55E+01 G
			328.76	1.462E+00	?(P	3.905E+00	7.99E+01	2.03E+01 G
			815.77	-2.166E-01	+ P	5.766E+00	8.40E+02	2.33E+01 G
CE-141	I	4.6764E-01					3.25E+01	
			145.44	4.676E-01	*(	2.609E+00	1.67E+02	4.82E+01 G
PM-144	C	3.5244E-01					3.63E+02	
			696.54	3.524E-01	?(	7.928E-01	9.47E+01	9.90E+01 G
			618.06	0.000E+00	-	2.686E+00	1.00E+03	9.91E+01 G
EU-152	F	8.6412E-01					4.94E+03	
			121.78	1.733E-01	&(	2.320E+00	3.92E+02	2.86E+01 G
			344.29	-2.084E-01	+ P	5.235E+00	4.81E+02	2.65E+01 G
			1112.07	-5.554E+00	+	2.006E+01	1.07E+02	1.36E+01 G
			778.92	-4.109E-01	& P	7.698E+00	7.63E+02	1.29E+01 G
			964.11	-2.913E+00	+	1.649E+01	1.65E+02	1.46E+01 G
			244.69	3.469E+00	?(	2.396E+01	2.06E+02	7.58E+00 G
			1408.00	3.149E+00	?	2.578E+00	3.33E+01	2.10E+01 GA
EU-154	I	1.2426E+00					3.14E+03	
			123.10	3.408E-01	&(	1.464E+00	1.27E+02	4.08E+01 G
			1274.54	2.879E-01	?(	3.657E+00	3.41E+02	3.52E+01 G
			723.36	1.328E-01	%	8.758E+00	1.88E+03	2.02E+01 G
			873.23	3.431E+00	?(P	1.252E+01	1.07E+02	1.23E+01 G
			1004.77	3.660E+00	?(	1.292E+01	1.04E+02	1.80E+01 G
			996.33	-8.131E+00	+	2.127E+01	7.84E+01	1.06E+01 G
EU-155	I	-1.1197E+00					1.81E+03	
			105.31	-1.120E+00	?(P	4.593E+00	1.03E+02	2.12E+01 G
			86.54	0.000E+00	&	4.654E+00	1.00E+03	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ta-182	F	2.0583E+00					1.14E+02	
			1121.30	1.902E+00	?(	5.152E+00	8.06E+01	3.49E+01 G
			1221.41	2.260E+00	?(	4.286E+00	8.50E+01	2.70E+01 G
			1189.05	-4.665E+00	+	1.130E+01	1.11E+02	1.62E+01 G
Hg-203	F	-2.6671E-01					4.66E+01	
			279.20	-2.667E-01	?(	1.150E+00	1.27E+02	8.15E+01 G
TL-208	N	5.1756E+00					6.98E+02	
			583.02	5.176E+00	(P	8.329E-01	1.08E+01	8.45E+01 G
			277.28	1.008E+01	+	8.898E+00	3.78E+01	6.31E+00 G
			860.56	3.655E+00	- P	7.903E+00	9.42E+01	1.24E+01 G
PM-146	C	-6.4218E-01					2.02E+03	
			453.88	-6.422E-01	?(P	1.446E+00	1.24E+02	6.50E+01 G
			747.16	-3.601E-01	+ P	3.112E+00	3.26E+02	3.40E+01 G
			735.72	-1.773E-01	+ P	4.183E+00	9.80E+02	2.25E+01 G
Y-88	F	-1.2615E-01					1.07E+02	
			1836.06	-1.262E-01	?(	1.366E+00	4.77E+02	9.92E+01 G
			898.04	-7.347E-01	& P	1.581E+00	6.72E+01	9.37E+01 G
Cd-113m		3.2820E+03					5.33E+03	
			263.70	3.282E+03	*(	9.172E+03	8.31E+01	6.00E-03 K
Cd-109	F	4.6764E+00					4.53E+02	
			88.04	4.676E+00	&(	3.590E+01	2.29E+02	3.79E+00 G
Cf-251	T	-1.1990E+00					3.28E+05	
			176.60	-1.199E+00	&(	4.121E+00	1.34E+02	1.70E+01 G
			227.00	7.825E-01	?	1.111E+01	5.40E+02	6.30E+00 GA
Cf-249	T	4.0577E-01					1.28E+05	
			387.95	1.272E-01	?(	1.714E+00	3.90E+02	6.60E+01 G
			333.44	1.591E+00	?(	6.845E+00	1.27E+02	1.55E+01 G
Sn-126		3.0110E+00					3.65E+07	
			87.57	0.000E+00	-	3.787E+00	1.00E+03	3.75E+01 GA
			64.28	3.011E+00	&(	1.105E+01	1.10E+02	9.70E+00 G
			86.94	0.000E+00	-	1.577E+01	1.00E+03	9.04E+00 GA
PB-210	N	1.6402E+00					8.14E+03	
			46.54	1.640E+00	*(P	3.897E+01	6.99E+02	4.25E+00 G
PB-212	N	1.2252E+01					6.98E+02	
			238.63	1.225E+01	(P	1.946E+00	7.08E+00	4.33E+01 G
			300.03	-9.559E+00	-	6.086E+01	1.90E+02	3.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	1.0872E+01					5.84E+05	
			351.93	1.057E+01	*(P	1.917E+00	1.04E+01	3.76E+01 G
			295.09	1.146E+01	*(P	2.161E+00	1.14E+01	1.93E+01 G
			242.00	3.816E+00	-	2.493E+01	1.95E+02	7.43E+00 GA
BI-207	C	5.3590E-01					1.18E+04	
			1063.66	5.359E-01	?(P	1.387E+00	1.13E+02	7.45E+01 G
			569.70	-3.511E-02	& P	1.326E+00	1.85E+03	9.77E+01 G
BI-212	N	-3.5742E-01					6.98E+02	
			727.17	-3.574E-01	%(	2.371E+01	1.89E+03	7.55E+00 G
			785.42	-4.516E+00	+	8.542E+01	7.73E+02	1.28E+00 GA
U-235	N	-2.1388E+00					2.57E+11	
			143.79	-2.139E+00	?(P	1.203E+01	3.62E+01	1.10E+01 G
			205.33	1.594E+00	+ P	1.261E+01	3.02E+02	5.01E+00 G
			163.38	1.916E+00	& P	1.659E+01	2.55E+02	5.08E+00 G
			185.72	1.644E+00	+	1.103E+00	2.96E+01	5.40E+01 GA
BI-214	N	1.0430E+01					5.84E+05	
			609.31	1.043E+01	*(P	1.370E+00	9.75E+00	4.61E+01 G
			1120.29	4.359E+00	- P	1.663E+01	1.13E+02	1.51E+01 G
			1764.49	1.438E+01	+ P	4.972E+00	2.15E+01	1.54E+01 G
BI-210M	T	3.7470E-01					1.10E+09	
			265.83	3.747E-01	?(P	1.352E+00	1.06E+02	5.00E+01 G
			304.90	0.000E+00	-	6.535E+00	1.00E+03	2.80E+01 G
AC-228	N	1.6613E+01					2.10E+03	
			911.07	1.604E+01	(P	1.286E+00	1.04E+01	2.90E+01 G
			968.97	1.864E+01	(P	5.406E+00	1.81E+01	1.75E+01 G
			338.32	1.506E+01	(P	4.055E+00	1.44E+01	1.20E+01 G
			93.35	2.393E+01	+	1.113E+01	2.10E+01	5.56E+00 XA
TH-227	N	2.5483E+00					7.95E+03	
			256.24	1.170E+00	?(	1.020E+01	3.31E+02	7.00E+00 G
			235.97	2.243E+00	?(	1.527E+01	2.03E+02	1.23E+01 G
			50.14	4.224E+00	&(	1.744E+01	1.23E+02	8.00E+00 G
TH-229	N	-4.1353E+00					2.68E+06	
			193.51	-4.135E+00	&(P	1.612E+01	1.54E+02	4.40E+00 G
			210.85	-3.254E+00	+	2.814E+01	3.34E+02	2.99E+00 G
TH-234	N	3.6481E+00					1.63E+12	
			92.59	-3.739E+00	*(P	2.439E+01	1.20E+02	5.58E+00 G
			63.29	1.447E+01	(P	2.842E+01	5.98E+01	3.81E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-231	N	9.7678E+00					1.20E+07	
			302.65	9.768E+00	?(	6.192E+01	1.89E+02	2.88E+00 G
			300.07	-1.275E+01	+	7.982E+01	1.87E+02	2.46E+00 G
PA-233	C	6.2444E-01					7.82E+08	
			312.01	-4.221E-02	&(P	5.189E+00	1.75E+03	3.60E+01 G
			300.18	4.495E+00	?(	2.803E+01	1.86E+02	6.20E+00 G
PA-234	N	9.7118E-01					1.63E+12	
			131.29	-1.011E+00	&(	5.120E+00	1.51E+02	1.80E+01 G
			946.02	1.900E+00	?(P	6.676E+00	1.47E+02	1.34E+01 G
			569.47	1.570E+00	?(P	1.637E+01	3.00E+02	8.20E+00 G
			883.24	2.880E+00	?(	1.073E+01	1.07E+02	9.60E+00 G
			880.53	4.589E+00	?	1.671E+01	1.05E+02	6.00E+00 GA
PA-234M	N	-1.0363E+02					1.63E+12	
			1001.00	-1.036E+02	&(	2.977E+02	8.58E+01	8.37E-01 G
			766.41	-1.904E+02	&	5.867E+02	9.15E+01	2.94E-01 G
AM-241	T	8.2227E-01					1.58E+05	
			59.54	8.223E-01	&(	3.025E+00	1.37E+02	3.59E+01 G
Np-237	F	4.0167E-01					2.14E+06	
			86.49	4.017E-01	&(	1.088E+01	8.07E+02	1.31E+01 G
Ir-192	F	-5.8039E-03					7.40E+01	
			316.49	-3.513E-01	&(	1.641E+00	1.39E+02	8.70E+01 G
			468.06	5.752E-01	&(	1.986E+00	1.02E+02	5.18E+01 G
			308.44	0.000E+00	+	5.820E+00	1.00E+03	3.18E+01 G
Cs-136	F	2.2490E-02					1.30E+01	
			818.50	2.249E-02	%(	1.405E+00	1.74E+03	1.00E+02 G
			1048.07	-1.755E-01	+	1.635E+00	2.58E+02	8.00E+01 G
			340.57	-6.867E-01	+	3.185E+00	1.38E+02	4.69E+01 G
Np-239	T	-8.5129E-01					2.36E+00	
			103.70	0.000E+00	+	4.333E+00	1.00E+03	2.40E+01 X
			106.13	-8.513E-01	&(	4.395E+00	1.54E+02	2.27E+01 G
			99.50	0.000E+00	+	6.991E+00	1.00E+03	1.50E+01 X
Nd-147		2.4453E+00					1.11E+01	
			531.00	2.445E+00	?(	5.757E+00	9.68E+01	1.30E+01 G
			91.10	0.000E+00	-	4.783E+00	1.00E+03	2.83E+01 G
TL-210	N	1.0313E-01					5.84E+05	
			799.60	1.031E-01	?(	1.307E+00	3.55E+02	9.90E+01 G
			296.00	-3.909E-01	&	2.538E+00	1.94E+02	7.90E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          1313.00 1.423E+00 ?   4.531E+00 1.37E+02 2.10E+01 GA

Kr-85    I  -2.3108E+00                                        3.92E+03
                          513.98-2.311E+00 &(  3.890E+02 4.87E+03 4.30E-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	234.	3.	0.002	698.60	1.640E+00	P
TH-227	50.14	217.	17.	0.010	122.93	4.224E+00	
AM-241	59.54	223.	20.	0.011	137.09	8.223E-01	
TH-234	63.29	261.	40.	0.022	59.80	1.447E+01	P
Sn-126	64.28	266.	21.	0.012	109.71	3.011E+00	
BA-133	80.99	1039.	-29.	-0.016	158.37	-9.326E-01	
Np-237	86.49	811.	5.	0.003	806.72	4.017E-01	
Cd-109	88.04	752.	17.	0.009	229.41	4.676E+00	
TH-234	92.59	789.	-20.	-0.011	120.42	-3.739E+00	P
EU-155	105.31	425.	-24.	-0.013	102.61	-1.120E+00	P
Np-239	106.13	448.	-20.	-0.011	154.14	-8.513E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	121.78	190.	5.	0.003	392.43	1.733E-01	
CO-57	122.06	138.	-3.	-0.002	556.78	-3.473E-02	
EU-154	123.10	152.	14.	0.008	127.38	3.408E-01	
CO-57	136.47	391.	-24.	-0.013	116.97	-2.335E+00	
Tc-99m	140.51	334.	-23.	-0.013	116.31	-2.714E-01	
CE-141	145.44	618.	21.	0.012	166.87	4.676E-01	
Ba-140	162.66	231.	-7.	-0.004	324.50	-1.229E+00	
CE-139	165.85	228.	-21.	-0.012	101.69	-3.060E-01	
TH-229	193.51	125.	-14.	-0.008	153.76	-4.135E+00	P
TH-229	210.85	154.	-7.	-0.004	333.81	-3.254E+00	
TH-227	235.97	666.	18.	0.010	203.45	2.243E+00	
EU-152	244.69	584.	17.	0.009	206.17	3.469E+00	
TH-227	256.24	77.	5.	0.003	331.36	1.170E+00	
Cd-113m	263.70	42.	12.	0.007	83.10	3.282E+03	
BI-210M	265.83	64.	11.	0.006	106.49	3.747E-01	P
Hg-203	279.20	117.	-12.	-0.007	127.43	-2.667E-01	
I-131	284.30	59.	-6.	-0.003	206.11	-1.672E+00	P
TL-210	296.00	514.	-17.	-0.009	193.68	-3.909E-01	
PA-231	300.07	480.	-17.	-0.009	186.72	-1.275E+01	
PA-233	300.18	373.	15.	0.008	185.51	4.495E+00	
PA-231	302.65	388.	15.	0.008	188.67	9.768E+00	
Ir-192	316.49	227.	-16.	-0.009	138.83	-3.513E-01	
CR-51	320.08	106.	15.	0.008	99.30	3.017E+00	
La-140	328.76	61.	15.	0.008	79.86	1.462E+00	P
Cf-249	333.44	111.	12.	0.007	127.02	1.591E+00	
Cs-136	340.57	218.	-15.	-0.009	137.80	-6.867E-01	
EU-152	344.29	184.	-3.	-0.001	480.60	-2.084E-01	P
HF-181	345.83	221.	-17.	-0.009	129.66	-2.316E+00	
BA-133	356.00	315.	-17.	-0.010	148.40	-5.986E-01	
I-131	364.48	56.	-8.	-0.004	186.53	-2.166E-01	
BA-133	383.84	84.	12.	0.007	108.27	3.210E+00	
Cf-249	387.95	96.	4.	0.002	389.85	1.272E-01	
SN-113	391.69	80.	11.	0.006	118.88	4.050E-01	
SB-125	427.88	52.	-13.	-0.007	112.09	-1.116E+00	
AG-108M	433.94	36.	-2.	-0.001	872.91	-6.305E-02	P
PM-146	453.88	48.	-16.	-0.009	124.24	-6.422E-01	P
SB-125	463.37	47.	12.	0.007	82.51	3.242E+00	
Ir-192	468.06	55.	11.	0.006	101.84	5.752E-01	
BE-7	477.60	103.	-7.	-0.004	199.48	-1.949E+00	
La-140	487.02	100.	10.	0.006	140.57	6.459E-01	
RU-103	497.05	26.	-2.	-0.001	525.20	-6.370E-02	
RH-106	511.86	55.	75.	0.042	18.04	1.119E+01	
Nd-147	531.00	22.	10.	0.006	96.80	2.445E+00	
Ba-140	537.26	39.	-11.	-0.006	119.74	-1.398E+00	
CS-134	563.24	26.	12.	0.006	94.30	4.493E+00	
CS-134	569.32	61.	-11.	-0.006	104.84	-2.332E+00	
SB-125	600.50	274.	-13.	-0.007	184.11	-2.462E+00	
SB-124	602.73	261.	-13.	-0.007	179.57	-4.496E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RU-103	610.30	273.	-13.	-0.007	182.47	-7.807E+00	
AG-108M	614.28	260.	-13.	-0.007	180.23	-4.967E-01	
RH-106	621.92	180.	11.	0.006	174.73	3.914E+00	
SB-125	635.89	42.	-14.	-0.008	100.33	-4.296E+00	P
I-131	636.97	39.	11.	0.006	84.92	5.592E+00	
AG-110M	657.76	37.	-2.	-0.001	376.07	-9.130E-02	
CS-137	661.66	44.	3.	0.002	326.64	1.273E-01	P
PM-144	696.54	14.	9.	0.005	94.72	3.524E-01	
NB-94	702.63	23.	2.	0.001	619.68	6.684E-02	
SB-124	722.79	75.	-5.	-0.003	249.00	-1.862E+00	
PM-146	735.72	19.	-1.	-0.001	980.08	-1.773E-01	P
PM-146	747.16	24.	-3.	-0.002	326.19	-3.601E-01	P
ZR-95	756.73	19.	3.	0.002	286.72	2.512E-01	P
AG-110M	763.94	14.	29.	0.016	25.66	5.568E+00	
PA-234M	766.41	66.	-13.	-0.007	91.51	-1.904E+02	
EU-152	778.92	19.	-1.	-0.001	762.54	-4.109E-01	P
BI-212	785.42	23.	-1.	-0.001	773.39	-4.516E+00	
CS-134	795.87	17.	11.	0.006	60.11	5.736E-01	
TL-210	799.60	33.	2.	0.001	355.08	1.031E-01	
CS-134	801.95	22.	5.	0.003	128.83	2.794E+00	
CO-58	810.78	29.	9.	0.005	90.95	4.036E-01	
La-140	815.77	34.	-1.	-0.001	839.78	-2.166E-01	P
MN-54	834.85	28.	-6.	-0.004	148.44	-2.929E-01	P
Co-56	846.77	14.	6.	0.003	144.57	2.672E-01	P
NB-94	871.10	36.	-14.	-0.008	66.35	-6.654E-01	
EU-154	873.23	40.	9.	0.005	106.89	3.431E+00	P
AG-110M	884.68	22.	6.	0.003	122.29	3.812E-01	
Sc-46	889.28	61.	-12.	-0.006	99.98	-5.582E-01	
Y-88	898.04	35.	-14.	-0.008	67.16	-7.347E-01	P
AG-110M	937.49	25.	-3.	-0.002	370.93	-4.435E-01	
EU-152	964.11	87.	-8.	-0.005	165.42	-2.913E+00	
EU-154	996.33	71.	-16.	-0.009	78.36	-8.131E+00	
PA-234M	1001.00	87.	-16.	-0.009	85.76	-1.036E+02	
EU-154	1004.77	75.	12.	0.007	104.37	3.660E+00	
Co-56	1037.84	15.	1.	0.001	857.32	3.940E-01	
Cs-136	1048.07	20.	-2.	-0.001	257.68	-1.755E-01	
RH-106	1050.36	9.	6.	0.003	80.18	2.245E+01	
BI-207	1063.66	11.	7.	0.004	113.03	5.359E-01	P
Ga-68	1077.40	21.	-4.	-0.002	246.99	-8.843E+00	
FE-59	1099.25	11.	1.	0.001	596.99	1.308E-01	P
EU-152	1112.07	87.	-13.	-0.007	106.89	-5.554E+00	
ZN-65	1115.55	74.	-13.	-0.007	99.16	-1.504E+00	
Sc-46	1120.55	57.	13.	0.007	87.60	7.659E-01	
Ta-182	1121.30	35.	11.	0.006	80.59	1.902E+00	
CO-60	1173.24	16.	3.	0.002	308.52	1.869E-01	
Ta-182	1189.05	32.	-12.	-0.007	110.97	-4.665E+00	
Ta-182	1221.41	11.	9.	0.005	84.99	2.260E+00	
Co-56	1238.28	16.	9.	0.005	106.38	8.902E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
NA-22	1274.53	6.	7.	0.004	62.45	4.581E-01		
EU-154	1274.54	12.	2.	0.001	340.90	2.879E-01		
FE-59	1291.60	6.	4.	0.002	148.05	6.357E-01		P
TL-210	1313.00	6.	4.	0.002	137.50	1.423E+00		
CO-60	1332.50	23.	-10.	-0.006	59.36	-7.175E-01		P
EU-152	1408.00	0.	9.	0.005	33.33	3.149E+00		
La-140	1596.21	12.	2.	0.001	424.26	1.729E-01		
Co-56	1771.35	36.	-6.	-0.003	161.09	-3.226E+00		
Y-88	1836.06	6.	-1.	-0.001	476.64	-1.262E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-1.9489E+00	-1.9489E+00	1.995E+02%	1.33E+01
NA-22	#A	4.5809E-01	4.5809E-01	6.245E+01%	9.27E-01
K-40		9.8810E+01	9.8810E+01	8.698E+00%	7.96E+00
Sc-46	#A	1.0390E-01	1.0390E-01	6.646E+01%	1.89E+00
CR-51	#A	3.0165E+00	3.0166E+00	9.930E+01%	1.01E+01
MN-54	#A	-2.9289E-01	-2.9289E-01	1.484E+02%	1.26E+00
FE-59	#A	3.4957E-01	3.4957E-01	1.480E+02%	1.87E+00
Co-56	#A	5.0567E-01	5.0567E-01	1.064E+02%	9.42E-01
CO-57	#A	-3.4733E-02	-3.4734E-02	5.568E+02%	6.65E-01
CO-58	#A	4.0358E-01	4.0358E-01	9.095E+01%	1.25E+00
CO-60	#A	-7.1746E-01	-7.1746E-01	5.936E+01%	1.76E+00
ZN-65	#A	-1.5042E+00	-1.5042E+00	9.916E+01%	5.03E+00
NB-94	#A	6.6840E-02	6.6840E-02	6.197E+02%	1.01E+00
ZR-95	#A	2.5120E-01	2.5121E-01	2.867E+02%	1.76E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.41E+00
RU-103	#A	-6.3695E-02	-6.3695E-02	5.252E+02%	8.43E-01
RH-106	#A	6.4309E+00	6.4309E+00	8.018E+01%	2.32E+01
AG-108M	#A	-6.3050E-02	-6.3050E-02	8.729E+02%	8.74E-01
AG-110M	#A	1.5982E+00	1.5982E+00	2.566E+01%	1.62E+00
SN-113	#A	4.0501E-01	4.0501E-01	1.189E+02%	1.63E+00
SB-124	#A	-4.4960E-01	-4.4961E-01	1.796E+02%	2.72E+00
SB-125	#A	2.2854E-02	2.2854E-02	6.959E+01%	3.12E+00
I-131	#A	2.5199E-01	2.5200E-01	8.492E+01%	1.02E+00
Gd-153	#A	-9.4543E-02	-9.4543E-02	1.097E+03%	3.50E+00
Ga-68	#A	-8.7855E+00	-8.8426E+00	2.470E+02%	4.95E+01
Tc-99m	#A	-2.7111E-01	-2.7144E-01	1.163E+02%	1.06E+00
BA-133	#A	-5.9864E-01	-5.9864E-01	1.484E+02%	2.98E+00
CS-134	#A	1.0807E+00	1.0807E+00	5.686E+01%	1.12E+00
CS-137	#A	1.2727E-01	1.2727E-01	3.266E+02%	1.47E+00
CE-139	#A	-3.0598E-01	-3.0598E-01	1.017E+02%	1.04E+00
Ba-140	#A	-1.3976E+00	-1.3976E+00	1.197E+02%	4.04E+00

La-140 #A	4.6877E-01	4.6878E-01	7.986E+01%		1.63E+00
CE-141 #A	4.6763E-01	4.6764E-01	1.669E+02%		2.61E+00
CE-144 #A	0.0000E+00	0.0000E+00	1.000E+03%		8.56E+00
PM-144 #A	3.5244E-01	3.5244E-01	9.472E+01%		7.93E-01
EU-152 #A	8.6412E-01	8.6412E-01	2.062E+02%		2.32E+00
EU-154 #A	1.2426E+00	1.2426E+00	9.835E+01%		1.46E+00
EU-155 #A	-1.1197E+00	-1.1197E+00	1.026E+02%		4.59E+00
HF-181 #A	0.0000E+00	0.0000E+00	5.774E+02%		1.81E+00
Ta-182 #A	2.0582E+00	2.0583E+00	5.856E+01%		5.15E+00
Hg-203 #A	-2.6671E-01	-2.6671E-01	1.274E+02%		1.15E+00
TL-208	5.1756E+00	5.1756E+00	1.082E+01%		8.33E-01
PM-146 #A	-6.4218E-01	-6.4218E-01	1.242E+02%		1.45E+00
Y-88 #A	-1.2615E-01	-1.2615E-01	4.766E+02%		1.37E+00
Cd-113m#A	3.2820E+03	3.2820E+03	8.310E+01%		9.17E+03
Cd-109 #A	4.6764E+00	4.6764E+00	2.294E+02%		3.59E+01
Cf-251 #A	-1.1990E+00	-1.1990E+00	1.338E+02%		4.12E+00
Cf-249 #A	4.0577E-01	4.0577E-01	1.270E+02%		1.71E+00
Sn-126 #A	3.0110E+00	3.0110E+00	1.097E+02%		1.11E+01
PB-210 #A	1.6402E+00	1.6402E+00	6.986E+02%		3.90E+01
PB-212 #	1.2252E+01	1.2252E+01	7.083E+00%		1.95E+00
PB-214 #	1.0872E+01	1.0872E+01	7.743E+00%		1.92E+00
BI-207 #A	5.3590E-01	5.3590E-01	1.130E+02%		1.39E+00
BI-212 #A	-3.5742E-01	-3.5742E-01	1.893E+03%		2.37E+01
U-235 A	-2.1388E+00	-2.1388E+00	3.618E+01%		1.20E+01
BI-214	1.0430E+01	1.0430E+01	9.752E+00%		1.37E+00
BI-210M#A	3.7470E-01	3.7470E-01	1.065E+02%		1.35E+00
AC-228	1.6613E+01	1.6613E+01	8.470E+00%		1.29E+00
TH-227 #A	2.5483E+00	2.5483E+00	1.229E+02%		1.02E+01
TH-229 #A	-4.1353E+00	-4.1353E+00	1.538E+02%		1.61E+01
TH-234 #A	3.6481E+00	3.6481E+00	5.980E+01%		2.44E+01
PA-231 #A	9.7678E+00	9.7678E+00	1.887E+02%		6.19E+01
PA-233 #A	6.2444E-01	6.2444E-01	1.855E+02%		5.19E+00
PA-234 #A	9.7118E-01	9.7118E-01	9.547E+01%		5.12E+00
PA-234M#A	-1.0363E+02	-1.0363E+02	8.576E+01%		2.98E+02
AM-241 #A	8.2227E-01	8.2227E-01	1.371E+02%		3.02E+00
Np-237 #A	4.0167E-01	4.0167E-01	8.067E+02%		1.09E+01
Ir-192 #A	-5.8038E-03	-5.8039E-03	8.609E+01%		1.64E+00
Cs-136 #A	2.2490E-02	2.2490E-02	1.738E+03%		1.41E+00
Np-239 #A	-8.5118E-01	-8.5129E-01	1.541E+02%		4.39E+00
Nd-147 #A	2.4452E+00	2.4453E+00	9.680E+01%		5.76E+00
TL-210 #A	1.0313E-01	1.0313E-01	3.551E+02%		1.31E+00
Kr-85 #A	-2.3108E+00	-2.3108E+00	4.865E+03%		3.89E+02

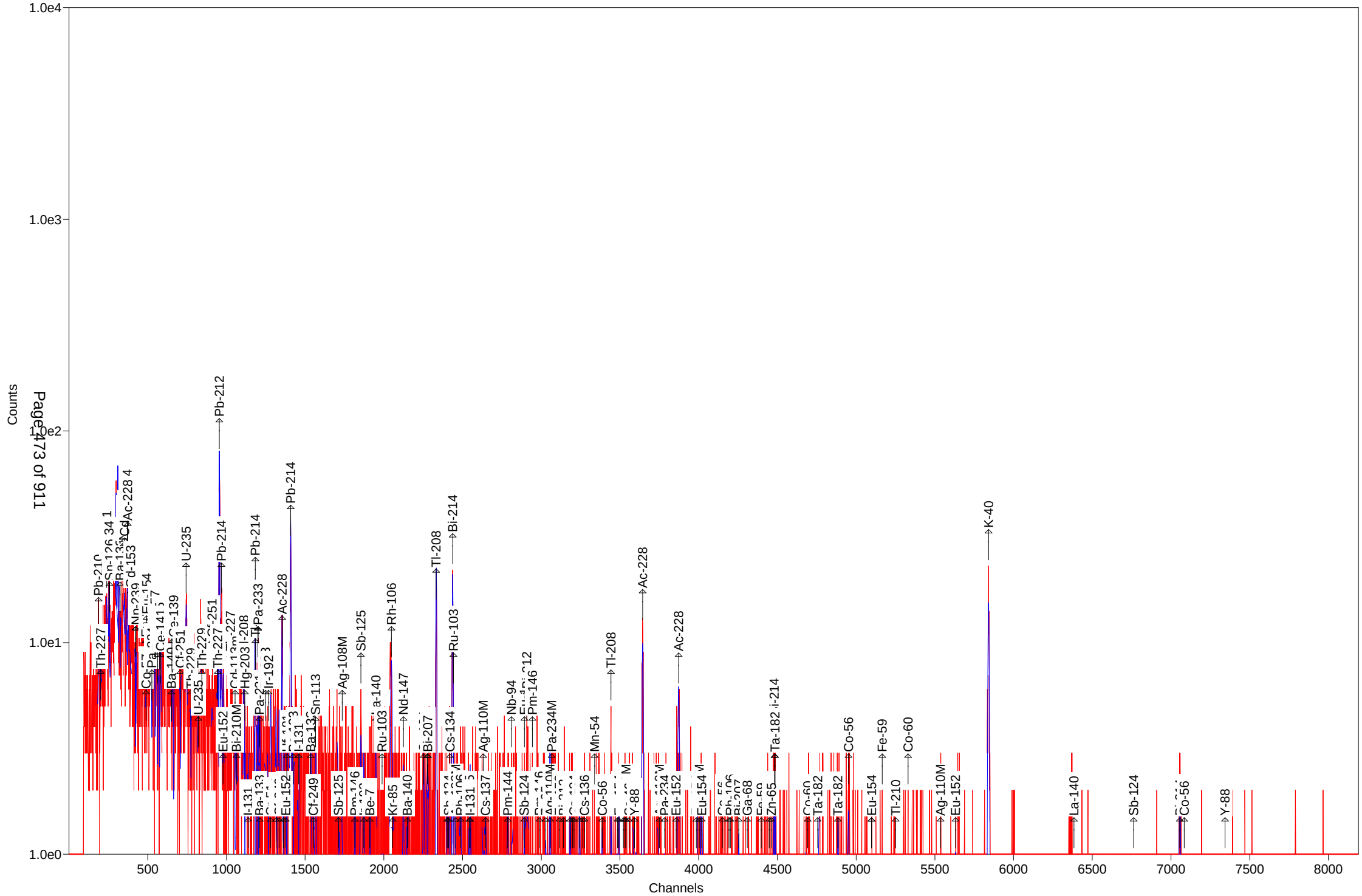
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 1.542E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 1.5415097E+02 Bq/Sample

412881_Gamma_180-86110-A-8-A. 7_Gamma_20190290.spc.



Test America St. Louis Spectrum ID: 5_Gamma_20190291

Sample Description: 412881_Gamma_180-86110-A-9-A
Detector: Detector # 5
Batch ID: 412881
Work Order Number: Gamma
Lot Number: 180-86110-A-9-A

Decay to Time: 2/21/2019 01:54 Live Time: 1800 sec
Acquisition Time: 2/21/2019 01:54:55 Real Time: 1807 sec
Analysis Time: 2/21/2019 02:25 Dead Time: 0.36 %
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_Rev15.lib
Bkgd Correction File: 5_2019-01-20_1014.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	1.621E+00	234.5	3.802E+00	3.803E+00	1.334E+01
NA-22	6.797E-01	37.8	2.569E-01	2.591E-01	7.156E-01
K-40	1.175E+02	9.5	1.113E+01	1.265E+01	9.188E+00
Sc-46	5.957E-01	90.0	5.359E-01	5.367E-01	2.522E+00
CR-51	-3.792E+00	109.7	4.159E+00	4.164E+00	1.407E+01
MN-54	-2.948E-01	241.3	7.113E-01	7.115E-01	1.716E+00
FE-59	4.599E-02	44.2	2.033E-02	2.046E-02	3.572E+00
Co-56	6.581E-01	90.1	5.932E-01	5.942E-01	1.175E+00
CO-57	-3.257E-01	89.7	2.921E-01	2.927E-01	9.779E-01
CO-58	-1.358E-01	342.5	4.651E-01	4.651E-01	1.856E+00
CO-60	8.957E-01	48.7	4.364E-01	4.387E-01	1.361E+00
ZN-65	5.832E-01	270.4	1.577E+00	1.577E+00	5.555E+00
NB-94	4.997E-01	95.4	4.766E-01	4.773E-01	1.178E+00
ZR-95	5.779E-01	95.6	5.525E-01	5.534E-01	1.427E+00
NB-95	4.528E-01	80.6	3.650E-01	3.657E-01	1.237E+00
RU-103	1.607E-01	272.3	4.376E-01	4.377E-01	1.159E+00
RH-106	-7.643E+00	74.5	5.695E+00	5.708E+00	4.101E+01
AG-108M	4.328E-01	107.7	4.662E-01	4.668E-01	1.030E+00
AG-110M	8.202E-01	87.1	7.142E-01	7.154E-01	3.593E+00
SN-113	-4.353E-01	40.8	1.776E-01	1.790E-01	2.636E+00
SB-124	-4.417E-02	58.4	2.581E-02	2.591E-02	3.838E+00
SB-125	-1.709E+00	24.4	4.175E-01	4.266E-01	4.773E+00
I-131	-7.790E-02	140.5	1.095E-01	1.095E-01	1.349E+00
Gd-153	1.622E-01	95.7	1.553E-01	1.556E-01	3.153E+00
Ga-68	-2.096E+01	145.5	3.048E+01	3.051E+01	7.051E+01
Tc-99m	3.009E-01	69.2	2.083E-01	2.090E-01	6.052E-01
BA-133	3.536E-01	263.8	9.327E-01	9.329E-01	3.185E+00
CS-134	8.726E-01	88.5	7.719E-01	7.732E-01	1.675E+00
CS-137	1.241E-01	384.4	4.772E-01	4.772E-01	1.715E+00
CE-139	-2.071E-01	182.5	3.779E-01	3.785E-01	1.285E+00
Ba-140	3.030E+00	50.3	1.525E+00	1.533E+00	2.320E+00
La-140	1.550E-01	78.8	1.222E-01	1.225E-01	2.262E+00
CE-141	5.296E-01	119.9	6.350E-01	6.355E-01	2.138E+00

CE-144	-3.425E-08	8818019279.4	3.020E+00	3.020E+00	1.034E+01
PM-144	3.740E-01	170.1	6.361E-01	6.364E-01	1.440E+00
EU-152	3.625E+00	25.1	9.106E-01	9.304E-01	3.191E+00
EU-154	6.259E-01	103.7	6.492E-01	6.500E-01	2.181E+00
EU-155	-1.362E+00	85.8	1.169E+00	1.171E+00	6.685E+00
HF-181	3.142E-01	172.4	5.416E-01	5.418E-01	1.831E+00
Ta-182	7.165E-01	132.7	9.507E-01	9.514E-01	6.051E+00
Hg-203	4.286E-01	114.4	4.904E-01	4.910E-01	1.658E+00
TL-208	5.867E+00	11.2	6.594E-01	7.263E-01	8.728E-01
PM-146	8.156E-02	192.1	1.567E-01	1.567E-01	2.114E+00
Y-88	-1.331E+00	89.4	1.190E+00	1.193E+00	2.509E+00
Cd-113m	1.735E+03	320.2	5.554E+03	5.555E+03	1.925E+04
Cd-109	1.170E+00	1094.2	1.280E+01	1.281E+01	4.328E+01
Cf-251	1.486E+00	105.5	1.567E+00	1.573E+00	4.263E+00
Cf-249	8.288E-01	87.4	7.242E-01	7.255E-01	2.383E+00
Sn-126	3.845E+00	116.2	4.468E+00	4.473E+00	1.499E+01
PB-210	-5.495E+00	220.2	1.210E+01	1.211E+01	3.664E+01
PB-212	1.334E+01	7.5	1.007E+00	1.326E+00	1.875E+00
PB-214	1.130E+01	8.6	9.763E-01	1.139E+00	2.107E+00
BI-207	-2.269E-01	345.0	7.829E-01	7.830E-01	2.636E+00
BI-212	5.558E+00	122.6	6.816E+00	6.822E+00	2.351E+01
U-235	2.125E+00	53.6	1.139E+00	1.144E+00	9.587E+00
BI-214	9.724E+00	12.3	1.201E+00	1.303E+00	1.822E+00
BI-210M	2.074E-02	110.1	2.284E-02	2.287E-02	2.499E+00
AC-228	1.355E+01	13.4	1.810E+00	1.938E+00	3.224E+00
TH-227	1.777E+00	236.0	4.194E+00	4.196E+00	1.310E+01
TH-229	1.626E-01	358.7	5.832E-01	5.833E-01	2.160E+01
TH-234	1.145E+01	40.2	4.602E+00	4.646E+00	1.512E+01
PA-231	6.192E+00	194.9	1.207E+01	1.207E+01	7.900E+01
PA-233	6.226E-01	294.2	1.831E+00	1.832E+00	3.974E+00
PA-234	1.459E+00	128.8	1.879E+00	1.881E+00	6.318E+00
PA-234M	-1.353E+02	48.7	6.583E+01	6.618E+01	4.082E+02
AM-241	7.949E-01	153.4	1.220E+00	1.220E+00	3.502E+00
Np-237	0.000E+00	1.#INF	3.898E+00	3.898E+00	1.318E+01
Ir-192	4.186E-01	134.2	5.618E-01	5.623E-01	1.316E+00
Cs-136	3.484E-02	128.1	4.464E-02	4.469E-02	1.348E+00
Np-239	-9.148E-01	203.8	1.865E+00	1.865E+00	6.272E+00
Nd-147	-3.941E+00	105.1	4.143E+00	4.149E+00	1.042E+01
TL-210	4.823E-01	102.7	4.951E-01	4.959E-01	1.701E+00
Kr-85	-1.434E+02	124.0	1.777E+02	1.779E+02	6.000E+02
Total	1.964E+03				

Analyst: Morgan Reichert

Sample description
412881_Gamma_180-86110-A-9-A

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20190291.An1

Acquisition information
Start time: 2/21/2019 1:54:55 AM
Live time: 1800
Real time: 1807
Dead time: 0.36 %
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_Rev15.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	2/21/2019 1:54:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2019-01-20_1014.PBC 1/20/2019 10:14:28 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 23 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1618

***** 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	-8.	220.23	0.78	1.788E-02	46.54	4.250	PBC<MDA	PB210
59.54	13.	153.44	0.80	2.533E-02	59.54	35.900	PBC<MDA	AM241
63.38	37.	40.19	0.80	2.712E-02	63.29	3.810	PBC<MDA	TH234
64.37	19.	116.21	0.80	2.757E-02	64.28	9.700	PBC<MDA	Sn126
74.90	116.	13.89	0.81	3.155E-02				
77.11	194.	9.51	0.81	3.221E-02				
86.96	14.	115.42	0.83	3.443E-02	86.94	9.040	PBC<MDA	Sn126
87.59	41.	37.85	0.83	3.454E-02	87.57	37.500	PBC<MDA	Sn126
91.10	4.	737.67	0.83	3.508E-02	91.10	28.300	PBC<MDA	Nd147
92.67	20.	82.31	0.83	3.527E-02	92.59	5.584	PBC<MDA	TH234
99.50	3.	579.14	0.84	3.592E-02	99.50	15.000	PBC<MDA	Np239
103.20	18.	119.01	0.84	3.612E-02	103.20	21.800	PBC<MDA	Gd153
103.70	5.	363.48	0.84	3.614E-02	103.70	24.000	PBC<MDA	Np239
123.10	16.	103.72	0.86	3.575E-02	123.10	40.790	PBC<MDA	EU154
131.29	17.	128.81	0.87	3.509E-02	131.29	18.000	PBC<MDA	PA234
140.56	16.	69.22	0.24	3.411E-02	140.51	89.300	PBC<MDA	Tc99m
145.44	15.	119.90	0.88	3.351E-02	145.44	48.200	PBC<MDA	CE141
162.66	14.	108.96	0.90	3.113E-02	162.66	6.220	PBC<MDA	Ba140
163.38	9.	184.86	0.90	3.102E-02	163.38	5.080	PBC<MDA	U235
176.60	14.	105.50	0.92	2.975E-02	176.60	17.000	PBC<MDA	Cf251
185.72	56.	28.01	0.93	2.854E-02	185.72	54.000	2.019E+00	U235
205.33	24.	53.60	0.94	2.626E-02	205.33	5.010	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
210.85	3.	494.14	0.95	2.569E-02	210.85	2.990	PBC<MDA	TH229
227.00	9.	153.75	0.97	2.417E-02	227.00	6.300	PBC<MDA	Cf251
235.97	11.	293.88	0.98	2.341E-02	235.97	12.300	PBC<MDA	TH227
238.65	245.	8.55	1.02	2.319E-02	238.63	43.300	1.354E+01	PB212
242.05	35.	34.98	0.98	2.293E-02	242.00	7.430	PBC<MDA	PB214
256.24	4.	369.27	1.00	2.186E-02	256.24	7.000	PBC<MDA	TH227
263.70	4.	320.16	1.00	2.135E-02	263.70	0.006	PBC<MDA	Cd113m
279.20	13.	114.41	1.02	2.036E-02	279.20	81.460	PBC<MDA	Hg203
284.30	7.	209.47	1.02	2.006E-02	284.30	6.140	PBC<MDA	I131
295.22	87.	12.64	1.24	1.945E-02	295.09	19.300	1.290E+01	PB214
299.95	11.	191.48	1.04	1.918E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	11.	194.94	1.04	1.918E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.344E+01	PA231
					300.18	6.200	5.334E+00	PA233
300.18	8.	294.16	1.04	1.917E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	9.077E+00	PA231
					300.18	6.200	3.603E+00	PA233
304.85	11.	156.22	1.04	1.893E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	1.202E+00	BI210M
304.90	11.	161.71	1.04	1.893E-02	304.85	4.290	7.843E+00	Ba140
					304.90	28.000	1.202E+00	BI210M
308.18	12.	165.88	1.05	1.875E-02	308.44	31.750	PBC<MDA	Ir192
316.68	5.	210.99	1.05	1.835E-02	316.49	87.040	PBC<MDA	Ir192
328.76	13.	100.65	1.07	1.778E-02	328.76	20.300	PBC<MDA	La140
333.44	11.	100.84	1.07	1.757E-02	333.44	15.510	PBC<MDA	Cf249
338.01	47.	21.55	0.88	1.736E-02	338.32	12.010	1.256E+01	AC228
340.57	10.	154.27	1.08	1.727E-02	340.57	46.900	PBC<MDA	Cs136
344.29	10.	160.20	1.08	1.711E-02	344.29	26.500	PBC<MDA	EU152
345.83	9.	172.36	1.08	1.705E-02	345.83	15.070	PBC<MDA	HF181
351.87	119.	11.77	0.87	1.680E-02	351.93	37.600	1.048E+01	PB214
356.00	7.	263.79	1.09	1.664E-02	356.00	62.050	PBC<MDA	BA133
387.95	9.	142.72	1.12	1.549E-02	387.95	66.000	PBC<MDA	Cf249
433.94	4.	238.11	1.16	1.411E-02	433.94	90.480	PBC<MDA	AG108M
463.37	7.	145.01	1.19	1.336E-02	463.37	10.470	PBC<MDA	SB125
477.60	4.	234.52	1.20	1.303E-02	477.60	10.520	PBC<MDA	BE7
487.02	8.	101.52	1.21	1.282E-02	487.02	45.500	PBC<MDA	La140
497.05	3.	272.30	1.22	1.260E-02	497.05	90.900	PBC<MDA	RU103
511.86	67.	18.10	2.48	1.230E-02	511.86	20.000	1.513E+01	RH106
537.26	10.	50.33	1.26	1.181E-02	537.26	24.390	PBC<MDA	Ba140
563.24	4.	241.15	1.28	1.135E-02	563.24	8.350	PBC<MDA	CS134
569.32	6.	102.74	1.29	1.125E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.613E+00	PA234
					569.70	97.740	3.032E-01	BI207
583.05	100.	11.24	0.63	1.103E-02	583.02	84.500	5.986E+00	TL208
609.38	86.	12.35	1.30	1.063E-02	609.31	46.090	9.724E+00	BI214
610.30	11.	162.52	1.32	1.062E-02	610.30	5.750	PBC<MDA	RU103

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
614.28	11.	167.47	1.33	1.056E-02	614.28	89.850	PBC<MDA	AG108M
618.06	10.	177.35	1.33	1.051E-02	618.06	99.100	PBC<MDA	PM144
635.89	8.	82.73	1.34	1.026E-02	635.89	11.310	PBC<MDA	SB125
657.76	7.	87.08	1.36	9.974E-03	657.76	94.640	PBC<MDA	AG110M
661.66	2.	384.36	1.37	9.924E-03	661.66	85.210	PBC<MDA	CS137
696.54	3.	290.26	1.40	9.507E-03	696.54	99.000	PBC<MDA	PM144
702.63	8.	95.38	1.40	9.438E-03	702.63	97.900	PBC<MDA	NB94
722.79	11.	82.54	1.42	9.217E-03	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	7.311E-01	AG108M
					723.36	20.220	3.286E+00	EU154
722.94	7.	140.45	1.42	9.215E-03	722.79	10.810	3.987E+00	SB124
					722.94	90.840	4.745E-01	AG108M
					723.36	20.220	2.133E+00	EU154
727.17	7.	122.64	1.42	9.170E-03	727.17	7.550	PBC<MDA	BI212
735.72	4.	199.13	1.43	9.081E-03	735.72	22.500	PBC<MDA	PM146
756.73	5.	95.62	1.45	8.869E-03	756.73	54.460	PBC<MDA	ZR95
763.94	2.	308.22	1.45	8.799E-03	763.94	22.280	PBC<MDA	AG110M
765.79	7.	80.61	1.45	8.781E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.538E+02	PA234M
778.92	2.	403.11	1.46	8.657E-03	778.92	12.940	PBC<MDA	EU152
785.42	5.	136.42	1.47	8.597E-03	785.42	1.280	PBC<MDA	BI212
795.87	7.	88.46	1.48	8.503E-03	795.87	85.530	PBC<MDA	CS134
799.60	7.	102.66	1.48	8.469E-03	799.60	98.960	PBC<MDA	TL210
846.77	5.	151.68	1.52	8.072E-03	846.77	99.935	PBC<MDA	Co56
860.63	9.	94.28	1.53	7.963E-03	860.56	12.420	PBC<MDA	TL208
871.10	1.	372.49	1.54	7.882E-03	871.10	99.890	PBC<MDA	NB94
884.68	9.	115.07	1.55	7.781E-03	884.68	72.680	PBC<MDA	AG110M
889.28	9.	110.42	1.55	7.747E-03	889.28	99.984	PBC<MDA	Sc46
911.23	55.	15.79	1.57	7.591E-03	911.07	29.000	1.396E+01	AC228
964.11	33.	25.12	1.61	7.239E-03	964.11	14.605	1.717E+01	EU152
968.96	6.	166.07	1.61	7.209E-03	968.97	17.460	PBC<MDA	AC228
1112.07	6.	145.35	1.72	6.421E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	3.	270.40	1.72	6.404E-03	1115.55	50.600	PBC<MDA	ZN65
1120.40	6.	129.78	1.72	6.381E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	5.215E-01	Sc46
1120.55	6.	142.05	1.72	6.380E-03	1120.29	15.100	3.453E+00	BI214
					1120.55	99.987	5.215E-01	Sc46
					1121.30	34.900	1.495E+00	Ta182
1173.24	13.	48.72	1.76	6.138E-03	1173.24	99.900	PBC<MDA	CO60
1188.94	4.	132.68	1.77	6.069E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	8.	97.43	1.80	5.866E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	7.	37.80	1.83	5.725E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.930E+00	EU154
1291.60	6.	44.20	1.84	5.661E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	6.	90.53	1.87	5.514E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	6.	101.72	1.90	5.340E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	2.	324.82	1.91	5.264E-03	1408.00	21.005	PBC<MDA	EU152
1460.62	115.	9.47	1.99	5.103E-03	1460.83	10.670	1.175E+02	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.48	6.	86.25	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
299.22	74.95	71.	116.	3.668E+03	13.89	0.813	- D
308.08	77.16	74.	194.	6.039E+03	9.51	0.815	- 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_Rev15.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.69	46.54	104.	-8.	-0.004	220.23	0.783s
TH-227	200.11	50.14	96.	-4.	-0.002	415.33	0.787s
AM-241	237.72	59.54	137.	13.	0.007	153.44	0.797s
TH-234	252.74	63.29	94.	37.	0.021	40.19	0.801D
Sn-126	256.71	64.28	222.	19.	0.010	116.21	0.802s
BA-133	323.61	80.99	201.	-23.	-0.013	82.02	0.819
Np-237	345.63	86.49	499.	0.	0.000	1000.00	0.825A
EU-155	345.84	86.54	565.	-21.	-0.012	159.47	0.825s
Sn-126	347.43	86.94	498.	14.	0.008	115.42	0.825D
Sn-126	349.95	87.57	435.	41.	0.023	37.85	0.826D
Nd-147	364.08	91.10	477.	4.	0.002	737.67	0.829s
TH-234	370.05	92.59	119.	20.	0.011	82.31	0.831D
AC-228	373.09	93.35	507.	-11.	-0.006	303.93	0.832s
Gd-153	389.70	97.50	156.	-12.	-0.007	150.00	0.836s
Np-239	397.71	99.50	185.	3.	0.002	579.14	0.838
Gd-153	412.52	103.20	210.	18.	0.010	119.01	0.842s
Np-239	414.52	103.70	192.	5.	0.003	363.48	0.842s
EU-155	420.98	105.31	370.	-19.	-0.010	85.78	0.844s
Np-239	424.25	106.13	373.	-14.	-0.008	203.82	0.845s
CO-57	488.03	122.06	121.	-18.	-0.010	89.70	0.861s
EU-154	492.18	123.10	137.	16.	0.009	103.72	0.862
PA-234	524.99	131.29	220.	17.	0.009	128.81	0.871s
HF-181	531.91	133.02	235.	-14.	-0.008	154.45	0.872s
Tc-99m	562.06	140.56	40.	16.	0.009	69.22	0.244s
U-235	574.99	143.79	172.	-13.	-0.007	127.98	0.883

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CE-141	581.61	145.44	163.	15.	0.009	119.90	0.885s
Ba-140	650.54	162.66	110.	14.	0.008	108.96	0.902s
U-235	653.42	163.38	124.	9.	0.005	184.86	0.903s
CE-139	663.32	165.85	140.	-9.	-0.005	182.46	0.905s
Cf-251	706.34	176.60	60.	14.	0.008	105.50	0.916
U-235	742.85	185.72	60.	56.	0.031	28.01	0.925s
TH-229	774.03	193.51	91.	-3.	-0.002	520.06	0.933s
U-235	821.35	205.33	43.	24.	0.013	53.60	0.945
TH-229	843.44	210.85	91.	3.	0.002	494.14	0.950s
Cf-251	908.08	227.00	53.	9.	0.005	153.75	0.966s
TH-227	943.98	235.97	473.	11.	0.006	293.88	0.975s
PB-212	954.64	238.63	45.	241.	0.134	7.55	0.978D
PB-214	968.10	242.00	59.	35.	0.020	34.98	0.981D
EU-152	978.89	244.69	576.	-19.	-0.010	182.48	0.984s
TH-227	1025.11	256.24	51.	4.	0.002	369.27	0.995s
Cd-113m	1054.97	263.70	80.	4.	0.002	320.16	1.002
BI-210M	1063.50	265.83	93.	-12.	-0.007	149.55	1.005s
TL-208	1109.33	277.28	103.	-16.	-0.009	94.41	1.016
Hg-203	1117.00	279.20	101.	13.	0.007	114.41	1.017
I-131	1137.41	284.30	55.	7.	0.004	209.47	1.022
PB-214	1181.13	295.22	11.	87.	0.048	12.64	1.236
TL-210	1184.24	296.00	272.	-11.	-0.006	207.45	1.034s
PB-212	1200.37	300.03	231.	11.	0.006	191.48	1.038
PA-231	1200.53	300.07	242.	11.	0.006	194.94	1.038
PA-233	1200.97	300.18	253.	8.	0.004	294.16	1.038
Ba-140	1219.66	304.85	155.	11.	0.006	156.22	1.042s
BI-210M	1219.85	304.90	166.	11.	0.006	161.71	1.042s
Ir-192	1234.03	308.44	176.	12.	0.006	165.88	1.046s
Ir-192	1266.25	316.49	57.	5.	0.003	210.99	1.053s
CR-51	1280.63	320.08	85.	-12.	-0.007	109.68	1.057s
La-140	1315.35	328.76	44.	13.	0.007	100.65	1.065s
Cf-249	1334.08	333.44	33.	11.	0.006	100.84	1.070s
AC-228	1352.36	338.01	18.	47.	0.026	21.55	0.884s
Cs-136	1362.62	340.57	112.	10.	0.006	154.27	1.077s
EU-152	1377.49	344.29	122.	10.	0.006	160.20	1.080s
HF-181	1383.66	345.83	122.	9.	0.005	172.36	1.082s
PB-214	1407.86	351.87	21.	119.	0.066	11.77	0.866s
BA-133	1424.36	356.00	147.	7.	0.004	263.79	1.091
I-131	1458.32	364.48	41.	-8.	-0.004	187.34	1.099s
BA-133	1535.78	383.84	91.	-10.	-0.006	136.60	1.117s
Cf-249	1552.22	387.95	78.	9.	0.005	142.72	1.121
SN-113	1567.19	391.69	89.	-8.	-0.004	40.79	1.125s
SB-125	1711.99	427.88	52.	-13.	-0.007	24.43	1.158s
AG-108M	1736.25	433.94	20.	4.	0.002	238.11	1.164s
PM-146	1816.05	453.88	44.	-4.	-0.002	328.51	1.182s
SB-125	1854.01	463.37	25.	7.	0.004	145.01	1.191s
Ir-192	1872.79	468.06	51.	-2.	-0.001	509.90	1.195
BE-7	1910.94	477.59	42.	4.	0.002	234.52	1.204s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	1928.56	482.00	46.	0.	0.000	1000.00	1.208s
La-140	1948.65	487.02	16.	8.	0.005	101.52	1.212s
RU-103	1988.80	497.05	21.	3.	0.002	272.30	1.221
RH-106	2048.06	511.86	40.	67.	0.037	18.10	2.485s
Kr-85	2056.53	513.98	135.	-14.	-0.008	123.97	1.237s
Nd-147	2124.62	531.00	32.	-11.	-0.006	105.10	1.252s
Ba-140	2149.67	537.26	4.	10.	0.006	50.33	1.258s
CS-134	2253.60	563.24	20.	4.	0.002	241.15	1.280s
CS-134	2277.94	569.32	16.	6.	0.003	102.74	1.286s
PA-234	2278.54	569.47	31.	-7.	-0.004	118.67	1.286s
BI-207	2279.47	569.70	26.	0.	0.000	1000.00	1.286s
TL-208	2332.88	583.05	7.	100.	0.056	11.24	0.629s
SB-125	2402.69	600.50	238.	-13.	-0.007	171.39	1.313s
SB-124	2411.61	602.73	226.	-14.	-0.008	82.72	1.315s
CS-134	2419.53	604.71	213.	-13.	-0.007	161.65	1.317s
BI-214	2438.23	609.38	8.	86.	0.048	12.35	1.296
RU-103	2441.89	610.30	162.	11.	0.006	162.52	1.322s
AG-108M	2457.82	614.28	173.	11.	0.006	167.47	1.325s
PM-144	2472.94	618.06	163.	10.	0.006	177.35	1.328s
RH-106	2488.37	621.92	251.	-14.	-0.008	74.51	1.332s
SB-125	2544.26	635.89	16.	8.	0.004	82.73	1.344s
I-131	2548.61	636.97	23.	0.	0.000	1000.00	1.345s
AG-110M	2631.76	657.76	14.	7.	0.004	87.08	1.362s
CS-137	2647.36	661.66	25.	2.	0.001	384.36	1.366s
PM-144	2786.90	696.54	22.	3.	0.002	290.26	1.395
NB-94	2811.25	702.63	13.	8.	0.005	95.38	1.400s
SB-124	2891.88	722.79	36.	11.	0.006	82.54	1.417s
AG-108M	2892.48	722.94	47.	7.	0.004	140.45	1.417s
EU-154	2894.17	723.36	54.	0.	0.000	1000.00	1.418s
BI-212	2909.41	727.17	33.	7.	0.004	122.64	1.421
PM-146	2943.61	735.72	13.	4.	0.002	199.13	1.428s
PM-146	2989.37	747.16	17.	-1.	-0.001	643.23	1.437s
ZR-95	3027.65	756.73	4.	5.	0.003	95.62	1.445s
AG-110M	3056.50	763.94	18.	2.	0.001	308.22	1.451s
NB-95	3063.89	765.79	13.	7.	0.004	80.61	1.453s
EU-152	3116.41	778.92	14.	2.	0.001	403.11	1.463s
BI-212	3142.41	785.42	10.	5.	0.003	136.42	1.468s
CS-134	3184.20	795.87	17.	7.	0.004	88.46	1.477s
TL-210	3199.12	799.60	24.	7.	0.004	102.66	1.480s
CS-134	3208.53	801.95	50.	-10.	-0.005	106.07	1.482s
CO-58	3243.82	810.78	29.	-2.	-0.001	342.52	1.489s
Cs-136	3274.72	818.50	14.	-4.	-0.002	204.63	1.495s
MN-54	3340.10	834.85	23.	-4.	-0.002	241.30	1.508s
Co-56	3387.78	846.77	9.	5.	0.003	151.68	1.518s
TL-208	3442.95	860.56	14.	9.	0.005	94.28	1.529s
NB-94	3485.08	871.10	12.	1.	0.001	372.49	1.537s
EU-154	3493.61	873.23	20.	-6.	-0.003	115.63	1.539s
PA-234	3522.80	880.53	62.	-13.	-0.007	89.06	1.544s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	3533.64	883.24	75.	-13.	-0.007	97.09	1.547s
AG-110M	3539.41	884.68	53.	9.	0.005	115.07	1.547s
Sc-46	3557.79	889.28	49.	9.	0.005	110.42	1.551s
Y-88	3592.83	898.04	14.	-4.	-0.002	169.57	1.558s
AC-228	3644.94	911.07	5.	55.	0.031	15.79	1.568s
AG-110M	3750.60	937.49	19.	-7.	-0.004	142.83	1.589s
PA-234	3784.70	946.02	14.	-3.	-0.002	223.15	1.595s
EU-152	3857.05	964.11	17.	33.	0.018	25.12	1.609s
AC-228	3876.48	968.97	40.	6.	0.003	166.07	1.612s
EU-154	3985.88	996.33	61.	-14.	-0.008	83.86	1.633
PA-234M	4004.55	1001.00	75.	-14.	-0.008	48.67	1.636s
EU-154	4019.65	1004.77	113.	-16.	-0.009	96.63	1.639s
Co-56	4151.87	1037.84	15.	-6.	-0.003	114.22	1.664s
Cs-136	4192.77	1048.07	18.	-7.	-0.004	93.68	1.671s
BI-207	4255.11	1063.66	20.	-2.	-0.001	345.02	1.682s
Ga-68	4310.04	1077.40	20.	-7.	-0.004	145.45	1.692s
FE-59	4397.41	1099.25	20.	-6.	-0.003	168.87	1.708s
EU-152	4448.68	1112.07	35.	6.	0.003	145.35	1.717s
ZN-65	4462.56	1115.55	41.	3.	0.002	270.40	1.720s
BI-214	4481.51	1120.29	27.	6.	0.003	129.78	1.723s
Sc-46	4482.57	1120.55	33.	6.	0.003	142.05	1.723s
Ta-182	4485.56	1121.30	21.	0.	0.000	1000.00	1.724s
CO-60	4693.21	1173.24	5.	13.	0.007	48.72	1.760s
Ta-182	4756.42	1189.05	5.	4.	0.002	132.68	1.771s
Ta-182	4885.79	1221.41	32.	-12.	-0.007	110.97	1.793s
Co-56	4953.23	1238.28	11.	8.	0.005	97.43	1.804s
NA-22	5098.13	1274.53	0.	7.	0.004	37.80	1.828s
EU-154	5098.17	1274.54	7.	0.	0.000	1000.00	1.828s
FE-59	5166.35	1291.60	0.	6.	0.003	44.20	1.840s
TL-210	5251.91	1313.00	11.	-6.	-0.003	137.58	1.854s
CO-60	5329.85	1332.50	5.	6.	0.004	90.53	1.866s
AG-110M	5536.88	1384.30	5.	6.	0.003	101.72	1.899s
EU-152	5631.62	1408.00	11.	2.	0.001	324.82	1.914s
K-40	5841.92	1460.62	2.	115.	0.064	9.47	1.989
La-140	6383.73	1596.21	11.	-4.	-0.002	188.42	2.024s
BI-214	7056.06	1764.49	11.	6.	0.003	86.25	2.114s
Co-56	7083.46	1771.35	28.	-7.	-0.004	109.01	2.117s
Y-88	7341.96	1836.06	12.	-10.	-0.006	89.44	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	1.6212E+00				5.31E+01	
			477.60	1.621E+00	?(	1.334E+01 2.35E+02	1.05E+01 G
NA-22	C	6.7971E-01				9.50E+02	
			1274.53	6.797E-01	?(	7.156E-01 3.78E+01	9.99E+01 G
K-40	N	1.1751E+02				4.66E+11	
			1460.83	1.175E+02	(P	9.188E+00 9.47E+00	1.07E+01 G
Sc-46	F	5.9568E-01				8.38E+01	
			889.28	6.699E-01	?(	2.522E+00 1.10E+02	1.00E+02 G
			1120.55	5.215E-01	?(	2.574E+00 1.42E+02	1.00E+02 G
CR-51	F	-3.7918E+00				2.77E+01	
			320.08	-3.792E+00	?(	1.407E+01 1.10E+02	9.94E+00 G
MN-54	C	-2.9478E-01				3.12E+02	
			834.85	-2.948E-01	?(	1.716E+00 2.41E+02	1.00E+02 G
FE-59	F	4.5993E-02				4.45E+01	
			1099.25	-9.099E-01	?(	3.572E+00 1.69E+02	5.65E+01 G
			1291.60	1.296E+00	?(P	1.674E+00 4.42E+01	4.32E+01 G
Co-56	C	6.5811E-01				7.73E+01	
			846.77	3.110E-01	?(P	1.175E+00 1.52E+02	9.99E+01 G
			1238.28	1.183E+00	?(P	2.632E+00 9.74E+01	6.61E+01 G
			1037.84	-3.531E+00	+ P	1.203E+01 1.14E+02	1.41E+01 G
			1771.35	-6.073E+00	+	2.277E+01 1.09E+02	1.55E+01 A
CO-57	C	-3.2571E-01				2.72E+02	
			122.06	-3.257E-01	&(	9.779E-01 8.97E+01	8.56E+01 G
			136.47	1.076E-07	%	1.083E+01 2.94E+09	1.07E+01 G
CO-58	C	-1.3578E-01				7.09E+01	
			810.78	-1.358E-01	?(P	1.856E+00 3.43E+02	9.95E+01 G
CO-60	F	8.9568E-01				1.93E+03	
			1332.50	6.503E-01	?(P	1.361E+00 9.05E+01	1.00E+02 G
			1173.24	1.141E+00	?(P	1.227E+00 4.87E+01	9.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F	5.8318E-01					2.44E+02	
			1115.55	5.832E-01	?(	5.555E+00	2.70E+02	5.06E+01 G
NB-94	I	4.9970E-01					7.41E+06	
			702.63	4.997E-01	(P	1.178E+00	9.54E+01	9.79E+01 G
			871.10	9.408E-02	-	1.314E+00	3.72E+02	9.99E+01 G
ZR-95	I	5.7787E-01					6.40E+01	
			756.73	5.779E-01	?(	1.427E+00	9.56E+01	5.45E+01 G
			724.20	-5.540E-02	% P	5.071E+00	1.97E+03	4.42E+01 G
NB-95	I	4.5276E-01					6.40E+01	
			765.79	4.528E-01	?(	1.237E+00	8.06E+01	9.98E+01 G
RU-103	I	1.6072E-01					3.93E+01	
			497.05	1.607E-01	&(P	1.159E+00	2.72E+02	9.09E+01 G
			610.30	1.024E+01	?	5.639E+01	1.63E+02	5.75E+00 GA
RH-106	I	-7.6430E+00					3.74E+02	
			621.92	-7.643E+00	?(P	4.101E+01	7.45E+01	9.93E+00 G
			1050.36	-2.643E+00	%	1.411E+02	1.46E+03	1.56E+00 G
			511.86	1.513E+01	+	7.269E+00	1.81E+01	2.00E+01 GA
AG-108M	C	4.3276E-01					1.53E+05	
			433.94	1.644E-01	?(P	1.030E+00	2.38E+02	9.05E+01 G
			722.94	4.745E-01	?(	2.297E+00	1.40E+02	9.08E+01 G
			614.28	6.608E-01	&(	3.747E+00	1.67E+02	8.98E+01 G
AG-110M	F	8.2015E-01					2.50E+02	
			884.68	9.153E-01	?(	3.593E+00	1.15E+02	7.27E+01 G
			657.76	3.943E-01	?(	1.173E+00	8.71E+01	9.46E+01 G
			937.49	-1.454E+00	+	4.984E+00	1.43E+02	3.44E+01 G
			1384.30	2.427E+00	?(	5.770E+00	1.02E+02	2.43E+01 G
			763.94	5.668E-01	?(	6.371E+00	3.08E+02	2.23E+01 G
SN-113	F	-4.3531E-01					1.15E+02	
			391.69	-4.353E-01	?(P	2.636E+00	4.08E+01	6.40E+01 G
SB-124	F	-4.4171E-02					6.02E+01	
			602.73	-7.248E-01	?(P	3.838E+00	8.27E+01	9.83E+01 G
			1690.98	6.170E-02	% P	3.581E+00	2.35E+03	4.78E+01 G
			722.79	6.143E+00	?(	1.707E+01	8.25E+01	1.08E+01 G
SB-125	I	-1.7093E+00					1.01E+03	
			427.88	-1.709E+00	(P	4.773E+00	2.44E+01	2.96E+01 G
			600.50	-3.732E+00	-	2.158E+01	1.71E+02	1.79E+01 G
			635.89	3.591E+00	+	1.008E+01	8.27E+01	1.13E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			463.37	2.754E+00	+ P	1.034E+01	1.45E+02	1.05E+01 G
I-131	I	-7.7899E-02					8.02E+00	
			364.48	-3.126E-01	?(P	1.349E+00	1.87E+02	8.17E+01 G
			284.30	3.045E+00	(P	1.685E+01	2.09E+02	6.14E+00 G
			636.97	0.000E+00	&	1.895E+01	1.00E+03	7.17E+00 G
Gd-153	F	1.6219E-01					2.42E+02	
			97.50	-6.212E-01	?(	3.153E+00	1.50E+02	3.00E+01 G
			103.20	1.240E+00	(	4.956E+00	1.19E+02	2.18E+01 G
Ga-68	C	-2.0958E+01					4.71E-02	
			1077.40	-2.096E+01	?(	7.051E+01	1.45E+02	3.30E+00 G
Tc-99m	I	3.0086E-01					2.51E-01	
			140.51	3.009E-01	(	6.052E-01	6.92E+01	8.93E+01 G
BA-133	F	3.5360E-01					3.85E+03	
			356.00	3.536E-01	?(	3.185E+00	2.64E+02	6.20E+01 G
			302.85	-1.215E-06	&	1.242E+01	2.99E+08	1.83E+01 G
			383.84	-4.106E+00	+ P	1.878E+01	1.37E+02	8.94E+00 GA
			80.99	-1.110E+00	& P	3.375E+00	8.20E+01	3.41E+01 GA
CS-134	I	8.7256E-01					7.54E+02	
			795.87	5.547E-01	?(	1.675E+00	8.85E+01	8.55E+01 G
			604.71	-6.888E-01	-	3.758E+00	1.62E+02	9.76E+01 G
			569.32	1.926E+00	?(	6.853E+00	1.03E+02	1.54E+01 G
			801.95	-7.469E+00	+	2.695E+01	1.06E+02	8.69E+00 G
			563.24	2.188E+00	&(P	1.388E+01	2.41E+02	8.35E+00 G
CS-137	I	1.2415E-01					1.10E+04	
			661.66	1.241E-01	?(P	1.715E+00	3.84E+02	8.52E+01 G
CE-139	F	-2.0714E-01					1.38E+02	
			165.85	-2.071E-01	(	1.285E+00	1.82E+02	7.99E+01 G
Ba-140	I	3.0299E+00					1.28E+01	
			537.26	1.929E+00	&(	2.320E+00	5.03E+01	2.44E+01 G
			162.66	4.029E+00	&(	1.480E+01	1.09E+02	6.22E+00 G
			304.85	7.843E+00	?(	4.150E+01	1.56E+02	4.29E+00 G
La-140	I	1.5505E-01					1.28E+01	
			1596.21	-5.329E-01	?(	2.262E+00	1.88E+02	9.54E+01 G
			487.02	7.853E-01	?(P	2.044E+00	1.02E+02	4.55E+01 G
			328.76	1.975E+00	?(	5.175E+00	1.01E+02	2.03E+01 G
			815.77	-2.008E-02	% P	8.220E+00	9.98E+03	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	5.2956E-01					3.25E+01	
			145.44	5.296E-01	?(	2.138E+00	1.20E+02	4.82E+01 G
CE-144	I	-3.4250E-08					2.85E+02	
			133.54	-3.425E-08	%(	1.034E+01	8.82E+09	1.11E+01 G
PM-144	C	3.7399E-01					3.63E+02	
			696.54	1.968E-01	?(	1.440E+00	2.90E+02	9.90E+01 G
			618.06	5.511E-01	&(	3.315E+00	1.77E+02	9.91E+01 G
EU-152	F	3.6250E+00					4.94E+03	
			121.78	5.424E-02	%(	3.191E+00	1.71E+03	2.86E+01 G
			344.29	1.217E+00	?(	6.632E+00	1.60E+02	2.65E+01 G
			1112.07	3.784E+00	?(	1.911E+01	1.45E+02	1.36E+01 G
			778.92	9.918E-01	?(	9.991E+00	4.03E+02	1.29E+01 G
			964.11	1.717E+01	?(	1.162E+01	2.51E+01	1.46E+01 G
			244.69	-6.048E+00	+	3.695E+01	1.82E+02	7.58E+00 G
			1408.00	1.172E+00	?	9.008E+00	3.25E+02	2.10E+01 GA
EU-154	I	6.2587E-01					3.14E+03	
			123.10	6.259E-01	?(	2.181E+00	1.04E+02	4.08E+01 G
			1274.54	0.000E+00	-	4.147E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	1.102E+01	1.00E+03	2.02E+01 G
			873.23	-3.358E+00	+	1.351E+01	1.16E+02	1.23E+01 G
			1004.77	-7.109E+00	+	2.307E+01	9.66E+01	1.80E+01 G
			996.33	-1.035E+01	&	2.910E+01	8.39E+01	1.06E+01 G
EU-155	I	-1.3624E+00					1.81E+03	
			105.31	-1.362E+00	&(P	6.685E+00	8.58E+01	2.12E+01 G
			86.54	-1.121E+00	+	5.978E+00	1.59E+02	3.07E+01 G
HF-181	F	3.1420E-01					4.24E+01	
			482.00	0.000E+00	?(	1.831E+00	1.00E+03	8.05E+01 G
			133.02	-5.237E-01	&	2.725E+00	1.54E+02	4.33E+01 G
			345.83	1.993E+00	?(	1.169E+01	1.72E+02	1.51E+01 G
			136.30	-6.547E-08	%	1.977E+01	8.82E+09	5.85E+00 G
Ta-182	F	7.1652E-01					1.14E+02	
			1121.30	0.000E+00	?(	6.051E+00	1.00E+03	3.49E+01 G
			1221.41	-4.161E+00	+	1.008E+01	1.11E+02	2.70E+01 G
			1189.05	2.260E+00	?(	7.419E+00	1.33E+02	1.62E+01 G
Hg-203	F	4.2863E-01					4.66E+01	
			279.20	4.286E-01	(	1.658E+00	1.14E+02	8.15E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N	5.8668E+00					6.98E+02	
			583.02	5.986E+00	(P	8.728E-01	1.12E+01	8.45E+01 G
			277.28	-6.792E+00	&	2.153E+01	9.44E+01	6.31E+00 G
			860.56	5.055E+00	?(	1.132E+01	9.43E+01	1.24E+01 G
PM-146	C	8.1562E-02					2.02E+03	
			453.88	-2.515E-01	(	2.114E+00	3.29E+02	6.50E+01 G
			747.16	-2.430E-01	+	4.030E+00	6.43E+02	3.40E+01 G
			735.72	1.044E+00	?(P	5.334E+00	1.99E+02	2.25E+01 G
Y-88	F	-1.3310E+00					1.07E+02	
			1836.06	-1.331E+00	?(	2.509E+00	8.94E+01	9.92E+01 G
			898.04	-3.126E-01	+ P	1.557E+00	1.70E+02	9.37E+01 G
Cd-113m		1.7347E+03					5.33E+03	
			263.70	1.735E+03	(	1.925E+04	3.20E+02	6.00E-03 K
Cd-109	F	1.1703E+00					4.53E+02	
								Derived Ave Activity
			88.04	1.170E+00	}(	4.328E+01	1.09E+03	3.79E+00 G
Cf-251	T	1.4856E+00					3.28E+05	
			176.60	1.486E+00	?(	4.263E+00	1.05E+02	1.70E+01 G
			227.00	3.162E+00		1.340E+01	1.54E+02	6.30E+00 GA
Cf-249	T	8.2883E-01					1.28E+05	
			387.95	4.890E-01	?(	2.383E+00	1.43E+02	6.60E+01 G
			333.44	2.275E+00	?(	6.009E+00	1.01E+02	1.55E+01 G
Sn-126		3.8447E+00					3.65E+07	
			87.57	1.779E+00	}	4.285E+00	3.79E+01	3.75E+01 GA
			64.28	3.845E+00	&(	1.499E+01	1.16E+02	9.70E+00 G
			86.94	2.567E+00	}	1.905E+01	1.15E+02	9.04E+00 GA
PB-210	N	-5.4949E+00					8.14E+03	
			46.54	-5.495E+00	*(P	3.664E+01	2.20E+02	4.25E+00 G
PB-212	N	1.3343E+01					6.98E+02	
			238.63	1.334E+01	(P	1.875E+00	7.55E+00	4.33E+01 G
			300.03	1.002E+01	- P	6.487E+01	1.91E+02	3.28E+00 GA
PB-214	N	1.1303E+01					5.84E+05	
			351.93	1.048E+01	@(P	2.107E+00	1.18E+01	3.76E+01 G
			295.09	1.290E+01	(	2.671E+00	1.26E+01	1.93E+01 G
			242.00	1.152E+01		1.253E+01	3.50E+01	7.43E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-207	C	-2.2691E-01					1.18E+04	
			1063.66	-2.269E-01	?(P	2.636E+00	3.45E+02	7.45E+01 G
			569.70	0.000E+00	&	1.338E+00	1.00E+03	9.77E+01 G
BI-212	N	5.5576E+00					6.98E+02	
			727.17	5.558E+00	(P	2.351E+01	1.23E+02	7.55E+00 G
			785.42	2.573E+01	? P	8.772E+01	1.36E+02	1.28E+00 GA
U-235	N	2.1249E+00					2.57E+11	
			143.79	-1.905E+00	&(P	9.587E+00	1.28E+02	1.10E+01 G
			205.33	9.992E+00	(	1.410E+01	5.36E+01	5.01E+00 G
			163.38	3.060E+00	?(P	1.927E+01	1.85E+02	5.08E+00 G
			185.72	2.019E+00	*	1.399E+00	2.80E+01	5.40E+01 GA
BI-214	N	9.7245E+00					5.84E+05	
			609.31	9.724E+00	(P	1.822E+00	1.23E+01	4.61E+01 G
			1120.29	3.452E+00	-	1.557E+01	1.30E+02	1.51E+01 G
			1764.49	5.111E+00	- P	1.506E+01	8.62E+01	1.54E+01 G
BI-210M	T	2.0737E-02					1.10E+09	
			265.83	-6.407E-01	?(P	2.499E+00	1.50E+02	5.00E+01 G
			304.90	1.202E+00	?(	6.580E+00	1.62E+02	2.80E+01 G
AC-228	N	1.3554E+01					2.10E+03	
			911.07	1.396E+01	?(	3.224E+00	1.58E+01	2.90E+01 G
			968.97	2.473E+00	-	1.429E+01	1.66E+02	1.75E+01 G
			338.32	1.256E+01	(P	5.967E+00	2.15E+01	1.20E+01 G
			93.35	-2.974E+00	-	3.039E+01	3.04E+02	5.56E+00 XA
TH-227	N	1.7775E+00					7.95E+03	
			256.24	1.331E+00	?(	1.310E+01	3.69E+02	7.00E+00 G
			235.97	2.032E+00	?(	2.009E+01	2.94E+02	1.23E+01 G
			50.14	-1.381E+00	+	1.670E+01	4.15E+02	8.00E+00 G
TH-229	N	1.6258E-01					2.68E+06	
			193.51	-1.420E+00	?(P	2.160E+01	5.20E+02	4.40E+00 G
			210.85	2.491E+00	?(P	3.403E+01	4.94E+02	2.99E+00 G
TH-234	N	1.1449E+01					1.63E+12	
			92.59	5.525E+00	(P	1.512E+01	8.23E+01	5.58E+00 G
			63.29	2.013E+01	(P	2.571E+01	4.02E+01	3.81E+00 G
PA-231	N	6.1916E+00					1.20E+07	
			302.65	7.728E-06	%(	7.900E+01	2.99E+08	2.88E+00 G
			300.07	1.344E+01	?(	8.852E+01	1.95E+02	2.46E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-233   C   6.2256E-01                                     7.82E+08
                         312.01 1.093E-01 %(P 3.974E+00 1.04E+03 3.60E+01 G
                         300.18 3.603E+00 ?(  3.592E+01 2.94E+02 6.20E+00 G

PA-234   N   1.4591E+00                                     1.63E+12
                         131.29 1.459E+00 ?(  6.318E+00 1.29E+02 1.80E+01 G
                         946.02-1.741E+00 + P 1.139E+01 2.23E+02 1.34E+01 G
                         569.47-4.215E+00 &   1.726E+01 1.19E+02 8.20E+00 G
                         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

PA-234M  N  -1.3526E+02                                     1.63E+12
                        1001.00-1.353E+02 ?(P 4.082E+02 4.87E+01 8.37E-01 G
                         766.41 7.718E+00 %   5.763E+02 2.04E+03 2.94E-01 G

AM-241   T   7.9489E-01                                     1.58E+05
                          59.54 7.949E-01 &(P 3.502E+00 1.53E+02 3.59E+01 G

Ir-192   F   4.1861E-01                                     7.40E+01
                         316.49 1.797E-01 ?(  1.316E+00 2.11E+02 8.70E+01 G
                         468.06-1.620E-01 +   2.916E+00 5.10E+02 5.18E+01 G
                         308.44 1.074E+00 ?(  6.027E+00 1.66E+02 3.18E+01 G

Cs-136   F   3.4842E-02                                     1.30E+01
                         818.50-2.676E-01 ?(  1.348E+00 2.05E+02 1.00E+02 G
                        1048.07-7.203E-01 +   2.313E+00 9.37E+01 8.00E+01 G
                         340.57 6.797E-01 ?(  3.567E+00 1.54E+02 4.69E+01 G

Np-239   T  -9.1482E-01                                     2.36E+00
                         103.70 3.475E-01 ?   4.306E+00 3.63E+02 2.40E+01 X
                         106.13-9.148E-01 ?(  6.272E+00 2.04E+02 2.27E+01 G
                          99.50 3.438E-01 &   6.810E+00 5.79E+02 1.50E+01 X

Nd-147      -3.9414E+00                                     1.11E+01
                         531.00-3.941E+00 &(  1.042E+01 1.05E+02 1.30E+01 G
                          91.10 2.348E-01 +   5.846E+00 7.38E+02 2.83E+01 G

TL-210   N   4.8231E-01                                     5.84E+05
                         799.60 4.823E-01 ?(  1.701E+00 1.03E+02 9.90E+01 G
                         296.00-4.122E-01 -   2.887E+00 2.07E+02 7.90E+01 G
                        1313.00-2.685E+00 +   8.495E+00 1.38E+02 2.10E+01 GA

Kr-85    I  -1.4337E+02                                     3.92E+03
                         513.98-1.434E+02 ?(  6.000E+02 1.24E+02 4.30E-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	
PB-210	46.54	104.	-8.	-0.004	220.23	-5.495E+00	P
TH-227	50.14	96.	-4.	-0.002	415.33	-1.381E+00	
AM-241	59.54	137.	13.	0.007	153.44	7.949E-01	P
BA-133	80.99	201.	-23.	-0.013	82.02	-1.110E+00	P
EU-155	86.54	565.	-21.	-0.012	159.47	-1.121E+00	
Nd-147	91.10	477.	4.	0.002	737.67	2.348E-01	
Gd-153	97.50	156.	-12.	-0.007	150.00	-6.212E-01	
Np-239	99.50	185.	3.	0.002	579.14	3.438E-01	
Gd-153	103.20	210.	18.	0.010	119.01	1.240E+00	
Np-239	103.70	192.	5.	0.003	363.48	3.475E-01	
EU-155	105.31	370.	-19.	-0.010	85.78	-1.362E+00	P
Np-239	106.13	373.	-14.	-0.008	203.82	-9.148E-01	
CO-57	122.06	121.	-18.	-0.010	89.70	-3.257E-01	
EU-154	123.10	137.	16.	0.009	103.72	6.259E-01	
PA-234	131.29	220.	17.	0.009	128.81	1.459E+00	
HF-181	133.02	235.	-14.	-0.008	154.45	-5.237E-01	
U-235	143.79	172.	-13.	-0.007	127.98	-1.905E+00	P
CE-141	145.44	163.	15.	0.009	119.90	5.296E-01	
U-235	163.38	124.	9.	0.005	184.86	3.060E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CE-139	165.85	140.	-9.	-0.005	182.46	-2.071E-01	
Cf-251	176.60	60.	14.	0.008	105.50	1.486E+00	
U-235	185.72	60.	56.	0.031	28.01	2.019E+00	
TH-229	193.51	91.	-3.	-0.002	520.06	-1.420E+00	P
U-235	205.33	43.	24.	0.013	53.60	9.992E+00	
TH-229	210.85	91.	3.	0.002	494.14	2.491E+00	P
Cf-251	227.00	53.	9.	0.005	153.75	3.162E+00	
TH-227	235.97	473.	11.	0.006	293.88	2.032E+00	
TH-227	256.24	51.	4.	0.002	369.27	1.331E+00	
Cd-113m	263.70	80.	4.	0.002	320.16	1.735E+03	
BI-210M	265.83	93.	-12.	-0.007	149.55	-6.407E-01	P
Hg-203	279.20	101.	13.	0.007	114.41	4.286E-01	
I-131	284.30	55.	7.	0.004	209.47	3.045E+00	P
TL-210	296.00	272.	-11.	-0.006	207.45	-4.122E-01	
PA-231	300.07	242.	11.	0.006	194.94	1.344E+01	
PA-233	300.18	253.	8.	0.004	294.16	3.603E+00	
BI-210M	304.90	166.	11.	0.006	161.71	1.202E+00	
CR-51	320.08	85.	-12.	-0.007	109.68	-3.792E+00	
La-140	328.76	44.	13.	0.007	100.65	1.975E+00	
Cf-249	333.44	33.	11.	0.006	100.84	2.275E+00	
Cs-136	340.57	112.	10.	0.006	154.27	6.797E-01	
HF-181	345.83	122.	9.	0.005	172.36	1.993E+00	
BA-133	356.00	147.	7.	0.004	263.79	3.536E-01	
I-131	364.48	41.	-8.	-0.004	187.34	-3.126E-01	P
BA-133	383.84	91.	-10.	-0.006	136.60	-4.106E+00	P
Cf-249	387.95	78.	9.	0.005	142.72	4.890E-01	
SN-113	391.69	89.	-8.	-0.004	40.79	-4.353E-01	P
SB-125	427.88	52.	-13.	-0.007	24.43	-1.709E+00	P
AG-108M	433.94	20.	4.	0.002	238.11	1.644E-01	P
PM-146	453.88	44.	-4.	-0.002	328.51	-2.515E-01	
SB-125	463.37	25.	7.	0.004	145.01	2.754E+00	P
BE-7	477.59	42.	4.	0.002	234.52	1.621E+00	
La-140	487.02	16.	8.	0.005	101.52	7.853E-01	P
RU-103	497.05	21.	3.	0.002	272.30	1.607E-01	P
RH-106	511.86	40.	67.	0.037	18.10	1.513E+01	
Kr-85	513.98	135.	-14.	-0.008	123.97	-1.434E+02	
Nd-147	531.00	32.	-11.	-0.006	105.10	-3.941E+00	
CS-134	563.24	20.	4.	0.002	241.15	2.188E+00	P
CS-134	569.32	16.	6.	0.003	102.74	1.926E+00	
PA-234	569.47	31.	-7.	-0.004	118.67	-4.215E+00	
SB-125	600.50	238.	-13.	-0.007	171.39	-3.732E+00	
SB-124	602.73	226.	-14.	-0.008	82.72	-7.248E-01	P
CS-134	604.71	213.	-13.	-0.007	161.65	-6.888E-01	
RU-103	610.30	162.	11.	0.006	162.52	1.024E+01	
AG-108M	614.28	173.	11.	0.006	167.47	6.608E-01	
PM-144	618.06	163.	10.	0.006	177.35	5.511E-01	
RH-106	621.92	251.	-14.	-0.008	74.51	-7.643E+00	P
SB-125	635.89	16.	8.	0.004	82.73	3.591E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-110M	657.76	14.	7.	0.004	87.08	3.943E-01	
CS-137	661.66	25.	2.	0.001	384.36	1.241E-01	P
PM-144	696.54	22.	3.	0.002	290.26	1.968E-01	
NB-94	702.63	13.	8.	0.005	95.38	4.997E-01	P
SB-124	722.79	36.	11.	0.006	82.54	6.143E+00	
AG-108M	722.94	47.	7.	0.004	140.45	4.745E-01	
BI-212	727.17	33.	7.	0.004	122.64	5.558E+00	P
PM-146	735.72	13.	4.	0.002	199.13	1.044E+00	P
PM-146	747.16	17.	-1.	-0.001	643.23	-2.430E-01	
ZR-95	756.73	4.	5.	0.003	95.62	5.779E-01	
AG-110M	763.94	18.	2.	0.001	308.22	5.668E-01	
NB-95	765.79	13.	7.	0.004	80.61	4.528E-01	
BI-212	785.42	10.	5.	0.003	136.42	2.573E+01	P
CS-134	795.87	17.	7.	0.004	88.46	5.547E-01	
TL-210	799.60	24.	7.	0.004	102.66	4.823E-01	
CS-134	801.95	50.	-10.	-0.005	106.07	-7.469E+00	
CO-58	810.78	29.	-2.	-0.001	342.52	-1.358E-01	P
Cs-136	818.50	14.	-4.	-0.002	204.63	-2.676E-01	
MN-54	834.85	23.	-4.	-0.002	241.30	-2.948E-01	
Co-56	846.77	9.	5.	0.003	151.68	3.110E-01	P
NB-94	871.10	12.	1.	0.001	372.49	9.408E-02	
EU-154	873.23	20.	-6.	-0.003	115.63	-3.358E+00	
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	
AG-110M	884.68	53.	9.	0.005	115.07	9.153E-01	
Sc-46	889.28	49.	9.	0.005	110.42	6.699E-01	
Y-88	898.04	14.	-4.	-0.002	169.57	-3.126E-01	P
AG-110M	937.49	19.	-7.	-0.004	142.83	-1.454E+00	
PA-234	946.02	14.	-3.	-0.002	223.15	-1.741E+00	P
EU-154	996.33	61.	-14.	-0.008	83.86	-1.035E+01	
PA-234M	1001.00	75.	-14.	-0.008	48.67	-1.353E+02	P
EU-154	1004.77	113.	-16.	-0.009	96.63	-7.109E+00	
Co-56	1037.84	15.	-6.	-0.003	114.22	-3.531E+00	P
Cs-136	1048.07	18.	-7.	-0.004	93.68	-7.203E-01	
BI-207	1063.66	20.	-2.	-0.001	345.02	-2.269E-01	P
Ga-68	1077.40	20.	-7.	-0.004	145.45	-2.096E+01	
FE-59	1099.25	20.	-6.	-0.003	168.87	-9.099E-01	
ZN-65	1115.55	41.	3.	0.002	270.40	5.832E-01	
Sc-46	1120.55	33.	6.	0.003	142.05	5.215E-01	
CO-60	1173.24	5.	13.	0.007	48.72	1.141E+00	P
Co-56	1238.28	11.	8.	0.005	97.43	1.183E+00	P
NA-22	1274.53	0.	7.	0.004	37.80	6.797E-01	
FE-59	1291.60	0.	6.	0.003	44.20	1.296E+00	P
TL-210	1313.00	11.	-6.	-0.003	137.58	-2.685E+00	
CO-60	1332.50	5.	6.	0.004	90.53	6.503E-01	P
AG-110M	1384.30	5.	6.	0.003	101.72	2.427E+00	
La-140	1596.21	11.	-4.	-0.002	188.42	-5.329E-01	
Co-56	1771.35	28.	-7.	-0.004	109.01	-6.073E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Y-88	1836.06	12.	-10.	-0.006	89.44	-1.331E+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	1.6212E+00	1.6212E+00	2.345E+02%	1.33E+01
NA-22	#A	6.7971E-01	6.7971E-01	3.780E+01%	7.16E-01
K-40		1.1751E+02	1.1751E+02	9.474E+00%	9.19E+00
Sc-46	#A	5.9568E-01	5.9568E-01	8.996E+01%	2.52E+00
CR-51	#A	-3.7918E+00	-3.7918E+00	1.097E+02%	1.41E+01
MN-54	#A	-2.9478E-01	-2.9478E-01	2.413E+02%	1.72E+00
FE-59	#A	4.5992E-02	4.5993E-02	4.420E+01%	3.57E+00
Co-56	#A	6.5811E-01	6.5811E-01	9.014E+01%	1.18E+00
CO-57	#A	-3.2571E-01	-3.2571E-01	8.970E+01%	9.78E-01
CO-58	#A	-1.3578E-01	-1.3578E-01	3.425E+02%	1.86E+00
CO-60	#A	8.9568E-01	8.9568E-01	4.872E+01%	1.36E+00
ZN-65	#A	5.8318E-01	5.8318E-01	2.704E+02%	5.56E+00
NB-94	#A	4.9970E-01	4.9970E-01	9.538E+01%	1.18E+00
ZR-95	#A	5.7786E-01	5.7787E-01	9.562E+01%	1.43E+00
NB-95	#A	4.5276E-01	4.5276E-01	8.061E+01%	1.24E+00
RU-103	#A	1.6072E-01	1.6072E-01	2.723E+02%	1.16E+00
RH-106	#A	-7.6430E+00	-7.6430E+00	7.451E+01%	4.10E+01
AG-108M	#A	4.3276E-01	4.3276E-01	1.077E+02%	1.03E+00
AG-110M	#A	8.2015E-01	8.2015E-01	8.708E+01%	3.59E+00
SN-113	#A	-4.3531E-01	-4.3531E-01	4.079E+01%	2.64E+00
SB-124	#A	-4.4171E-02	-4.4171E-02	5.843E+01%	3.84E+00
SB-125	#A	-1.7093E+00	-1.7093E+00	2.443E+01%	4.77E+00
I-131	#A	-7.7894E-02	-7.7899E-02	1.405E+02%	1.35E+00
Gd-153	#A	1.6219E-01	1.6219E-01	9.574E+01%	3.15E+00
Ga-68	#A	-2.0763E+01	-2.0958E+01	1.455E+02%	7.05E+01
Tc-99m	A	3.0033E-01	3.0086E-01	6.922E+01%	6.05E-01
BA-133	#A	3.5360E-01	3.5360E-01	2.638E+02%	3.19E+00
CS-134	#A	8.7256E-01	8.7256E-01	8.846E+01%	1.67E+00
CS-137	#A	1.2415E-01	1.2415E-01	3.844E+02%	1.71E+00
CE-139	#A	-2.0714E-01	-2.0714E-01	1.825E+02%	1.29E+00
Ba-140	#	3.0298E+00	3.0299E+00	5.033E+01%	2.32E+00
La-140	#A	1.5504E-01	1.5505E-01	7.884E+01%	2.26E+00
CE-141	#A	5.2955E-01	5.2956E-01	1.199E+02%	2.14E+00
CE-144	#A	-3.4250E-08	-3.4250E-08	8.818E+09%	1.03E+01
PM-144	#A	3.7399E-01	3.7399E-01	1.701E+02%	1.44E+00
EU-152	#C	3.6250E+00	3.6250E+00	2.512E+01%	3.19E+00
EU-154	#A	6.2587E-01	6.2587E-01	1.037E+02%	2.18E+00
EU-155	#A	-1.3624E+00	-1.3624E+00	8.578E+01%	6.69E+00
HF-181	#A	3.1419E-01	3.1420E-01	1.724E+02%	1.83E+00

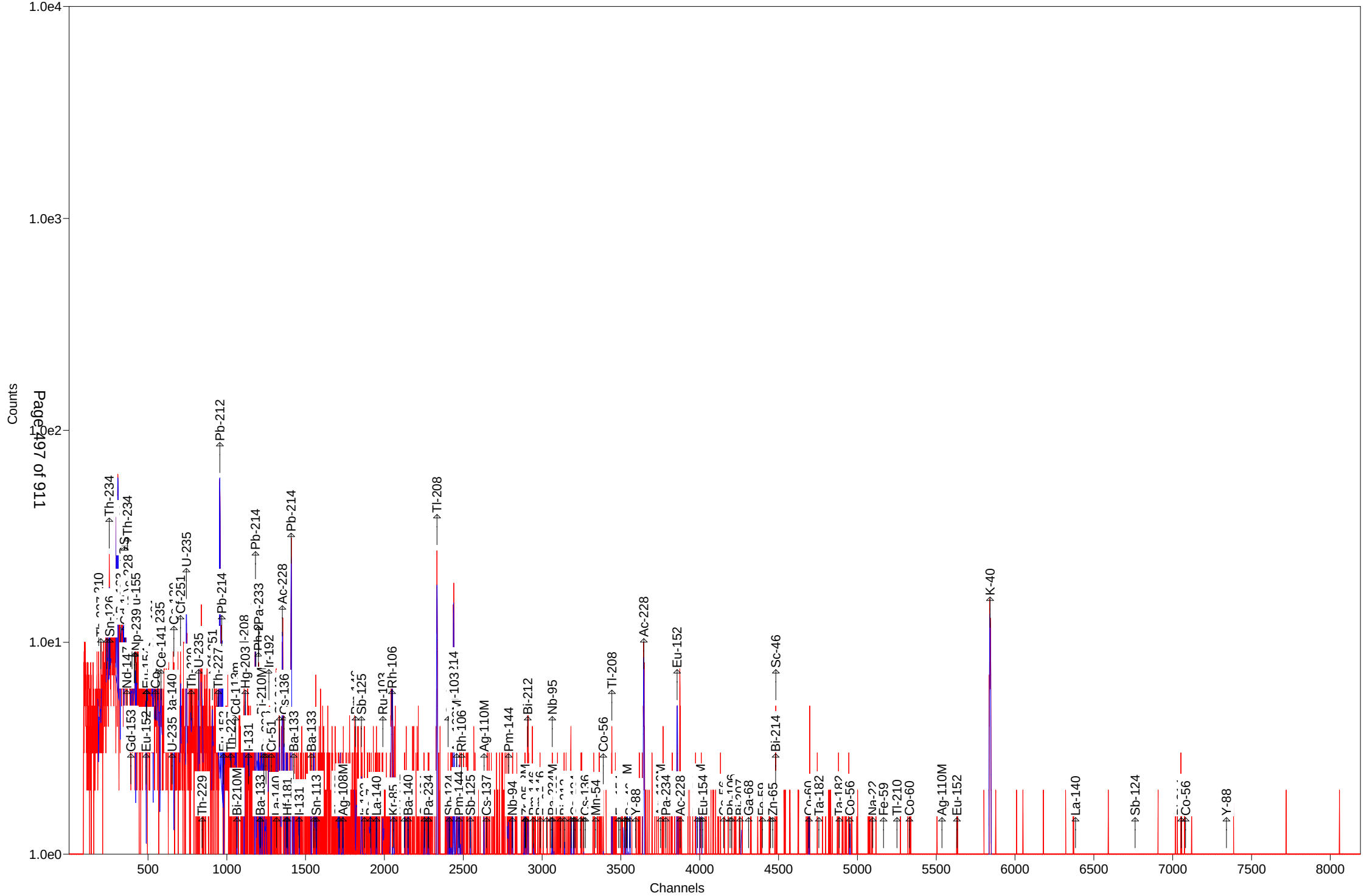
Ta-182 #A	7.1652E-01	7.1652E-01	1.327E+02%		6.05E+00
Hg-203 #A	4.2863E-01	4.2863E-01	1.144E+02%		1.66E+00
TL-208	5.8668E+00	5.8668E+00	1.124E+01%		8.73E-01
PM-146 #A	8.1562E-02	8.1562E-02	1.921E+02%		2.11E+00
Y-88 #A	-1.3310E+00	-1.3310E+00	8.944E+01%		2.51E+00
Cd-113m#A	1.7347E+03	1.7347E+03	3.202E+02%		1.93E+04
Cd-109 #A	1.1703E+00	1.1703E+00	1.094E+03%		4.33E+01
Cf-251 #A	1.4856E+00	1.4856E+00	1.055E+02%		4.26E+00
Cf-249 #A	8.2883E-01	8.2883E-01	8.738E+01%		2.38E+00
Sn-126 #A	3.8447E+00	3.8447E+00	1.162E+02%		1.50E+01
PB-210 #A	-5.4949E+00	-5.4949E+00	2.202E+02%		3.66E+01
PB-212	1.3343E+01	1.3343E+01	7.547E+00%		1.88E+00
PB-214	1.1303E+01	1.1303E+01	8.637E+00%		2.11E+00
BI-207 #A	-2.2691E-01	-2.2691E-01	3.450E+02%		2.64E+00
BI-212 #A	5.5576E+00	5.5576E+00	1.226E+02%		2.35E+01
U-235 #A	2.1249E+00	2.1249E+00	5.360E+01%		9.59E+00
BI-214	9.7245E+00	9.7245E+00	1.235E+01%		1.82E+00
BI-210M#A	2.0737E-02	2.0737E-02	1.101E+02%		2.50E+00
AC-228 #	1.3554E+01	1.3554E+01	1.336E+01%		3.22E+00
TH-227 #A	1.7775E+00	1.7775E+00	2.360E+02%		1.31E+01
TH-229 #A	1.6258E-01	1.6258E-01	3.587E+02%		2.16E+01
TH-234 A	1.1449E+01	1.1449E+01	4.019E+01%		1.51E+01
PA-231 #A	6.1916E+00	6.1916E+00	1.949E+02%		7.90E+01
PA-233 #A	6.2256E-01	6.2256E-01	2.942E+02%		3.97E+00
PA-234 #A	1.4591E+00	1.4591E+00	1.288E+02%		6.32E+00
PA-234M#A	-1.3526E+02	-1.3526E+02	4.867E+01%		4.08E+02
AM-241 #A	7.9489E-01	7.9489E-01	1.534E+02%		3.50E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.32E+01
Ir-192 #A	4.1861E-01	4.1861E-01	1.342E+02%		1.32E+00
Cs-136 #A	3.4841E-02	3.4842E-02	1.281E+02%		1.35E+00
Np-239 #A	-9.1465E-01	-9.1482E-01	2.038E+02%		6.27E+00
Nd-147 #A	-3.9413E+00	-3.9414E+00	1.051E+02%		1.04E+01
TL-210 #A	4.8231E-01	4.8231E-01	1.027E+02%		1.70E+00
Kr-85 #A	-1.4337E+02	-1.4337E+02	1.240E+02%		6.00E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.8 keV) 1.716E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 1.7160245E+02 Bq/Sample

412881_Gamma_180-86110-A-9-A. 5_Gamma_20190291.spc.



Test America St. Louis Spectrum ID: 7_Gamma_20190291

Sample Description: 412881_Gamma_180-86110-A-10-A
Detector: Detector # 7
Batch ID: 412881
Work Order Number: Gamma
Lot Number: 180-86110-A-10-A

Decay to Time: 2/20/2019 10:46 Live Time: 1800 sec
Acquisition Time: 2/20/2019 10:46:33 Real Time: 1805 sec
Analysis Time: 2/20/2019 11:17 Dead Time: 0.29 %
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_Rev15.lib
Bkgd Correction File: 7_2019-01-20_1017.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	2.126E+00	174.1	3.702E+00	3.703E+00	1.266E+01
NA-22	-1.119E-01	411.3	4.602E-01	4.603E-01	1.671E+00
K-40	1.950E+02	6.1	1.193E+01	1.555E+01	7.961E+00
Sc-46	3.827E-01	98.4	3.765E-01	3.770E-01	1.615E+00
CR-51	-2.490E+00	127.8	3.183E+00	3.186E+00	1.077E+01
MN-54	1.650E-01	228.0	3.762E-01	3.763E-01	9.337E-01
FE-59	-2.160E-01	111.7	2.412E-01	2.415E-01	2.783E+00
Co-56	5.134E-01	97.6	5.011E-01	5.018E-01	7.947E-01
CO-57	-2.507E-01	90.2	2.261E-01	2.265E-01	7.550E-01
CO-58	-6.068E-01	84.1	5.104E-01	5.113E-01	1.713E+00
CO-60	2.843E-01	202.2	5.748E-01	5.750E-01	1.314E+00
ZN-65	1.303E+00	85.7	1.116E+00	1.118E+00	3.762E+00
NB-94	-3.075E-01	162.2	4.988E-01	4.990E-01	1.177E+00
ZR-95	5.781E-01	93.9	5.430E-01	5.438E-01	1.309E+00
NB-95	-4.955E-01	90.3	4.475E-01	4.482E-01	1.510E+00
RU-103	2.548E-01	134.8	3.435E-01	3.438E-01	8.430E-01
RH-106	6.096E+00	81.3	4.954E+00	4.964E+00	2.577E+01
AG-108M	5.066E-02	664.7	3.367E-01	3.368E-01	8.743E-01
AG-110M	2.373E-01	176.1	4.178E-01	4.180E-01	2.409E+00
SN-113	4.841E-01	112.8	5.462E-01	5.467E-01	1.845E+00
SB-124	1.569E-02	78.8	1.237E-02	1.239E-02	2.845E+00
SB-125	1.334E+00	74.5	9.935E-01	9.958E-01	2.496E+00
I-131	6.359E-01	67.9	4.319E-01	4.331E-01	7.872E-01
Gd-153	-7.174E-01	148.9	1.068E+00	1.069E+00	3.573E+00
Ga-68	-2.515E+01	116.2	2.921E+01	2.924E+01	6.358E+01
Tc-99m	-1.622E-01	198.6	3.220E-01	3.221E-01	1.084E+00
BA-133	-5.644E-01	155.7	8.787E-01	8.792E-01	2.953E+00
CS-134	6.152E-01	81.1	4.989E-01	4.999E-01	1.533E+00
CS-137	-5.280E-01	68.0	3.590E-01	3.600E-01	1.744E+00
CE-139	-3.097E-01	108.3	3.354E-01	3.367E-01	1.122E+00
Ba-140	2.163E-02	109.1	2.360E-02	2.362E-02	4.242E+00
La-140	8.277E-01	33.3	2.759E-01	2.793E-01	6.371E-01
CE-141	-5.636E-01	158.9	8.953E-01	8.957E-01	2.987E+00

CE-144	0.000E+00	1.#INF	8.609E-01	8.609E-01	8.204E+00
PM-144	1.836E-01	224.4	4.121E-01	4.122E-01	9.925E-01
EU-152	1.907E+00	83.8	1.598E+00	1.601E+00	2.231E+00
EU-154	1.577E+00	68.9	1.087E+00	1.090E+00	1.468E+00
EU-155	-4.098E-02	2833.8	1.161E+00	1.161E+00	5.151E+00
HF-181	8.876E-02	135.6	1.203E-01	1.204E-01	1.634E+00
Ta-182	-1.882E+00	121.6	2.289E+00	2.291E+00	7.772E+00
Hg-203	-1.081E-01	282.1	3.051E-01	3.051E-01	1.051E+00
TL-208	5.222E+00	9.9	5.171E-01	5.838E-01	6.568E-01
PM-146	6.221E-01	106.6	6.630E-01	6.638E-01	1.269E+00
Y-88	0.000E+00	1.#INF	1.892E-01	1.892E-01	6.973E-01
Cd-113m	-1.305E+03	285.9	3.732E+03	3.733E+03	1.289E+04
Cd-109	7.153E+00	141.9	1.015E+01	1.016E+01	3.387E+01
Cf-251	2.351E-01	600.9	1.413E+00	1.413E+00	3.695E+00
Cf-249	3.448E-01	105.5	3.637E-01	3.642E-01	2.128E+00
Sn-126	3.040E+00	102.3	3.109E+00	3.113E+00	1.040E+01
PB-210	-1.027E+01	101.9	1.046E+01	1.048E+01	4.657E+01
PB-212	1.213E+01	6.8	8.237E-01	1.138E+00	1.726E+00
PB-214	1.082E+01	8.8	9.531E-01	1.107E+00	1.661E+00
BI-207	8.456E-02	460.3	3.892E-01	3.892E-01	1.864E+00
BI-212	-6.970E+00	97.0	6.760E+00	6.770E+00	2.280E+01
U-235	6.602E-01	65.1	4.301E-01	4.314E-01	1.341E+01
BI-214	9.591E+00	10.0	9.599E-01	1.082E+00	1.211E+00
BI-210M	4.640E-01	97.6	4.529E-01	4.537E-01	1.525E+00
AC-228	1.604E+01	8.8	1.404E+00	1.625E+00	2.133E+00
TH-227	-4.877E+00	99.7	4.861E+00	4.870E+00	1.245E+01
TH-229	4.261E+00	135.2	5.759E+00	5.769E+00	1.566E+01
TH-234	-8.609E+00	52.9	4.551E+00	4.576E+00	1.770E+01
PA-231	0.000E+00	1.#INF	5.481E+00	5.481E+00	6.523E+01
PA-233	-4.221E-02	2168.1	9.152E-01	9.152E-01	5.360E+00
PA-234	1.351E+00	122.0	1.648E+00	1.649E+00	4.854E+00
PA-234M	-1.108E+02	85.1	9.423E+01	9.440E+01	3.152E+02
AM-241	5.157E-01	204.3	1.054E+00	1.054E+00	2.846E+00
Np-237	-2.170E+00	150.7	3.271E+00	3.274E+00	1.091E+01
Ir-192	3.042E-01	167.1	5.083E-01	5.086E-01	1.714E+00
Cs-136	2.235E-02	1000.0	2.235E-01	2.235E-01	1.039E+00
Np-239	4.627E-01	301.2	1.393E+00	1.394E+00	4.685E+00
Nd-147	-3.281E+00	95.5	3.134E+00	3.139E+00	7.506E+00
TL-210	4.888E-01	91.5	4.471E-01	4.480E-01	1.511E+00
Kr-85	-1.004E+02	124.2	1.246E+02	1.247E+02	4.201E+02
Total	2.885E+02				

Analyst: kody Saulters

Sample description
412881_Gamma_180-86110-A-10-A

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20190291.An1

Acquisition information
Start time: 2/20/2019 10:46:33 AM
Live time: 1800
Real time: 1805
Dead time: 0.29 %
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_Rev15.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	2/20/2019 10:46:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2019-01-20_1017.PBC 1/20/2019 10:17:25 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1147

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
50.14	20.	118.30	0.84	2.841E-02	50.14	8.000	PBC<MDA	TH227
59.54	12.	204.34	0.85	3.701E-02	59.54	35.900	PBC<MDA	AM241
63.29	4.	606.76	0.85	4.005E-02	63.29	3.810	PBC<MDA	TH234
66.00	22.	102.27	0.86	4.080E-02	64.28	9.700	PBC<MDA	Sn126
74.64	109.	19.86	0.87	4.754E-02				
77.18	235.	10.20	0.87	4.888E-02				
87.44	26.	139.25	0.88	5.314E-02	87.57	37.500	PBC<MDA	Sn126
88.04	26.	141.90	0.88	5.329E-02	88.04	3.790	PBC<MDA	Cd109
93.00	110.	22.01	1.63	5.470E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	2.018E+01	AC228
106.13	11.	301.17	0.90	5.643E-02	106.13	22.700	PBC<MDA	Np239
121.78	19.	101.73	0.92	5.608E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.186E-01	CO57
123.10	19.	93.98	0.92	5.596E-02	123.10	40.790	PBC<MDA	EU154
131.29	21.	121.98	0.93	5.493E-02	131.29	18.000	PBC<MDA	PA234
162.66	18.	109.10	0.96	4.843E-02	162.66	6.220	PBC<MDA	Ba140
163.38	17.	117.80	0.96	4.826E-02	163.38	5.080	PBC<MDA	U235
176.60	3.	600.88	0.98	4.633E-02	176.60	17.000	PBC<MDA	Cf251
185.72	61.	34.29	0.99	4.443E-02	185.72	54.000	1.405E+00	U235
193.51	9.	221.32	0.99	4.294E-02	193.51	4.400	PBC<MDA	TH229
205.33	17.	126.64	1.01	4.086E-02	205.33	5.010	PBC<MDA	U235
209.04	52.	30.87	0.65	4.026E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
210.85	14.	155.26	1.01	3.997E-02	210.85	2.990	PBC<MDA	TH229
227.00	11.	151.21	1.03	3.757E-02	227.00	6.300	PBC<MDA	Cf251
235.97	18.	211.37	1.04	3.636E-02	235.97	12.300	PBC<MDA	TH227
238.57	339.	9.27	1.35	3.603E-02	238.63	43.300	1.206E+01	PB212
241.99	71.	20.18	1.04	3.560E-02	242.00	7.430	1.496E+01	PB214
244.69	17.	214.59	1.05	3.526E-02	244.69	7.580	PBC<MDA	EU152
265.83	14.	97.60	1.07	3.288E-02	265.83	50.000	PBC<MDA	BI210M
277.19	16.	73.55	1.42	3.172E-02	277.28	6.310	PBC<MDA	TL208
295.28	118.	14.33	1.44	3.007E-02	295.09	19.300	1.132E+01	PB214
					296.00	79.000	2.773E+00	TL210
299.98	37.	25.23	2.12	2.966E-02	300.03	3.280	2.094E+01	PB212
					300.07	2.460	2.792E+01	PA231
					300.18	6.200	1.108E+01	PA233
316.49	14.	167.10	1.12	2.834E-02	316.49	87.040	PBC<MDA	Ir192
328.76	15.	97.80	1.13	2.744E-02	328.76	20.300	PBC<MDA	La140
333.44	14.	105.49	1.14	2.711E-02	333.44	15.510	PBC<MDA	Cf249
338.33	88.	16.04	0.77	2.677E-02	338.32	12.010	1.518E+01	AC228
345.83	12.	149.69	1.15	2.627E-02	345.83	15.070	PBC<MDA	HF181
351.80	185.	10.25	1.25	2.589E-02	351.93	37.600	1.056E+01	PB214
364.48	12.	100.67	1.17	2.511E-02	364.48	81.700	PBC<MDA	I131
391.69	13.	112.82	1.20	2.360E-02	391.69	64.000	PBC<MDA	SN113
427.88	6.	189.05	1.23	2.186E-02	427.88	29.600	PBC<MDA	SB125
433.94	2.	664.66	1.24	2.160E-02	433.94	90.480	PBC<MDA	AG108M
453.88	7.	184.20	1.26	2.077E-02	453.88	65.000	PBC<MDA	PM146
477.60	8.	174.10	1.28	1.987E-02	477.60	10.520	PBC<MDA	BE7
487.02	10.	107.96	1.29	1.954E-02	487.02	45.500	PBC<MDA	La140
497.05	8.	134.82	1.30	1.919E-02	497.05	90.900	PBC<MDA	RU103
511.86	84.	13.91	2.56	1.870E-02	511.86	20.000	1.252E+01	RH106
563.24	3.	428.82	1.36	1.720E-02	563.24	8.350	PBC<MDA	CS134
569.47	4.	251.92	1.37	1.704E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.707E+00	PA234
					569.70	97.740	PBC<MDA	BI207
569.70	2.	477.65	1.37	1.703E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	PBC<MDA	PA234
					569.70	97.740	PBC<MDA	BI207
583.09	134.	9.90	1.59	1.669E-02	583.02	84.500	5.281E+00	TL208
609.28	128.	10.01	1.08	1.605E-02	609.31	46.090	9.591E+00	BI214
635.89	11.	74.47	1.43	1.546E-02	635.89	11.310	PBC<MDA	SB125
636.97	9.	91.18	1.43	1.543E-02	636.97	7.170	PBC<MDA	I131
696.54	5.	224.40	1.49	1.426E-02	696.54	99.000	PBC<MDA	PM144
722.79	13.	78.82	1.51	1.380E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.704E-01	AG108M
					723.36	20.220	2.564E+00	EU154
735.72	9.	107.27	1.52	1.358E-02	735.72	22.500	PBC<MDA	PM146
756.73	8.	93.93	1.54	1.325E-02	756.73	54.460	PBC<MDA	ZR95
766.41	6.	200.14	1.55	1.310E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	7.935E+01	PA234M
778.92	2.	496.06	1.56	1.291E-02	778.92	12.940	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
785.42	9.	90.22	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
799.60	11.	91.48	1.58	1.261E-02	799.60	98.960	PBC<MDA	TL210
834.85	4.	227.96	1.61	1.213E-02	834.85	99.980	PBC<MDA	MN54
846.77	5.	127.67	1.62	1.198E-02	846.77	99.935	PBC<MDA	Co56
880.53	11.	90.57	1.65	1.157E-02	880.53	6.000	PBC<MDA	PA234
889.28	10.	98.38	1.66	1.147E-02	889.28	99.984	PBC<MDA	Sc46
911.17	88.	11.66	1.46	1.122E-02	911.07	29.000	1.496E+01	AC228
937.49	5.	176.07	1.70	1.094E-02	937.49	34.360	PBC<MDA	AG110M
968.33	62.	17.21	1.44	1.062E-02	968.97	17.460	1.844E+01	AC228
1004.77	14.	100.90	1.75	1.027E-02	1004.77	18.010	PBC<MDA	EU154
1037.84	6.	147.67	1.78	9.978E-03	1037.84	14.130	PBC<MDA	Co56
1050.36	12.	81.26	1.79	9.871E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	1.	786.99	1.80	9.759E-03	1063.66	74.500	PBC<MDA	BI207
1112.07	11.	83.78	1.84	9.373E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	11.	85.66	1.84	9.347E-03	1115.55	50.600	PBC<MDA	ZN65
1120.32	9.	119.35	1.85	9.311E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	5.	247.96	1.85	9.309E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	2.820E-01	Sc46
					1121.30	34.900	8.085E-01	Ta182
1291.60	4.	187.48	1.98	8.180E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	4.	202.21	2.01	7.951E-03	1332.50	99.980	PBC<MDA	CO60
1408.00	3.	176.21	2.06	7.560E-03	1408.00	21.005	PBC<MDA	EU152
1460.59	274.	6.12	1.78	7.309E-03	1460.83	10.670	1.950E+02	K40
1596.21	9.	33.33	2.19	6.737E-03	1596.21	95.400	7.780E-01	La140
1690.98	1.	666.50	2.25	6.388E-03	1690.98	47.790	PBC<MDA	SB124
1764.65	6.	84.58	2.29	6.141E-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
298.13	74.58	182.	109.	2.303E+03	19.86	0.867	- D
308.28	77.12	170.	235.	4.811E+03	10.20	0.870	- sD
835.76	209.04	58.	52.	1.279E+03	30.87	0.647	- 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_Rev15.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.71	46.54	338.	-20.	-0.011	101.91	0.836s
TH-227	200.12	50.14	265.	20.	0.011	118.30	0.840
AM-241	237.70	59.54	197.	12.	0.007	204.34	0.850s
TH-234	252.71	63.29	286.	4.	0.002	606.76	0.854s
Sn-126	256.68	64.28	234.	22.	0.012	102.27	0.856s
BA-133	323.52	80.99	233.	-25.	-0.014	108.76	0.874s
Np-237	345.53	86.49	816.	-27.	-0.015	150.74	0.880s
EU-155	345.74	86.54	703.	-6.	-0.003	662.19	0.880s
Sn-126	347.33	86.94	697.	0.	0.000	1000.00	0.880
Sn-126	349.85	87.57	642.	26.	0.014	139.25	0.881s
Cd-109	351.73	88.04	668.	26.	0.014	141.90	0.881s
TH-234	369.93	92.59	409.	-47.	-0.026	52.86	0.886s
AC-228	371.57	93.00	138.	110.	0.061	22.01	1.630s
Gd-153	389.57	97.50	502.	-22.	-0.012	148.87	0.892s
Np-239	397.57	99.50	523.	0.	0.000	1000.00	0.894s
Gd-153	412.38	103.20	516.	-21.	-0.012	153.34	0.898s
Np-239	414.38	103.70	537.	0.	0.000	1000.00	0.898
Np-239	424.10	106.13	511.	11.	0.006	301.17	0.901s
EU-152	486.70	121.78	175.	19.	0.010	101.73	0.918s
CO-57	487.83	122.06	180.	-22.	-0.012	90.21	0.918s
EU-154	491.98	123.10	153.	19.	0.011	93.98	0.919s
PA-234	524.77	131.29	322.	21.	0.012	121.98	0.928
CE-144	533.74	133.54	346.	0.	0.000	1000.00	0.930s
HF-181	544.79	136.30	346.	0.	0.000	1000.00	0.933s
CO-57	545.48	136.47	437.	-26.	-0.014	117.35	0.933s
Tc-99m	561.63	140.51	352.	-14.	-0.007	198.55	0.938s
U-235	574.73	143.79	862.	-28.	-0.015	91.02	0.941s
CE-141	581.35	145.44	815.	-26.	-0.014	158.86	0.943s
Ba-140	650.24	162.66	177.	18.	0.010	109.10	0.961s
U-235	653.11	163.38	196.	17.	0.010	117.80	0.962s
CE-139	663.01	165.85	266.	-22.	-0.012	108.32	0.965s
Cf-251	706.00	176.60	114.	3.	0.002	600.88	0.976s
U-235	742.49	185.72	106.	61.	0.034	34.29	0.986
TH-229	773.64	193.51	118.	9.	0.005	221.32	0.994s
U-235	820.94	205.33	224.	17.	0.009	126.64	1.007s
TH-229	843.01	210.85	230.	14.	0.008	155.26	1.012
Cf-251	907.62	227.00	81.	11.	0.006	151.21	1.029s
TH-227	943.50	235.97	689.	18.	0.010	211.37	1.039s
PB-212	954.15	238.63	96.	341.	0.189	6.79	1.041D
PB-214	967.61	242.00	68.	71.	0.040	20.18	1.045D
EU-152	978.39	244.69	633.	17.	0.009	214.59	1.048s
TH-227	1024.59	256.24	117.	-21.	-0.012	99.67	1.060s
Cd-113m	1054.43	263.70	87.	-5.	-0.003	285.89	1.067s
BI-210M	1062.96	265.83	83.	14.	0.008	97.60	1.070s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1108.38	277.19	35.	16.	0.009	73.55	1.416s
Hg-203	1116.44	279.20	97.	-5.	-0.003	282.13	1.083s
I-131	1136.83	284.30	84.	-18.	-0.010	73.63	1.089s
PB-214	1180.74	295.28	36.	118.	0.066	14.33	1.442s
TL-210	1183.64	296.00	450.	-14.	-0.008	211.22	1.101s
PB-212	1199.55	299.98	13.	37.	0.020	25.23	2.118s
PA-231	1199.92	300.07	436.	-4.	-0.002	768.86	1.105s
PA-233	1200.36	300.18	432.	0.	0.000	1000.00	1.105s
PA-231	1210.24	302.65	432.	0.	0.000	1000.00	1.107s
BA-133	1211.05	302.85	432.	0.	0.000	1000.00	1.108s
Ba-140	1219.04	304.85	432.	0.	0.000	1000.00	1.110s
BI-210M	1219.23	304.90	432.	0.	0.000	1000.00	1.110s
Ir-192	1233.41	308.44	432.	0.	0.000	1000.00	1.113s
Ir-192	1265.61	316.49	248.	14.	0.008	167.10	1.122s
CR-51	1279.99	320.08	122.	-13.	-0.007	127.80	1.125s
La-140	1314.69	328.76	102.	15.	0.008	97.80	1.134s
Cf-249	1333.41	333.44	98.	14.	0.008	105.49	1.139s
AC-228	1352.99	338.33	28.	88.	0.049	16.04	0.771s
Cs-136	1361.93	340.57	199.	2.	0.001	1000.00	1.146s
EU-152	1376.80	344.29	227.	-17.	-0.009	84.48	1.150s
HF-181	1382.97	345.83	156.	12.	0.007	149.69	1.151s
PB-214	1406.86	351.80	32.	185.	0.103	10.25	1.248s
BA-133	1423.66	356.00	308.	-16.	-0.009	155.69	1.162s
I-131	1457.59	364.48	32.	12.	0.006	100.67	1.170s
BA-133	1535.03	383.84	140.	-12.	-0.007	142.40	1.189s
Cf-249	1551.47	387.95	152.	0.	0.000	1000.00	1.193s
SN-113	1566.43	391.69	104.	13.	0.007	112.82	1.197s
SB-125	1711.18	427.88	32.	6.	0.003	189.05	1.233s
AG-108M	1735.43	433.94	36.	2.	0.001	664.66	1.239s
PM-146	1815.20	453.88	36.	7.	0.004	184.20	1.258s
SB-125	1853.15	463.37	100.	-16.	-0.009	89.35	1.268s
BE-7	1910.07	477.60	93.	8.	0.004	174.10	1.282s
HF-181	1927.68	482.00	89.	-6.	-0.003	226.08	1.286s
La-140	1947.77	487.02	54.	10.	0.006	107.96	1.291s
RU-103	1987.91	497.05	26.	8.	0.004	134.82	1.301s
RH-106	2047.15	511.86	27.	84.	0.047	13.91	2.565s
Kr-85	2055.62	513.98	154.	-14.	-0.008	124.16	1.317s
Nd-147	2123.70	531.00	39.	-14.	-0.008	95.52	1.333s
Ba-140	2148.74	537.26	43.	-6.	-0.004	215.85	1.339s
CS-134	2252.65	563.24	39.	3.	0.002	428.82	1.364
CS-134	2276.99	569.32	48.	-16.	-0.009	66.76	1.369s
PA-234	2277.59	569.47	56.	4.	0.002	251.92	1.370s
BI-207	2278.51	569.70	50.	2.	0.001	477.65	1.370s
TL-208	2332.06	583.09	9.	134.	0.074	9.90	1.593s
SB-125	2401.71	600.50	301.	-15.	-0.008	170.10	1.399s
SB-124	2410.64	602.73	286.	-15.	-0.008	165.78	1.401s
CS-134	2418.55	604.71	268.	-15.	-0.008	160.51	1.403s
BI-214	2436.84	609.28	8.	128.	0.071	10.01	1.079s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RU-103	2440.91	610.30	254.	-15.	-0.008	155.64	1.408s
AG-108M	2456.84	614.28	239.	-14.	-0.008	156.84	1.412
PM-144	2471.96	618.06	225.	0.	0.000	1000.00	1.415s
RH-106	2487.38	621.92	225.	0.	0.000	1000.00	1.419
SB-125	2543.28	635.89	28.	11.	0.006	74.47	1.432
I-131	2547.62	636.97	27.	9.	0.005	91.18	1.433s
AG-110M	2630.77	657.76	41.	-2.	-0.001	498.43	1.452s
CS-137	2646.36	661.66	64.	-12.	-0.007	67.98	1.455s
PM-144	2785.90	696.54	23.	5.	0.003	224.40	1.487s
NB-94	2810.25	702.63	33.	-8.	-0.004	162.22	1.493s
SB-124	2890.87	722.79	45.	13.	0.007	78.82	1.511s
EU-154	2893.17	723.36	57.	0.	0.000	1000.00	1.511s
ZR-95	2896.52	724.20	57.	0.	0.000	1000.00	1.512s
BI-212	2908.41	727.17	73.	-13.	-0.007	97.00	1.515s
PM-146	2942.61	735.72	19.	9.	0.005	107.27	1.523s
PM-146	2988.37	747.16	29.	-7.	-0.004	147.36	1.533s
ZR-95	3026.65	756.73	9.	8.	0.004	93.93	1.541s
AG-110M	3055.51	763.94	30.	-3.	-0.002	264.58	1.548s
NB-95	3062.89	765.79	50.	-12.	-0.006	90.31	1.549s
PA-234M	3065.38	766.41	58.	6.	0.003	200.14	1.550s
EU-152	3115.41	778.92	24.	2.	0.001	496.06	1.561s
BI-212	3141.41	785.42	14.	9.	0.005	90.22	1.567s
CS-134	3183.22	795.87	34.	11.	0.006	81.10	1.576s
TL-210	3198.14	799.60	45.	11.	0.006	91.48	1.579s
CS-134	3207.54	801.95	66.	-5.	-0.003	229.59	1.581s
CO-58	3242.84	810.78	58.	-14.	-0.008	84.11	1.589s
MN-54	3339.13	834.85	14.	4.	0.002	227.96	1.610s
Co-56	3386.82	846.77	10.	5.	0.003	127.67	1.620s
NB-94	3484.13	871.10	25.	-3.	-0.002	220.45	1.641s
EU-154	3492.66	873.23	29.	-1.	0.000	864.62	1.643s
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
AG-110M	3538.47	884.68	52.	0.	0.000	1000.00	1.653s
Sc-46	3556.86	889.28	43.	10.	0.006	98.38	1.657s
Y-88	3591.90	898.04	20.	-5.	-0.003	138.03	1.664s
AC-228	3644.40	911.17	4.	88.	0.049	11.66	1.457
AG-110M	3749.71	937.49	15.	5.	0.003	176.07	1.697s
PA-234	3783.82	946.02	25.	-3.	-0.002	337.69	1.704s
EU-152	3856.18	964.11	100.	-12.	-0.007	116.34	1.719s
AC-228	3873.07	968.33	9.	62.	0.034	17.21	1.443
EU-154	3985.06	996.33	81.	-17.	-0.010	78.11	1.746s
PA-234M	4003.73	1001.00	99.	-17.	-0.010	85.06	1.750s
EU-154	4018.84	1004.77	88.	14.	0.008	100.90	1.753s
Co-56	4151.10	1037.84	15.	6.	0.003	147.67	1.780s
Cs-136	4192.02	1048.07	43.	-18.	-0.010	57.70	1.788s
RH-106	4201.18	1050.36	45.	12.	0.007	81.26	1.790s
BI-207	4254.38	1063.66	22.	1.	0.001	786.99	1.801s
Ga-68	4309.34	1077.40	37.	-12.	-0.007	116.15	1.812s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
FE-59	4396.74	1099.25	27.	-9.	-0.005	121.39	1.829s
EU-152	4448.04	1112.07	38.	11.	0.006	83.78	1.839s
ZN-65	4461.92	1115.55	40.	11.	0.006	85.66	1.842s
BI-214	4480.88	1120.29	57.	9.	0.005	119.35	1.845s
Sc-46	4481.94	1120.55	66.	5.	0.003	247.96	1.846s
Ta-182	4484.94	1121.30	84.	-11.	-0.006	121.63	1.846s
CO-60	4692.68	1173.24	21.	-2.	-0.001	454.68	1.886s
Ta-182	4755.93	1189.05	32.	-6.	-0.003	218.16	1.899s
Ta-182	4885.37	1221.41	43.	-10.	-0.005	156.93	1.923s
Co-56	4952.84	1238.28	37.	-9.	-0.005	152.36	1.936s
NA-22	5097.84	1274.53	23.	-2.	-0.001	411.34	1.963
EU-154	5097.88	1274.54	24.	0.	0.000	1000.00	1.963
FE-59	5166.10	1291.60	12.	4.	0.002	187.48	1.975s
TL-210	5251.71	1313.00	17.	-2.	-0.001	488.62	1.991s
CO-60	5329.71	1332.50	12.	4.	0.002	202.21	2.005s
AG-110M	5536.89	1384.30	23.	-8.	-0.004	150.05	2.042s
EU-152	5631.70	1408.00	6.	3.	0.002	176.21	2.059s
K-40	5842.04	1460.59	3.	274.	0.152	6.12	1.781
La-140	6384.49	1596.21	0.	9.	0.005	33.33	2.185s
SB-124	6763.55	1690.98	6.	1.	0.001	666.50	2.245s
BI-214	7057.56	1764.49	12.	6.	0.004	84.58	2.290s
Co-56	7084.99	1771.35	40.	-14.	-0.008	70.47	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	2.1261E+00				5.31E+01	
			477.60	2.126E+00	?(	1.266E+01 1.74E+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	1.9498E+02				4.66E+11	
			1460.83	1.950E+02	(P	7.961E+00 6.12E+00 1.07E+01	G
Sc-46	F	3.8270E-01				8.38E+01	
			889.28	4.834E-01	?(	1.615E+00 9.84E+01 1.00E+02	G
			1120.55	2.820E-01	?(	2.426E+00 2.48E+02 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	-2.4905E+00					2.77E+01	
			320.08	-2.490E+00	(	1.077E+01	1.28E+02	9.94E+00 G
MN-54	C	1.6503E-01					3.12E+02	
			834.85	1.650E-01	?(P	9.337E-01	2.28E+02	1.00E+02 G
FE-59	F	-2.1599E-01					4.45E+01	
			1099.25	-9.073E-01	?(P	2.783E+00	1.21E+02	5.65E+01 G
			1291.60	6.881E-01	?(P	2.924E+00	1.87E+02	4.32E+01 G
Co-56	C	5.1344E-01					7.73E+01	
			846.77	2.518E-01	?(P	7.947E-01	1.28E+02	9.99E+01 G
			1238.28	-9.232E-01	+	3.084E+00	1.52E+02	6.61E+01 G
			1037.84	2.364E+00	?(	8.180E+00	1.48E+02	1.41E+01 G
			1771.35	-8.100E+00	+	1.897E+01	7.05E+01	1.55E+01 A
CO-57	C	-2.5066E-01					2.72E+02	
			122.06	-2.507E-01	&(	7.550E-01	9.02E+01	8.56E+01 G
			136.47	-2.457E+00	+	9.626E+00	1.17E+02	1.07E+01 G
CO-58	C	-6.0678E-01					7.09E+01	
			810.78	-6.068E-01	?(	1.713E+00	8.41E+01	9.95E+01 G
CO-60	F	2.8427E-01					1.93E+03	
			1332.50	2.843E-01	?(P	1.314E+00	2.02E+02	1.00E+02 G
			1173.24	-1.453E-01	+	1.509E+00	4.55E+02	9.99E+01 G
ZN-65	F	1.3027E+00					2.44E+02	
			1115.55	1.303E+00	?(	3.762E+00	8.57E+01	5.06E+01 G
NB-94	I	-3.0747E-01					7.41E+06	
			702.63	-3.075E-01	?(	1.177E+00	1.62E+02	9.79E+01 G
			871.10	-1.587E-01	+	1.246E+00	2.20E+02	9.99E+01 G
ZR-95	I	5.7811E-01					6.40E+01	
			756.73	5.781E-01	?(P	1.309E+00	9.39E+01	5.45E+01 G
			724.20	0.000E+00	-	3.461E+00	1.00E+03	4.42E+01 G
NB-95	I	-4.9554E-01					6.40E+01	
			765.79	-4.955E-01	?(	1.510E+00	9.03E+01	9.98E+01 G
RU-103	I	2.5478E-01					3.93E+01	
			497.05	2.548E-01	?(	8.430E-01	1.35E+02	9.09E+01 G
			610.30	-8.852E+00	+	4.639E+01	1.56E+02	5.75E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RH-106	I	6.0962E+00					3.74E+02	
			621.92	0.000E+00	?(	2.577E+01	1.00E+03	9.93E+00 G
			1050.36	4.490E+01	?(	1.225E+02	8.13E+01	1.56E+00 G
			511.86	1.252E+01	?	3.976E+00	1.39E+01	2.00E+01 GA
AG-108M	C	5.0664E-02					1.53E+05	
			433.94	5.066E-02	?(P	8.743E-01	6.65E+02	9.05E+01 G
			722.94	5.882E-03	%	1.692E+00	8.11E+03	9.08E+01 G
			614.28	-5.490E-01	+	2.901E+00	1.57E+02	8.98E+01 G
AG-110M	F	2.3730E-01					2.50E+02	
			884.68	0.000E+00	?(	2.409E+00	1.00E+03	7.27E+01 G
			657.76	-7.174E-02	+	1.271E+00	4.98E+02	9.46E+01 G
			937.49	7.392E-01	?(	3.069E+00	1.76E+02	3.44E+01 G
			1384.30	-2.284E+00	+	7.416E+00	1.50E+02	2.43E+01 G
			763.94	-5.695E-01	+	5.360E+00	2.65E+02	2.23E+01 G
SN-113	F	4.8408E-01					1.15E+02	
			391.69	4.841E-01	&(	1.845E+00	1.13E+02	6.40E+01 G
SB-124	F	1.5690E-02					6.02E+01	
			602.73	-5.098E-01	?(	2.845E+00	1.66E+02	9.83E+01 G
			1690.98	1.642E-01	+ P	2.587E+00	6.66E+02	4.78E+01 G
			722.79	4.792E+00	?(	1.265E+01	7.88E+01	1.08E+01 G
SB-125	I	1.3341E+00					1.01E+03	
			427.88	5.151E-01	?(	2.496E+00	1.89E+02	2.96E+01 G
			600.50	-2.791E+00	+	1.598E+01	1.70E+02	1.79E+01 G
			635.89	3.478E+00	&(P	8.653E+00	7.45E+01	1.13E+01 G
			463.37	-4.289E+00	+	1.285E+01	8.94E+01	1.05E+01 G
I-131	I	6.3592E-01					8.02E+00	
			364.48	3.116E-01	&(	7.872E-01	1.01E+02	8.17E+01 G
			284.30	-5.309E+00	+ P	1.326E+01	7.36E+01	6.14E+00 G
			636.97	4.332E+00	&(	1.343E+01	9.12E+01	7.17E+00 G
Gd-153	F	-7.1742E-01					2.42E+02	
			97.50	-7.174E-01	?(	3.573E+00	1.49E+02	3.00E+01 G
			103.20	-9.596E-01	+	4.922E+00	1.53E+02	2.18E+01 G
Ga-68	C	-2.5146E+01					4.71E-02	
			1077.40	-2.515E+01	?(	6.358E+01	1.16E+02	3.30E+00 G
Tc-99m	I	-1.6216E-01					2.51E-01	
			140.51	-1.622E-01	?(	1.084E+00	1.99E+02	8.93E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BA-133	F	-5.6440E-01					3.85E+03	
			356.00	-5.644E-01	&(	2.953E+00	1.56E+02	6.20E+01 G
			302.85	0.000E+00	+	1.025E+01	1.00E+03	1.83E+01 G
			383.84	-3.105E+00	&	1.497E+01	1.42E+02	8.94E+00 GA
			80.99	-8.179E-01	+	2.378E+00	1.09E+02	3.41E+01 GA
CS-134	I	6.1520E-01					7.54E+02	
			795.87	5.620E-01	&(	1.533E+00	8.11E+01	8.55E+01 G
			604.71	-5.153E-01	&	2.785E+00	1.61E+02	9.76E+01 G
			569.32	-3.348E+00	+	7.395E+00	6.68E+01	1.54E+01 G
			801.95	-2.594E+00	+	2.063E+01	2.30E+02	8.69E+00 G
			563.24	1.160E+00	(	1.230E+01	4.29E+02	8.35E+00 G
CS-137	I	-5.2804E-01					1.10E+04	
			661.66	-5.280E-01	?(P	1.744E+00	6.80E+01	8.52E+01 G
CE-139	F	-3.0969E-01					1.38E+02	
			165.85	-3.097E-01	&(	1.122E+00	1.08E+02	7.99E+01 G
Ba-140	I	2.1629E-02					1.28E+01	
			537.26	-8.047E-01	?(	4.242E+00	2.16E+02	2.44E+01 G
			162.66	3.262E+00	?(	1.194E+01	1.09E+02	6.22E+00 G
			304.85	0.000E+00	-	4.406E+01	1.00E+03	4.29E+00 G
La-140	I	8.2766E-01					1.28E+01	
			1596.21	7.780E-01	?(	6.371E-01	3.33E+01	9.54E+01 G
			487.02	6.272E-01	?(	2.303E+00	1.08E+02	4.55E+01 G
			328.76	1.510E+00	*(P	4.964E+00	9.78E+01	2.03E+01 G
			815.77	-1.142E-01	% P	7.906E+00	1.76E+03	2.33E+01 G
CE-141	I	-5.6357E-01					3.25E+01	
			145.44	-5.636E-01	?(	2.987E+00	1.59E+02	4.82E+01 G
PM-144	C	1.8365E-01					3.63E+02	
			696.54	1.836E-01	?(	9.925E-01	2.24E+02	9.90E+01 G
			618.06	0.000E+00	-	2.568E+00	1.00E+03	9.91E+01 G
EU-152	F	1.9070E+00					4.94E+03	
			121.78	6.544E-01	?(	2.231E+00	1.02E+02	2.86E+01 G
			344.29	-1.328E+00	+ P	5.799E+00	8.45E+01	2.65E+01 G
			1112.07	4.810E+00	?(	1.357E+01	8.38E+01	1.36E+01 G
			778.92	6.977E-01	?(P	8.478E+00	4.96E+02	1.29E+01 G
			964.11	-4.459E+00	+	1.755E+01	1.16E+02	1.46E+01 G
			244.69	3.469E+00	?(	2.493E+01	2.15E+02	7.58E+00 G
			1408.00	1.166E+00	?	4.829E+00	1.76E+02	2.10E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	1.5769E+00					3.14E+03	
			123.10	4.667E-01	(	1.468E+00	9.40E+01	4.08E+01 G
			1274.54	0.000E+00	-	4.899E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	7.550E+00	1.00E+03	2.02E+01 G
			873.23	-3.143E-01	- P	1.088E+01	8.65E+02	1.23E+01 G
			1004.77	4.091E+00	?(	1.392E+01	1.01E+02	1.80E+01 G
			996.33	-8.692E+00	+	2.265E+01	7.81E+01	1.06E+01 G
EU-155	I	-4.0979E-02					1.81E+03	
			105.31	-4.098E-02	%(P	5.151E+00	2.83E+03	2.12E+01 G
			86.54	-1.944E-01	+	4.326E+00	6.62E+02	3.07E+01 G
HF-181	F	8.8761E-02					4.24E+01	
			482.00	-2.101E-01	?(	1.634E+00	2.26E+02	8.05E+01 G
			133.02	5.496E-02	%	2.091E+00	1.12E+03	4.33E+01 G
			345.83	1.685E+00	&(	8.535E+00	1.50E+02	1.51E+01 G
			136.30	0.000E+00	-	1.568E+01	1.00E+03	5.85E+00 G
Ta-182	F	-1.8822E+00					1.14E+02	
			1121.30	-1.882E+00	?(	7.772E+00	1.22E+02	3.49E+01 G
			1221.41	-2.311E+00	&	7.924E+00	1.57E+02	2.70E+01 G
			1189.05	-2.333E+00	+	1.130E+01	2.18E+02	1.62E+01 G
Hg-203	F	-1.0813E-01					4.66E+01	
			279.20	-1.081E-01	?(	1.051E+00	2.82E+02	8.15E+01 G
TL-208	N	5.2223E+00					6.98E+02	
			583.02	5.281E+00	(P	6.568E-01	9.90E+00	8.45E+01 G
			277.28	4.441E+00	(	8.404E+00	7.36E+01	6.31E+00 G
			860.56	-6.765E-02	% P	1.072E+01	3.90E+03	1.24E+01 G
PM-146	C	6.2207E-01					2.02E+03	
			453.88	2.695E-01	&(P	1.269E+00	1.84E+02	6.50E+01 G
			747.16	-8.072E-01	+ P	3.371E+00	1.47E+02	3.40E+01 G
			735.72	1.641E+00	?(P	4.183E+00	1.07E+02	2.25E+01 G
Cd-113m		-1.3053E+03					5.33E+03	
			263.70	-1.305E+03	&(	1.289E+04	2.86E+02	6.00E-03 K
Cd-109	F	7.1531E+00					4.53E+02	
			88.04	7.153E+00	&(	3.387E+01	1.42E+02	3.79E+00 G
Cf-251	T	2.3510E-01					3.28E+05	
			176.60	2.351E-01	(	3.695E+00	6.01E+02	1.70E+01 G
			227.00	2.660E+00		1.046E+01	1.51E+02	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	3.4481E-01					1.28E+05	
			387.95	0.000E+00	?(	2.128E+00	1.00E+03	6.60E+01 G
			333.44	1.812E+00	&(	6.447E+00	1.05E+02	1.55E+01 G
Sn-126		3.0398E+00					3.65E+07	
			87.57	7.245E-01	-	3.367E+00	1.39E+02	3.75E+01 GA
			64.28	3.040E+00	&(	1.040E+01	1.02E+02	9.70E+00 G
			86.94	0.000E+00	-	1.460E+01	1.00E+03	9.04E+00 GA
PB-210	N	-1.0267E+01					8.14E+03	
			46.54	-1.027E+01	*(P	4.657E+01	1.02E+02	4.25E+00 G
PB-212	N	1.2132E+01					6.98E+02	
			238.63	1.213E+01	(P	1.726E+00	6.79E+00	4.33E+01 G
			300.03	2.094E+01	+	1.126E+01	2.52E+01	3.28E+00 GA
PB-214	N	1.0817E+01					5.84E+05	
			351.93	1.056E+01	*(P	1.661E+00	1.03E+01	3.76E+01 G
			295.09	1.132E+01	(P	2.923E+00	1.43E+01	1.93E+01 G
			242.00	1.496E+01	+	8.627E+00	2.02E+01	7.43E+00 GA
BI-207	C	8.4558E-02					1.18E+04	
			1063.66	1.029E-01	?(P	1.864E+00	7.87E+02	7.45E+01 G
			569.70	7.059E-02	&(P	1.189E+00	4.78E+02	9.77E+01 G
BI-212	N	-6.9696E+00					6.98E+02	
			727.17	-6.970E+00	?(	2.280E+01	9.70E+01	7.55E+00 G
			785.42	3.195E+01	?	6.823E+01	9.02E+01	1.28E+00 GA
U-235	N	6.6018E-01					2.57E+11	
			143.79	-2.645E+00	(P	1.341E+01	9.10E+01	1.10E+01 G
			205.33	4.618E+00	?(P	1.965E+01	1.27E+02	5.01E+00 G
			163.38	3.888E+00	?(P	1.538E+01	1.18E+02	5.08E+00 G
			185.72	1.405E+00		1.175E+00	3.43E+01	5.40E+01 GA
BI-214	N	9.5911E+00					5.84E+05	
			609.31	9.591E+00	*(P	1.211E+00	1.00E+01	4.61E+01 G
			1120.29	3.680E+00	- P	1.497E+01	1.19E+02	1.51E+01 G
			1764.49	3.780E+00	- P	1.089E+01	8.46E+01	1.54E+01 G
BI-210M	T	4.6401E-01					1.10E+09	
			265.83	4.640E-01	?(P	1.525E+00	9.76E+01	5.00E+01 G
			304.90	0.000E+00	-	6.751E+00	1.00E+03	2.80E+01 G
AC-228	N	1.6040E+01					2.10E+03	
			911.07	1.496E+01	(P	2.133E+00	1.17E+01	2.90E+01 G
			968.97	1.844E+01	(P	5.114E+00	1.72E+01	1.75E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			338.32	1.518E+01	(P	4.743E+00	1.60E+01	1.20E+01 G
			93.35	2.018E+01		1.048E+01	2.20E+01	5.56E+00 XA
TH-227	N	-4.8770E+00					7.95E+03	
			256.24	-4.877E+00	?(	1.245E+01	9.97E+01	7.00E+00 G
			235.97	2.196E+00	+	1.553E+01	2.11E+02	1.23E+01 G
			50.14	4.842E+00	+	1.920E+01	1.18E+02	8.00E+00 G
TH-229	N	4.2606E+00					2.68E+06	
			193.51	2.726E+00	&(P	1.566E+01	2.21E+02	4.40E+00 G
			210.85	6.519E+00	?(	3.411E+01	1.55E+02	2.99E+00 G
TH-234	N	-8.6087E+00					1.63E+12	
			92.59	-8.609E+00	(P	1.770E+01	5.29E+01	5.58E+00 G
			63.29	1.443E+00	+ P	2.968E+01	6.07E+02	3.81E+00 G
PA-233	C	-4.2210E-02					7.82E+08	
			312.01	-4.221E-02	%(P	5.360E+00	2.17E+03	3.60E+01 G
			300.18	0.000E+00	+	3.009E+01	1.00E+03	6.20E+00 G
PA-234	N	1.3509E+00					1.63E+12	
			131.29	1.189E+00	&(	4.854E+00	1.22E+02	1.80E+01 G
			946.02	-1.157E+00	+ P	9.946E+00	3.38E+02	1.34E+01 G
			569.47	1.707E+00	?(	1.498E+01	2.52E+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	-1.1079E+02					1.63E+12	
			1001.00	-1.108E+02	&(	3.152E+02	8.51E+01	8.37E-01 G
			766.41	7.935E+01	+	5.504E+02	2.00E+02	2.94E-01 G
AM-241	T	5.1566E-01					1.58E+05	
			59.54	5.157E-01	&(	2.846E+00	2.04E+02	3.59E+01 G
Np-237	F	-2.1702E+00					2.14E+06	
			86.49	-2.170E+00	?(	1.091E+01	1.51E+02	1.31E+01 G
Ir-192	F	3.0420E-01					7.40E+01	
			316.49	3.042E-01	?(	1.714E+00	1.67E+02	8.70E+01 G
			468.06	7.036E-02	%	2.734E+00	1.12E+03	5.18E+01 G
			308.44	0.000E+00	-	6.013E+00	1.00E+03	3.18E+01 G
Cs-136	F	2.2347E-02					1.30E+01	
			818.50	-8.915E-03	%(	1.039E+00	4.69E+03	1.00E+02 G
			1048.07	-1.235E+00	+	2.328E+00	5.77E+01	8.00E+01 G
			340.57	8.900E-02	?(	3.046E+00	1.00E+03	4.69E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Np-239   T   4.6269E-01                                      2.36E+00
                          103.70 0.000E+00 -   4.557E+00 1.00E+03 2.40E+01 X
                          106.13 4.627E-01 ?(  4.685E+00 3.01E+02 2.27E+01 G
                           99.50 0.000E+00 &   7.255E+00 1.00E+03 1.50E+01 X

Nd-147      -3.2807E+00                                       1.11E+01
                          531.00-3.281E+00 ?(  7.506E+00 9.55E+01 1.30E+01 G
                           91.10 1.159E-01 %   4.548E+00 1.17E+03 2.83E+01 G

TL-210   N   4.8876E-01                                       5.84E+05
                          799.60 4.888E-01 ?(  1.511E+00 9.15E+01 9.90E+01 G
                          296.00-3.355E-01 -   2.381E+00 2.11E+02 7.90E+01 G
                         1313.00-6.566E-01 +   7.197E+00 4.89E+02 2.10E+01 GA

Kr-85    I  -1.0037E+02                                       3.92E+03
                          513.98-1.004E+02 &(  4.201E+02 1.24E+02 4.30E-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	338.	-20.	-0.011	101.91	-1.027E+01	P
TH-227	50.14	265.	20.	0.011	118.30	4.842E+00	
AM-241	59.54	197.	12.	0.007	204.34	5.157E-01	
TH-234	63.29	286.	4.	0.002	606.76	1.443E+00	P
BA-133	80.99	233.	-25.	-0.014	108.76	-8.179E-01	
Np-237	86.49	816.	-27.	-0.015	150.74	-2.170E+00	
EU-155	86.54	703.	-6.	-0.003	662.19	-1.944E-01	
Cd-109	88.04	668.	26.	0.014	141.90	7.153E+00	
TH-234	92.59	409.	-47.	-0.026	52.86	-8.609E+00	P
Gd-153	97.50	502.	-22.	-0.012	148.87	-7.174E-01	
Gd-153	103.20	516.	-21.	-0.012	153.34	-9.596E-01	
Np-239	106.13	511.	11.	0.006	301.17	4.627E-01	
EU-152	121.78	175.	19.	0.010	101.73	6.544E-01	
CO-57	122.06	180.	-22.	-0.012	90.21	-2.507E-01	
PA-234	131.29	322.	21.	0.012	121.98	1.189E+00	
CO-57	136.47	437.	-26.	-0.014	117.35	-2.457E+00	
Tc-99m	140.51	352.	-14.	-0.007	198.55	-1.622E-01	
U-235	143.79	862.	-28.	-0.015	91.02	-2.645E+00	P
CE-141	145.44	815.	-26.	-0.014	158.86	-5.636E-01	
Ba-140	162.66	177.	18.	0.010	109.10	3.262E+00	
U-235	163.38	196.	17.	0.010	117.80	3.888E+00	P
CE-139	165.85	266.	-22.	-0.012	108.32	-3.097E-01	
Cf-251	176.60	114.	3.	0.002	600.88	2.351E-01	
U-235	185.72	106.	61.	0.034	34.29	1.405E+00	
TH-229	193.51	118.	9.	0.005	221.32	2.726E+00	P
U-235	205.33	224.	17.	0.009	126.64	4.618E+00	P
TH-229	210.85	230.	14.	0.008	155.26	6.519E+00	
Cf-251	227.00	81.	11.	0.006	151.21	2.660E+00	
TH-227	235.97	689.	18.	0.010	211.37	2.196E+00	
EU-152	244.69	633.	17.	0.009	214.59	3.469E+00	
TH-227	256.24	117.	-21.	-0.012	99.67	-4.877E+00	
Cd-113m	263.70	87.	-5.	-0.003	285.89	-1.305E+03	
BI-210M	265.83	83.	14.	0.008	97.60	4.640E-01	P
Hg-203	279.20	97.	-5.	-0.003	282.13	-1.081E-01	
I-131	284.30	84.	-18.	-0.010	73.63	-5.309E+00	P
TL-210	296.00	450.	-14.	-0.008	211.22	-3.355E-01	
PA-231	300.07	436.	-4.	-0.002	768.86	-2.930E+00	
Ir-192	316.49	248.	14.	0.008	167.10	3.042E-01	
CR-51	320.08	122.	-13.	-0.007	127.80	-2.490E+00	
Cf-249	333.44	98.	14.	0.008	105.49	1.812E+00	
EU-152	344.29	227.	-17.	-0.009	84.48	-1.328E+00	P
HF-181	345.83	156.	12.	0.007	149.69	1.685E+00	
BA-133	356.00	308.	-16.	-0.009	155.69	-5.644E-01	
I-131	364.48	32.	12.	0.006	100.67	3.116E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
BA-133	383.84	140.	-12.	-0.007	142.40	-3.105E+00		
SN-113	391.69	104.	13.	0.007	112.82	4.841E-01		
SB-125	427.88	32.	6.	0.003	189.05	5.151E-01		
AG-108M	433.94	36.	2.	0.001	664.66	5.066E-02		P
PM-146	453.88	36.	7.	0.004	184.20	2.695E-01		P
SB-125	463.37	100.	-16.	-0.009	89.35	-4.289E+00		
BE-7	477.60	93.	8.	0.004	174.10	2.126E+00		
HF-181	482.00	89.	-6.	-0.003	226.08	-2.101E-01		
RU-103	497.05	26.	8.	0.004	134.82	2.548E-01		
RH-106	511.86	27.	84.	0.047	13.91	1.252E+01		
Kr-85	513.98	154.	-14.	-0.008	124.16	-1.004E+02		
Nd-147	531.00	39.	-14.	-0.008	95.52	-3.281E+00		
Ba-140	537.26	43.	-6.	-0.004	215.85	-8.047E-01		
CS-134	563.24	39.	3.	0.002	428.82	1.160E+00		
CS-134	569.32	48.	-16.	-0.009	66.76	-3.348E+00		
PA-234	569.47	56.	4.	0.002	251.92	1.707E+00		
BI-207	569.70	50.	2.	0.001	477.65	7.059E-02		P
SB-125	600.50	301.	-15.	-0.008	170.10	-2.791E+00		
SB-124	602.73	286.	-15.	-0.008	165.78	-5.098E-01		
CS-134	604.71	268.	-15.	-0.008	160.51	-5.153E-01		
RU-103	610.30	254.	-15.	-0.008	155.64	-8.852E+00		
AG-108M	614.28	239.	-14.	-0.008	156.84	-5.490E-01		
SB-125	635.89	28.	11.	0.006	74.47	3.478E+00		P
I-131	636.97	27.	9.	0.005	91.18	4.332E+00		
AG-110M	657.76	41.	-2.	-0.001	498.43	-7.174E-02		
CS-137	661.66	64.	-12.	-0.007	67.98	-5.280E-01		P
PM-144	696.54	23.	5.	0.003	224.40	1.836E-01		
NB-94	702.63	33.	-8.	-0.004	162.22	-3.075E-01		
SB-124	722.79	45.	13.	0.007	78.82	4.792E+00		
BI-212	727.17	73.	-13.	-0.007	97.00	-6.970E+00		
PM-146	735.72	19.	9.	0.005	107.27	1.641E+00		P
PM-146	747.16	29.	-7.	-0.004	147.36	-8.072E-01		P
ZR-95	756.73	9.	8.	0.004	93.93	5.781E-01		P
AG-110M	763.94	30.	-3.	-0.002	264.58	-5.695E-01		
NB-95	765.79	50.	-12.	-0.006	90.31	-4.955E-01		
PA-234M	766.41	58.	6.	0.003	200.14	7.935E+01		
EU-152	778.92	24.	2.	0.001	496.06	6.977E-01		P
BI-212	785.42	14.	9.	0.005	90.22	3.195E+01		
CS-134	795.87	34.	11.	0.006	81.10	5.620E-01		
TL-210	799.60	45.	11.	0.006	91.48	4.888E-01		
CS-134	801.95	66.	-5.	-0.003	229.59	-2.594E+00		
CO-58	810.78	58.	-14.	-0.008	84.11	-6.068E-01		
MN-54	834.85	14.	4.	0.002	227.96	1.650E-01		P
Co-56	846.77	10.	5.	0.003	127.67	2.518E-01		P
NB-94	871.10	25.	-3.	-0.002	220.45	-1.587E-01		
PA-234	880.53	41.	11.	0.006	90.57	8.537E+00		
Sc-46	889.28	43.	10.	0.006	98.38	4.834E-01		
Y-88	898.04	20.	-5.	-0.003	138.03	-2.652E-01		P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
AG-110M	937.49	15.	5.	0.003	176.07	7.392E-01		
PA-234	946.02	25.	-3.	-0.002	337.69	-1.157E+00		P
EU-152	964.11	100.	-12.	-0.007	116.34	-4.459E+00		
PA-234M	1001.00	99.	-17.	-0.010	85.06	-1.108E+02		
Co-56	1037.84	15.	6.	0.003	147.67	2.364E+00		
Cs-136	1048.07	43.	-18.	-0.010	57.70	-1.235E+00		
RH-106	1050.36	45.	12.	0.007	81.26	4.490E+01		
BI-207	1063.66	22.	1.	0.001	786.99	1.029E-01		P
Ga-68	1077.40	37.	-12.	-0.007	116.15	-2.515E+01		
FE-59	1099.25	27.	-9.	-0.005	121.39	-9.073E-01		P
EU-152	1112.07	38.	11.	0.006	83.78	4.810E+00		
ZN-65	1115.55	40.	11.	0.006	85.66	1.303E+00		
Sc-46	1120.55	66.	5.	0.003	247.96	2.820E-01		
Ta-182	1121.30	84.	-11.	-0.006	121.63	-1.882E+00		
CO-60	1173.24	21.	-2.	-0.001	454.68	-1.453E-01		
Ta-182	1189.05	32.	-6.	-0.003	218.16	-2.333E+00		
Ta-182	1221.41	43.	-10.	-0.005	156.93	-2.311E+00		
Co-56	1238.28	37.	-9.	-0.005	152.36	-9.232E-01		
NA-22	1274.53	23.	-2.	-0.001	411.34	-1.119E-01		
FE-59	1291.60	12.	4.	0.002	187.48	6.881E-01		P
TL-210	1313.00	17.	-2.	-0.001	488.62	-6.566E-01		
CO-60	1332.50	12.	4.	0.002	202.21	2.843E-01		P
AG-110M	1384.30	23.	-8.	-0.004	150.05	-2.284E+00		
EU-152	1408.00	6.	3.	0.002	176.21	1.166E+00		
SB-124	1690.98	6.	1.	0.001	666.50	1.642E-01		P
Co-56	1771.35	40.	-14.	-0.008	70.47	-8.100E+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	2.1261E+00	2.1261E+00	1.741E+02%	1.27E+01
NA-22	#A	-1.1189E-01	-1.1189E-01	4.113E+02%	1.67E+00
K-40		1.9498E+02	1.9498E+02	6.120E+00%	7.96E+00
Sc-46	#A	3.8270E-01	3.8270E-01	9.838E+01%	1.61E+00
CR-51	#A	-2.4904E+00	-2.4905E+00	1.278E+02%	1.08E+01
MN-54	#A	1.6503E-01	1.6503E-01	2.280E+02%	9.34E-01
FE-59	#A	-2.1599E-01	-2.1599E-01	1.117E+02%	2.78E+00
Co-56	#A	5.1344E-01	5.1344E-01	9.760E+01%	7.95E-01
CO-57	#A	-2.5066E-01	-2.5066E-01	9.021E+01%	7.55E-01
CO-58	#A	-6.0678E-01	-6.0678E-01	8.411E+01%	1.71E+00
CO-60	#A	2.8427E-01	2.8427E-01	2.022E+02%	1.31E+00
ZN-65	#A	1.3027E+00	1.3027E+00	8.566E+01%	3.76E+00
NB-94	#A	-3.0747E-01	-3.0747E-01	1.622E+02%	1.18E+00
ZR-95	#A	5.7811E-01	5.7811E-01	9.393E+01%	1.31E+00

NB-95	#A	-4.9554E-01	-4.9554E-01	9.031E+01%	1.51E+00
RU-103	#A	2.5478E-01	2.5478E-01	1.348E+02%	8.43E-01
RH-106	#A	6.0962E+00	6.0962E+00	8.126E+01%	2.58E+01
AG-108M	#A	5.0664E-02	5.0664E-02	6.647E+02%	8.74E-01
AG-110M	#A	2.3730E-01	2.3730E-01	1.761E+02%	2.41E+00
SN-113	#A	4.8408E-01	4.8408E-01	1.128E+02%	1.84E+00
SB-124	#A	1.5690E-02	1.5690E-02	7.882E+01%	2.84E+00
SB-125	#A	1.3341E+00	1.3341E+00	7.447E+01%	2.50E+00
I-131	#A	6.3590E-01	6.3592E-01	6.791E+01%	7.87E-01
Gd-153	#A	-7.1742E-01	-7.1742E-01	1.489E+02%	3.57E+00
Ga-68	#A	-2.5005E+01	-2.5146E+01	1.162E+02%	6.36E+01
Tc-99m	#A	-1.6199E-01	-1.6216E-01	1.986E+02%	1.08E+00
BA-133	#A	-5.6440E-01	-5.6440E-01	1.557E+02%	2.95E+00
CS-134	#A	6.1520E-01	6.1520E-01	8.110E+01%	1.53E+00
CS-137	#A	-5.2804E-01	-5.2804E-01	6.798E+01%	1.74E+00
CE-139	#A	-3.0969E-01	-3.0969E-01	1.083E+02%	1.12E+00
Ba-140	#A	2.1629E-02	2.1629E-02	1.091E+02%	4.24E+00
La-140	#	8.2765E-01	8.2766E-01	3.333E+01%	6.37E-01
CE-141	#A	-5.6356E-01	-5.6357E-01	1.589E+02%	2.99E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.20E+00
PM-144	#A	1.8365E-01	1.8365E-01	2.244E+02%	9.92E-01
EU-152	#A	1.9070E+00	1.9070E+00	8.378E+01%	2.23E+00
EU-154	#C	1.5769E+00	1.5769E+00	6.894E+01%	1.47E+00
EU-155	#A	-4.0979E-02	-4.0979E-02	2.834E+03%	5.15E+00
HF-181	#A	8.8761E-02	8.8761E-02	1.356E+02%	1.63E+00
Ta-182	#A	-1.8822E+00	-1.8822E+00	1.216E+02%	7.77E+00
Hg-203	#A	-1.0812E-01	-1.0813E-01	2.821E+02%	1.05E+00
TL-208		5.2223E+00	5.2223E+00	9.902E+00%	6.57E-01
PM-146	#A	6.2207E-01	6.2207E-01	1.066E+02%	1.27E+00
Y-88	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.97E-01
Cd-113m	#A	-1.3053E+03	-1.3053E+03	2.859E+02%	1.29E+04
Cd-109	#A	7.1531E+00	7.1531E+00	1.419E+02%	3.39E+01
Cf-251	#A	2.3510E-01	2.3510E-01	6.009E+02%	3.70E+00
Cf-249	#A	3.4481E-01	3.4481E-01	1.055E+02%	2.13E+00
Sn-126	#A	3.0398E+00	3.0398E+00	1.023E+02%	1.04E+01
PB-210	#A	-1.0267E+01	-1.0267E+01	1.019E+02%	4.66E+01
PB-212		1.2132E+01	1.2132E+01	6.790E+00%	1.73E+00
PB-214		1.0817E+01	1.0817E+01	8.812E+00%	1.66E+00
BI-207	#A	8.4558E-02	8.4558E-02	4.603E+02%	1.86E+00
BI-212	#A	-6.9696E+00	-6.9696E+00	9.700E+01%	2.28E+01
U-235	#A	6.6018E-01	6.6018E-01	6.515E+01%	1.34E+01
BI-214	#	9.5911E+00	9.5911E+00	1.001E+01%	1.21E+00
BI-210M	#A	4.6401E-01	4.6401E-01	9.760E+01%	1.52E+00
AC-228		1.6040E+01	1.6040E+01	8.752E+00%	2.13E+00
TH-227	#A	-4.8770E+00	-4.8770E+00	9.967E+01%	1.24E+01
TH-229	#A	4.2606E+00	4.2606E+00	1.352E+02%	1.57E+01
TH-234	#A	-8.6087E+00	-8.6087E+00	5.286E+01%	1.77E+01
PA-231	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.52E+01
PA-233	#A	-4.2210E-02	-4.2210E-02	2.168E+03%	5.36E+00

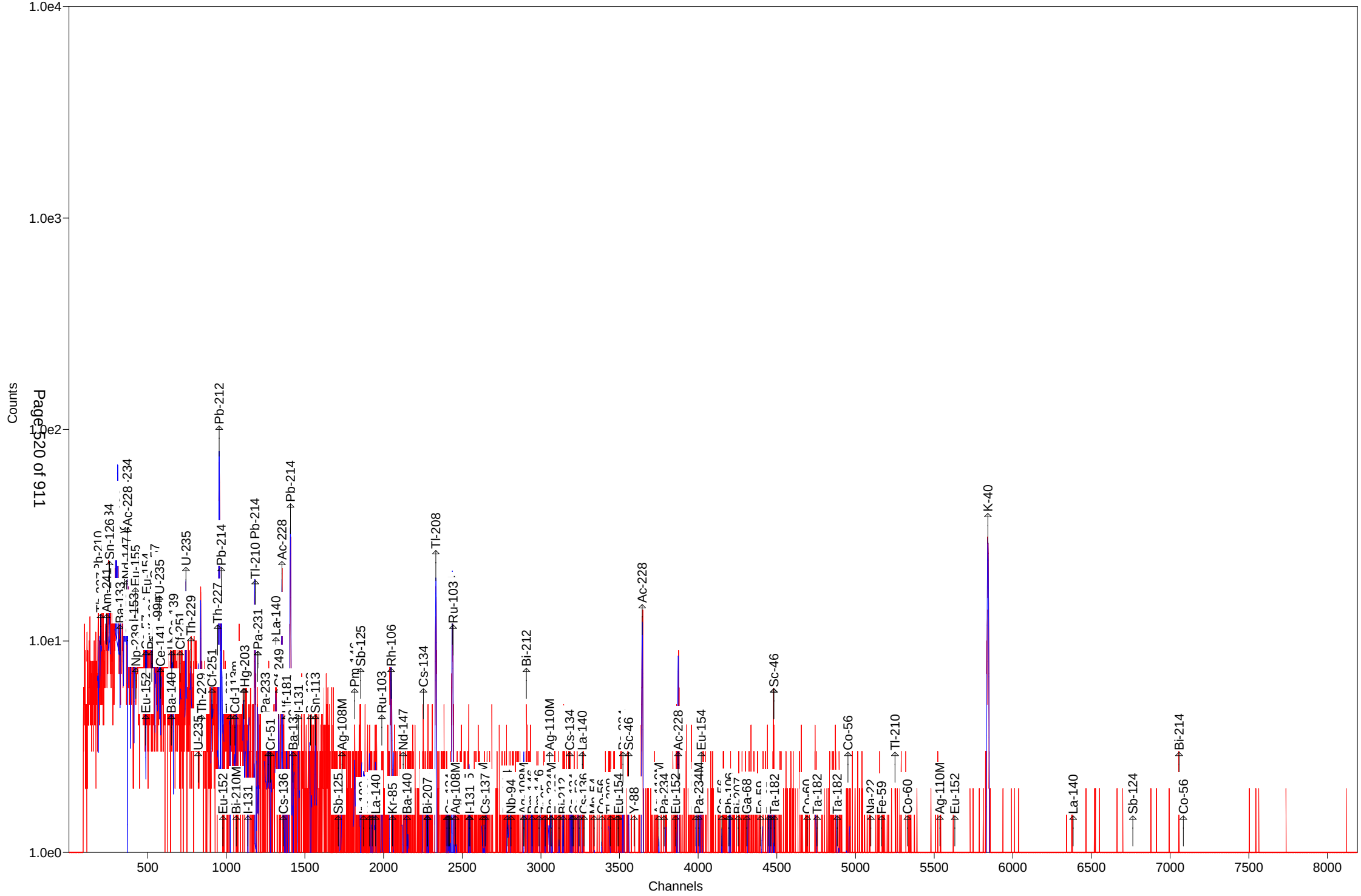
PA-234 #A	1.3509E+00	1.3509E+00	1.220E+02%		4.85E+00
PA-234M#A	-1.1079E+02	-1.1079E+02	8.506E+01%		3.15E+02
AM-241 #A	5.1566E-01	5.1566E-01	2.043E+02%		2.85E+00
Np-237 #A	-2.1702E+00	-2.1702E+00	1.507E+02%		1.09E+01
Ir-192 #A	3.0420E-01	3.0420E-01	1.671E+02%		1.71E+00
Cs-136 #A	2.2347E-02	2.2347E-02	1.000E+03%		1.04E+00
Np-239 #A	4.6264E-01	4.6269E-01	3.012E+02%		4.69E+00
Nd-147 #A	-3.2806E+00	-3.2807E+00	9.552E+01%		7.51E+00
TL-210 #A	4.8876E-01	4.8876E-01	9.148E+01%		1.51E+00
Kr-85 #A	-1.0037E+02	-1.0037E+02	1.242E+02%		4.20E+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) 2.488E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 2.4878635E+02 Bq/Sample

412881_Gamma_180-86110-A-10-A. 7_Gamma_20190291.spc.



Test America St. Louis Spectrum ID: 8_Gamma_20190277

Sample Description: 412881_Gamma_180-86110-A-11-A
Detector: Detector # 8
Batch ID: 412881
Work Order Number: Gamma
Lot Number: 180-86110-A-11-A

Decay to Time: 2/21/2019 01:55 Live Time: 1800 sec
Acquisition Time: 2/21/2019 01:56:08 Real Time: 1842 sec
Analysis Time: 2/21/2019 02:27 Dead Time: 2.28 %
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_Rev15.lib
Bkgd Correction File: 8_2019-01-20_1045.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	1.671E+00	214.5	3.584E+00	3.585E+00	1.245E+01
NA-22	-5.607E-01	89.2	5.003E-01	5.010E-01	1.710E+00
K-40	8.552E+01	11.5	9.850E+00	1.078E+01	1.392E+01
Sc-46	4.707E-01	71.7	3.373E-01	3.382E-01	1.131E+00
CR-51	3.172E+00	197.6	6.268E+00	6.270E+00	2.113E+01
MN-54	4.306E-01	91.4	3.936E-01	3.942E-01	9.460E-01
FE-59	6.595E-01	109.2	7.204E-01	7.212E-01	2.177E+00
Co-56	2.373E-01	98.9	2.347E-01	2.350E-01	1.296E+00
CO-57	-1.641E-01	200.0	3.282E-01	3.283E-01	1.111E+00
CO-58	4.183E-01	89.7	3.752E-01	3.758E-01	1.280E+00
CO-60	-4.958E-01	107.3	5.321E-01	5.327E-01	1.958E+00
ZN-65	0.000E+00	1.#INF	4.461E-01	4.461E-01	4.890E+00
NB-94	-8.444E-01	92.0	7.772E-01	7.784E-01	1.781E+00
ZR-95	2.322E-01	118.3	2.747E-01	2.750E-01	2.394E+00
NB-95	0.000E+00	1.#INF	1.274E-01	1.274E-01	1.491E+00
RU-103	-1.602E-01	252.2	4.040E-01	4.041E-01	1.058E+00
RH-106	-7.576E+00	144.5	1.094E+01	1.095E+01	3.675E+01
AG-108M	9.541E-03	74.5	7.110E-03	7.127E-03	1.084E+00
AG-110M	-2.492E-01	76.1	1.895E-01	1.900E-01	2.540E+00
SN-113	-2.230E-01	197.9	4.413E-01	4.415E-01	1.449E+00
SB-124	6.544E-01	44.7	2.927E-01	2.946E-01	2.739E+00
SB-125	1.552E+00	89.3	1.386E+00	1.388E+00	2.973E+00
I-131	2.422E-01	172.0	4.167E-01	4.169E-01	1.061E+00
Gd-153	-5.635E-01	380.9	2.147E+00	2.147E+00	7.176E+00
Ga-68	-1.238E+01	201.7	2.496E+01	2.497E+01	5.829E+01
Tc-99m	-4.163E-01	151.5	6.308E-01	6.312E-01	2.105E+00
BA-133	-6.707E-01	142.3	9.544E-01	9.551E-01	3.214E+00
CS-134	1.099E+00	41.5	4.558E-01	4.593E-01	1.398E+00
CS-137	2.497E-01	206.8	5.163E-01	5.164E-01	1.798E+00
CE-139	3.642E-01	95.2	3.466E-01	3.483E-01	1.160E+00
Ba-140	3.860E+00	32.5	1.255E+00	1.271E+00	2.730E+00
La-140	1.143E-01	72.6	8.301E-02	8.323E-02	1.878E+00
CE-141	-7.883E-01	149.6	1.180E+00	1.180E+00	3.935E+00

CE-144	-3.161E+00	144.3	4.561E+00	4.564E+00	1.522E+01
PM-144	-5.115E-01	91.7	4.689E-01	4.697E-01	1.439E+00
EU-152	9.414E-01	79.1	7.445E-01	7.461E-01	3.157E+00
EU-154	1.444E+00	57.7	8.335E-01	8.369E-01	1.878E+00
EU-155	-1.869E+00	68.0	1.272E+00	1.276E+00	1.016E+01
HF-181	4.157E-01	157.5	6.548E-01	6.552E-01	1.593E+00
Ta-182	2.677E+00	31.6	8.465E-01	8.570E-01	6.279E+00
Hg-203	1.583E-01	217.6	3.445E-01	3.447E-01	1.190E+00
TL-208	5.200E+00	11.2	5.850E-01	6.442E-01	8.703E-01
PM-146	-8.556E-01	96.1	8.225E-01	8.236E-01	1.956E+00
Y-88	6.512E-01	42.3	2.757E-01	2.782E-01	8.180E-01
Cd-113m	-5.975E+03	90.1	5.382E+03	5.396E+03	1.804E+04
Cd-109	0.000E+00	1.#INF	1.779E+01	1.779E+01	5.926E+01
Cf-251	1.008E+00	174.0	1.753E+00	1.755E+00	4.554E+00
Cf-249	1.677E-01	482.2	8.084E-01	8.085E-01	2.039E+00
Sn-126	-5.154E+00	112.1	5.778E+00	5.784E+00	1.926E+01
PB-210	2.575E+01	53.4	1.376E+01	1.384E+01	4.504E+01
PB-212	1.157E+01	7.3	8.438E-01	1.128E+00	1.478E+00
PB-214	9.968E+00	11.7	1.170E+00	1.280E+00	1.924E+00
BI-207	-1.391E-01	471.8	6.562E-01	6.563E-01	1.938E+00
BI-212	8.697E-01	696.6	6.058E+00	6.059E+00	2.159E+01
U-235	2.368E+00	63.2	1.497E+00	1.501E+00	4.269E+00
BI-214	7.825E+00	12.8	1.001E+00	1.081E+00	1.622E+00
BI-210M	1.664E-01	392.5	6.532E-01	6.533E-01	2.252E+00
AC-228	1.381E+01	16.0	2.203E+00	2.313E+00	2.991E+00
TH-227	-9.171E-01	556.8	5.106E+00	5.107E+00	1.292E+01
TH-229	8.170E+00	48.6	3.968E+00	4.021E+00	1.954E+01
TH-234	1.307E+01	30.4	3.973E+00	4.039E+00	1.669E+01
PA-231	0.000E+00	1.#INF	7.668E+00	7.669E+00	7.485E+01
PA-233	0.000E+00	1.#INF	4.603E-01	4.603E-01	6.134E+00
PA-234	-4.516E-01	126.2	5.698E-01	5.703E-01	9.316E+00
PA-234M	-2.495E+01	222.2	5.544E+01	5.545E+01	2.829E+02
AM-241	-2.017E+00	34.6	6.979E-01	7.057E-01	5.571E+00
Np-237	0.000E+00	1.#INF	4.849E+00	4.849E+00	1.619E+01
Ir-192	0.000E+00	1.#INF	2.286E-01	2.286E-01	2.566E+00
Cs-136	7.669E-01	25.0	1.917E-01	1.967E-01	1.431E+00
Np-239	-1.800E+00	166.4	2.994E+00	2.996E+00	9.967E+00
Nd-147	-1.081E+00	264.3	2.858E+00	2.859E+00	7.195E+00
TL-210	4.136E-01	116.1	4.804E-01	4.809E-01	1.651E+00
Kr-85	0.000E+00	1.#INF	5.061E+01	5.061E+01	4.219E+02
Total	2.084E+02				

Analyst: Morgan Reichert

Sample description
412881_Gamma_180-86110-A-11-A

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20190277.An1

Acquisition information
Start time: 2/21/2019 1:56:08 AM
Live time: 1800
Real time: 1842
Dead time: 2.28 %
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_Rev15.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	2/21/2019 1:55:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2019-01-20_1045.PBC 1/20/2019 10:45:13 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 28 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1462

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.42	40.	53.43	1.01	2.005E-02	46.54	4.250	PBC<MDA	PB210
63.51	132.	18.44	0.96	3.106E-02	63.29	3.810	4.997E+01	TH234
					64.28	9.700	2.394E+01	Sn126
74.81	147.	13.17	1.03	3.616E-02				
77.14	190.	10.90	1.04	3.699E-02				
89.77	46.	32.39	1.05	4.027E-02				
92.80	81.	21.77	1.05	4.076E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	1.976E+01	AC228
123.10	18.	95.29	1.07	4.138E-02	123.10	40.790	PBC<MDA	EU154
143.89	18.	63.19	1.18	3.899E-02	143.79	10.960	PBC<MDA	U235
163.38	-3.	344.47	1.10	3.580E-02	163.38	5.080	PBC<MDA	U235
165.78	19.	95.16	1.10	3.629E-02	165.85	79.900	PBC<MDA	CE139
176.60	11.	173.96	1.11	3.460E-02	176.60	17.000	PBC<MDA	Cf251
185.92	70.	24.34	1.36	3.329E-02	185.72	54.000	2.160E+00	U235
212.37	40.	48.56	1.14	3.020E-02	210.85	2.990	PBC<MDA	TH229
227.00	6.	272.17	1.15	2.853E-02	227.00	6.300	PBC<MDA	Cf251
238.63	241.	8.09	1.14	2.744E-02	238.63	43.300	1.129E+01	PB212
242.01	46.	26.08	1.16	2.714E-02	242.00	7.430	1.267E+01	PB214
244.69	15.	190.35	1.16	2.691E-02	244.69	7.580	PBC<MDA	EU152
266.19	4.	392.48	1.18	2.523E-02	265.83	50.000	PBC<MDA	BI210M
277.54	14.	87.00	1.19	2.440E-02	277.28	6.310	PBC<MDA	TL208
279.20	6.	217.59	1.19	2.427E-02	279.20	81.460	PBC<MDA	Hg203

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
295.30	64.	16.23	1.20	2.324E-02	295.09	19.300	7.937E+00	PB214
300.24	32.	30.17	1.20	2.294E-02	300.03	3.280	2.330E+01	PB212
					300.07	2.460	3.107E+01	PA231
					300.18	6.200	PBC<MDA	PA233
320.08	12.	197.61	1.22	2.179E-02	320.08	9.940	PBC<MDA	CR51
333.32	5.	482.22	1.23	2.110E-02	333.44	15.510	PBC<MDA	Cf249
338.20	46.	20.36	1.23	2.085E-02	338.32	12.010	1.022E+01	AC228
344.29	13.	151.47	1.24	2.057E-02	344.29	26.500	PBC<MDA	EU152
345.83	13.	157.51	1.24	2.049E-02	345.83	15.070	PBC<MDA	HF181
352.00	136.	11.74	1.19	2.021E-02	351.93	37.600	9.968E+00	PB214
364.48	7.	172.02	1.25	1.965E-02	364.48	81.700	PBC<MDA	I131
383.84	6.	206.29	1.27	1.885E-02	383.84	8.940	PBC<MDA	BA133
427.88	2.	522.81	1.30	1.728E-02	427.88	29.600	PBC<MDA	SB125
463.37	11.	90.24	1.32	1.620E-02	463.37	10.470	PBC<MDA	SB125
477.60	5.	214.48	1.33	1.580E-02	477.60	10.520	PBC<MDA	BE7
482.00	1.	767.30	1.34	1.569E-02	482.00	80.500	PBC<MDA	HF181
487.02	8.	114.19	1.34	1.555E-02	487.02	45.500	PBC<MDA	La140
510.84	18.	64.84	0.98	1.496E-02	511.86	20.000	3.334E+00	RH106
537.26	24.	32.53	1.37	1.436E-02	537.26	24.390	3.860E+00	Ba140
583.18	107.	11.25	1.26	1.342E-02	583.02	84.500	5.219E+00	TL208
600.50	9.	197.37	1.42	1.310E-02	600.50	17.860	PBC<MDA	SB125
602.73	7.	259.69	1.42	1.306E-02	602.73	98.260	PBC<MDA	SB124
609.32	84.	12.79	1.80	1.294E-02	609.31	46.090	7.825E+00	BI214
635.89	5.	89.27	1.44	1.250E-02	635.89	11.310	PBC<MDA	SB125
661.66	5.	206.78	1.46	1.209E-02	661.66	85.210	PBC<MDA	CS137
722.79	4.	140.33	1.50	1.123E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.315E-01	AG108M
					723.36	20.220	1.040E+00	EU154
722.94	7.	92.64	1.50	1.123E-02	722.79	10.810	3.369E+00	SB124
					722.94	90.840	4.010E-01	AG108M
					723.36	20.220	1.802E+00	EU154
723.36	7.	106.28	1.50	1.123E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.010E-01	AG108M
					723.36	20.220	1.802E+00	EU154
724.20	7.	118.32	1.50	1.121E-02	724.20	44.150	PBC<MDA	ZR95
727.17	1.	696.64	1.50	1.118E-02	727.17	7.550	PBC<MDA	BI212
735.72	3.	332.49	1.51	1.107E-02	735.72	22.500	PBC<MDA	PM146
763.94	6.	117.81	1.52	1.072E-02	763.94	22.280	PBC<MDA	AG110M
785.42	9.	93.55	1.54	1.048E-02	785.42	1.280	PBC<MDA	BI212
795.87	18.	41.46	1.54	1.036E-02	795.87	85.530	PBC<MDA	CS134
799.60	8.	116.14	1.55	1.032E-02	799.60	98.960	PBC<MDA	TL210
810.78	8.	89.71	1.55	1.020E-02	810.78	99.460	PBC<MDA	CO58
815.77	8.	103.07	1.56	1.015E-02	815.77	23.280	PBC<MDA	La140
818.50	5.	137.68	1.56	1.012E-02	818.50	100.000	PBC<MDA	Cs136
834.85	8.	91.40	1.57	9.955E-03	834.85	99.980	PBC<MDA	MN54
859.51	16.	37.41	1.59	9.703E-03	860.56	12.420	7.529E+00	TL208
871.10	5.	116.06	1.59	9.604E-03	871.10	99.890	PBC<MDA	NB94
880.53	8.	90.49	1.60	9.517E-03	880.53	6.000	PBC<MDA	PA234

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
883.24	4.	206.88	1.60	9.493E-03	883.24	9.600	PBC<MDA	PA234
889.28	6.	99.31	1.60	9.438E-03	889.28	99.984	PBC<MDA	Sc46
910.86	67.	15.95	1.35	9.247E-03	911.07	29.000	1.381E+01	AC228
946.02	1.	702.38	1.64	8.957E-03	946.02	13.400	PBC<MDA	PA234
964.11	6.	180.25	1.65	8.814E-03	964.11	14.605	PBC<MDA	EU152
968.95	74.	12.47	1.65	8.776E-03	968.97	17.460	2.693E+01	AC228
1001.00	-3.	222.24	1.67	8.537E-03	1001.00	0.837	PBC<MDA	PA234M
1004.77	8.	97.93	1.67	8.509E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	1.	928.11	1.69	8.278E-03	1037.84	14.130	PBC<MDA	Co56
1048.07	16.	25.00	1.70	8.209E-03	1048.07	80.000	1.354E+00	Cs136
1099.25	4.	180.85	1.73	7.881E-03	1099.25	56.500	PBC<MDA	FE59
1120.27	6.	133.36	1.74	7.754E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	9.	103.34	1.74	7.752E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	6.133E-01	Sc46
					1121.30	34.900	1.758E+00	Ta182
1121.28	9.	104.49	1.74	7.748E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.759E+00	Ta182
1188.74	10.	31.62	1.78	7.367E-03	1189.05	16.200	4.655E+00	Ta182
1221.24	1.	649.73	1.80	7.199E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	10.	98.88	1.81	7.114E-03	1238.28	66.070	PBC<MDA	Co56
1291.60	5.	122.58	1.84	6.860E-03	1291.60	43.200	PBC<MDA	FE59
1408.00	6.	40.82	1.90	6.366E-03	1408.00	21.005	PBC<MDA	EU152
1460.86	101.	11.52	1.92	6.165E-03	1460.83	10.670	8.552E+01	K40
1690.98	5.	44.72	2.03	5.425E-03	1690.98	47.790	PBC<MDA	SB124
1764.47	18.	25.73	2.07	5.226E-03	1764.49	15.400	1.257E+01	BI214
1836.06	6.	42.33	2.10	5.046E-03	1836.06	99.200	PBC<MDA	Y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
299.03	74.79	114.	147.	4.060E+03	13.17	1.034	- D
308.36	77.12	119.	190.	5.131E+03	10.90	1.036	- sD
359.21	89.87	123.	46.	1.134E+03	37.45	1.046	- sD
2043.28	510.84	45.	18.	1.198E+03	64.84	0.984	- 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_Rev15.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	203.	40.	0.022	53.43	1.012s
TH-227	200.36	50.14	280.	-22.	-0.012	108.05	1.015s
AM-241	237.95	59.54	470.	-38.	-0.021	34.59	1.022s
TH-234	252.96	63.29	134.	60.	0.033	30.40	1.025D
Sn-126	256.93	64.28	490.	-28.	-0.016	112.11	1.026s
BA-133	323.77	80.99	794.	-28.	-0.016	142.50	1.039s
Np-237	345.77	86.49	1014.	0.	0.000	213.15	1.043A
EU-155	345.98	86.54	1217.	-29.	-0.016	173.72	1.043s
Sn-126	347.57	86.94	1188.	-29.	-0.016	171.63	1.044
Sn-126	350.09	87.57	1082.	-29.	-0.016	163.82	1.044s
Cd-109	351.97	88.04	1160.	0.	0.000	169.46	1.044A
Nd-147	364.21	91.10	1055.	-29.	-0.016	161.35	1.047s
TH-234	370.17	92.59	198.	11.	0.006	177.44	1.048D
AC-228	373.21	93.35	1113.	-29.	-0.016	165.40	1.049s
Gd-153	389.81	97.50	1141.	-13.	-0.007	380.93	1.052s
Np-239	397.81	99.50	1154.	0.	0.000	1000.00	1.053s
Gd-153	412.62	103.20	1154.	0.	0.000	1000.00	1.056s
Np-239	414.62	103.70	1154.	0.	0.000	1000.00	1.057s
EU-155	421.07	105.31	1173.	-30.	-0.017	68.05	1.058s
Np-239	424.34	106.13	1296.	-31.	-0.017	166.36	1.058s
EU-152	486.94	121.78	192.	-22.	-0.012	91.62	1.071s
CO-57	488.06	122.06	215.	-10.	-0.006	200.05	1.071s
EU-154	492.22	123.10	136.	18.	0.010	95.29	1.072s
PA-234	525.00	131.29	662.	-25.	-0.014	144.48	1.078s
HF-181	531.92	133.02	637.	-25.	-0.014	141.61	1.079s
CE-144	533.98	133.54	662.	-25.	-0.014	144.30	1.080s
HF-181	545.02	136.30	687.	-26.	-0.014	146.72	1.082s
CO-57	545.72	136.47	713.	-26.	-0.014	149.34	1.082s
Tc-99m	561.86	140.51	739.	-26.	-0.014	151.51	1.085s
U-235	575.39	143.89	42.	18.	0.010	63.19	1.183
CE-141	581.59	145.44	773.	-26.	-0.015	149.64	1.089s
Ba-140	650.47	162.66	168.	-8.	-0.004	231.84	1.102s
U-235	653.35	163.38	163.	-3.	-0.002	344.47	1.102
CE-139	663.24	165.85	154.	19.	0.011	95.16	1.104s
Cf-251	706.23	176.60	95.	11.	0.006	173.96	1.112s
U-235	743.50	185.92	70.	70.	0.039	24.34	1.357s
TH-229	773.87	193.51	103.	-8.	-0.004	249.88	1.125s
TH-229	843.24	210.85	88.	40.	0.022	48.56	1.138s
Cf-251	907.84	227.00	68.	6.	0.003	272.17	1.151s
PB-212	954.37	238.63	38.	248.	0.138	7.29	1.159D
PB-214	967.84	242.00	49.	46.	0.026	26.08	1.162D
EU-152	978.62	244.69	408.	15.	0.008	190.35	1.164s
TH-227	1024.81	256.24	72.	-3.	-0.002	556.78	1.172
Cd-113m	1054.65	263.70	101.	-16.	-0.009	90.07	1.178

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	1063.18	265.83	108.	4.	0.002	392.48	1.179s
TL-208	1108.99	277.28	64.	14.	0.008	87.00	1.188s
Hg-203	1116.66	279.20	72.	6.	0.003	217.59	1.189s
I-131	1137.05	284.30	44.	-3.	-0.002	436.74	1.193s
PB-214	1180.22	295.09	22.	64.	0.036	16.23	1.201D
PB-212	1199.98	300.03	29.	32.	0.018	30.17	1.205D
PA-231	1200.14	300.07	338.	0.	0.000	1000.00	1.205s
PA-233	1200.58	300.18	338.	0.	0.000	1000.00	1.205s
PA-231	1210.46	302.65	338.	0.	0.000	1000.00	1.207s
BA-133	1211.27	302.85	338.	0.	0.000	1000.00	1.207s
Ba-140	1219.26	304.85	338.	0.	0.000	1000.00	1.208s
Ir-192	1233.62	308.44	338.	0.	0.000	1000.00	1.211s
PA-233	1247.91	312.01	338.	0.	0.000	1000.00	1.214s
Ir-192	1265.82	316.49	338.	0.	0.000	1000.00	1.217s
CR-51	1280.20	320.08	292.	12.	0.007	197.61	1.219s
La-140	1314.91	328.76	253.	-2.	-0.001	921.98	1.226s
Cf-249	1333.63	333.44	246.	5.	0.003	482.22	1.229s
AC-228	1353.15	338.32	21.	46.	0.026	20.36	1.233D
Cs-136	1362.15	340.57	251.	0.	0.000	1000.00	1.234s
EU-152	1377.01	344.29	184.	13.	0.007	151.47	1.237s
HF-181	1383.19	345.83	200.	13.	0.007	157.51	1.238s
PB-214	1407.88	352.00	26.	136.	0.076	11.74	1.187
BA-133	1423.87	356.00	220.	-15.	-0.008	142.31	1.245s
I-131	1457.81	364.48	36.	7.	0.004	172.02	1.252s
BA-133	1535.24	383.84	78.	6.	0.003	206.29	1.266
SN-113	1566.64	391.69	37.	-5.	-0.003	197.90	1.271
SB-125	1711.39	427.88	28.	2.	0.001	522.81	1.297s
AG-108M	1735.64	433.94	35.	-11.	-0.006	116.76	1.301
PM-146	1815.41	453.88	56.	-16.	-0.009	96.13	1.315s
SB-125	1853.36	463.37	45.	11.	0.006	90.24	1.322s
Ir-192	1872.14	468.06	87.	-11.	-0.006	122.04	1.325s
BE-7	1910.28	477.60	55.	5.	0.003	214.48	1.332s
HF-181	1927.89	482.00	52.	1.	0.001	767.30	1.335s
La-140	1947.98	487.02	38.	8.	0.004	114.19	1.339s
RU-103	1988.12	497.05	26.	-4.	-0.002	252.19	1.346s
RH-106	2047.36	511.86	125.	-28.	-0.015	60.16	2.606s
Kr-85	2055.83	513.98	97.	0.	0.000	1000.00	1.357s
Nd-147	2123.91	531.00	22.	-4.	-0.002	264.34	1.369s
Ba-140	2148.95	537.26	10.	24.	0.014	32.53	1.373s
CS-134	2252.86	563.24	26.	0.	0.000	1000.00	1.391s
CS-134	2277.20	569.32	26.	-5.	-0.003	151.00	1.395
PA-234	2277.80	569.47	32.	0.	0.000	1000.00	1.395
BI-207	2278.73	569.70	33.	0.	0.000	1000.00	1.396
TL-208	2332.63	583.18	10.	107.	0.059	11.25	1.262
SB-125	2401.92	600.50	160.	9.	0.005	197.37	1.416
SB-124	2410.85	602.73	169.	7.	0.004	259.69	1.418s
CS-134	2418.76	604.71	176.	0.	0.000	1000.00	1.419s
BI-214	2437.22	609.32	10.	84.	0.047	12.79	1.802s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RU-103	2441.12	610.30	176.	0.	0.000	1000.00	1.423s
AG-108M	2457.05	614.28	243.	-14.	-0.008	159.39	1.426s
PM-144	2472.18	618.06	229.	-14.	-0.008	154.58	1.428s
RH-106	2487.60	621.92	301.	-17.	-0.010	144.46	1.431s
SB-125	2543.49	635.89	9.	5.	0.003	89.27	1.440s
I-131	2547.83	636.97	47.	-14.	-0.008	73.17	1.441s
AG-110M	2630.98	657.76	52.	-2.	-0.001	687.99	1.455s
CS-137	2646.58	661.66	43.	5.	0.003	206.78	1.457s
PM-144	2786.11	696.54	34.	-11.	-0.006	91.68	1.480s
NB-94	2810.46	702.63	51.	-17.	-0.010	92.04	1.484s
SB-124	2891.09	722.79	16.	4.	0.002	140.33	1.497s
AG-108M	2891.70	722.94	20.	7.	0.004	92.64	1.498s
EU-154	2893.39	723.36	27.	7.	0.004	106.28	1.498
ZR-95	2896.74	724.20	34.	7.	0.004	118.32	1.498s
BI-212	2908.63	727.17	42.	1.	0.001	696.64	1.500s
PM-146	2942.83	735.72	19.	3.	0.002	332.49	1.506s
PM-146	2988.59	747.16	28.	-4.	-0.002	220.92	1.513s
ZR-95	3026.87	756.73	24.	-3.	-0.001	357.51	1.519s
AG-110M	3055.73	763.94	25.	6.	0.004	117.81	1.524s
NB-95	3063.11	765.79	31.	0.	0.000	1000.00	1.525s
PA-234M	3065.60	766.41	38.	-5.	-0.003	180.00	1.526s
EU-152	3115.64	778.92	28.	-8.	-0.004	144.70	1.534s
BI-212	3141.64	785.42	14.	9.	0.005	93.55	1.538s
CS-134	3183.44	795.87	18.	18.	0.010	41.46	1.544s
TL-210	3198.36	799.60	35.	8.	0.004	116.14	1.547s
CS-134	3207.77	801.95	60.	-11.	-0.006	106.60	1.548s
CO-58	3243.06	810.78	20.	8.	0.004	89.71	1.554s
La-140	3263.04	815.77	27.	8.	0.004	103.07	1.557s
Cs-136	3273.97	818.50	25.	5.	0.003	137.68	1.559s
MN-54	3339.36	834.85	9.	8.	0.004	91.40	1.569s
Co-56	3387.05	846.77	19.	-7.	-0.004	125.35	1.577s
TL-208	3442.23	860.56	5.	16.	0.009	37.41	1.585s
NB-94	3484.36	871.10	12.	5.	0.003	116.06	1.592s
EU-154	3492.89	873.23	17.	0.	0.000	1000.00	1.593s
PA-234	3522.10	880.53	21.	8.	0.004	90.49	1.598s
PA-234	3532.94	883.24	29.	4.	0.002	206.88	1.599s
AG-110M	3538.71	884.68	38.	-10.	-0.005	96.22	1.600s
Sc-46	3557.10	889.28	13.	6.	0.003	99.31	1.603s
AC-228	3643.42	910.86	6.	67.	0.037	15.95	1.354
AG-110M	3749.96	937.49	10.	-1.	-0.001	702.38	1.633s
PA-234	3784.07	946.02	10.	1.	0.001	702.38	1.638s
EU-152	3856.43	964.11	50.	6.	0.003	180.25	1.649s
AC-228	3875.88	968.97	6.	74.	0.041	12.47	1.652s
EU-154	3985.31	996.33	42.	-7.	-0.004	136.28	1.668s
PA-234M	4003.99	1001.00	52.	-3.	-0.002	222.24	1.671
EU-154	4019.10	1004.77	28.	8.	0.005	97.93	1.673s
Co-56	4151.36	1037.84	10.	1.	0.000	928.11	1.693s
Cs-136	4192.29	1048.07	0.	16.	0.009	25.00	1.698s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RH-106	4201.45	1050.36	16.	0.	0.000	1000.00	1.700
BI-207	4254.65	1063.66	16.	-2.	-0.001	471.83	1.708s
Ga-68	4309.61	1077.40	20.	-5.	-0.003	201.66	1.716s
FE-59	4397.02	1099.25	10.	4.	0.002	180.85	1.728s
EU-152	4448.32	1112.07	51.	-4.	-0.002	274.96	1.736s
ZN-65	4462.20	1115.55	47.	0.	0.000	1000.00	1.738
BI-214	4481.17	1120.29	29.	6.	0.003	133.36	1.740
Sc-46	4482.22	1120.55	35.	9.	0.005	103.34	1.740
Ta-182	4485.22	1121.30	36.	9.	0.005	104.49	1.741s
Ta-182	4756.23	1189.05	0.	10.	0.006	31.62	1.779s
Ta-182	4885.67	1221.41	11.	1.	0.001	649.73	1.797s
Co-56	4953.16	1238.28	16.	10.	0.005	98.88	1.806s
NA-22	5098.16	1274.53	16.	-7.	-0.004	89.21	1.826s
EU-154	5098.20	1274.54	23.	0.	0.000	1000.00	1.826s
FE-59	5166.43	1291.60	5.	5.	0.003	122.58	1.835s
CO-60	5330.06	1332.50	20.	-6.	-0.003	107.32	1.857s
AG-110M	5537.25	1384.30	16.	-7.	-0.004	135.27	1.884s
EU-152	5632.07	1408.00	0.	6.	0.003	40.82	1.896s
K-40	5843.40	1460.83	9.	101.	0.056	11.52	1.923s
La-140	6384.93	1596.21	11.	-5.	-0.003	154.24	1.990s
SB-124	6764.03	1690.98	0.	5.	0.003	44.72	2.034s
BI-214	7058.07	1764.49	2.	18.	0.010	25.73	2.067s
Co-56	7085.51	1771.35	20.	0.	0.000	1000.00	2.070s
Y-88	7344.36	1836.06	0.	6.	0.003	42.33	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	1.6708E+00				5.31E+01	
			477.60	1.671E+00	?(	1.245E+01 2.14E+02 1.05E+01	G
NA-22	C	-5.6074E-01				9.50E+02	
			1274.53	-5.607E-01	?(	1.710E+00 8.92E+01 9.99E+01	G
K-40	N	8.5524E+01				4.66E+11	
			1460.83	8.552E+01	?(P	1.392E+01 1.15E+01 1.07E+01	G
Sc-46	F	4.7071E-01				8.38E+01	
			889.28	3.281E-01	?(	1.131E+00 9.93E+01 1.00E+02	G
			1120.55	6.133E-01	?(	2.165E+00 1.03E+02 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	3.1719E+00					2.77E+01	
			320.08	3.172E+00	&(P	2.113E+01	1.98E+02	9.94E+00 G
MN-54	C	4.3063E-01					3.12E+02	
			834.85	4.306E-01	?(	9.460E-01	9.14E+01	1.00E+02 G
FE-59	F	6.5950E-01					4.45E+01	
			1099.25	4.991E-01	?(	2.177E+00	1.81E+02	5.65E+01 G
			1291.60	8.693E-01	?(P	2.531E+00	1.23E+02	4.32E+01 G
Co-56	C	2.3734E-01					7.73E+01	
			846.77	-3.852E-01	?(P	1.296E+00	1.25E+02	9.99E+01 G
			1238.28	1.153E+00	?(P	2.540E+00	9.89E+01	6.61E+01 G
			1037.84	3.606E-01	?(P	8.370E+00	9.28E+02	1.41E+01 G
			1771.35	0.000E+00	-	1.623E+01	1.00E+03	1.55E+01 A
CO-57	C	-1.6407E-01					2.72E+02	
			122.06	-1.641E-01	?(	1.111E+00	2.00E+02	8.56E+01 G
			136.47	-3.319E+00	+	1.654E+01	1.49E+02	1.07E+01 G
CO-58	C	4.1829E-01					7.09E+01	
			810.78	4.183E-01	?(	1.280E+00	8.97E+01	9.95E+01 G
CO-60	F	-4.9582E-01					1.93E+03	
			1332.50	-4.958E-01	?(P	1.958E+00	1.07E+02	1.00E+02 G
			1173.24	-4.228E-02	% P	1.435E+00	1.29E+03	9.99E+01 G
NB-94	I	-8.4444E-01					7.41E+06	
			702.63	-8.444E-01	?(	1.781E+00	9.20E+01	9.79E+01 G
			871.10	2.702E-01	+	1.105E+00	1.16E+02	9.99E+01 G
ZR-95	I	2.3219E-01					6.40E+01	
			756.73	-2.497E-01	?(P	2.394E+00	3.58E+02	5.45E+01 G
			724.20	8.267E-01	?(	3.367E+00	1.18E+02	4.42E+01 G
RU-103	I	-1.6019E-01					3.93E+01	
			497.05	-1.602E-01	?(P	1.058E+00	2.52E+02	9.09E+01 G
			610.30	0.000E+00	+	4.823E+01	1.00E+03	5.75E+00 GA
RH-106	I	-7.5757E+00					3.74E+02	
			621.92	-7.576E+00	?(	3.675E+01	1.44E+02	9.93E+00 G
			1050.36	0.000E+00	&	9.280E+01	1.00E+03	1.56E+00 G
			511.86	-5.146E+00	+	1.018E+01	6.02E+01	2.00E+01 GA
AG-108M	C	9.5410E-03					1.53E+05	
			433.94	-3.834E-01	?(	1.084E+00	1.17E+02	9.05E+01 G
			722.94	4.010E-01	&(	1.271E+00	9.26E+01	9.08E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		614.28	-6.742E-01	&	3.621E+00	1.59E+02	8.98E+01 G
AG-110M F	-2.4922E-01					2.50E+02	
		884.68	-7.770E-01	?(	2.540E+00	9.62E+01	7.27E+01 G
		657.76	-7.247E-02	+	1.762E+00	6.88E+02	9.46E+01 G
		937.49	-1.791E-01	+	3.125E+00	7.02E+02	3.44E+01 G
		1384.30	-2.478E+00	+	7.559E+00	1.35E+02	2.43E+01 G
		763.94	1.472E+00	?(	6.011E+00	1.18E+02	2.23E+01 G
SN-113 F	-2.2300E-01					1.15E+02	
		391.69	-2.230E-01	?(P	1.449E+00	1.98E+02	6.40E+01 G
SB-124 F	6.5439E-01					6.02E+01	
		602.73	3.096E-01	?(	2.739E+00	2.60E+02	9.83E+01 G
		1690.98	1.071E+00	?(	1.579E+00	4.47E+01	4.78E+01 G
		722.79	1.945E+00	?(	9.679E+00	1.40E+02	1.08E+01 G
SB-125 I	1.5523E+00					1.01E+03	
		427.88	2.173E-01	?(	2.973E+00	5.23E+02	2.96E+01 G
		600.50	2.181E+00	?(P	1.462E+01	1.97E+02	1.79E+01 G
		635.89	2.097E+00	?(	6.458E+00	8.93E+01	1.13E+01 G
		463.37	3.666E+00	?(P	1.116E+01	9.02E+01	1.05E+01 G
I-131 I	2.4224E-01					8.02E+00	
		364.48	2.422E-01	(	1.061E+00	1.72E+02	8.17E+01 G
		284.30	-1.134E+00	+	1.271E+01	4.37E+02	6.14E+00 G
		636.97	-8.800E+00	+	2.145E+01	7.32E+01	7.17E+00 G
Gd-153 F	-5.6354E-01					2.42E+02	
		97.50	-5.635E-01	?(	7.176E+00	3.81E+02	3.00E+01 G
		103.20	0.000E+00	+	9.826E+00	1.00E+03	2.18E+01 G
Ga-68 C	-1.2375E+01					4.71E-02	
		1077.40	-1.238E+01	?(	5.829E+01	2.02E+02	3.30E+00 G
Tc-99m I	-4.1633E-01					2.51E-01	
		140.51	-4.163E-01	*(	2.105E+00	1.52E+02	8.93E+01 G
BA-133 F	-6.7070E-01					3.85E+03	
		356.00	-6.707E-01	?(	3.214E+00	1.42E+02	6.20E+01 G
		302.85	0.000E+00	+	1.177E+01	1.00E+03	1.83E+01 G
		383.84	2.033E+00	&	1.444E+01	2.06E+02	8.94E+00 GA
		80.99	-1.205E+00	+	5.722E+00	1.43E+02	3.41E+01 GA
CS-134 I	1.0992E+00					7.54E+02	
		795.87	1.099E+00	?(	1.398E+00	4.15E+01	8.55E+01 G
		604.71	0.000E+00	-	2.820E+00	1.00E+03	9.76E+01 G
		569.32	-1.319E+00	-	6.985E+00	1.51E+02	1.54E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			801.95	-6.684E+00	-	2.418E+01	1.07E+02	8.69E+00 G
			563.24	0.000E+00	-	1.275E+01	1.00E+03	8.35E+00 G
CS-137	I	2.4968E-01					1.10E+04	
			661.66	2.497E-01	(P	1.798E+00	2.07E+02	8.52E+01 G
CE-139	F	3.6420E-01					1.38E+02	
			165.85	3.642E-01	?(P	1.160E+00	9.52E+01	7.99E+01 G
Ba-140	I	3.8596E+00					1.28E+01	
			537.26	3.860E+00	&(P	2.730E+00	3.25E+01	2.44E+01 G
			162.66	-1.989E+00	&	1.569E+01	2.32E+02	6.22E+00 G
			304.85	0.000E+00	-	5.054E+01	1.00E+03	4.29E+00 G
La-140	I	1.1431E-01					1.28E+01	
			1596.21	-5.443E-01	?(	1.878E+00	1.54E+02	9.54E+01 G
			487.02	6.328E-01	?(	2.478E+00	1.14E+02	4.55E+01 G
			328.76	-3.140E-01	&	9.865E+00	9.22E+02	2.03E+01 G
			815.77	1.800E+00	?(	6.363E+00	1.03E+02	2.33E+01 G
CE-141	I	-7.8835E-01					3.25E+01	
			145.44	-7.883E-01	?(	3.935E+00	1.50E+02	4.82E+01 G
CE-144	I	-3.1606E+00					2.85E+02	
			133.54	-3.161E+00	?(	1.522E+01	1.44E+02	1.11E+01 G
PM-144	C	-5.1147E-01					3.63E+02	
			696.54	-5.115E-01	?(P	1.439E+00	9.17E+01	9.90E+01 G
			618.06	-6.155E-01	+	3.207E+00	1.55E+02	9.91E+01 G
EU-152	F	9.4142E-01					4.94E+03	
			121.78	-1.032E+00	?(	3.157E+00	9.16E+01	2.86E+01 G
			344.29	1.315E+00	?(	6.729E+00	1.51E+02	2.65E+01 G
			1112.07	-1.946E+00	+	1.873E+01	2.75E+02	1.36E+01 G
			778.92	-3.255E+00	+	1.114E+01	1.45E+02	1.29E+01 G
			964.11	2.474E+00	?(	1.546E+01	1.80E+02	1.46E+01 G
			244.69	4.123E+00	?(	2.636E+01	1.90E+02	7.58E+00 G
			1408.00	2.493E+00	?	3.062E+00	4.08E+01	2.10E+01 GA
EU-154	I	1.4444E+00					3.14E+03	
			123.10	5.881E-01	?(	1.878E+00	9.53E+01	4.08E+01 G
			1274.54	0.000E+00	-	5.701E+00	1.00E+03	3.52E+01 G
			723.36	1.802E+00	(	6.584E+00	1.06E+02	2.02E+01 G
			873.23	0.000E+00	-	1.036E+01	1.00E+03	1.23E+01 G
			1004.77	2.982E+00	?(	9.974E+00	9.79E+01	1.80E+01 G
			996.33	-4.281E+00	+	2.012E+01	1.36E+02	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	-1.8693E+00					1.81E+03	
			105.31	-1.869E+00	(P	1.016E+01	6.80E+01	2.12E+01 G
			86.54	-1.305E+00	&	7.551E+00	1.74E+02	3.07E+01 G
HF-181	F	4.1572E-01					4.24E+01	
			482.00	5.866E-02	?(	1.593E+00	7.67E+02	8.05E+01 G
			133.02	-8.080E-01	+	3.819E+00	1.42E+02	4.33E+01 G
			345.83	2.323E+00	&(	1.235E+01	1.58E+02	1.51E+01 G
			136.30	-6.054E+00	+	2.964E+01	1.47E+02	5.85E+00 G
Ta-182	F	2.6767E+00					1.14E+02	
			1121.30	1.759E+00	?(	6.279E+00	1.04E+02	3.49E+01 G
			1221.41	3.312E-01	- P	5.160E+00	6.50E+02	2.70E+01 G
			1189.05	4.655E+00	?(	3.431E+00	3.16E+01	1.62E+01 G
Hg-203	F	1.5834E-01					4.66E+01	
			279.20	1.583E-01	?(	1.190E+00	2.18E+02	8.15E+01 G
TL-208	N	5.1998E+00					6.98E+02	
			583.02	5.219E+00	(P	8.703E-01	1.12E+01	8.45E+01 G
			277.28	4.942E+00	?(	1.444E+01	8.70E+01	6.31E+00 G
			860.56	7.529E+00	&	5.890E+00	3.74E+01	1.24E+01 G
PM-146	C	-8.5557E-01					2.02E+03	
			453.88	-8.556E-01	?(	1.956E+00	9.61E+01	6.50E+01 G
			747.16	-6.374E-01	+ P	4.110E+00	2.21E+02	3.40E+01 G
			735.72	6.292E-01	& P	5.157E+00	3.32E+02	2.25E+01 G
Y-88	F	6.5122E-01					1.07E+02	
			1836.06	6.512E-01	?(P	8.180E-01	4.23E+01	9.92E+01 G
			898.04	3.233E-02	% P	1.081E+00	1.28E+03	9.37E+01 G
Cd-113m		-5.9751E+03					5.33E+03	
			263.70	-5.975E+03	?(	1.804E+04	9.01E+01	6.00E-03 K
Cf-251	T	1.0075E+00					3.28E+05	
			176.60	1.008E+00	?(	4.554E+00	1.74E+02	1.70E+01 G
			227.00	1.855E+00		1.272E+01	2.72E+02	6.30E+00 GA
Cf-249	T	1.6765E-01					1.28E+05	
			387.95	2.251E-02	%(	2.039E+00	2.59E+03	6.60E+01 G
			333.44	7.853E-01	&(	1.288E+01	4.82E+02	1.55E+01 G
Sn-126		-5.1539E+00					3.65E+07	
			87.57	-1.063E+00	}	5.803E+00	1.64E+02	3.75E+01 GA
			64.28	-5.154E+00	?(	1.926E+01	1.12E+02	9.70E+00 G
			86.94	-4.424E+00	}	2.529E+01	1.72E+02	9.04E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	2.5749E+01					8.14E+03	
			46.54	2.575E+01	?(	4.504E+01	5.34E+01	4.25E+00 G
PB-212	N	1.1572E+01					6.98E+02	
			238.63	1.157E+01	(P	1.478E+00	7.29E+00	4.33E+01 G
			300.03	2.330E+01	+ P	2.068E+01	3.02E+01	3.28E+00 GA
PB-214	N	9.9678E+00					5.84E+05	
			351.93	9.968E+00	(	1.924E+00	1.17E+01	3.76E+01 G
			295.09	7.937E+00	- P	3.039E+00	1.62E+01	1.93E+01 G
			242.00	1.267E+01		9.731E+00	2.61E+01	7.43E+00 GA
BI-207	C	-1.3908E-01					1.18E+04	
			1063.66	-1.391E-01	?(P	1.938E+00	4.72E+02	7.45E+01 G
			569.70	0.000E+00	+	1.225E+00	1.00E+03	9.77E+01 G
BI-212	N	8.6967E-01					6.98E+02	
			727.17	8.697E-01	?(	2.159E+01	6.97E+02	7.55E+00 G
			785.42	3.771E+01	? P	8.385E+01	9.35E+01	1.28E+00 GA
U-235	N	2.3685E+00					2.57E+11	
			143.79	2.368E+00	(P	4.269E+00	6.32E+01	1.10E+01 G
			205.33	6.692E-01	% P	1.943E+01	1.11E+03	5.01E+00 G
			163.38	-1.056E+00	- P	1.903E+01	3.44E+02	5.08E+00 G
			185.72	2.160E+00	P	1.289E+00	2.43E+01	5.40E+01 GA
BI-214	N	7.8254E+00					5.84E+05	
			609.31	7.825E+00	(P	1.622E+00	1.28E+01	4.61E+01 G
			1120.29	2.862E+00	- P	1.322E+01	1.33E+02	1.51E+01 G
			1764.49	1.257E+01	+ P	6.177E+00	2.57E+01	1.54E+01 G
BI-210M	T	1.6643E-01					1.10E+09	
			265.83	1.664E-01	?(P	2.252E+00	3.92E+02	5.00E+01 G
			304.90	1.989E-01	%	7.718E+00	1.14E+03	2.80E+01 G
AC-228	N	1.3812E+01					2.10E+03	
			911.07	1.381E+01	(	2.991E+00	1.60E+01	2.90E+01 G
			968.97	2.693E+01	+	5.027E+00	1.25E+01	1.75E+01 G
			338.32	1.022E+01	- P	5.324E+00	2.04E+01	1.20E+01 G
			93.35	-7.024E+00	-	3.870E+01	1.65E+02	5.56E+00 XA
TH-227	N	-9.1712E-01					7.95E+03	
			256.24	-9.171E-01	&(	1.292E+01	5.57E+02	7.00E+00 G
			235.97	-4.547E-01	%	1.722E+01	1.12E+03	1.23E+01 G
			50.14	-6.837E+00	+	2.470E+01	1.08E+02	8.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	8.1699E+00					2.68E+06	
			193.51	-3.000E+00	?(	1.954E+01	2.50E+02	4.40E+00 G
			210.85	2.461E+01	&(	2.856E+01	4.86E+01	2.99E+00 G
TH-234	N	1.3069E+01					1.63E+12	
			92.59	2.794E+00	(P	1.669E+01	1.77E+02	5.58E+00 G
			63.29	2.813E+01	(P	2.671E+01	3.04E+01	3.81E+00 G
PA-234	N	-4.5164E-01					1.63E+12	
			131.29	-1.932E+00	?(	9.316E+00	1.44E+02	1.80E+01 G
			946.02	4.629E-01	+	8.076E+00	7.02E+02	1.34E+01 G
			569.47	0.000E+00	+	1.439E+01	1.00E+03	8.20E+00 G
			883.24	2.324E+00	?(	1.700E+01	2.07E+02	9.60E+00 G
			880.53	7.642E+00	&	2.358E+01	9.05E+01	6.00E+00 GA
PA-234M	N	-2.4945E+01					1.63E+12	
			1001.00	-2.495E+01	?(P	2.829E+02	2.22E+02	8.37E-01 G
			766.41	-8.833E+01	+	5.554E+02	1.80E+02	2.94E-01 G
AM-241	T	-2.0173E+00					1.58E+05	
			59.54	-2.017E+00	(P	5.571E+00	3.46E+01	3.59E+01 G
Cs-136	F	7.6687E-01					1.30E+01	
			818.50	2.975E-01	?(	1.431E+00	1.38E+02	1.00E+02 G
			1048.07	1.354E+00	?(	6.235E-01	2.50E+01	8.00E+01 G
			340.57	0.000E+00	-	4.371E+00	1.00E+03	4.69E+01 G
Np-239	T	-1.7999E+00					2.36E+00	
			103.70	0.000E+00	+	8.922E+00	1.00E+03	2.40E+01 X
			106.13	-1.800E+00	&(	9.967E+00	1.66E+02	2.27E+01 G
			99.50	0.000E+00	+	1.437E+01	1.00E+03	1.50E+01 X
Nd-147		-1.0812E+00					1.11E+01	
			531.00	-1.081E+00	?(	7.195E+00	2.64E+02	1.30E+01 G
			91.10	-1.390E+00	+	7.471E+00	1.61E+02	2.83E+01 G
TL-210	N	4.1362E-01					5.84E+05	
			799.60	4.136E-01	?(	1.651E+00	1.16E+02	9.90E+01 G
			296.00	6.026E-02	%	2.673E+00	1.31E+03	7.90E+01 G
			1313.00	-2.608E-01	%	7.013E+00	1.12E+03	2.10E+01 GA

(- 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	280.	-22.	-0.012	108.05	-6.837E+00	
AM-241	59.54	470.	-38.	-0.021	34.59	-2.017E+00	P
Sn-126	64.28	490.	-28.	-0.016	112.11	-5.154E+00	
BA-133	80.99	794.	-28.	-0.016	142.50	-1.205E+00	
EU-155	86.54	1217.	-29.	-0.016	173.72	-1.305E+00	
Sn-126	86.94	1188.	-29.	-0.016	171.63	-4.424E+00	
Sn-126	87.57	1082.	-29.	-0.016	163.82	-1.063E+00	
Nd-147	91.10	1055.	-29.	-0.016	161.35	-1.390E+00	
Gd-153	97.50	1141.	-13.	-0.007	380.93	-5.635E-01	
EU-155	105.31	1173.	-30.	-0.017	68.05	-1.869E+00	P
Np-239	106.13	1296.	-31.	-0.017	166.36	-1.800E+00	
EU-152	121.78	192.	-22.	-0.012	91.62	-1.032E+00	
CO-57	122.06	215.	-10.	-0.006	200.05	-1.641E-01	
EU-154	123.10	136.	18.	0.010	95.29	5.881E-01	
PA-234	131.29	662.	-25.	-0.014	144.48	-1.932E+00	
HF-181	133.02	637.	-25.	-0.014	141.61	-8.080E-01	
CE-144	133.54	662.	-25.	-0.014	144.30	-3.161E+00	
HF-181	136.30	687.	-26.	-0.014	146.72	-6.054E+00	
CO-57	136.47	713.	-26.	-0.014	149.34	-3.319E+00	
Tc-99m	140.51	739.	-26.	-0.014	151.51	-4.163E-01	
CE-141	145.44	773.	-26.	-0.015	149.64	-7.883E-01	
Cf-251	176.60	95.	11.	0.006	173.96	1.008E+00	
Cf-251	227.00	68.	6.	0.003	272.17	1.855E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	244.69	408.	15.	0.008	190.35	4.123E+00	
TH-227	256.24	72.	-3.	-0.002	556.78	-9.171E-01	
Cd-113m	263.70	101.	-16.	-0.009	90.07	-5.975E+03	
Hg-203	279.20	72.	6.	0.003	217.59	1.583E-01	
I-131	284.30	44.	-3.	-0.002	436.74	-1.134E+00	
CR-51	320.08	292.	12.	0.007	197.61	3.172E+00	P
La-140	328.76	253.	-2.	-0.001	921.98	-3.140E-01	
EU-152	344.29	184.	13.	0.007	151.47	1.315E+00	
HF-181	345.83	200.	13.	0.007	157.51	2.323E+00	
BA-133	356.00	220.	-15.	-0.008	142.31	-6.707E-01	
I-131	364.48	36.	7.	0.004	172.02	2.422E-01	
BA-133	383.84	78.	6.	0.003	206.29	2.033E+00	
SN-113	391.69	37.	-5.	-0.003	197.90	-2.230E-01	P
SB-125	427.88	28.	2.	0.001	522.81	2.173E-01	
AG-108M	433.94	35.	-11.	-0.006	116.76	-3.834E-01	
PM-146	453.88	56.	-16.	-0.009	96.13	-8.556E-01	
SB-125	463.37	45.	11.	0.006	90.24	3.666E+00	P
Ir-192	468.06	87.	-11.	-0.006	122.04	-7.458E-01	
BE-7	477.60	55.	5.	0.003	214.48	1.671E+00	
HF-181	482.00	52.	1.	0.001	767.30	5.866E-02	
La-140	487.02	38.	8.	0.004	114.19	6.328E-01	
RU-103	497.05	26.	-4.	-0.002	252.19	-1.602E-01	P
RH-106	511.86	125.	-28.	-0.015	60.16	-5.146E+00	
Nd-147	531.00	22.	-4.	-0.002	264.34	-1.081E+00	
CS-134	569.32	26.	-5.	-0.003	151.00	-1.319E+00	
SB-125	600.50	160.	9.	0.005	197.37	2.181E+00	P
SB-124	602.73	169.	7.	0.004	259.69	3.096E-01	
AG-108M	614.28	243.	-14.	-0.008	159.39	-6.742E-01	
PM-144	618.06	229.	-14.	-0.008	154.58	-6.155E-01	
RH-106	621.92	301.	-17.	-0.010	144.46	-7.576E+00	
SB-125	635.89	9.	5.	0.003	89.27	2.097E+00	
I-131	636.97	47.	-14.	-0.008	73.17	-8.800E+00	
AG-110M	657.76	52.	-2.	-0.001	687.99	-7.247E-02	
CS-137	661.66	43.	5.	0.003	206.78	2.497E-01	P
PM-144	696.54	34.	-11.	-0.006	91.68	-5.115E-01	P
NB-94	702.63	51.	-17.	-0.010	92.04	-8.444E-01	
SB-124	722.79	16.	4.	0.002	140.33	1.945E+00	
AG-108M	722.94	20.	7.	0.004	92.64	4.010E-01	
EU-154	723.36	27.	7.	0.004	106.28	1.802E+00	
ZR-95	724.20	34.	7.	0.004	118.32	8.267E-01	
BI-212	727.17	42.	1.	0.001	696.64	8.697E-01	
PM-146	735.72	19.	3.	0.002	332.49	6.292E-01	P
PM-146	747.16	28.	-4.	-0.002	220.92	-6.374E-01	P
ZR-95	756.73	24.	-3.	-0.001	357.51	-2.497E-01	P
AG-110M	763.94	25.	6.	0.004	117.81	1.472E+00	
PA-234M	766.41	38.	-5.	-0.003	180.00	-8.833E+01	
EU-152	778.92	28.	-8.	-0.004	144.70	-3.255E+00	
BI-212	785.42	14.	9.	0.005	93.55	3.771E+01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CS-134	795.87	18.	18.	0.010	41.46	1.099E+00		
TL-210	799.60	35.	8.	0.004	116.14	4.136E-01		
CS-134	801.95	60.	-11.	-0.006	106.60	-6.684E+00		
CO-58	810.78	20.	8.	0.004	89.71	4.183E-01		
La-140	815.77	27.	8.	0.004	103.07	1.800E+00		
Cs-136	818.50	25.	5.	0.003	137.68	2.975E-01		
MN-54	834.85	9.	8.	0.004	91.40	4.306E-01		
Co-56	846.77	19.	-7.	-0.004	125.35	-3.852E-01		P
NB-94	871.10	12.	5.	0.003	116.06	2.702E-01		
PA-234	880.53	21.	8.	0.004	90.49	7.642E+00		
PA-234	883.24	29.	4.	0.002	206.88	2.324E+00		
AG-110M	884.68	38.	-10.	-0.005	96.22	-7.770E-01		
Sc-46	889.28	13.	6.	0.003	99.31	3.281E-01		
AG-110M	937.49	10.	-1.	-0.001	702.38	-1.791E-01		
PA-234	946.02	10.	1.	0.001	702.38	4.629E-01		
EU-152	964.11	50.	6.	0.003	180.25	2.474E+00		
EU-154	996.33	42.	-7.	-0.004	136.28	-4.281E+00		
PA-234M	1001.00	52.	-3.	-0.002	222.24	-2.495E+01		P
EU-154	1004.77	28.	8.	0.005	97.93	2.982E+00		
Co-56	1037.84	10.	1.	0.000	928.11	3.606E-01		P
Cs-136	1048.07	0.	16.	0.009	25.00	1.354E+00		
BI-207	1063.66	16.	-2.	-0.001	471.83	-1.391E-01		P
Ga-68	1077.40	20.	-5.	-0.003	201.66	-1.238E+01		
FE-59	1099.25	10.	4.	0.002	180.85	4.991E-01		
EU-152	1112.07	51.	-4.	-0.002	274.96	-1.946E+00		
Sc-46	1120.55	35.	9.	0.005	103.34	6.133E-01		
Co-56	1238.28	16.	10.	0.005	98.88	1.153E+00		P
NA-22	1274.53	16.	-7.	-0.004	89.21	-5.607E-01		
FE-59	1291.60	5.	5.	0.003	122.58	8.693E-01		P
CO-60	1332.50	20.	-6.	-0.003	107.32	-4.958E-01		P
AG-110M	1384.30	16.	-7.	-0.004	135.27	-2.478E+00		
EU-152	1408.00	0.	6.	0.003	40.82	2.493E+00		
La-140	1596.21	11.	-5.	-0.003	154.24	-5.443E-01		
SB-124	1690.98	0.	5.	0.003	44.72	1.071E+00		
Y-88	1836.06	0.	6.	0.003	42.33	6.512E-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	1.6708E+00	1.6708E+00	2.145E+02%	1.25E+01
NA-22	#A	-5.6074E-01	-5.6074E-01	8.921E+01%	1.71E+00
K-40	#	8.5524E+01	8.5524E+01	1.152E+01%	1.39E+01
Sc-46	#A	4.7070E-01	4.7071E-01	7.166E+01%	1.13E+00
CR-51	#A	3.1719E+00	3.1719E+00	1.976E+02%	2.11E+01

MN-54	#A	4.3063E-01	4.3063E-01	9.140E+01%	9.46E-01
FE-59	#A	6.5949E-01	6.5950E-01	1.092E+02%	2.18E+00
Co-56	#A	2.3733E-01	2.3734E-01	9.888E+01%	1.30E+00
CO-57	#A	-1.6407E-01	-1.6407E-01	2.000E+02%	1.11E+00
CO-58	#A	4.1828E-01	4.1829E-01	8.971E+01%	1.28E+00
CO-60	#A	-4.9582E-01	-4.9582E-01	1.073E+02%	1.96E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.89E+00
NB-94	#A	-8.4444E-01	-8.4444E-01	9.204E+01%	1.78E+00
ZR-95	#A	2.3219E-01	2.3219E-01	1.183E+02%	2.39E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.49E+00
RU-103	#A	-1.6019E-01	-1.6019E-01	2.522E+02%	1.06E+00
RH-106	#A	-7.5757E+00	-7.5757E+00	1.445E+02%	3.67E+01
AG-108M	#A	9.5410E-03	9.5410E-03	7.452E+01%	1.08E+00
AG-110M	#A	-2.4922E-01	-2.4922E-01	7.605E+01%	2.54E+00
SN-113	#A	-2.2300E-01	-2.2300E-01	1.979E+02%	1.45E+00
SB-124	#A	6.5439E-01	6.5439E-01	4.472E+01%	2.74E+00
SB-125	#A	1.5523E+00	1.5523E+00	8.927E+01%	2.97E+00
I-131	#A	2.4222E-01	2.4224E-01	1.720E+02%	1.06E+00
Gd-153	#A	-5.6353E-01	-5.6354E-01	3.809E+02%	7.18E+00
Ga-68	#A	-1.2233E+01	-1.2375E+01	2.017E+02%	5.83E+01
Tc-99m	#A	-4.1543E-01	-4.1633E-01	1.515E+02%	2.10E+00
BA-133	#A	-6.7070E-01	-6.7070E-01	1.423E+02%	3.21E+00
CS-134	#A	1.0992E+00	1.0992E+00	4.146E+01%	1.40E+00
CS-137	#A	2.4968E-01	2.4968E-01	2.068E+02%	1.80E+00
CE-139	#A	3.6420E-01	3.6420E-01	9.516E+01%	1.16E+00
Ba-140	#	3.8594E+00	3.8596E+00	3.253E+01%	2.73E+00
La-140	#A	1.1431E-01	1.1431E-01	7.261E+01%	1.88E+00
CE-141	#A	-7.8834E-01	-7.8835E-01	1.496E+02%	3.94E+00
CE-144	#A	-3.1606E+00	-3.1606E+00	1.443E+02%	1.52E+01
PM-144	#A	-5.1147E-01	-5.1147E-01	9.168E+01%	1.44E+00
EU-152	#A	9.4142E-01	9.4142E-01	7.908E+01%	3.16E+00
EU-154	#A	1.4444E+00	1.4444E+00	5.770E+01%	1.88E+00
EU-155	#A	-1.8693E+00	-1.8693E+00	6.805E+01%	1.02E+01
HF-181	#A	4.1572E-01	4.1572E-01	1.575E+02%	1.59E+00
Ta-182	#A	2.6767E+00	2.6767E+00	3.162E+01%	6.28E+00
Hg-203	#A	1.5834E-01	1.5834E-01	2.176E+02%	1.19E+00
TL-208		5.1998E+00	5.1998E+00	1.125E+01%	8.70E-01
PM-146	#A	-8.5557E-01	-8.5557E-01	9.613E+01%	1.96E+00
Y-88	#A	6.5121E-01	6.5122E-01	4.233E+01%	8.18E-01
Cd-113m	#A	-5.9751E+03	-5.9751E+03	9.007E+01%	1.80E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.93E+01
Cf-251	#A	1.0075E+00	1.0075E+00	1.740E+02%	4.55E+00
Cf-249	#A	1.6765E-01	1.6765E-01	4.822E+02%	2.04E+00
Sn-126	#A	-5.1539E+00	-5.1539E+00	1.121E+02%	1.93E+01
PB-210	#A	2.5749E+01	2.5749E+01	5.343E+01%	4.50E+01
PB-212		1.1572E+01	1.1572E+01	7.291E+00%	1.48E+00
PB-214		9.9678E+00	9.9678E+00	1.174E+01%	1.92E+00
BI-207	#A	-1.3908E-01	-1.3908E-01	4.718E+02%	1.94E+00
BI-212	#A	8.6967E-01	8.6967E-01	6.966E+02%	2.16E+01

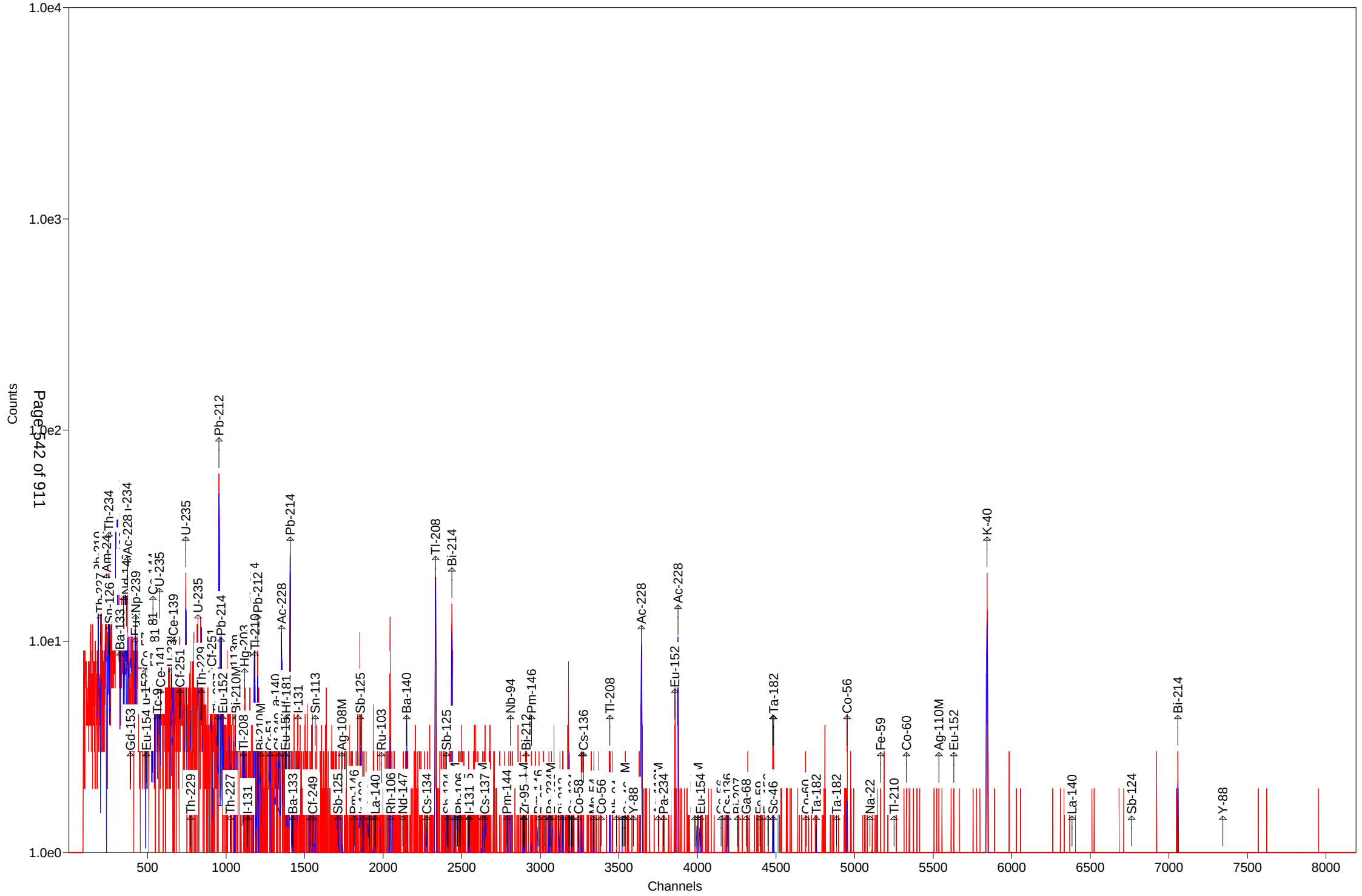
U-235 A	2.3685E+00	2.3685E+00	6.319E+01%		4.27E+00
BI-214	7.8254E+00	7.8254E+00	1.279E+01%		1.62E+00
BI-210M#A	1.6643E-01	1.6643E-01	3.925E+02%		2.25E+00
AC-228	1.3812E+01	1.3812E+01	1.595E+01%		2.99E+00
TH-227 #A	-9.1712E-01	-9.1712E-01	5.568E+02%		1.29E+01
TH-229 #A	8.1699E+00	8.1699E+00	4.856E+01%		1.95E+01
TH-234 A	1.3069E+01	1.3069E+01	3.040E+01%		1.67E+01
PA-231 #A	0.0000E+00	0.0000E+00	7.071E+02%		7.48E+01
PA-233 #A	0.0000E+00	0.0000E+00	7.071E+02%		6.13E+00
PA-234 #A	-4.5164E-01	-4.5164E-01	1.262E+02%		9.32E+00
PA-234M#A	-2.4945E+01	-2.4945E+01	2.222E+02%		2.83E+02
AM-241 #A	-2.0173E+00	-2.0173E+00	3.459E+01%		5.57E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.62E+01
Ir-192 #A	0.0000E+00	0.0000E+00	7.071E+02%		2.57E+00
Cs-136 #A	7.6684E-01	7.6687E-01	2.500E+01%		1.43E+00
Np-239 #A	-1.7995E+00	-1.7999E+00	1.664E+02%		9.97E+00
Nd-147 #A	-1.0811E+00	-1.0812E+00	2.643E+02%		7.19E+00
TL-210 #A	4.1362E-01	4.1362E-01	1.161E+02%		1.65E+00
Kr-85 #A	0.0000E+00	0.0000E+00	1.000E+03%		4.22E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 1.620E+02 Bq/Sample
Total Decayed Activity (37.5 to 2000.0 keV) 1.6201843E+02 Bq/Sample

412881_Gamma_180-86110-A-11-A. 8_Gamma_20190277.spc.



Test America St. Louis Spectrum ID: 9_Gamma_20190341

Sample Description: 412881_Gamma_180-86110-A-14-A
Detector: Detector # 9
Batch ID: 412881
Work Order Number: Gamma
Lot Number: 180-86110-A-14-A

Decay to Time: 2/20/2019 10:46 Live Time: 1800 sec
Acquisition Time: 2/20/2019 10:47:05 Real Time: 1804 sec
Analysis Time: 2/20/2019 11:17 Dead Time: 0.20 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 9_Soil_TunaCan.Clb
Efficiency Cal Desc: 9_Soil_TunaCan_90099_050312
Efficiency Cal Date: 6/14/2012 10:19
Energy Cal Date: 3/1/2012 13:57
Library: Client_Long_Rev15.lib
Bkgd Correction File: 9_2019-01-20_1010.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-3.513E+00	100.9	3.545E+00	3.549E+00	1.192E+01
NA-22	8.513E-02	296.0	2.520E-01	2.520E-01	9.397E-01
K-40	1.930E+02	5.4	1.035E+01	1.430E+01	7.896E+00
Sc-46	3.922E-01	106.1	4.161E-01	4.166E-01	1.413E+00
CR-51	-2.400E+00	94.8	2.276E+00	2.279E+00	9.481E+00
MN-54	4.824E-01	46.4	2.238E-01	2.252E-01	4.809E-01
FE-59	1.111E-01	765.7	8.510E-01	8.510E-01	1.958E+00
Co-56	6.654E-01	48.9	3.250E-01	3.268E-01	9.636E-01
CO-57	2.575E-01	84.4	2.175E-01	2.179E-01	7.254E-01
CO-58	-6.926E-01	80.4	5.569E-01	5.580E-01	1.857E+00
CO-60	-7.055E-02	598.4	4.222E-01	4.222E-01	9.735E-01
ZN-65	-1.693E+00	80.6	1.364E+00	1.367E+00	4.551E+00
NB-94	-6.503E-01	84.4	5.487E-01	5.498E-01	1.832E+00
ZR-95	4.367E-01	176.1	7.691E-01	7.694E-01	1.761E+00
NB-95	5.515E-01	77.1	4.255E-01	4.264E-01	1.420E+00
RU-103	-2.102E-02	1609.8	3.383E-01	3.383E-01	8.775E-01
RH-106	1.194E-01	5299.1	6.329E+00	6.329E+00	2.164E+01
AG-108M	1.504E-01	203.6	3.063E-01	3.064E-01	7.535E-01
AG-110M	2.658E-01	103.7	2.756E-01	2.759E-01	2.547E+00
SN-113	-1.700E-01	322.6	5.484E-01	5.484E-01	1.879E+00
SB-124	5.274E-01	39.6	2.091E-01	2.109E-01	2.036E+00
SB-125	1.167E+00	78.7	9.188E-01	9.207E-01	1.238E+00
I-131	3.601E-01	134.9	4.857E-01	4.861E-01	8.199E-01
Gd-153	0.000E+00	1.#INF	4.897E-01	4.897E-01	5.296E+00
Ga-68	1.272E+01	119.0	1.514E+01	1.515E+01	3.394E+01
Tc-99m	0.000E+00	1.#INF	1.681E-01	1.681E-01	1.472E+00
BA-133	-5.461E-01	139.7	7.628E-01	7.633E-01	2.561E+00
CS-134	6.918E-01	63.1	4.363E-01	4.377E-01	1.266E+00
CS-137	2.342E-01	165.3	3.872E-01	3.873E-01	1.337E+00
CE-139	-3.675E-01	95.2	3.500E-01	3.518E-01	1.167E+00
Ba-140	1.315E+00	93.6	1.232E+00	1.234E+00	2.880E+00
La-140	1.200E-01	326.4	3.917E-01	3.917E-01	9.150E-01
CE-141	5.522E-01	139.2	7.686E-01	7.691E-01	2.567E+00

CE-144	0.000E+00	1.#INF	9.940E-01	9.940E-01	1.128E+01
PM-144	-5.586E-01	80.4	4.489E-01	4.498E-01	1.499E+00
EU-152	4.216E-01	73.2	3.086E-01	3.094E-01	2.715E+00
EU-154	9.355E-01	111.6	1.044E+00	1.045E+00	1.633E+00
EU-155	0.000E+00	1.#INF	7.505E-01	7.506E-01	7.384E+00
HF-181	5.112E-02	850.5	4.348E-01	4.348E-01	1.667E+00
Ta-182	0.000E+00	1.#INF	1.181E+00	1.181E+00	6.695E+00
Hg-203	3.542E-01	81.2	2.875E-01	2.882E-01	9.601E-01
TL-208	4.623E+00	10.1	4.686E-01	5.264E-01	6.693E-01
PM-146	3.818E-01	94.2	3.597E-01	3.602E-01	8.735E-01
Y-88	3.285E-01	48.7	1.599E-01	1.610E-01	5.109E-01
Cd-113m	3.848E+03	81.5	3.134E+03	3.144E+03	1.050E+04
Cd-109	0.000E+00	1.#INF	1.395E+01	1.395E+01	4.649E+01
Cf-251	-1.771E+00	94.1	1.666E+00	1.674E+00	4.249E+00
Cf-249	-5.575E-01	99.3	5.535E-01	5.543E-01	1.856E+00
Sn-126	1.473E+00	283.9	4.183E+00	4.184E+00	1.409E+01
PB-210	9.857E+00	103.7	1.022E+01	1.024E+01	3.422E+01
PB-212	1.437E+01	5.5	7.906E-01	1.220E+00	1.280E+00
PB-214	8.315E+00	9.4	7.836E-01	8.949E-01	1.752E+00
BI-207	2.967E-01	187.3	5.557E-01	5.559E-01	1.267E+00
BI-212	7.897E+00	93.5	7.386E+00	7.398E+00	2.474E+01
U-235	3.611E-01	431.9	1.559E+00	1.560E+00	1.175E+01
BI-214	5.847E+00	15.0	8.747E-01	9.259E-01	1.588E+00
BI-210M	-6.752E-01	109.1	7.368E-01	7.379E-01	1.927E+00
AC-228	1.411E+01	8.5	1.203E+00	1.402E+00	9.956E-01
TH-227	6.255E-01	143.7	8.988E-01	8.996E-01	1.141E+01
TH-229	5.784E+00	102.3	5.917E+00	5.935E+00	1.453E+01
TH-234	3.833E+00	105.2	4.034E+00	4.040E+00	2.892E+01
PA-231	-9.477E+00	198.9	1.885E+01	1.885E+01	6.324E+01
PA-233	-3.850E-02	1592.8	6.132E-01	6.132E-01	5.087E+00
PA-234	-1.455E+00	139.2	2.025E+00	2.026E+00	6.763E+00
PA-234M	3.736E+01	71.9	2.685E+01	2.692E+01	2.004E+02
AM-241	9.852E-01	118.5	1.167E+00	1.168E+00	3.901E+00
Np-237	6.876E+00	21.9	1.503E+00	1.551E+00	4.496E+00
Ir-192	3.058E-01	152.0	4.650E-01	4.653E-01	2.051E+00
Cs-136	2.601E-01	96.8	2.519E-01	2.523E-01	1.928E+00
Np-239	-1.284E+00	164.9	2.117E+00	2.119E+00	7.055E+00
Nd-147	-2.742E+00	106.6	2.923E+00	2.927E+00	6.998E+00
TL-210	-2.512E-01	165.6	4.161E-01	4.163E-01	1.432E+00
Kr-85	0.000E+00	1.#INF	2.051E+01	2.051E+01	3.673E+02
Total	4.188E+03				

Analyst: kody Saulters

Sample description
412881_Gamma_180-86110-A-14-A

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20190341.An1

Acquisition information
Start time: 2/20/2019 10:47:05 AM
Live time: 1800
Real time: 1804
Dead time: 0.20 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/14/2012 10:19:51 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.30 %
Log(Eff): -8.079856E-01 + (-2.367265E-01*Log(E)) +
(-3.950640E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -2.387916E+01 + (8.875647E+00*Log(E)) +
(-9.401100E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev15.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.08keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	2/20/2019 10:46:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2019-01-20_1010.PBC 1/20/2019 10:10:08 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2048

***** 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.	103.68	1.00	2.577E-02	46.54	4.250	PBC<MDA	PB210
59.54	23.	118.49	1.01	3.659E-02	59.54	35.900	PBC<MDA	AM241
63.29	25.	105.24	1.01	3.921E-02	63.29	3.810	PBC<MDA	TH234
64.28	10.	283.94	1.02	3.987E-02	64.28	9.700	PBC<MDA	Sn126
74.53	134.	15.86	1.02	4.561E-02				
77.16	245.	9.26	1.03	4.679E-02				
86.51	81.	21.86	1.04	5.008E-02	86.49	13.100	6.876E+00	Np237
					86.54	30.700	2.933E+00	EU155
					86.94	9.040	9.939E+00	Sn126
87.59	50.	39.21	1.04	5.038E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	1.454E+01	Cd109
92.97	122.	19.76	1.74	5.171E-02	92.59	5.584	2.361E+01	TH234
					93.35	5.561	2.364E+01	AC228
122.06	21.	84.45	1.07	5.303E-02	121.78	28.580	7.710E-01	EU152
					122.06	85.600	2.575E-01	CO57
123.10	7.	261.54	1.07	5.296E-02	123.10	40.790	PBC<MDA	EU154
145.44	24.	139.19	1.09	5.012E-02	145.44	48.200	PBC<MDA	CE141
162.66	22.	93.64	1.11	4.690E-02	162.66	6.220	PBC<MDA	Ba140
163.38	5.	431.87	1.11	4.676E-02	163.38	5.080	PBC<MDA	U235
185.72	24.	95.55	1.13	4.403E-02	185.72	54.000	PBC<MDA	U235
193.51	20.	102.30	1.14	4.287E-02	193.51	4.400	PBC<MDA	TH229
227.00	6.	315.64	1.17	3.858E-02	227.00	6.300	PBC<MDA	Cf251

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
235.97	19.	200.45	1.18	3.760E-02	235.97	12.300	PBC<MDA	TH227
238.41	377.	6.84	0.95	3.734E-02	238.63	43.300	1.295E+01	PB212
241.79	58.	25.24	1.18	3.697E-02	242.00	7.430	1.168E+01	PB214
263.70	14.	81.46	1.20	3.489E-02	263.70	0.006	PBC<MDA	Cd113m
279.20	17.	81.17	1.22	3.356E-02	279.20	81.460	PBC<MDA	Hg203
284.30	3.	619.73	1.22	3.315E-02	284.30	6.140	PBC<MDA	I131
294.88	82.	15.01	1.23	3.232E-02	295.09	19.300	7.288E+00	PB214
299.82	19.	53.32	1.23	3.195E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.369E+01	PA231
					300.18	6.200	5.433E+00	PA233
316.49	19.	152.04	1.25	3.080E-02	316.49	87.040	PBC<MDA	Ir192
338.33	95.	13.89	0.84	2.940E-02	338.32	12.010	1.489E+01	AC228
345.83	3.	850.49	1.28	2.896E-02	345.83	15.070	PBC<MDA	HF181
351.75	171.	11.40	1.44	2.860E-02	351.93	37.600	8.842E+00	PB214
364.48	10.	134.87	1.29	2.791E-02	364.48	81.700	PBC<MDA	I131
383.84	13.	104.35	1.31	2.691E-02	383.84	8.940	PBC<MDA	BA133
427.88	4.	165.03	1.35	2.491E-02	427.88	29.600	PBC<MDA	SB125
433.94	6.	203.58	1.35	2.466E-02	433.94	90.480	PBC<MDA	AG108M
453.88	11.	94.21	1.37	2.388E-02	453.88	65.000	PBC<MDA	PM146
463.37	14.	78.72	1.38	2.352E-02	463.37	10.470	PBC<MDA	SB125
468.06	3.	415.90	1.38	2.335E-02	468.06	51.750	PBC<MDA	Ir192
511.86	85.	18.19	2.67	2.188E-02	511.86	20.000	1.079E+01	RH106
537.26	5.	195.25	1.44	2.112E-02	537.26	24.390	PBC<MDA	Ba140
563.24	10.	99.81	1.47	2.040E-02	563.24	8.350	PBC<MDA	CS134
569.47	-4.	240.37	1.47	2.024E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	PBC<MDA	PA234
					569.70	97.740	PBC<MDA	BI207
583.30	140.	10.14	1.26	1.989E-02	583.02	84.500	4.623E+00	TL208
600.50	11.	177.73	1.50	1.946E-02	600.50	17.860	PBC<MDA	SB125
602.73	12.	177.39	1.50	1.940E-02	602.73	98.260	PBC<MDA	SB124
604.71	11.	201.08	1.50	1.936E-02	604.71	97.620	PBC<MDA	CS134
609.54	93.	14.96	0.96	1.924E-02	609.31	46.090	5.847E+00	BI214
					610.30	5.750	4.693E+01	RU103
635.89	2.	380.79	1.53	1.864E-02	635.89	11.310	PBC<MDA	SB125
636.97	3.	233.67	1.53	1.862E-02	636.97	7.170	PBC<MDA	I131
657.76	10.	103.67	1.54	1.818E-02	657.76	94.640	PBC<MDA	AG110M
661.66	6.	165.34	1.55	1.810E-02	661.66	85.210	PBC<MDA	CS137
727.07	18.	93.53	1.60	1.686E-02	727.17	7.550	PBC<MDA	BI212
756.73	7.	176.13	1.62	1.635E-02	756.73	54.460	PBC<MDA	ZR95
765.79	16.	77.15	1.63	1.621E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.873E+02	PA234M
766.41	13.	71.88	1.63	1.620E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.481E+02	PA234M
786.16	9.	134.72	1.65	1.590E-02	785.42	1.280	PBC<MDA	BI212
795.87	12.	79.35	1.66	1.574E-02	795.87	85.530	PBC<MDA	CS134
801.95	12.	83.29	1.66	1.565E-02	801.95	8.690	PBC<MDA	CS134
818.50	7.	239.43	1.67	1.540E-02	818.50	100.000	PBC<MDA	Cs136
834.85	13.	46.40	1.69	1.517E-02	834.85	99.980	4.824E-01	MN54

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
859.74	29.	18.95	1.50	1.482E-02	860.56	12.420	8.844E+00	TL208
889.28	10.	106.09	1.73	1.445E-02	889.28	99.984	PBC<MDA	Sc46
910.83	102.	9.90	1.90	1.418E-02	911.07	29.000	1.378E+01	AC228
937.49	6.	122.85	1.77	1.387E-02	937.49	34.360	PBC<MDA	AG110M
964.11	11.	115.39	1.79	1.357E-02	964.11	14.605	PBC<MDA	EU152
969.06	47.	18.32	0.77	1.352E-02	968.97	17.460	1.098E+01	AC228
996.33	10.	111.58	1.81	1.323E-02	996.33	10.600	PBC<MDA	EU154
1037.84	2.	507.29	1.84	1.281E-02	1037.84	14.130	PBC<MDA	Co56
1048.07	5.	96.82	1.85	1.271E-02	1048.07	80.000	PBC<MDA	Cs136
1063.66	5.	187.26	1.86	1.257E-02	1063.66	74.500	PBC<MDA	BI207
1077.40	8.	119.02	1.87	1.244E-02	1077.40	3.300	PBC<MDA	Ga68
1099.25	1.	765.65	1.89	1.224E-02	1099.25	56.500	PBC<MDA	FE59
1120.71	30.	27.89	0.76	1.206E-02	1120.29	15.100	9.034E+00	BI214
					1120.55	99.987	PBC<MDA	Sc46
1238.28	22.	48.85	1.98	1.114E-02	1238.28	66.070	1.661E+00	Co56
1274.53	2.	295.97	2.01	1.088E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	2.418E-01	EU154
1313.00	7.	87.39	2.03	1.063E-02	1313.00	21.000	PBC<MDA	TL210
1408.00	14.	27.98	2.10	1.004E-02	1408.00	21.005	3.581E+00	EU152
1460.60	361.	5.36	2.14	9.749E-03	1460.83	10.670	1.930E+02	K40
1596.21	2.	326.43	2.22	9.069E-03	1596.21	95.400	PBC<MDA	La140
1690.98	7.	39.64	2.27	8.649E-03	1690.98	47.790	PBC<MDA	SB124
1764.58	4.	140.13	2.31	8.350E-03	1764.49	15.400	PBC<MDA	BI214
1836.06	5.	48.67	2.35	8.079E-03	1836.06	99.200	PBC<MDA	Y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
297.71	74.54	158.	134.	2.933E+03	15.86	1.025	-	D
308.24	77.18	136.	245.	5.245E+03	9.26	1.027	-	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_Rev15.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	193.	19.	0.011	103.68	0.998s
TH-227	200.20	50.14	230.	-9.	-0.005	242.62	1.001s
AM-241	237.77	59.54	369.	23.	0.013	118.49	1.010s
TH-234	252.77	63.29	345.	25.	0.014	105.24	1.014s
Sn-126	256.74	64.28	419.	10.	0.006	283.94	1.015
BA-133	323.56	80.99	1063.	-32.	-0.018	143.14	1.031s
Np-237	345.55	86.49	117.	81.	0.045	21.86	1.036D
EU-155	345.76	86.54	1195.	-26.	-0.015	185.73	1.036s
Sn-126	347.35	86.94	1169.	-26.	-0.015	183.64	1.037
Sn-126	349.87	87.57	1042.	50.	0.028	39.21	1.037D
Cd-109	351.75	88.04	1142.	0.	0.000	181.36	1.038A
Nd-147	363.99	91.10	1016.	-19.	-0.010	243.53	1.041s
AC-228	371.44	92.97	107.	122.	0.068	19.76	1.744s
Gd-153	389.58	97.50	997.	0.	0.000	1000.00	1.047s
Np-239	397.58	99.50	997.	0.	0.000	1000.00	1.049s
Gd-153	412.37	103.20	997.	0.	0.000	1000.00	1.052s
Np-239	414.37	103.70	997.	0.	0.000	1000.00	1.053s
EU-155	420.82	105.31	997.	0.	0.000	1000.00	1.054s
Np-239	424.09	106.13	1046.	-28.	-0.016	164.86	1.055s
EU-152	486.67	121.78	235.	-25.	-0.014	90.10	1.070s
CO-57	487.80	122.06	147.	21.	0.012	84.45	1.070s
EU-154	491.95	123.10	170.	7.	0.004	261.54	1.071s
PA-234	524.72	131.29	573.	-25.	-0.014	139.18	1.079s
CE-144	533.69	133.54	600.	0.	0.000	1000.00	1.081s
HF-181	544.74	136.30	600.	0.	0.000	1000.00	1.084s
CO-57	545.43	136.47	600.	0.	0.000	1000.00	1.084s
Tc-99m	561.57	140.51	600.	0.	0.000	1000.00	1.088
U-235	574.67	143.79	600.	0.	0.000	1000.00	1.091s
CE-141	581.29	145.44	546.	24.	0.013	139.19	1.092s
Ba-140	650.15	162.66	197.	22.	0.012	93.64	1.108s
U-235	653.03	163.38	219.	5.	0.003	431.87	1.109s
CE-139	662.92	165.85	272.	-25.	-0.014	95.23	1.111
Cf-251	705.90	176.60	147.	-25.	-0.014	94.08	1.122s
U-235	742.37	185.72	139.	24.	0.013	95.55	1.130s
TH-229	773.52	193.51	100.	20.	0.011	102.30	1.137s
U-235	820.80	205.33	152.	-24.	-0.014	82.60	1.148s
TH-229	842.87	210.85	164.	-12.	-0.007	210.93	1.153s
Cf-251	907.45	227.00	92.	6.	0.003	315.64	1.168s
TH-227	943.33	235.97	696.	19.	0.010	200.45	1.176s
PB-212	953.97	238.63	55.	418.	0.232	5.50	1.179D
PB-214	967.43	242.00	77.	58.	0.032	25.24	1.182D
EU-152	978.21	244.69	734.	-20.	-0.011	191.24	1.185s
TH-227	1024.39	256.24	108.	-10.	-0.006	205.91	1.195
Cd-113m	1054.23	263.70	62.	14.	0.008	81.46	1.202s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	1062.75	265.83	152.	-21.	-0.012	109.13	1.204s
TL-208	1108.55	277.28	99.	-4.	-0.002	241.18	1.215s
Hg-203	1116.22	279.20	91.	17.	0.010	81.17	1.216s
I-131	1136.61	284.30	72.	3.	0.001	619.73	1.221s
PB-214	1179.77	295.09	34.	82.	0.045	15.01	1.230D
TL-210	1183.41	296.00	531.	-19.	-0.011	171.80	1.231s
PB-212	1199.52	300.03	44.	19.	0.011	53.32	1.235D
PA-231	1199.68	300.07	512.	-19.	-0.011	168.21	1.235
PA-233	1200.12	300.18	493.	-19.	-0.011	165.08	1.235
PA-231	1210.00	302.65	474.	-16.	-0.009	198.86	1.237s
BA-133	1210.81	302.85	458.	0.	0.000	1000.00	1.238s
Ba-140	1218.80	304.85	458.	0.	0.000	1000.00	1.240s
BI-210M	1218.99	304.90	458.	0.	0.000	1000.00	1.240s
Ir-192	1233.16	308.44	458.	0.	0.000	1000.00	1.243
Ir-192	1265.35	316.49	427.	19.	0.011	152.04	1.250s
CR-51	1279.73	320.08	111.	-13.	-0.007	94.83	1.253s
La-140	1314.43	328.76	389.	-19.	-0.011	147.80	1.261
Cf-249	1333.15	333.44	370.	-19.	-0.011	143.73	1.265s
AC-228	1352.69	338.33	21.	95.	0.053	13.89	0.839s
Cs-136	1361.66	340.57	351.	-19.	-0.011	139.35	1.272s
EU-152	1376.53	344.29	313.	-8.	-0.004	330.16	1.275s
HF-181	1382.70	345.83	324.	3.	0.002	850.49	1.276s
PB-214	1406.37	351.75	45.	171.	0.095	11.40	1.438s
BA-133	1423.37	356.00	284.	-17.	-0.010	139.68	1.285s
I-131	1457.31	364.48	44.	10.	0.006	134.87	1.293s
BA-133	1534.73	383.84	79.	13.	0.007	104.35	1.310s
Cf-249	1551.17	387.95	145.	-18.	-0.010	99.28	1.314s
SN-113	1566.12	391.69	138.	-5.	-0.003	322.62	1.317s
SB-125	1710.86	427.88	9.	4.	0.002	165.03	1.349s
AG-108M	1735.10	433.94	35.	6.	0.003	203.58	1.354s
PM-146	1814.87	453.88	22.	11.	0.006	94.21	1.372s
SB-125	1852.82	463.37	57.	14.	0.008	78.72	1.380
Ir-192	1871.59	468.06	82.	3.	0.002	415.90	1.384s
BE-7	1909.73	477.60	112.	-15.	-0.009	100.91	1.392s
La-140	1947.43	487.02	35.	-2.	-0.001	527.46	1.400s
RH-106	2046.81	511.86	77.	85.	0.047	18.19	2.672s
Kr-85	2055.27	513.98	162.	0.	0.000	1000.00	1.424s
Nd-147	2123.35	531.00	48.	-14.	-0.008	106.61	1.438s
Ba-140	2148.39	537.26	27.	5.	0.003	195.25	1.444s
CS-134	2252.30	563.24	19.	10.	0.005	99.81	1.466s
CS-134	2276.64	569.32	42.	-1.	-0.001	921.95	1.471s
PA-234	2277.24	569.47	47.	-4.	-0.002	240.37	1.471s
TL-208	2332.55	583.30	14.	140.	0.078	10.14	1.257s
SB-125	2401.36	600.50	196.	11.	0.006	177.73	1.497s
SB-124	2410.29	602.73	208.	12.	0.006	177.39	1.499s
CS-134	2418.21	604.71	219.	11.	0.006	201.08	1.500s
BI-214	2437.53	609.54	24.	93.	0.052	14.96	0.960s
RU-103	2440.56	610.30	230.	0.	0.000	1000.00	1.505s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-108M	2456.49	614.28	230.	0.	0.000	1000.00	1.508s
PM-144	2471.62	618.06	230.	0.	0.000	1000.00	1.512s
SB-125	2542.94	635.89	28.	2.	0.001	380.79	1.526s
I-131	2547.28	636.97	29.	3.	0.002	233.67	1.527s
AG-110M	2630.43	657.76	53.	10.	0.006	103.67	1.544s
CS-137	2646.03	661.66	54.	6.	0.004	165.34	1.548s
PM-144	2785.58	696.54	88.	-17.	-0.010	80.36	1.576s
NB-94	2809.93	702.63	130.	-20.	-0.011	84.38	1.581s
SB-124	2890.57	722.79	98.	-16.	-0.009	92.75	1.598s
AG-108M	2891.17	722.94	83.	-2.	-0.001	797.20	1.598s
EU-154	2892.86	723.36	81.	0.	0.000	1000.00	1.598
ZR-95	2896.22	724.20	104.	-19.	-0.011	78.40	1.599s
BI-212	2908.11	727.17	134.	18.	0.010	93.53	1.601s
PM-146	2942.31	735.72	33.	-7.	-0.004	185.94	1.608s
PM-146	2988.08	747.16	28.	-3.	-0.002	378.59	1.617s
ZR-95	3026.36	756.73	30.	7.	0.004	176.13	1.625s
AG-110M	3055.23	763.94	72.	-18.	-0.010	59.07	1.631
NB-95	3062.61	765.79	69.	16.	0.009	77.15	1.632s
PA-234M	3065.10	766.41	35.	13.	0.007	71.88	1.633s
EU-152	3115.14	778.92	40.	-13.	-0.007	110.49	1.643
BI-212	3141.15	785.42	69.	9.	0.005	134.72	1.648s
CS-134	3182.96	795.87	36.	12.	0.006	79.35	1.656s
TL-210	3197.88	799.60	64.	-7.	-0.004	165.61	1.659s
CS-134	3207.29	801.95	40.	12.	0.006	83.29	1.661s
CO-58	3242.59	810.78	110.	-19.	-0.011	80.41	1.668s
La-140	3262.58	815.77	129.	-19.	-0.011	86.43	1.672s
Cs-136	3273.50	818.50	119.	7.	0.004	239.43	1.674s
MN-54	3338.91	834.85	5.	13.	0.007	46.40	1.687s
Co-56	3386.61	846.77	25.	0.	0.000	1000.00	1.696s
TL-208	3438.50	859.74	1.	29.	0.016	18.95	1.500
NB-94	3483.94	871.10	20.	0.	0.000	1000.00	1.715s
EU-154	3492.47	873.23	38.	-15.	-0.008	65.11	1.717s
PA-234	3521.68	880.53	75.	-16.	-0.009	81.10	1.722s
PA-234	3532.53	883.24	91.	-5.	-0.003	282.82	1.724s
Sc-46	3556.69	889.28	53.	10.	0.006	106.09	1.729s
Y-88	3591.74	898.04	21.	-4.	-0.002	295.57	1.736s
AC-228	3642.91	910.83	0.	102.	0.057	9.90	1.899
AG-110M	3749.60	937.49	10.	6.	0.003	122.85	1.766s
PA-234	3783.72	946.02	30.	-15.	-0.008	84.33	1.772s
EU-152	3856.11	964.11	72.	11.	0.006	115.39	1.786s
AC-228	3875.92	969.06	6.	47.	0.026	18.32	0.772s
EU-154	3985.03	996.33	53.	10.	0.005	111.58	1.810s
EU-154	4018.82	1004.77	53.	-20.	-0.011	86.06	1.816s
Co-56	4151.13	1037.84	27.	2.	0.001	507.29	1.841s
Cs-136	4192.07	1048.07	11.	5.	0.003	96.82	1.848s
RH-106	4201.23	1050.36	33.	-10.	-0.006	106.74	1.850s
BI-207	4254.46	1063.66	16.	5.	0.003	187.26	1.860s
Ga-68	4309.44	1077.40	16.	8.	0.004	119.02	1.870s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
FE-59	4396.88	1099.25	22.	1.	0.001	765.65	1.886s
EU-152	4448.20	1112.07	122.	-19.	-0.010	87.05	1.895s
ZN-65	4462.09	1115.55	104.	-19.	-0.010	80.55	1.897s
BI-214	4482.74	1120.71	8.	30.	0.016	27.89	0.756s
Sc-46	4482.12	1120.55	99.	-7.	-0.004	203.67	1.901s
Ta-182	4485.12	1121.30	106.	0.	0.000	1000.00	1.901s
CO-60	4692.96	1173.24	37.	-13.	-0.007	61.82	1.938s
Ta-182	4756.25	1189.05	23.	-3.	-0.001	423.16	1.949s
Ta-182	4885.75	1221.41	51.	-6.	-0.003	282.11	1.972s
Co-56	4953.27	1238.28	17.	22.	0.012	48.85	1.984s
NA-22	5098.35	1274.53	11.	2.	0.001	295.97	2.008s
EU-154	5098.39	1274.54	13.	0.	0.000	1000.00	2.008s
FE-59	5166.65	1291.60	23.	-7.	-0.004	171.90	2.020s
TL-210	5252.32	1313.00	6.	7.	0.004	87.39	2.034s
CO-60	5330.37	1332.50	11.	-1.	-0.001	598.44	2.047s
AG-110M	5537.69	1384.30	11.	-4.	-0.002	188.42	2.082s
EU-152	5632.56	1408.00	0.	14.	0.008	27.98	2.097s
K-40	5843.10	1460.60	7.	361.	0.201	5.36	2.142
La-140	6385.95	1596.21	6.	2.	0.001	326.43	2.215s
SB-124	6765.35	1690.98	0.	7.	0.004	39.64	2.272s
BI-214	7059.65	1764.49	14.	4.	0.002	140.13	2.314s
Co-56	7087.11	1771.35	8.	0.	0.000	1000.00	2.318s
Y-88	7346.20	1836.06	0.	5.	0.003	48.67	2.354s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-3.5128E+00				5.31E+01	
			477.60	-3.513E+00	?(	1.192E+01 1.01E+02 1.05E+01	G
NA-22	C	8.5128E-02				9.50E+02	
			1274.53	8.513E-02	?(	9.397E-01 2.96E+02 9.99E+01	G
K-40	N	1.9296E+02				4.66E+11	
			1460.83	1.930E+02	(P	7.896E+00 5.36E+00 1.07E+01	G
Sc-46	F	3.9224E-01				8.38E+01	
			889.28	3.922E-01	?(P	1.413E+00 1.06E+02 1.00E+02	G
			1120.55	-3.239E-01	-	2.261E+00 2.04E+02 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	-2.4000E+00					2.77E+01	
			320.08	-2.400E+00	&(P	9.481E+00	9.48E+01	9.94E+00 G
MN-54	C	4.8241E-01					3.12E+02	
			834.85	4.824E-01	?(	4.809E-01	4.64E+01	1.00E+02 G
FE-59	F	1.1114E-01					4.45E+01	
			1099.25	1.111E-01	&(P	1.958E+00	7.66E+02	5.65E+01 G
			1291.60	-7.962E-01	+	2.973E+00	1.72E+02	4.32E+01 G
Co-56	C	6.6537E-01					7.73E+01	
			846.77	0.000E+00	&(	9.636E-01	1.00E+03	9.99E+01 G
			1238.28	1.661E+00	&(	1.655E+00	4.89E+01	6.61E+01 G
			1037.84	7.161E-01	?(	8.217E+00	5.07E+02	1.41E+01 G
			1771.35	0.000E+00	-	6.870E+00	1.00E+03	1.55E+01 A
CO-57	C	2.5751E-01					2.72E+02	
			122.06	2.575E-01	&(	7.254E-01	8.44E+01	8.56E+01 G
			136.47	0.000E+00	-	1.180E+01	1.00E+03	1.07E+01 G
CO-58	C	-6.9256E-01					7.09E+01	
			810.78	-6.926E-01	?(	1.857E+00	8.04E+01	9.95E+01 G
CO-60	F	-7.0552E-02					1.93E+03	
			1332.50	-7.055E-02	?(	9.735E-01	5.98E+02	1.00E+02 G
			1173.24	-6.406E-01	+ P	1.493E+00	6.18E+01	9.99E+01 G
ZN-65	F	-1.6933E+00					2.44E+02	
			1115.55	-1.693E+00	?(	4.551E+00	8.06E+01	5.06E+01 G
NB-94	I	-6.5031E-01					7.41E+06	
			702.63	-6.503E-01	?(	1.832E+00	8.44E+01	9.79E+01 G
			871.10	0.000E+00	+	8.921E-01	1.00E+03	9.99E+01 G
ZR-95	I	4.3665E-01					6.40E+01	
			756.73	4.367E-01	&(	1.761E+00	1.76E+02	5.45E+01 G
			724.20	-1.433E+00	+	3.744E+00	7.84E+01	4.42E+01 G
NB-95	I	5.5147E-01					6.40E+01	
			765.79	5.515E-01	?(	1.420E+00	7.71E+01	9.98E+01 G
RU-103	I	-2.1018E-02					3.93E+01	
			497.05	-2.102E-02	%(P	8.775E-01	1.61E+03	9.09E+01 G
			610.30	0.000E+00	+	3.688E+01	1.00E+03	5.75E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RH-106	I	1.1943E-01					3.74E+02	
			621.92	1.194E-01	%(P	2.164E+01	5.30E+03	9.93E+00 G
			1050.36	-2.895E+01	+ P	8.309E+01	1.07E+02	1.56E+00 G
			511.86	1.079E+01	?	5.535E+00	1.82E+01	2.00E+01 GA
AG-108M	C	1.5044E-01					1.53E+05	
			433.94	1.504E-01	?(P	7.535E-01	2.04E+02	9.05E+01 G
			722.94	-5.853E-02	+	1.628E+00	7.97E+02	9.08E+01 G
			614.28	0.000E+00	&	2.372E+00	1.00E+03	8.98E+01 G
AG-110M	F	2.6584E-01					2.50E+02	
			884.68	-2.935E-02	&(P	2.547E+00	1.02E+03	7.27E+01 G
			657.76	3.351E-01	(P	1.179E+00	1.04E+02	9.46E+01 G
			937.49	6.994E-01	?(	2.034E+00	1.23E+02	3.44E+01 G
			1384.30	-9.733E-01	+	4.132E+00	1.88E+02	2.43E+01 G
			763.94	-2.806E+00	+ P	6.500E+00	5.91E+01	2.23E+01 G
SN-113	F	-1.6998E-01					1.15E+02	
			391.69	-1.700E-01	(	1.879E+00	3.23E+02	6.40E+01 G
SB-124	F	5.2743E-01					6.02E+01	
			602.73	3.395E-01	?(	2.036E+00	1.77E+02	9.83E+01 G
			1690.98	9.137E-01	?(P	9.906E-01	3.96E+01	4.78E+01 G
			722.79	-4.769E+00	+	1.485E+01	9.27E+01	1.08E+01 G
SB-125	I	1.1671E+00					1.01E+03	
			427.88	2.885E-01	?(	1.238E+00	1.65E+02	2.96E+01 G
			600.50	1.809E+00	?(P	1.088E+01	1.78E+02	1.79E+01 G
			635.89	5.269E-01	?(	7.210E+00	3.81E+02	1.13E+01 G
			463.37	3.247E+00	(	8.548E+00	7.87E+01	1.05E+01 G
I-131	I	3.6013E-01					8.02E+00	
			364.48	2.417E-01	?(P	8.199E-01	1.35E+02	8.17E+01 G
			284.30	7.364E-01	&(P	1.155E+01	6.20E+02	6.14E+00 G
			636.97	1.387E+00	?(	1.151E+01	2.34E+02	7.17E+00 G
Ga-68	C	1.2716E+01					4.71E-02	
			1077.40	1.272E+01	&(	3.394E+01	1.19E+02	3.30E+00 G
BA-133	F	-5.4608E-01					3.85E+03	
			356.00	-5.461E-01	?(	2.561E+00	1.40E+02	6.20E+01 G
			302.85	0.000E+00	+	9.780E+00	1.00E+03	1.83E+01 G
			383.84	2.893E+00	? P	1.019E+01	1.04E+02	8.94E+00 GA
			80.99	-1.096E+00	+	5.221E+00	1.43E+02	3.41E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	I	6.9184E-01					7.54E+02	
			795.87	4.754E-01	?(	1.266E+00	7.93E+01	8.55E+01 G
			604.71	3.100E-01	?(	2.109E+00	2.01E+02	9.76E+01 G
			569.32	-1.785E-01	-	5.873E+00	9.22E+02	1.54E+01 G
			801.95	4.720E+00	?(	1.323E+01	8.33E+01	8.69E+00 G
			563.24	3.181E+00	?(P	7.526E+00	9.98E+01	8.35E+00 G
CS-137	I	2.3416E-01					1.10E+04	
			661.66	2.342E-01	?(	1.337E+00	1.65E+02	8.52E+01 G
CE-139	F	-3.6755E-01					1.38E+02	
			165.85	-3.675E-01	&(	1.167E+00	9.52E+01	7.99E+01 G
Ba-140	I	1.3154E+00					1.28E+01	
			537.26	5.924E-01	?(P	2.880E+00	1.95E+02	2.44E+01 G
			162.66	4.150E+00	?(	1.298E+01	9.36E+01	6.22E+00 G
			304.85	0.000E+00	-	4.198E+01	1.00E+03	4.29E+00 G
La-140	I	1.1999E-01					1.28E+01	
			1596.21	1.200E-01	?(P	9.150E-01	3.26E+02	9.54E+01 G
			487.02	-1.242E-01	+	1.630E+00	5.27E+02	4.55E+01 G
			328.76	-1.743E+00	&	8.635E+00	1.48E+02	2.03E+01 G
			815.77	-2.980E+00	&	8.606E+00	8.64E+01	2.33E+01 G
CE-141	I	5.5216E-01					3.25E+01	
			145.44	5.522E-01	?(	2.567E+00	1.39E+02	4.82E+01 G
PM-144	C	-5.5860E-01					3.63E+02	
			696.54	-5.586E-01	?(	1.499E+00	8.04E+01	9.90E+01 G
			618.06	0.000E+00	+	2.160E+00	1.00E+03	9.91E+01 G
EU-152	F	4.2160E-01					4.94E+03	
			121.78	-9.039E-01	&(	2.715E+00	9.01E+01	2.86E+01 G
			344.29	-5.500E-01	&	6.143E+00	3.30E+02	2.65E+01 G
			1112.07	-6.256E+00	&	1.821E+01	8.71E+01	1.36E+01 G
			778.92	-3.489E+00	+	8.637E+00	1.10E+02	1.29E+01 G
			964.11	3.015E+00	?(	1.182E+01	1.15E+02	1.46E+01 G
			244.69	-4.029E+00	+	2.575E+01	1.91E+02	7.58E+00 G
			1408.00	3.581E+00	? P	1.941E+00	2.80E+01	2.10E+01 GA
EU-154	I	9.3554E-01					3.14E+03	
			123.10	1.833E-01	(	1.633E+00	2.62E+02	4.08E+01 G
			1274.54	0.000E+00	-	2.830E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	7.249E+00	1.00E+03	2.02E+01 G
			873.23	-4.518E+00	+	9.713E+00	6.51E+01	1.23E+01 G
			1004.77	-4.690E+00	+	8.625E+00	8.61E+01	1.80E+01 G
			996.33	3.830E+00	&(	1.456E+01	1.12E+02	1.06E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

HF-181   F   5.1118E-02                                     4.24E+01
                          482.00-1.082E-02 %(  1.667E+00 4.45E+03 8.05E+01 G
                          133.02-4.305E-02 %   2.881E+00 1.99E+03 4.33E+01 G
                          345.83 3.820E-01 &(  1.102E+01 8.50E+02 1.51E+01 G
                          136.30 0.000E+00 &   2.153E+01 1.00E+03 5.85E+00 G

Hg-203   F   3.5416E-01                                     4.66E+01
                          279.20 3.542E-01 ?(  9.601E-01 8.12E+01 8.15E+01 G

TL-208   N   4.6231E+00                                     6.98E+02
                          583.02 4.623E+00 *(P 6.693E-01 1.01E+01 8.45E+01 G
                          277.28-1.156E+00 & P 1.284E+01 2.41E+02 6.31E+00 G
                          860.56 8.844E+00 + P 2.224E+00 1.90E+01 1.24E+01 G

PM-146   C   3.8175E-01                                     2.02E+03
                          453.88 3.818E-01 ?(  8.735E-01 9.42E+01 6.50E+01 G
                          747.16-2.969E-01 -   2.708E+00 3.79E+02 3.40E+01 G
                          735.72-9.853E-01 +   4.337E+00 1.86E+02 2.25E+01 G

Y-88     F   3.2850E-01                                     1.07E+02
                         1836.06 3.285E-01 ?(P 5.109E-01 4.87E+01 9.92E+01 G
                          898.04-1.525E-01 - P 9.884E-01 2.96E+02 9.37E+01 G

Cd-113m      3.8478E+03                                     5.33E+03
                          263.70 3.848E+03 ?(  1.050E+04 8.15E+01 6.00E-03   K

Cf-251   T  -1.7712E+00                                     3.28E+05
                          176.60-1.771E+00 ?(  4.249E+00 9.41E+01 1.70E+01 G
                          227.00 1.371E+00 +   1.083E+01 3.16E+02 6.30E+00 GA

Cf-249   T  -5.5753E-01                                     1.28E+05
                          387.95-5.575E-01 ?(  1.856E+00 9.93E+01 6.60E+01 G
                          333.44-2.312E+00 +   1.114E+01 1.44E+02 1.55E+01 G

Sn-126       1.4732E+00                                     3.65E+07
                           87.57 1.473E+00 }   4.503E+00 3.92E+01 3.75E+01 GA
                           64.28 1.473E+00  (  1.409E+01 2.84E+02 9.70E+00 G
                           86.94-3.240E+00 +   1.983E+01 1.84E+02 9.04E+00 GA

PB-210   N   9.8570E+00                                     8.14E+03
                           46.54 9.857E+00 *(P 3.422E+01 1.04E+02 4.25E+00 G

PB-212   N   1.4374E+01                                     6.98E+02
                          238.63 1.437E+01  (P 1.280E+00 5.50E+00 4.33E+01 G
                          300.03 1.027E+01 -   1.775E+01 5.33E+01 3.28E+00 GA
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	8.3152E+00					5.84E+05	
			351.93	8.842E+00	@(P	1.752E+00	1.14E+01	3.76E+01 G
			295.09	7.288E+00	(P	2.668E+00	1.50E+01	1.93E+01 G
			242.00	1.168E+01	+	8.833E+00	2.52E+01	7.43E+00 GA
BI-207	C	2.9673E-01					1.18E+04	
			1063.66	2.967E-01	?(	1.267E+00	1.87E+02	7.45E+01 G
			569.70	-6.088E-03	% P	9.369E-01	4.31E+03	9.77E+01 G
BI-212	N	7.8971E+00					6.98E+02	
			727.17	7.897E+00	?(	2.474E+01	9.35E+01	7.55E+00 G
			785.42	2.457E+01	?	1.131E+02	1.35E+02	1.28E+00 GA
U-235	N	3.6108E-01					2.57E+11	
			143.79	0.000E+00	?(	1.175E+01	1.00E+03	1.10E+01 G
			205.33	-6.551E+00	+ P	1.620E+01	8.26E+01	5.01E+00 G
			163.38	1.140E+00	?(	1.677E+01	4.32E+02	5.08E+00 G
			185.72	5.530E-01		1.349E+00	9.55E+01	5.40E+01 GA
BI-214	N	5.8473E+00					5.84E+05	
			609.31	5.847E+00	(P	1.588E+00	1.50E+01	4.61E+01 G
			1120.29	9.034E+00	+ P	4.943E+00	2.79E+01	1.51E+01 G
			1764.49	1.772E+00	- P	8.780E+00	1.40E+02	1.54E+01 G
BI-210M	T	-6.7516E-01					1.10E+09	
			265.83	-6.752E-01	?(P	1.927E+00	1.09E+02	5.00E+01 G
			304.90	0.000E+00	+	6.432E+00	1.00E+03	2.80E+01 G
AC-228	N	1.4105E+01					2.10E+03	
			911.07	1.378E+01	(	9.956E-01	9.90E+00	2.90E+01 G
			968.97	1.098E+01	-	3.398E+00	1.83E+01	1.75E+01 G
			338.32	1.489E+01	(	3.813E+00	1.39E+01	1.20E+01 G
			93.35	2.364E+01	+	9.822E+00	1.98E+01	5.56E+00 XA
TH-227	N	6.2552E-01					7.95E+03	
			256.24	-2.231E+00	?(	1.141E+01	2.06E+02	7.00E+00 G
			235.97	2.251E+00	&(	1.510E+01	2.00E+02	1.23E+01 G
			50.14	-2.137E+00	&	1.757E+01	2.43E+02	8.00E+00 G
TH-229	N	5.7841E+00					2.68E+06	
			193.51	5.784E+00	?(P	1.453E+01	1.02E+02	4.40E+00 G
			210.85	-5.503E+00	-	2.861E+01	2.11E+02	2.99E+00 G
TH-234	N	3.8330E+00					1.63E+12	
			92.59	-1.472E-06	%(	2.892E+01	5.85E+08	5.58E+00 G
			63.29	9.451E+00	(	3.319E+01	1.05E+02	3.81E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-231	N	-9.4768E+00					1.20E+07	
			302.65	-9.477E+00	?(	6.324E+01	1.99E+02	2.88E+00 G
			300.07	-1.357E+01	+	7.645E+01	1.68E+02	2.46E+00 G
PA-233	C	-3.8501E-02					7.82E+08	
			312.01	-3.850E-02	&(P	5.087E+00	1.59E+03	3.60E+01 G
			300.18	-5.387E+00	+	2.978E+01	1.65E+02	6.20E+00 G
PA-234	N	-1.4550E+00					1.63E+12	
			131.29	-1.455E+00	?(	6.763E+00	1.39E+02	1.80E+01 G
			946.02	-4.515E+00	+	8.499E+00	8.43E+01	1.34E+01 G
			569.47	-1.189E+00	+ P	1.155E+01	2.40E+02	8.20E+00 G
			883.24	-1.920E+00	+	1.874E+01	2.83E+02	9.60E+00 G
			880.53	-1.008E+01	+	2.733E+01	8.11E+01	6.00E+00 GA
PA-234M	N	3.7357E+01					1.63E+12	
			1001.00	-1.545E+00	&(P	2.004E+02	3.57E+03	8.37E-01 G
			766.41	1.481E+02	?(	3.546E+02	7.19E+01	2.94E-01 G
AM-241	T	9.8522E-01					1.58E+05	
			59.54	9.852E-01	(P	3.901E+00	1.18E+02	3.59E+01 G
Np-237	F	6.8756E+00					2.14E+06	
			86.49	6.876E+00	(	4.496E+00	2.19E+01	1.31E+01 G
Ir-192	F	3.0581E-01					7.40E+01	
			316.49	4.027E-01	?(	2.051E+00	1.52E+02	8.70E+01 G
			468.06	1.428E-01	?(	2.063E+00	4.16E+02	5.18E+01 G
			308.44	0.000E+00	-	5.718E+00	1.00E+03	3.18E+01 G
Cs-136	F	2.6011E-01					1.30E+01	
			818.50	2.351E-01	?(	1.928E+00	2.39E+02	1.00E+02 G
			1048.07	2.914E-01	?(	9.795E-01	9.68E+01	8.00E+01 G
			340.57	-7.800E-01	+	3.643E+00	1.39E+02	4.69E+01 G
Np-239	T	-1.2842E+00					2.36E+00	
			103.70	0.000E+00	+	6.538E+00	1.00E+03	2.40E+01 X
			106.13	-1.284E+00	?(	7.055E+00	1.65E+02	2.27E+01 G
			99.50	0.000E+00	+	1.054E+01	1.00E+03	1.50E+01 X
Nd-147		-2.7416E+00					1.11E+01	
			531.00	-2.742E+00	?(	6.998E+00	1.07E+02	1.30E+01 G
			91.10	-7.122E-01	+	5.793E+00	2.44E+02	2.83E+01 G
TL-210	N	-2.5124E-01					5.84E+05	
			799.60	-2.512E-01	?(	1.432E+00	1.66E+02	9.90E+01 G
			296.00	-4.174E-01	+	2.401E+00	1.72E+02	7.90E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1313.00	1.762E+00	?	3.436E+00	8.74E+01	2.10E+01 GA

(- 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	193.	19.	0.011	103.68	9.857E+00	P
TH-227	50.14	230.	-9.	-0.005	242.62	-2.137E+00	
AM-241	59.54	369.	23.	0.013	118.49	9.852E-01	P
TH-234	63.29	345.	25.	0.014	105.24	9.451E+00	
BA-133	80.99	1063.	-32.	-0.018	143.14	-1.096E+00	
EU-155	86.54	1195.	-26.	-0.015	185.73	-9.561E-01	
Nd-147	91.10	1016.	-19.	-0.010	243.53	-7.122E-01	
Np-239	106.13	1046.	-28.	-0.016	164.86	-1.284E+00	
EU-152	121.78	235.	-25.	-0.014	90.10	-9.039E-01	
CO-57	122.06	147.	21.	0.012	84.45	2.575E-01	
EU-154	123.10	170.	7.	0.004	261.54	1.833E-01	
PA-234	131.29	573.	-25.	-0.014	139.18	-1.455E+00	
CE-141	145.44	546.	24.	0.013	139.19	5.522E-01	
Ba-140	162.66	197.	22.	0.012	93.64	4.150E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
U-235	163.38	219.	5.	0.003	431.87	1.140E+00		
CE-139	165.85	272.	-25.	-0.014	95.23	-3.675E-01		
Cf-251	176.60	147.	-25.	-0.014	94.08	-1.771E+00		
U-235	185.72	139.	24.	0.013	95.55	5.530E-01		
TH-229	193.51	100.	20.	0.011	102.30	5.784E+00		P
U-235	205.33	152.	-24.	-0.014	82.60	-6.551E+00		P
TH-229	210.85	164.	-12.	-0.007	210.93	-5.503E+00		
Cf-251	227.00	92.	6.	0.003	315.64	1.371E+00		
TH-227	235.97	696.	19.	0.010	200.45	2.251E+00		
EU-152	244.69	734.	-20.	-0.011	191.24	-4.029E+00		
TH-227	256.24	108.	-10.	-0.006	205.91	-2.231E+00		
Cd-113m	263.70	62.	14.	0.008	81.46	3.848E+03		
BI-210M	265.83	152.	-21.	-0.012	109.13	-6.752E-01		P
I-131	284.30	72.	3.	0.001	619.73	7.364E-01		P
TL-210	296.00	531.	-19.	-0.011	171.80	-4.174E-01		
PA-231	300.07	512.	-19.	-0.011	168.21	-1.357E+01		
PA-233	300.18	493.	-19.	-0.011	165.08	-5.387E+00		
PA-231	302.65	474.	-16.	-0.009	198.86	-9.477E+00		
Ir-192	316.49	427.	19.	0.011	152.04	4.027E-01		
CR-51	320.08	111.	-13.	-0.007	94.83	-2.400E+00		P
La-140	328.76	389.	-19.	-0.011	147.80	-1.743E+00		
Cf-249	333.44	370.	-19.	-0.011	143.73	-2.312E+00		
Cs-136	340.57	351.	-19.	-0.011	139.35	-7.800E-01		
EU-152	344.29	313.	-8.	-0.004	330.16	-5.500E-01		
HF-181	345.83	324.	3.	0.002	850.49	3.820E-01		
BA-133	356.00	284.	-17.	-0.010	139.68	-5.461E-01		
I-131	364.48	44.	10.	0.006	134.87	2.417E-01		P
BA-133	383.84	79.	13.	0.007	104.35	2.893E+00		P
Cf-249	387.95	145.	-18.	-0.010	99.28	-5.575E-01		
SN-113	391.69	138.	-5.	-0.003	322.62	-1.700E-01		
SB-125	427.88	9.	4.	0.002	165.03	2.885E-01		
AG-108M	433.94	35.	6.	0.003	203.58	1.504E-01		P
PM-146	453.88	22.	11.	0.006	94.21	3.818E-01		
SB-125	463.37	57.	14.	0.008	78.72	3.247E+00		
Ir-192	468.06	82.	3.	0.002	415.90	1.428E-01		
BE-7	477.60	112.	-15.	-0.009	100.91	-3.513E+00		
La-140	487.02	35.	-2.	-0.001	527.46	-1.242E-01		
RH-106	511.86	77.	85.	0.047	18.19	1.079E+01		
Nd-147	531.00	48.	-14.	-0.008	106.61	-2.742E+00		
Ba-140	537.26	27.	5.	0.003	195.25	5.924E-01		P
CS-134	563.24	19.	10.	0.005	99.81	3.181E+00		P
CS-134	569.32	42.	-1.	-0.001	921.95	-1.785E-01		
PA-234	569.47	47.	-4.	-0.002	240.37	-1.189E+00		P
SB-125	600.50	196.	11.	0.006	177.73	1.809E+00		P
SB-124	602.73	208.	12.	0.006	177.39	3.395E-01		
CS-134	604.71	219.	11.	0.006	201.08	3.100E-01		
SB-125	635.89	28.	2.	0.001	380.79	5.269E-01		
I-131	636.97	29.	3.	0.002	233.67	1.387E+00		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-110M	657.76	53.	10.	0.006	103.67	3.351E-01	P
CS-137	661.66	54.	6.	0.004	165.34	2.342E-01	
PM-144	696.54	88.	-17.	-0.010	80.36	-5.586E-01	
NB-94	702.63	130.	-20.	-0.011	84.38	-6.503E-01	
SB-124	722.79	98.	-16.	-0.009	92.75	-4.769E+00	
AG-108M	722.94	83.	-2.	-0.001	797.20	-5.853E-02	
ZR-95	724.20	104.	-19.	-0.011	78.40	-1.433E+00	
PM-146	735.72	33.	-7.	-0.004	185.94	-9.853E-01	
PM-146	747.16	28.	-3.	-0.002	378.59	-2.969E-01	
ZR-95	756.73	30.	7.	0.004	176.13	4.367E-01	
AG-110M	763.94	72.	-18.	-0.010	59.07	-2.806E+00	P
NB-95	765.79	69.	16.	0.009	77.15	5.515E-01	
PA-234M	766.41	35.	13.	0.007	71.88	1.481E+02	
EU-152	778.92	40.	-13.	-0.007	110.49	-3.489E+00	
CS-134	795.87	36.	12.	0.006	79.35	4.754E-01	
TL-210	799.60	64.	-7.	-0.004	165.61	-2.512E-01	
CS-134	801.95	40.	12.	0.006	83.29	4.720E+00	
CO-58	810.78	110.	-19.	-0.011	80.41	-6.926E-01	
La-140	815.77	129.	-19.	-0.011	86.43	-2.980E+00	
Cs-136	818.50	119.	7.	0.004	239.43	2.351E-01	
EU-154	873.23	38.	-15.	-0.008	65.11	-4.518E+00	
PA-234	880.53	75.	-16.	-0.009	81.10	-1.008E+01	
PA-234	883.24	91.	-5.	-0.003	282.82	-1.920E+00	
Sc-46	889.28	53.	10.	0.006	106.09	3.922E-01	P
Y-88	898.04	21.	-4.	-0.002	295.57	-1.525E-01	P
AG-110M	937.49	10.	6.	0.003	122.85	6.994E-01	
PA-234	946.02	30.	-15.	-0.008	84.33	-4.515E+00	
EU-152	964.11	72.	11.	0.006	115.39	3.015E+00	
EU-154	996.33	53.	10.	0.005	111.58	3.830E+00	
EU-154	1004.77	53.	-20.	-0.011	86.06	-4.690E+00	
Co-56	1037.84	27.	2.	0.001	507.29	7.161E-01	
Cs-136	1048.07	11.	5.	0.003	96.82	2.914E-01	
RH-106	1050.36	33.	-10.	-0.006	106.74	-2.895E+01	P
BI-207	1063.66	16.	5.	0.003	187.26	2.967E-01	
Ga-68	1077.40	16.	8.	0.004	119.02	1.272E+01	
FE-59	1099.25	22.	1.	0.001	765.65	1.111E-01	P
EU-152	1112.07	122.	-19.	-0.010	87.05	-6.256E+00	
ZN-65	1115.55	104.	-19.	-0.010	80.55	-1.693E+00	
Sc-46	1120.55	99.	-7.	-0.004	203.67	-3.239E-01	
CO-60	1173.24	37.	-13.	-0.007	61.82	-6.406E-01	P
Ta-182	1189.05	23.	-3.	-0.001	423.16	-7.949E-01	
Ta-182	1221.41	51.	-6.	-0.003	282.11	-1.096E+00	
Co-56	1238.28	17.	22.	0.012	48.85	1.661E+00	
NA-22	1274.53	11.	2.	0.001	295.97	8.513E-02	
FE-59	1291.60	23.	-7.	-0.004	171.90	-7.962E-01	
TL-210	1313.00	6.	7.	0.004	87.39	1.762E+00	
CO-60	1332.50	11.	-1.	-0.001	598.44	-7.055E-02	
AG-110M	1384.30	11.	-4.	-0.002	188.42	-9.733E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	1408.00	0.	14.	0.008	27.98	3.581E+00	P
La-140	1596.21	6.	2.	0.001	326.43	1.200E-01	P
SB-124	1690.98	0.	7.	0.004	39.64	9.137E-01	P
Y-88	1836.06	0.	5.	0.003	48.67	3.285E-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	-3.5128E+00	-3.5128E+00	1.009E+02%	1.19E+01
NA-22	#A	8.5128E-02	8.5128E-02	2.960E+02%	9.40E-01
K-40		1.9296E+02	1.9296E+02	5.363E+00%	7.90E+00
Sc-46	#A	3.9224E-01	3.9224E-01	1.061E+02%	1.41E+00
CR-51	#A	-2.4000E+00	-2.4000E+00	9.483E+01%	9.48E+00
MN-54	#	4.8240E-01	4.8241E-01	4.640E+01%	4.81E-01
FE-59	#A	1.1114E-01	1.1114E-01	7.657E+02%	1.96E+00
Co-56	#A	6.6537E-01	6.6537E-01	4.885E+01%	9.64E-01
CO-57	#A	2.5751E-01	2.5751E-01	8.445E+01%	7.25E-01
CO-58	#A	-6.9255E-01	-6.9256E-01	8.041E+01%	1.86E+00
CO-60	#A	-7.0552E-02	-7.0552E-02	5.984E+02%	9.74E-01
ZN-65	#A	-1.6933E+00	-1.6933E+00	8.055E+01%	4.55E+00
NB-94	#A	-6.5031E-01	-6.5031E-01	8.438E+01%	1.83E+00
ZR-95	#A	4.3665E-01	4.3665E-01	1.761E+02%	1.76E+00
NB-95	#A	5.5147E-01	5.5147E-01	7.715E+01%	1.42E+00
RU-103	#A	-2.1018E-02	-2.1018E-02	1.610E+03%	8.77E-01
RH-106	#A	1.1943E-01	1.1943E-01	5.299E+03%	2.16E+01
AG-108M	#A	1.5044E-01	1.5044E-01	2.036E+02%	7.54E-01
AG-110M	#A	2.6584E-01	2.6584E-01	1.037E+02%	2.55E+00
SN-113	#A	-1.6998E-01	-1.6998E-01	3.226E+02%	1.88E+00
SB-124	#A	5.2742E-01	5.2743E-01	3.964E+01%	2.04E+00
SB-125	#A	1.1671E+00	1.1671E+00	7.872E+01%	1.24E+00
I-131	#A	3.6010E-01	3.6013E-01	1.349E+02%	8.20E-01
Gd-153	#A	0.0000E+00	0.0000E+00	7.071E+02%	5.30E+00
Ga-68	#A	1.2576E+01	1.2716E+01	1.190E+02%	3.39E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.47E+00
BA-133	#A	-5.4608E-01	-5.4608E-01	1.397E+02%	2.56E+00
CS-134	#A	6.9184E-01	6.9184E-01	6.306E+01%	1.27E+00
CS-137	#A	2.3416E-01	2.3416E-01	1.653E+02%	1.34E+00
CE-139	#A	-3.6754E-01	-3.6755E-01	9.523E+01%	1.17E+00
Ba-140	#A	1.3153E+00	1.3154E+00	9.364E+01%	2.88E+00
La-140	#A	1.1999E-01	1.1999E-01	3.264E+02%	9.15E-01
CE-141	#A	5.5215E-01	5.5216E-01	1.392E+02%	2.57E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.13E+01
PM-144	#A	-5.5860E-01	-5.5860E-01	8.036E+01%	1.50E+00
EU-152	#A	4.2160E-01	4.2160E-01	7.320E+01%	2.72E+00

EU-154 #A	9.3554E-01	9.3554E-01	1.116E+02%		1.63E+00
EU-155 #A	0.0000E+00	0.0000E+00	1.000E+03%		7.38E+00
HF-181 #A	5.1118E-02	5.1118E-02	8.505E+02%		1.67E+00
Ta-182 #A	0.0000E+00	0.0000E+00	1.000E+03%		6.69E+00
Hg-203 #A	3.5416E-01	3.5416E-01	8.117E+01%		9.60E-01
TL-208	4.6230E+00	4.6231E+00	1.014E+01%		6.69E-01
PM-146 #A	3.8175E-01	3.8175E-01	9.421E+01%		8.73E-01
Y-88 #A	3.2850E-01	3.2850E-01	4.867E+01%		5.11E-01
Cd-113m#A	3.8478E+03	3.8478E+03	8.146E+01%		1.05E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		4.65E+01
Cf-251 #A	-1.7712E+00	-1.7712E+00	9.408E+01%		4.25E+00
Cf-249 #A	-5.5753E-01	-5.5753E-01	9.928E+01%		1.86E+00
Sn-126 A	1.4732E+00	1.4732E+00	2.839E+02%		1.41E+01
PB-210 #A	9.8570E+00	9.8570E+00	1.037E+02%		3.42E+01
PB-212	1.4374E+01	1.4374E+01	5.500E+00%		1.28E+00
PB-214	8.3152E+00	8.3152E+00	9.424E+00%		1.75E+00
BI-207 #A	2.9673E-01	2.9673E-01	1.873E+02%		1.27E+00
BI-212 #A	7.8971E+00	7.8971E+00	9.353E+01%		2.47E+01
U-235 #A	3.6108E-01	3.6108E-01	4.319E+02%		1.18E+01
BI-214	5.8473E+00	5.8473E+00	1.496E+01%		1.59E+00
BI-210M#A	-6.7516E-01	-6.7516E-01	1.091E+02%		1.93E+00
AC-228	1.4105E+01	1.4105E+01	8.529E+00%		9.96E-01
TH-227 #A	6.2552E-01	6.2552E-01	1.437E+02%		1.14E+01
TH-229 #A	5.7841E+00	5.7841E+00	1.023E+02%		1.45E+01
TH-234 #A	3.8330E+00	3.8330E+00	1.052E+02%		2.89E+01
PA-231 #A	-9.4768E+00	-9.4768E+00	1.989E+02%		6.32E+01
PA-233 #A	-3.8501E-02	-3.8501E-02	1.593E+03%		5.09E+00
PA-234 #A	-1.4550E+00	-1.4550E+00	1.392E+02%		6.76E+00
PA-234M#A	3.7357E+01	3.7357E+01	7.188E+01%		2.00E+02
AM-241 #A	9.8522E-01	9.8522E-01	1.185E+02%		3.90E+00
Np-237	6.8756E+00	6.8756E+00	2.186E+01%		4.50E+00
Ir-192 #A	3.0581E-01	3.0581E-01	1.520E+02%		2.05E+00
Cs-136 #A	2.6010E-01	2.6011E-01	9.682E+01%		1.93E+00
Np-239 #A	-1.2840E+00	-1.2842E+00	1.649E+02%		7.05E+00
Nd-147 #A	-2.7415E+00	-2.7416E+00	1.066E+02%		7.00E+00
TL-210 #A	-2.5124E-01	-2.5124E-01	1.656E+02%		1.43E+00
Kr-85 #A	0.0000E+00	0.0000E+00	1.000E+03%		3.67E+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 (25.1 to 1999.3 keV) 2.471E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.3 keV) 2.4710141E+02 Bq/Sample

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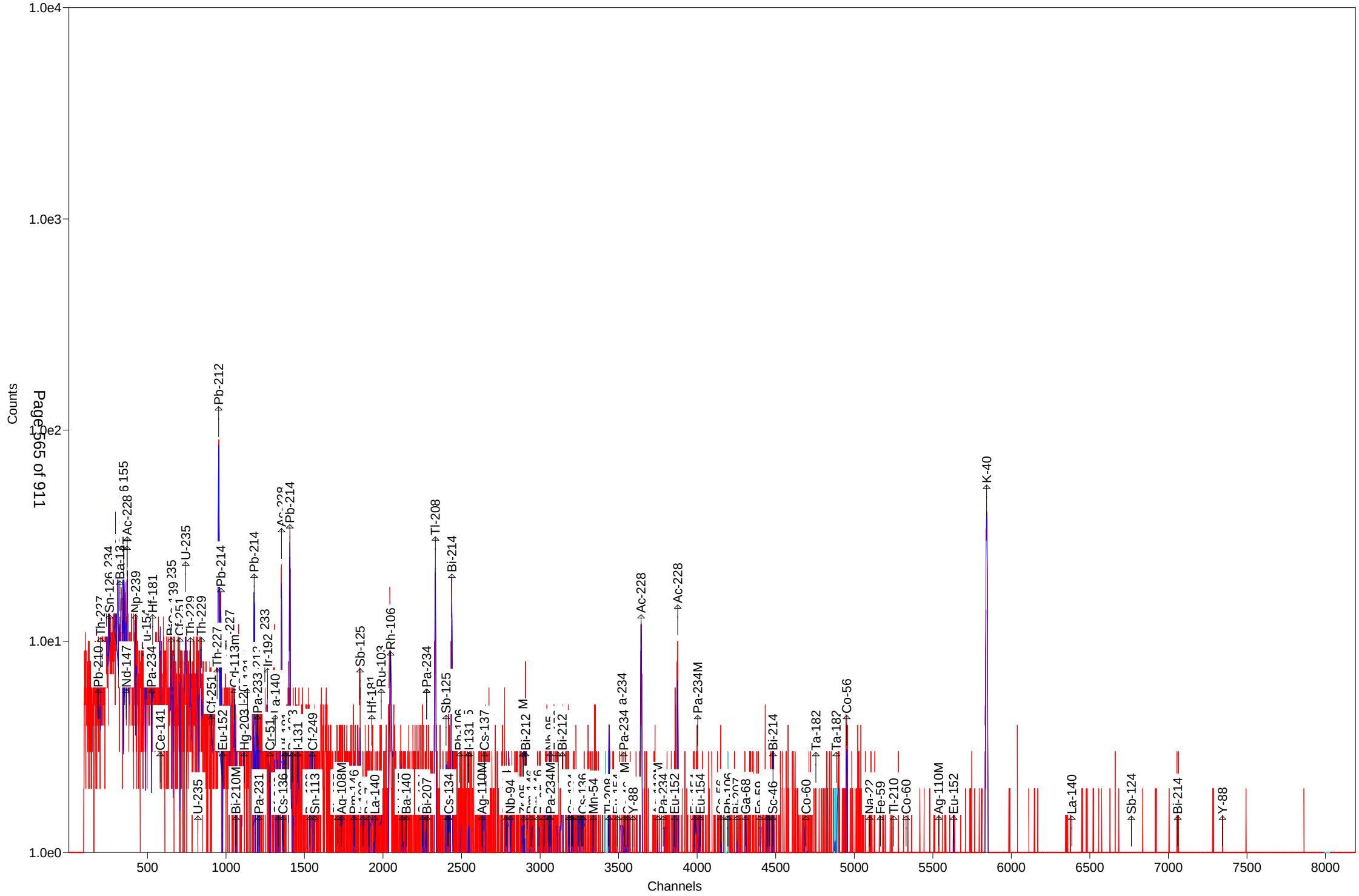
412881_Gamma_180-86110-A-14-A. 9_Gamma_20190341.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20190307

Sample Description: 412881_Gamma_180-86110-A-15-A
Detector: Detector #12
Batch ID: 412881
Work Order Number: Gamma
Lot Number: 180-86110-A-15-A

Decay to Time: 2/20/2019 10:47 Live Time: 1800 sec
Acquisition Time: 2/20/2019 10:47:47 Real Time: 1801 sec
Analysis Time: 2/20/2019 11:17 Dead Time: 0.08 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: Client_Long_Rev15.lib
Bkgd Correction File: 12_2019-01-20_1010.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-2.595E+00	174.1	4.517E+00	4.519E+00	1.545E+01
NA-22	-2.810E-01	154.1	4.330E-01	4.332E-01	1.540E+00
K-40	2.269E+02	5.7	1.289E+01	1.725E+01	5.395E+00
Sc-46	-4.405E-01	113.4	4.994E-01	4.999E-01	1.711E+00
CR-51	0.000E+00	1.#INF	1.073E+00	1.073E+00	2.248E+01
MN-54	-6.341E-01	108.9	6.904E-01	6.912E-01	1.603E+00
FE-59	6.259E-01	106.7	6.680E-01	6.688E-01	1.498E+00
Co-56	4.155E-01	93.9	3.900E-01	3.906E-01	9.066E-01
CO-57	-3.729E-01	105.0	3.913E-01	3.918E-01	1.309E+00
CO-58	-1.771E-01	283.6	5.022E-01	5.023E-01	1.762E+00
CO-60	8.439E-01	26.8	2.261E-01	2.300E-01	5.355E-01
ZN-65	1.152E+00	98.2	1.131E+00	1.132E+00	3.848E+00
NB-94	-5.717E-01	108.9	6.225E-01	6.231E-01	1.445E+00
ZR-95	0.000E+00	1.#INF	3.290E-01	3.290E-01	1.771E+00
NB-95	5.056E-02	759.5	3.840E-01	3.840E-01	1.386E+00
RU-103	0.000E+00	1.#INF	7.736E-02	7.736E-02	1.059E+00
RH-106	-6.968E-02	12735.8	8.874E+00	8.874E+00	3.037E+01
AG-108M	7.014E-02	591.6	4.149E-01	4.149E-01	1.076E+00
AG-110M	5.872E-01	54.7	3.214E-01	3.228E-01	1.813E+00
SN-113	-9.169E-02	793.7	7.278E-01	7.278E-01	2.513E+00
SB-124	0.000E+00	1.#INF	1.011E-01	1.011E-01	3.005E+00
SB-125	1.524E+00	83.4	1.271E+00	1.273E+00	2.902E+00
I-131	8.497E-01	37.2	3.158E-01	3.187E-01	7.257E-01
Gd-153	-9.982E-01	144.2	1.440E+00	1.441E+00	4.823E+00
Ga-68	1.829E+01	95.6	1.748E+01	1.751E+01	3.936E+01
Tc-99m	0.000E+00	1.#INF	1.716E-01	1.716E-01	1.815E+00
BA-133	-6.871E-01	135.5	9.309E-01	9.315E-01	3.133E+00
CS-134	1.489E+00	44.4	6.609E-01	6.653E-01	1.524E+00
CS-137	-2.595E-01	205.4	5.329E-01	5.331E-01	1.853E+00
CE-139	3.380E-01	106.7	3.606E-01	3.610E-01	1.212E+00
Ba-140	6.112E-01	265.0	1.619E+00	1.620E+00	4.045E+00
La-140	-6.162E-01	125.4	7.724E-01	7.731E-01	1.659E+00
CE-141	-6.014E-01	169.1	1.017E+00	1.017E+00	3.406E+00

CE-144	-7.443E-02	5561.4	4.140E+00	4.140E+00	1.401E+01
PM-144	4.859E-01	100.8	4.899E-01	4.905E-01	1.149E+00
EU-152	1.315E+00	62.9	8.278E-01	8.306E-01	3.748E+00
EU-154	1.594E+00	78.4	1.250E+00	1.252E+00	2.592E+00
EU-155	0.000E+00	1.#INF	9.062E-01	9.062E-01	6.915E+00
HF-181	3.704E-01	125.9	4.665E-01	4.669E-01	2.114E+00
Ta-182	1.716E+00	91.4	1.568E+00	1.571E+00	6.513E+00
Hg-203	0.000E+00	1.#INF	1.042E-01	1.042E-01	1.380E+00
TL-208	4.592E+00	11.6	5.332E-01	5.821E-01	7.047E-01
PM-146	9.673E-01	43.9	4.251E-01	4.279E-01	1.625E+00
Y-88	-2.546E-01	254.3	6.475E-01	6.477E-01	1.407E+00
Cd-113m	-6.179E+03	78.3	4.837E+03	4.850E+03	1.614E+04
Cd-109	0.000E+00	1.#INF	1.395E+01	1.395E+01	4.708E+01
Cf-251	-2.057E+00	107.1	2.203E+00	2.206E+00	5.639E+00
Cf-249	4.543E-01	107.0	4.860E-01	4.866E-01	2.419E+00
Sn-126	5.252E-01	1021.2	5.363E+00	5.363E+00	1.816E+01
PB-210	3.074E+01	44.3	1.362E+01	1.376E+01	3.460E+01
PB-212	1.530E+01	6.2	9.545E-01	1.244E+00	1.570E+00
PB-214	7.695E+00	13.5	1.040E+00	1.111E+00	2.094E+00
BI-207	2.468E-01	308.5	7.615E-01	7.616E-01	1.757E+00
BI-212	5.032E+00	149.9	7.542E+00	7.547E+00	2.584E+01
U-235	1.851E+00	104.8	1.940E+00	1.943E+00	1.444E+01
BI-214	1.103E+01	9.9	1.090E+00	1.226E+00	1.134E+00
BI-210M	6.316E-01	97.6	6.165E-01	6.174E-01	2.075E+00
AC-228	1.935E+01	9.3	1.803E+00	2.052E+00	1.391E+00
TH-227	3.372E+00	101.5	3.424E+00	3.428E+00	8.971E+00
TH-229	-9.771E-01	241.1	2.356E+00	2.357E+00	2.262E+01
TH-234	8.037E+00	49.6	3.990E+00	4.015E+00	1.759E+01
PA-231	0.000E+00	1.#INF	5.291E+00	5.292E+00	7.458E+01
PA-233	0.000E+00	1.#INF	2.563E-01	2.563E-01	6.106E+00
PA-234	2.037E+00	82.0	1.670E+00	1.673E+00	6.402E+00
PA-234M	6.456E+01	74.9	4.836E+01	4.847E+01	1.947E+02
AM-241	-1.320E+00	126.2	1.666E+00	1.668E+00	5.567E+00
Np-237	1.179E+00	343.9	4.056E+00	4.057E+00	1.363E+01
Ir-192	1.184E-01	243.0	2.876E-01	2.877E-01	2.553E+00
Cs-136	-7.460E-01	85.8	6.398E-01	6.412E-01	2.146E+00
Np-239	9.977E-01	114.5	1.142E+00	1.143E+00	3.845E+00
Nd-147	-4.555E+00	95.2	4.335E+00	4.343E+00	1.032E+01
TL-210	5.542E-01	85.5	4.737E-01	4.748E-01	1.597E+00
Kr-85	1.150E+02	121.1	1.392E+02	1.394E+02	4.699E+02
Total	5.535E+02				

Analyst: kody Saulters

Sample description
412881_Gamma_180-86110-A-15-A

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20190307.An1

Acquisition information

Start time:	2/20/2019 10:47:47 AM
Live time:	1800
Real time:	1801
Dead time:	0.08 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration

Filename:	12_Soil_TunaCan.Clb

12_TunaCan_108513

Energy Calibration

Created:	4/20/2018 11:13:27 AM
Zero offset:	0.059 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/20/2018 11:53:09 AM
Type:	Polynomial
Uncertainty:	1.020 %
Coefficients:	-0.363508 -4.707999 0.462125
	-0.051256 0.002384 -0.000043

Library Files

Main analysis library:	Client_Long_Rev15.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	100 (25.08keV)
Stop channel:	8000 (1999.13keV)
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	2/20/2019 10:47:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2019-01-20_1010.PBC 1/20/2019 10:10:35 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 23 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
46.65	42.	44.32	1.37	1.805E-02	46.54	4.250	PBC<MDA	PB210
63.30	33.	49.65	0.87	2.978E-02	63.29	3.810	PBC<MDA	TH234
74.73	131.	14.42	0.88	3.330E-02				
77.16	189.	10.82	0.88	3.387E-02				
86.33	10.	343.94	0.89	3.559E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	5.031E-01	EU155
86.78	3.	565.49	0.89	3.566E-02	86.54	30.700	PBC<MDA	EU155
					86.94	9.040	5.252E-01	Sn126
87.41	13.	134.68	0.89	3.575E-02	87.57	37.500	PBC<MDA	Sn126
92.58	9.	206.95	0.90	3.637E-02	92.59	5.584	PBC<MDA	TH234
93.34	5.	456.39	0.90	3.645E-02	93.35	5.561	PBC<MDA	AC228
106.13	15.	114.45	0.91	3.729E-02	106.13	22.700	PBC<MDA	Np239
123.10	11.	191.18	0.93	3.721E-02	123.10	40.790	PBC<MDA	EU154
129.22	50.	27.42	0.79	3.694E-02				
131.29	16.	139.49	0.94	3.683E-02	131.29	18.000	PBC<MDA	PA234
165.85	17.	106.68	0.97	3.405E-02	165.85	79.900	PBC<MDA	CE139
185.72	22.	89.28	0.99	3.215E-02	185.72	54.000	PBC<MDA	U235
205.33	16.	104.85	1.01	3.030E-02	205.33	5.010	PBC<MDA	U235
210.85	5.	436.71	1.02	2.980E-02	210.85	2.990	PBC<MDA	TH229
238.44	296.	8.94	0.87	2.744E-02	238.63	43.300	1.386E+01	PB212
241.89	47.	27.11	1.05	2.716E-02	242.00	7.430	1.296E+01	PB214
256.24	11.	101.53	1.06	2.608E-02	256.24	7.000	PBC<MDA	TH227
265.46	14.	97.62	1.07	2.539E-02	265.83	50.000	PBC<MDA	BI210M
277.21	28.	43.06	0.56	2.462E-02	277.28	6.310	1.001E+01	TL208
294.78	63.	23.38	0.78	2.352E-02	295.09	19.300	7.717E+00	PB214
300.31	28.	32.04	1.08	2.321E-02	300.03	3.280	2.044E+01	PB212
					300.07	2.460	2.725E+01	PA231

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					300.18	6.200	1.081E+01	PA233
333.44	14.	106.97	1.14	2.142E-02	333.44	15.510	PBC<MDA	Cf249
338.10	66.	17.67	1.27	2.118E-02	338.32	12.010	1.441E+01	AC228
345.83	13.	125.95	1.15	2.083E-02	345.83	15.070	PBC<MDA	HF181
351.63	107.	13.55	1.07	2.057E-02	351.93	37.600	7.683E+00	PB214
364.48	25.	37.17	1.17	2.001E-02	364.48	81.700	8.497E-01	I131
428.08	7.	152.75	1.23	1.770E-02	427.88	29.600	PBC<MDA	SB125
433.94	2.	591.61	1.24	1.751E-02	433.94	90.480	PBC<MDA	AG108M
453.88	10.	127.80	1.26	1.692E-02	453.88	65.000	PBC<MDA	PM146
463.28	11.	83.39	1.27	1.666E-02	463.37	10.470	PBC<MDA	SB125
468.06	5.	243.01	1.27	1.653E-02	468.06	51.750	PBC<MDA	Ir192
511.86	68.	22.21	2.56	1.546E-02	511.86	20.000	1.222E+01	RH106
513.98	14.	121.10	1.31	1.541E-02	513.98	0.430	PBC<MDA	Kr85
537.26	4.	264.97	1.34	1.491E-02	537.26	24.390	PBC<MDA	Ba140
563.24	11.	94.87	1.36	1.439E-02	563.24	8.350	PBC<MDA	CS134
569.32	10.	70.95	1.37	1.428E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.512E+00	PA234
					569.70	97.740	3.786E-01	BI207
569.47	4.	171.73	1.37	1.428E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.132E+00	PA234
					569.70	97.740	1.789E-01	BI207
583.19	98.	11.61	1.21	1.403E-02	583.02	84.500	4.592E+00	TL208
600.70	7.	281.11	1.40	1.373E-02	600.50	17.860	PBC<MDA	SB125
609.21	124.	9.88	1.22	1.358E-02	609.31	46.090	1.103E+01	BI214
657.76	10.	84.54	1.45	1.284E-02	657.76	94.640	PBC<MDA	AG110M
696.54	11.	100.83	1.49	1.232E-02	696.54	99.000	PBC<MDA	PM144
727.17	8.	149.89	1.52	1.194E-02	727.17	7.550	PBC<MDA	BI212
735.72	13.	43.95	1.52	1.184E-02	735.72	22.500	2.780E+00	PM146
747.16	5.	224.40	1.53	1.171E-02	747.16	34.000	PBC<MDA	PM146
763.94	8.	69.78	1.55	1.152E-02	763.94	22.280	PBC<MDA	AG110M
765.79	1.	759.53	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.717E+01	PA234M
766.41	5.	110.23	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	8.872E+01	PA234M
795.87	10.	77.47	1.58	1.119E-02	795.87	85.530	PBC<MDA	CS134
799.60	11.	85.48	1.58	1.115E-02	799.60	98.960	PBC<MDA	TL210
801.26	10.	107.21	1.58	1.113E-02	801.95	8.690	PBC<MDA	CS134
846.77	8.	93.86	1.63	1.070E-02	846.77	99.935	PBC<MDA	Co56
860.66	2.	554.15	1.64	1.057E-02	860.56	12.420	PBC<MDA	TL208
873.23	6.	110.41	1.65	1.046E-02	873.23	12.270	PBC<MDA	EU154
880.53	6.	89.80	1.66	1.040E-02	880.53	6.000	PBC<MDA	PA234
883.24	6.	107.25	1.66	1.038E-02	883.24	9.600	PBC<MDA	PA234
884.68	6.	122.25	1.66	1.036E-02	884.68	72.680	PBC<MDA	AG110M
911.16	99.	10.05	1.24	1.015E-02	911.07	29.000	1.869E+01	AC228
964.11	9.	134.45	1.73	9.739E-03	964.11	14.605	PBC<MDA	EU152
969.07	62.	15.70	1.74	9.703E-03	968.97	17.460	2.043E+01	AC228
996.33	9.	81.09	1.76	9.508E-03	996.33	10.600	PBC<MDA	EU154
1001.00	8.	101.47	1.76	9.476E-03	1001.00	0.837	PBC<MDA	PA234M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1048.07	5.	103.83	1.81	9.162E-03	1048.07	80.000	PBC<MDA	Cs136
1063.66	3.	308.52	1.82	9.063E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	8.	95.58	1.83	8.978E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	5.	121.64	1.85	8.846E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	9.	86.50	1.86	8.770E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	9.	98.15	1.87	8.750E-03	1115.55	50.600	PBC<MDA	ZN65
1121.30	9.	113.54	1.87	8.716E-03				
1122.29	9.	104.20	1.87	8.722E-03	1120.29	15.100	PBC<MDA	BI214
1173.24	16.	41.96	1.92	8.426E-03	1173.24	99.900	1.034E+00	CO60
1221.41	7.	143.21	1.96	8.175E-03	1221.41	27.000	PBC<MDA	Ta182
1291.60	5.	175.40	2.02	7.834E-03	1291.60	43.200	PBC<MDA	FE59
1313.00	7.	87.32	2.04	7.735E-03	1313.00	21.000	PBC<MDA	TL210
1332.50	9.	33.33	2.05	7.647E-03	1332.50	99.980	6.540E-01	CO60
1460.59	310.	5.68	1.89	7.112E-03	1460.83	10.670	2.269E+02	K40
1764.49	10.	31.24	2.40	6.075E-03	1764.49	15.400	6.084E+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
298.49	74.74	113.	131.	3.934E+03	14.42	0.880	- D
308.18	77.16	114.	189.	5.581E+03	10.82	0.883	- D
516.30	129.22	46.	50.	1.354E+03	27.42	0.795	- s
1107.96	277.21	32.	28.	1.137E+03	43.06	0.563	- 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_Rev15.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.25	46.65	94.	42.	0.024	44.32	1.366s
TH-227	200.18	50.14	244.	-16.	-0.009	142.81	0.855
AM-241	237.74	59.54	448.	-24.	-0.013	126.22	0.865s
TH-234	252.74	63.29	116.	33.	0.018	49.65	0.868D
BA-133	323.50	80.99	846.	-25.	-0.014	166.87	0.887s
Np-237	345.49	86.49	575.	10.	0.005	343.94	0.892A
EU-155	345.70	86.54	699.	-25.	-0.014	148.71	0.892s
Sn-126	347.29	86.94	674.	3.	0.002	565.49	0.892D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Sn-126	349.81	87.57	603.	13.	0.007	134.68	0.893D
TH-234	369.87	92.59	175.	9.	0.005	206.95	0.898D
AC-228	372.91	93.35	275.	5.	0.003	456.39	0.899s
Gd-153	389.50	97.50	400.	-20.	-0.011	144.24	0.903
Gd-153	412.29	103.20	401.	-20.	-0.011	144.44	0.909s
Np-239	414.29	103.70	421.	0.	0.000	1000.00	0.909s
EU-155	420.73	105.31	421.	0.	0.000	1000.00	0.911s
Np-239	424.00	106.13	144.	15.	0.008	114.45	0.912s
EU-152	486.56	121.78	220.	-21.	-0.012	100.43	0.928s
CO-57	487.69	122.06	241.	-21.	-0.012	104.95	0.928s
EU-154	491.84	123.10	214.	11.	0.006	191.18	0.929s
PA-234	524.60	131.29	250.	16.	0.009	139.49	0.938s
HF-181	531.51	133.02	477.	-18.	-0.010	177.35	0.939s
HF-181	544.61	136.30	459.	0.	0.000	1000.00	0.943s
CO-57	545.30	136.47	459.	0.	0.000	1000.00	0.943s
Tc-99m	561.44	140.51	459.	0.	0.000	1000.00	0.947
U-235	574.53	143.79	459.	0.	0.000	1000.00	0.950s
CE-141	581.15	145.44	491.	-19.	-0.010	169.06	0.952s
Ba-140	649.99	162.66	203.	-16.	-0.009	130.97	0.969s
U-235	652.87	163.38	218.	0.	0.000	1000.00	0.970s
CE-139	662.76	165.85	148.	17.	0.009	106.68	0.973s
Cf-251	705.72	176.60	136.	-21.	-0.012	107.11	0.983s
U-235	742.18	185.72	107.	22.	0.012	89.28	0.992s
TH-229	773.32	193.51	132.	-9.	-0.005	241.14	1.000s
U-235	820.59	205.33	77.	16.	0.009	104.85	1.012s
TH-229	842.65	210.85	117.	5.	0.003	436.71	1.018s
TH-227	943.09	235.97	611.	-17.	-0.010	202.64	1.043s
PB-212	953.73	238.63	44.	327.	0.182	6.24	1.045D
PB-214	967.18	242.00	58.	47.	0.026	27.11	1.049D
EU-152	977.96	244.69	634.	-19.	-0.011	185.54	1.051s
TH-227	1024.13	256.24	33.	11.	0.006	101.53	1.063
Cd-113m	1053.96	263.70	80.	-17.	-0.009	78.28	1.070s
BI-210M	1062.48	265.83	92.	14.	0.008	97.62	1.072s
TL-208	1108.27	277.28	108.	-2.	-0.001	738.24	1.084
Hg-203	1115.93	279.20	101.	0.	0.000	1000.00	1.086s
I-131	1136.32	284.30	55.	-6.	-0.003	234.82	1.091s
PB-214	1178.22	294.78	33.	63.	0.035	23.38	0.775s
TL-210	1183.11	296.00	349.	-5.	-0.003	530.28	1.102s
PB-212	1200.35	300.31	15.	28.	0.016	32.04	1.081
PA-231	1199.38	300.07	344.	0.	0.000	1000.00	1.106
PA-233	1199.82	300.18	344.	0.	0.000	1000.00	1.107
PA-231	1209.70	302.65	344.	0.	0.000	1000.00	1.109s
BA-133	1210.50	302.85	344.	0.	0.000	1000.00	1.109s
Ba-140	1218.49	304.85	344.	0.	0.000	1000.00	1.111s
BI-210M	1218.68	304.90	344.	0.	0.000	1000.00	1.111
Ir-192	1232.85	308.44	344.	0.	0.000	1000.00	1.115s
PA-233	1247.13	312.01	344.	0.	0.000	1000.00	1.118s
Ir-192	1265.04	316.49	344.	0.	0.000	1000.00	1.123s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CR-51	1279.41	320.08	342.	0.	0.000	1000.00	1.126s
La-140	1314.10	328.76	125.	-18.	-0.010	88.48	1.135s
Cf-249	1332.81	333.44	109.	14.	0.008	106.97	1.139s
AC-228	1351.46	338.10	20.	66.	0.037	17.67	1.267
Cs-136	1361.32	340.57	213.	-16.	-0.009	131.82	1.146
EU-152	1376.18	344.29	197.	-16.	-0.009	126.57	1.150s
HF-181	1382.35	345.83	133.	13.	0.007	125.95	1.151s
PB-214	1405.54	351.63	32.	107.	0.059	13.55	1.069
BA-133	1423.02	356.00	216.	-16.	-0.009	135.47	1.162
I-131	1456.95	364.48	16.	25.	0.014	37.17	1.170s
BA-133	1534.35	383.84	112.	-13.	-0.007	118.42	1.189s
Cf-249	1550.79	387.95	125.	0.	0.000	1000.00	1.193s
SN-113	1565.74	391.69	125.	-2.	-0.001	793.73	1.196s
SB-125	1710.45	427.88	28.	7.	0.004	152.75	1.232s
AG-108M	1734.69	433.94	36.	2.	0.001	591.61	1.238s
PM-146	1814.45	453.88	40.	10.	0.006	127.80	1.257s
SB-125	1852.39	463.37	35.	11.	0.006	83.39	1.266s
Ir-192	1871.16	468.06	68.	5.	0.003	243.01	1.271s
BE-7	1909.29	477.60	93.	-8.	-0.004	174.10	1.280s
HF-181	1926.90	482.00	101.	0.	0.000	1000.00	1.284s
La-140	1946.98	487.02	122.	-15.	-0.008	108.14	1.289s
RU-103	1987.11	497.05	28.	0.	0.000	1000.00	1.298s
RH-106	2046.35	511.86	80.	68.	0.038	22.21	2.563s
Kr-85	2054.81	513.98	131.	14.	0.008	121.10	1.315s
Nd-147	2122.88	531.00	52.	-16.	-0.009	95.17	1.331s
Ba-140	2147.92	537.26	26.	4.	0.002	264.97	1.337s
CS-134	2251.82	563.24	22.	11.	0.006	94.87	1.362
CS-134	2276.15	569.32	18.	10.	0.005	70.95	1.367
PA-234	2276.75	569.47	28.	4.	0.002	171.73	1.368s
TL-208	2331.61	583.19	7.	98.	0.054	11.61	1.207
SB-125	2400.87	600.50	218.	7.	0.004	281.11	1.397s
SB-124	2409.79	602.73	226.	0.	0.000	1000.00	1.399s
CS-134	2417.71	604.71	226.	0.	0.000	1000.00	1.401
BI-214	2435.69	609.21	5.	124.	0.069	9.88	1.218
RU-103	2440.06	610.30	226.	0.	0.000	1000.00	1.406s
AG-108M	2455.99	614.28	226.	0.	0.000	1000.00	1.410s
PM-144	2471.12	618.06	226.	0.	0.000	1000.00	1.414s
SB-125	2542.43	635.89	47.	-16.	-0.009	66.64	1.430s
I-131	2546.77	636.97	72.	-8.	-0.005	151.54	1.432s
AG-110M	2629.92	657.76	31.	10.	0.006	84.54	1.451s
CS-137	2645.51	661.66	52.	-5.	-0.003	205.36	1.455s
PM-144	2785.05	696.54	23.	11.	0.006	100.83	1.487s
NB-94	2809.41	702.63	37.	-12.	-0.007	108.88	1.493s
SB-124	2890.04	722.79	70.	-10.	-0.005	129.14	1.512s
AG-108M	2890.65	722.94	80.	0.	0.000	1000.00	1.512s
EU-154	2892.34	723.36	80.	0.	0.000	1000.00	1.512s
ZR-95	2895.69	724.20	80.	0.	0.000	1000.00	1.513s
BI-212	2907.58	727.17	71.	8.	0.005	149.89	1.516s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-146	2941.78	735.72	5.	13.	0.007	43.95	1.524s
PM-146	2987.55	747.16	23.	5.	0.003	224.40	1.535s
ZR-95	3025.83	756.73	14.	0.	0.000	1000.00	1.543s
AG-110M	3054.69	763.94	10.	8.	0.004	69.78	1.550s
NB-95	3062.08	765.79	31.	1.	0.001	759.53	1.552s
PA-234M	3064.57	766.41	15.	5.	0.003	110.23	1.552s
EU-152	3114.61	778.92	33.	-14.	-0.008	88.30	1.564s
BI-212	3140.62	785.42	33.	-5.	-0.003	263.90	1.570s
CS-134	3182.43	795.87	26.	10.	0.006	77.47	1.579
TL-210	3197.35	799.60	39.	11.	0.006	85.48	1.583s
CS-134	3206.76	801.95	48.	10.	0.005	107.21	1.585s
CO-58	3242.06	810.78	48.	-4.	-0.002	283.56	1.593
La-140	3262.05	815.77	51.	0.	0.000	1000.00	1.598s
Cs-136	3272.97	818.50	72.	-15.	-0.008	85.76	1.600s
MN-54	3338.38	834.85	37.	-12.	-0.007	108.88	1.615s
Co-56	3386.08	846.77	10.	8.	0.004	93.86	1.626s
TL-208	3441.27	860.56	25.	2.	0.001	554.15	1.638s
NB-94	3483.41	871.10	24.	-3.	-0.002	238.05	1.648s
EU-154	3491.95	873.23	22.	6.	0.004	110.41	1.650s
PA-234	3521.16	880.53	10.	6.	0.003	89.80	1.657s
PA-234	3532.00	883.24	16.	6.	0.003	107.25	1.659s
AG-110M	3537.78	884.68	22.	6.	0.003	122.25	1.660s
Sc-46	3556.17	889.28	39.	-8.	-0.005	113.37	1.664s
Y-88	3591.22	898.04	20.	0.	0.000	1000.00	1.672s
AC-228	3643.72	911.16	0.	99.	0.055	10.05	1.242s
AG-110M	3749.09	937.49	30.	-7.	-0.004	176.13	1.708s
PA-234	3783.21	946.02	30.	-4.	-0.002	305.16	1.716s
EU-152	3855.60	964.11	61.	9.	0.005	134.45	1.732
AC-228	3875.05	968.97	17.	62.	0.035	15.70	1.736s
EU-154	3984.54	996.33	20.	9.	0.005	81.09	1.761s
PA-234M	4003.22	1001.00	29.	8.	0.004	101.47	1.765s
Co-56	4150.66	1037.84	27.	-11.	-0.006	114.22	1.798
Cs-136	4191.60	1048.07	13.	5.	0.003	103.83	1.807s
RH-106	4200.76	1050.36	33.	-12.	-0.006	75.21	1.809s
BI-207	4253.99	1063.66	16.	3.	0.002	308.52	1.820s
Ga-68	4308.98	1077.40	11.	8.	0.005	95.58	1.833s
FE-59	4396.44	1099.25	5.	5.	0.003	121.64	1.852s
EU-152	4447.76	1112.07	27.	9.	0.005	86.50	1.863s
ZN-65	4461.66	1115.55	36.	9.	0.005	98.15	1.866s
BI-214	4480.63	1120.29	41.	9.	0.005	104.20	1.870s
Ta-182	4484.69	1121.30	50.	9.	0.005	113.54	1.871s
CO-60	4692.57	1173.24	5.	16.	0.009	41.96	1.916s
Ta-182	4885.39	1221.41	17.	7.	0.004	143.21	1.957s
Co-56	4952.92	1238.28	62.	-23.	-0.013	84.03	1.972s
NA-22	5098.03	1274.53	17.	-4.	-0.002	154.11	2.003s
EU-154	5098.08	1274.54	21.	0.	0.000	1000.00	2.003s
FE-59	5166.35	1291.60	11.	5.	0.003	175.40	2.017s
TL-210	5252.04	1313.00	6.	7.	0.004	87.32	2.036s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	5330.11	1332.50	0.	9.	0.005	33.33	2.052s
AG-110M	5537.48	1384.30	11.	-2.	-0.001	344.64	2.096s
EU-152	5632.39	1408.00	12.	-1.	-0.001	842.61	2.115s
K-40	5842.94	1460.59	0.	310.	0.172	5.68	1.893
La-140	6386.02	1596.21	12.	-7.	-0.004	125.36	2.269s
SB-124	6765.58	1690.98	0.	0.	0.000	1000.00	2.345s
BI-214	7060.00	1764.49	0.	10.	0.006	31.24	2.403s
Co-56	7087.48	1771.35	10.	0.	0.000	1000.00	2.408s
Y-88	7346.69	1836.06	7.	-3.	-0.001	254.34	2.459s

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	-2.5947E+00				5.31E+01	
			477.60	-2.595E+00	?(	1.545E+01 1.74E+02 1.05E+01	G
NA-22	C	-2.8097E-01				9.50E+02	
			1274.53	-2.810E-01	?(	1.540E+00 1.54E+02 9.99E+01	G
K-40	N	2.2694E+02				4.66E+11	
			1460.83	2.269E+02	(	5.395E+00 5.68E+00 1.07E+01	G
Sc-46	F	-4.4051E-01				8.38E+01	
			889.28	-4.405E-01	?(	1.711E+00 1.13E+02 1.00E+02	G
			1120.55	-3.461E-02	%	2.483E+00 2.03E+03 1.00E+02	G
MN-54	C	-6.3408E-01				3.12E+02	
			834.85	-6.341E-01	?(	1.603E+00 1.09E+02 1.00E+02	G
FE-59	F	6.2594E-01				4.45E+01	
			1099.25	5.188E-01	?(	1.498E+00 1.22E+02 5.65E+01	G
			1291.60	7.661E-01	?(	3.020E+00 1.75E+02 4.32E+01	G
Co-56	C	4.1551E-01				7.73E+01	
			846.77	4.155E-01	?(	9.066E-01 9.39E+01 9.99E+01	G
			1238.28	-2.365E+00	+	4.106E+00 8.40E+01 6.61E+01	G
			1037.84	-4.545E+00	+	1.141E+01 1.14E+02 1.41E+01	G
			1771.35	0.000E+00	-	1.045E+01 1.00E+03 1.55E+01	A
CO-57	C	-3.7286E-01				2.72E+02	
			122.06	-3.729E-01	&(	1.309E+00 1.05E+02 8.56E+01	G
			136.47	0.000E+00	+	1.461E+01 1.00E+03 1.07E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-58	C	-1.7710E-01					7.09E+01	
			810.78	-1.771E-01	?(	1.762E+00	2.84E+02	9.95E+01 G
CO-60	F	8.4388E-01					1.93E+03	
			1332.50	6.540E-01	?(	5.355E-01	3.33E+01	1.00E+02 G
			1173.24	1.034E+00	&(	8.891E-01	4.20E+01	9.99E+01 G
ZN-65	F	1.1519E+00					2.44E+02	
			1115.55	1.152E+00	?(	3.848E+00	9.82E+01	5.06E+01 G
NB-94	I	-5.7168E-01					7.41E+06	
			702.63	-5.717E-01	?(	1.445E+00	1.09E+02	9.79E+01 G
			871.10	-1.592E-01	+	1.355E+00	2.38E+02	9.99E+01 G
NB-95	I	5.0559E-02					6.40E+01	
			765.79	5.056E-02	?(	1.386E+00	7.60E+02	9.98E+01 G
RH-106	I	-6.9680E-02					3.74E+02	
			621.92	-6.968E-02	%(	3.037E+01	1.27E+04	9.93E+00 G
			1050.36	-4.542E+01	+	1.142E+02	7.52E+01	1.56E+00 G
			511.86	1.222E+01	?	7.978E+00	2.22E+01	2.00E+01 GA
AG-108M	C	7.0135E-02					1.53E+05	
			433.94	7.014E-02	&(	1.076E+00	5.92E+02	9.05E+01 G
			722.94	0.000E+00	-	2.264E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	-	3.332E+00	1.00E+03	8.98E+01 G
AG-110M	F	5.8724E-01					2.50E+02	
			884.68	4.259E-01	?(	1.813E+00	1.22E+02	7.27E+01 G
			657.76	4.611E-01	?(	1.316E+00	8.45E+01	9.46E+01 G
			937.49	-1.139E+00	+	4.593E+00	1.76E+02	3.44E+01 G
			1384.30	-7.190E-01	+	5.669E+00	3.45E+02	2.43E+01 G
			763.94	1.649E+00	?(	3.828E+00	6.98E+01	2.23E+01 G
SN-113	F	-9.1694E-02					1.15E+02	
			391.69	-9.169E-02	&(	2.513E+00	7.94E+02	6.40E+01 G
SB-125	I	1.5237E+00					1.01E+03	
			427.88	7.424E-01	?(	2.902E+00	1.53E+02	2.96E+01 G
			600.50	1.699E+00	?(	1.622E+01	2.81E+02	1.79E+01 G
			635.89	-5.845E+00	+	1.289E+01	6.66E+01	1.13E+01 G
			463.37	3.433E+00	?(	9.644E+00	8.34E+01	1.05E+01 G
I-131	I	8.4971E-01					8.02E+00	
			364.48	8.497E-01	(	7.257E-01	3.72E+01	8.17E+01 G
			284.30	-2.247E+00	-	1.396E+01	2.35E+02	6.14E+00 G
			636.97	-4.813E+00	-	2.498E+01	1.52E+02	7.17E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Gd-153	F	-9.9821E-01					2.42E+02	
			97.50	-9.982E-01	&(	4.823E+00	1.44E+02	3.00E+01 G
			103.20	-1.361E+00	&	6.584E+00	1.44E+02	2.18E+01 G
Ga-68	C	1.8293E+01					4.71E-02	
			1077.40	1.829E+01	?(	3.936E+01	9.56E+01	3.30E+00 G
BA-133	F	-6.8713E-01					3.85E+03	
			356.00	-6.871E-01	?(	3.133E+00	1.35E+02	6.20E+01 G
			302.85	0.000E+00	+	1.172E+01	1.00E+03	1.83E+01 G
			383.84	-4.201E+00	+	1.681E+01	1.18E+02	8.94E+00 GA
			80.99	-1.169E+00	+	6.507E+00	1.67E+02	3.41E+01 GA
CS-134	I	1.4888E+00					7.54E+02	
			795.87	5.857E-01	(	1.524E+00	7.75E+01	8.55E+01 G
			604.71	0.000E+00	-	3.032E+00	1.00E+03	9.76E+01 G
			569.32	2.405E+00	(	5.686E+00	7.10E+01	1.54E+01 G
			801.95	5.485E+00	?(	2.003E+01	1.07E+02	8.69E+00 G
			563.24	4.893E+00	(	1.128E+01	9.49E+01	8.35E+00 G
CS-137	I	-2.5950E-01					1.10E+04	
			661.66	-2.595E-01	?(	1.853E+00	2.05E+02	8.52E+01 G
CE-139	F	3.3803E-01					1.38E+02	
			165.85	3.380E-01	?(	1.212E+00	1.07E+02	7.99E+01 G
Ba-140	I	6.1118E-01					1.28E+01	
			537.26	6.112E-01	&(	4.045E+00	2.65E+02	2.44E+01 G
			162.66	-4.074E+00	&	1.795E+01	1.31E+02	6.22E+00 G
			304.85	0.000E+00	-	5.034E+01	1.00E+03	4.29E+00 G
La-140	I	-6.1616E-01					1.28E+01	
			1596.21	-6.162E-01	?(	1.659E+00	1.25E+02	9.54E+01 G
			487.02	-1.131E+00	+	4.118E+00	1.08E+02	4.55E+01 G
			328.76	-2.338E+00	+	6.919E+00	8.85E+01	2.03E+01 G
			815.77	0.000E+00	+	7.815E+00	1.00E+03	2.33E+01 G
CE-141	I	-6.0140E-01					3.25E+01	
			145.44	-6.014E-01	&(	3.406E+00	1.69E+02	4.82E+01 G
CE-144	I	-7.4433E-02					2.85E+02	
			133.54	-7.443E-02	%(	1.401E+01	5.56E+03	1.11E+01 G
PM-144	C	4.8585E-01					3.63E+02	
			696.54	4.859E-01	&(	1.149E+00	1.01E+02	9.90E+01 G
			618.06	0.000E+00	&	3.035E+00	1.00E+03	9.91E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-152	F	1.3154E+00					4.94E+03	
			121.78	-1.116E+00	?(	3.748E+00	1.00E+02	2.86E+01 G
			344.29	-1.604E+00	+	6.828E+00	1.27E+02	2.65E+01 G
			1112.07	4.255E+00	&(	1.247E+01	8.65E+01	1.36E+01 G
			778.92	-5.436E+00	+	1.109E+01	8.83E+01	1.29E+01 G
			964.11	3.328E+00	?(	1.531E+01	1.34E+02	1.46E+01 G
			244.69	-5.258E+00	+	3.264E+01	1.86E+02	7.58E+00 G
			1408.00	-3.611E-01	-	6.808E+00	8.43E+02	2.10E+01 GA
EU-154	I	1.5939E+00					3.14E+03	
			123.10	4.008E-01	&(	2.592E+00	1.91E+02	4.08E+01 G
			1274.54	0.000E+00	-	4.801E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	1.017E+01	1.00E+03	2.02E+01 G
			873.23	2.813E+00	?(	1.074E+01	1.10E+02	1.23E+01 G
			1004.77	1.088E-01	&	1.022E+01	2.61E+03	1.80E+01 G
			996.33	4.774E+00	?(	1.308E+01	8.11E+01	1.06E+01 G
HF-181	F	3.7041E-01					4.24E+01	
			482.00	0.000E+00	?(	2.114E+00	1.00E+03	8.05E+01 G
			133.02	-6.140E-01	+	3.650E+00	1.77E+02	4.33E+01 G
			345.83	2.349E+00	?(	9.994E+00	1.26E+02	1.51E+01 G
			136.30	0.000E+00	-	2.666E+01	1.00E+03	5.85E+00 G
Ta-182	F	1.7163E+00					1.14E+02	
			1121.30	1.681E+00	?(	6.513E+00	1.14E+02	3.49E+01 G
			1221.41	1.762E+00	?(	5.518E+00	1.43E+02	2.70E+01 G
			1189.05	1.370E-01	%	1.101E+01	3.53E+03	1.62E+01 G
TL-208	N	4.5918E+00					6.98E+02	
			583.02	4.592E+00	(	7.047E-01	1.16E+01	8.45E+01 G
			277.28	-7.153E-01	-	1.829E+01	7.38E+02	6.31E+00 G
			860.56	8.461E-01	-	1.100E+01	5.54E+02	1.24E+01 G
PM-146	C	9.6730E-01					2.02E+03	
			453.88	5.051E-01	*(	1.625E+00	1.28E+02	6.50E+01 G
			747.16	6.512E-01	?(	3.519E+00	2.24E+02	3.40E+01 G
			735.72	2.780E+00	?(	2.664E+00	4.39E+01	2.25E+01 G
Y-88	F	-2.5458E-01					1.07E+02	
			1836.06	-2.546E-01	?(	1.407E+00	2.54E+02	9.92E+01 G
			898.04	0.000E+00	&	1.362E+00	1.00E+03	9.37E+01 G
Cd-113m		-6.1793E+03					5.33E+03	
			263.70	-6.179E+03	(	1.614E+04	7.83E+01	6.00E-03 K

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-251	T	-2.0567E+00					3.28E+05	
			176.60	-2.057E+00	&(	5.639E+00	1.07E+02	1.70E+01 G
			227.00	-1.036E-01	%	1.414E+01	5.16E+03	6.30E+00 GA
Cf-249	T	4.5433E-01					1.28E+05	
			387.95	0.000E+00	?(	2.419E+00	1.00E+03	6.60E+01 G
			333.44	2.388E+00	?(	8.608E+00	1.07E+02	1.55E+01 G
Sn-126		5.2518E-01					3.65E+07	
			87.57	5.252E-01	}	4.855E+00	1.35E+02	3.75E+01 GA
			64.28	5.252E-01	%(	1.816E+01	1.02E+03	9.70E+00 G
			86.94	5.252E-01	}	2.131E+01	5.65E+02	9.04E+00 GA
PB-210	N	3.0744E+01					8.14E+03	
			46.54	3.074E+01	*(P	3.460E+01	4.43E+01	4.25E+00 G
PB-212	N	1.5305E+01					6.98E+02	
			238.63	1.530E+01	(P	1.570E+00	6.24E+00	4.33E+01 G
			300.03	2.044E+01	+	1.515E+01	3.20E+01	3.28E+00 GA
PB-214	N	7.6948E+00					5.84E+05	
			351.93	7.683E+00	(P	2.094E+00	1.36E+01	3.76E+01 G
			295.09	7.717E+00	(	3.611E+00	2.34E+01	1.93E+01 G
			242.00	1.296E+01	+	1.051E+01	2.71E+01	7.43E+00 GA
BI-207	C	2.4684E-01					1.18E+04	
			1063.66	2.468E-01	?(	1.757E+00	3.09E+02	7.45E+01 G
			569.70	-2.655E-02	&	1.169E+00	1.22E+03	9.77E+01 G
BI-212	N	5.0322E+00					6.98E+02	
			727.17	5.032E+00	?(	2.584E+01	1.50E+02	7.55E+00 G
			785.42	-1.793E+01	+	1.128E+02	2.64E+02	1.28E+00 GA
U-235	N	1.8507E+00					2.57E+11	
			143.79	0.000E+00	&(	1.444E+01	1.00E+03	1.10E+01 G
			205.33	5.899E+00	*(	1.596E+01	1.05E+02	5.01E+00 G
			163.38	0.000E+00	-	2.283E+01	1.00E+03	5.08E+00 G
			185.72	6.910E-01	* P	1.632E+00	8.93E+01	5.40E+01 GA
BI-214	N	1.1033E+01					5.84E+05	
			609.31	1.103E+01	(	1.134E+00	9.88E+00	4.61E+01 G
			1120.29	3.881E+00	&	1.378E+01	1.04E+02	1.51E+01 G
			1764.49	6.084E+00	-	4.376E+00	3.12E+01	1.54E+01 G
BI-210M	T	6.3156E-01					1.10E+09	
			265.83	6.316E-01	?(	2.075E+00	9.76E+01	5.00E+01 G
			304.90	0.000E+00	-	7.714E+00	1.00E+03	2.80E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AC-228	N	1.9346E+01					2.10E+03	
			911.07	1.869E+01	(	1.391E+00	1.01E+01	2.90E+01 G
			968.97	2.043E+01	?(	7.131E+00	1.57E+01	1.75E+01 G
			338.32	1.441E+01	-	5.143E+00	1.77E+01	1.20E+01 G
			93.35	1.414E+00	-	2.191E+01	4.56E+02	5.56E+00 XA
TH-227	N	3.3724E+00					7.95E+03	
			256.24	3.372E+00	(	8.971E+00	1.02E+02	7.00E+00 G
			235.97	-2.839E+00	-	1.927E+01	2.03E+02	1.23E+01 G
			50.14	-4.976E+00	&	2.390E+01	1.43E+02	8.00E+00 G
TH-229	N	-9.7709E-01					2.68E+06	
			193.51	-3.619E+00	&(	2.262E+01	2.41E+02	4.40E+00 G
			210.85	2.910E+00	&(	3.317E+01	4.37E+02	2.99E+00 G
TH-234	N	8.0366E+00					1.63E+12	
			92.59	2.513E+00	(P	1.759E+01	2.07E+02	5.58E+00 G
			63.29	1.613E+01	(P	2.588E+01	4.96E+01	3.81E+00 G
PA-234	N	2.0374E+00					1.63E+12	
			131.29	1.365E+00	?(	6.402E+00	1.39E+02	1.80E+01 G
			946.02	-1.680E+00	+	1.186E+01	3.05E+02	1.34E+01 G
			569.47	2.132E+00	&(	1.288E+01	1.72E+02	8.20E+00 G
			883.24	3.218E+00	?(	1.199E+01	1.07E+02	9.60E+00 G
			880.53	5.129E+00	?	1.586E+01	8.98E+01	6.00E+00 GA
PA-234M	N	6.4563E+01					1.63E+12	
			1001.00	5.608E+01	?(	1.947E+02	1.01E+02	8.37E-01 G
			766.41	8.872E+01	?(	3.412E+02	1.10E+02	2.94E-01 G
AM-241	T	-1.3201E+00					1.58E+05	
			59.54	-1.320E+00	?(	5.567E+00	1.26E+02	3.59E+01 G
Np-237	F	1.1794E+00					2.14E+06	
							Derived Ave Activity	
			86.49	1.179E+00	}(	1.363E+01	3.44E+02	1.31E+01 G
Ir-192	F	1.1835E-01					7.40E+01	
			316.49	0.000E+00	*(	2.553E+00	1.00E+03	8.70E+01 G
			468.06	3.174E-01	?(	2.673E+00	2.43E+02	5.18E+01 G
			308.44	0.000E+00	&	6.863E+00	1.00E+03	3.18E+01 G
Cs-136	F	-7.4600E-01					1.30E+01	
			818.50	-7.460E-01	&(	2.146E+00	8.58E+01	1.00E+02 G
			1048.07	4.043E-01	+	1.463E+00	1.04E+02	8.00E+01 G
			340.57	-8.957E-01	+	3.972E+00	1.32E+02	4.69E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Np-239   T   9.9765E-01                                      2.36E+00
                          103.70 0.000E+00 -   6.120E+00 1.00E+03 2.40E+01 X
                          106.13 9.977E-01 ?(  3.845E+00 1.14E+02 2.27E+01 G
                           99.50-1.151E-01 %   9.839E+00 2.52E+03 1.50E+01 X

Nd-147      -4.5549E+00                                     1.11E+01
                          531.00-4.555E+00 ?(  1.032E+01 9.52E+01 1.30E+01 G
                           91.10 2.068E-07 %   6.237E+00 8.94E+08 2.83E+01 G

TL-210   N   5.5419E-01                                      5.84E+05
                          799.60 5.542E-01 ?(  1.597E+00 8.55E+01 9.90E+01 G
                          296.00-1.500E-01 -   2.692E+00 5.30E+02 7.90E+01 G
                         1313.00 2.422E+00 ?   4.721E+00 8.73E+01 2.10E+01 GA

Kr-85    I   1.1496E+02                                      3.92E+03
                          513.98 1.150E+02 ?(  4.699E+02 1.21E+02 4.30E-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	244.	-16.	-0.009	142.81	-4.976E+00	
AM-241	59.54	448.	-24.	-0.013	126.22	-1.320E+00	
BA-133	80.99	846.	-25.	-0.014	166.87	-1.169E+00	
EU-155	86.54	699.	-25.	-0.014	148.71	-1.290E+00	
Sn-126	86.94	674.	3.	0.002	565.49	5.252E-01	
Sn-126	87.57	603.	13.	0.007	134.68	5.252E-01	
Gd-153	97.50	400.	-20.	-0.011	144.24	-9.982E-01	
Gd-153	103.20	401.	-20.	-0.011	144.44	-1.361E+00	
Np-239	106.13	144.	15.	0.008	114.45	9.977E-01	
EU-152	121.78	220.	-21.	-0.012	100.43	-1.116E+00	
CO-57	122.06	241.	-21.	-0.012	104.95	-3.729E-01	
EU-154	123.10	214.	11.	0.006	191.18	4.008E-01	
PA-234	131.29	250.	16.	0.009	139.49	1.365E+00	
HF-181	133.02	477.	-18.	-0.010	177.35	-6.140E-01	
CE-141	145.44	491.	-19.	-0.010	169.06	-6.014E-01	
Ba-140	162.66	203.	-16.	-0.009	130.97	-4.074E+00	
CE-139	165.85	148.	17.	0.009	106.68	3.380E-01	
Cf-251	176.60	136.	-21.	-0.012	107.11	-2.057E+00	
U-235	185.72	107.	22.	0.012	89.28	6.910E-01	P
TH-229	193.51	132.	-9.	-0.005	241.14	-3.619E+00	
U-235	205.33	77.	16.	0.009	104.85	5.899E+00	
TH-229	210.85	117.	5.	0.003	436.71	2.910E+00	
TH-227	235.97	611.	-17.	-0.010	202.64	-2.839E+00	
EU-152	244.69	634.	-19.	-0.011	185.54	-5.258E+00	
TH-227	256.24	33.	11.	0.006	101.53	3.372E+00	
Cd-113m	263.70	80.	-17.	-0.009	78.28	-6.179E+03	
TL-210	296.00	349.	-5.	-0.003	530.28	-1.500E-01	
La-140	328.76	125.	-18.	-0.010	88.48	-2.338E+00	
Cf-249	333.44	109.	14.	0.008	106.97	2.388E+00	
Cs-136	340.57	213.	-16.	-0.009	131.82	-8.957E-01	
EU-152	344.29	197.	-16.	-0.009	126.57	-1.604E+00	
HF-181	345.83	133.	13.	0.007	125.95	2.349E+00	
BA-133	356.00	216.	-16.	-0.009	135.47	-6.871E-01	
BA-133	383.84	112.	-13.	-0.007	118.42	-4.201E+00	
SN-113	391.69	125.	-2.	-0.001	793.73	-9.169E-02	
AG-108M	433.94	36.	2.	0.001	591.61	7.014E-02	
PM-146	453.88	40.	10.	0.006	127.80	5.051E-01	
Ir-192	468.06	68.	5.	0.003	243.01	3.174E-01	
BE-7	477.60	93.	-8.	-0.004	174.10	-2.595E+00	
La-140	487.02	122.	-15.	-0.008	108.14	-1.131E+00	
RH-106	511.86	80.	68.	0.038	22.21	1.222E+01	
Kr-85	513.98	131.	14.	0.008	121.10	1.150E+02	
Nd-147	531.00	52.	-16.	-0.009	95.17	-4.555E+00	
Ba-140	537.26	26.	4.	0.002	264.97	6.112E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	563.24	22.	11.	0.006	94.87	4.893E+00	
CS-134	569.32	18.	10.	0.005	70.95	2.405E+00	
PA-234	569.47	28.	4.	0.002	171.73	2.132E+00	
AG-110M	657.76	31.	10.	0.006	84.54	4.611E-01	
CS-137	661.66	52.	-5.	-0.003	205.36	-2.595E-01	
PM-144	696.54	23.	11.	0.006	100.83	4.859E-01	
NB-94	702.63	37.	-12.	-0.007	108.88	-5.717E-01	
SB-124	722.79	70.	-10.	-0.005	129.14	-4.071E+00	
BI-212	727.17	71.	8.	0.005	149.89	5.032E+00	
PM-146	735.72	5.	13.	0.007	43.95	2.780E+00	
PM-146	747.16	23.	5.	0.003	224.40	6.512E-01	
AG-110M	763.94	10.	8.	0.004	69.78	1.649E+00	
NB-95	765.79	31.	1.	0.001	759.53	5.056E-02	
PA-234M	766.41	15.	5.	0.003	110.23	8.872E+01	
EU-152	778.92	33.	-14.	-0.008	88.30	-5.436E+00	
BI-212	785.42	33.	-5.	-0.003	263.90	-1.793E+01	
CS-134	795.87	26.	10.	0.006	77.47	5.857E-01	
TL-210	799.60	39.	11.	0.006	85.48	5.542E-01	
CS-134	801.95	48.	10.	0.005	107.21	5.485E+00	
CO-58	810.78	48.	-4.	-0.002	283.56	-1.771E-01	
Cs-136	818.50	72.	-15.	-0.008	85.76	-7.460E-01	
MN-54	834.85	37.	-12.	-0.007	108.88	-6.341E-01	
Co-56	846.77	10.	8.	0.004	93.86	4.155E-01	
NB-94	871.10	24.	-3.	-0.002	238.05	-1.592E-01	
EU-154	873.23	22.	6.	0.004	110.41	2.813E+00	
PA-234	880.53	10.	6.	0.003	89.80	5.129E+00	
PA-234	883.24	16.	6.	0.003	107.25	3.218E+00	
AG-110M	884.68	22.	6.	0.003	122.25	4.259E-01	
Sc-46	889.28	39.	-8.	-0.005	113.37	-4.405E-01	
AG-110M	937.49	30.	-7.	-0.004	176.13	-1.139E+00	
PA-234	946.02	30.	-4.	-0.002	305.16	-1.680E+00	
EU-152	964.11	61.	9.	0.005	134.45	3.328E+00	
EU-154	996.33	20.	9.	0.005	81.09	4.774E+00	
PA-234M	1001.00	29.	8.	0.004	101.47	5.608E+01	
Co-56	1037.84	27.	-11.	-0.006	114.22	-4.545E+00	
Cs-136	1048.07	13.	5.	0.003	103.83	4.043E-01	
RH-106	1050.36	33.	-12.	-0.006	75.21	-4.542E+01	
BI-207	1063.66	16.	3.	0.002	308.52	2.468E-01	
Ga-68	1077.40	11.	8.	0.005	95.58	1.829E+01	
FE-59	1099.25	5.	5.	0.003	121.64	5.188E-01	
EU-152	1112.07	27.	9.	0.005	86.50	4.255E+00	
ZN-65	1115.55	36.	9.	0.005	98.15	1.152E+00	
Ta-182	1121.30	50.	9.	0.005	113.54	1.681E+00	
Ta-182	1221.41	17.	7.	0.004	143.21	1.762E+00	
Co-56	1238.28	62.	-23.	-0.013	84.03	-2.365E+00	
NA-22	1274.53	17.	-4.	-0.002	154.11	-2.810E-01	
FE-59	1291.60	11.	5.	0.003	175.40	7.661E-01	
TL-210	1313.00	6.	7.	0.004	87.32	2.422E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-110M	1384.30	11.	-2.	-0.001	344.64	-7.190E-01	
EU-152	1408.00	12.	-1.	-0.001	842.61	-3.611E-01	
La-140	1596.21	12.	-7.	-0.004	125.36	-6.162E-01	
Y-88	1836.06	7.	-3.	-0.001	254.34	-2.546E-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 *****

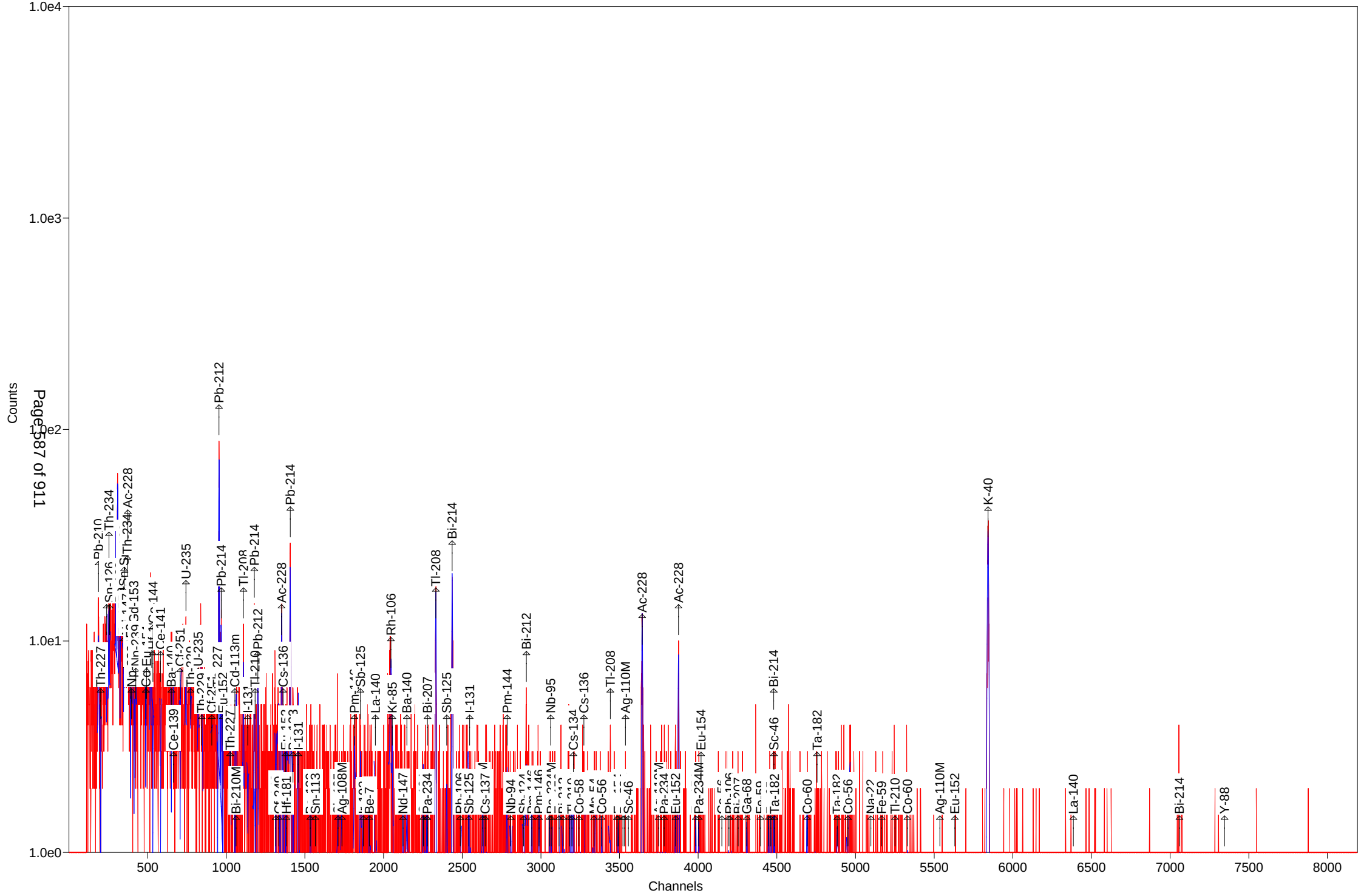
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-2.5946E+00	-2.5947E+00	1.741E+02%	1.55E+01
NA-22	#A	-2.8097E-01	-2.8097E-01	1.541E+02%	1.54E+00
K-40		2.2694E+02	2.2694E+02	5.680E+00%	5.40E+00
Sc-46	#A	-4.4051E-01	-4.4051E-01	1.134E+02%	1.71E+00
CR-51	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.25E+01
MN-54	#A	-6.3408E-01	-6.3408E-01	1.089E+02%	1.60E+00
FE-59	#A	6.2593E-01	6.2594E-01	1.067E+02%	1.50E+00
Co-56	#A	4.1551E-01	4.1551E-01	9.386E+01%	9.07E-01
CO-57	#A	-3.7286E-01	-3.7286E-01	1.050E+02%	1.31E+00
CO-58	#A	-1.7710E-01	-1.7710E-01	2.836E+02%	1.76E+00
CO-60	#	8.4388E-01	8.4388E-01	2.680E+01%	5.36E-01
ZN-65	#A	1.1519E+00	1.1519E+00	9.815E+01%	3.85E+00
NB-94	#A	-5.7168E-01	-5.7168E-01	1.089E+02%	1.45E+00
ZR-95	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.77E+00
NB-95	#A	5.0559E-02	5.0559E-02	7.595E+02%	1.39E+00
RU-103	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.06E+00
RH-106	#A	-6.9679E-02	-6.9680E-02	1.274E+04%	3.04E+01
AG-108M	#A	7.0135E-02	7.0135E-02	5.916E+02%	1.08E+00
AG-110M	#A	5.8724E-01	5.8724E-01	5.473E+01%	1.81E+00
SN-113	#A	-9.1694E-02	-9.1694E-02	7.937E+02%	2.51E+00
SB-124	#A	0.0000E+00	0.0000E+00	7.071E+02%	3.00E+00
SB-125	#A	1.5237E+00	1.5237E+00	8.339E+01%	2.90E+00
I-131	#	8.4967E-01	8.4971E-01	3.717E+01%	7.26E-01
Gd-153	#A	-9.9821E-01	-9.9821E-01	1.442E+02%	4.82E+00
Ga-68	#A	1.8147E+01	1.8293E+01	9.558E+01%	3.94E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.81E+00
BA-133	#A	-6.8713E-01	-6.8713E-01	1.355E+02%	3.13E+00
CS-134	#A	1.4888E+00	1.4888E+00	4.439E+01%	1.52E+00
CS-137	#A	-2.5950E-01	-2.5950E-01	2.054E+02%	1.85E+00
CE-139	#A	3.3803E-01	3.3803E-01	1.067E+02%	1.21E+00
Ba-140	#A	6.1117E-01	6.1118E-01	2.650E+02%	4.04E+00
La-140	#A	-6.1614E-01	-6.1616E-01	1.254E+02%	1.66E+00
CE-141	#A	-6.0139E-01	-6.0140E-01	1.691E+02%	3.41E+00
CE-144	#A	-7.4433E-02	-7.4433E-02	5.561E+03%	1.40E+01
PM-144	#A	4.8585E-01	4.8585E-01	1.008E+02%	1.15E+00
EU-152	#A	1.3154E+00	1.3154E+00	6.293E+01%	3.75E+00

EU-154 #A	1.5939E+00	1.5939E+00	7.840E+01%		2.59E+00
EU-155 #A	0.0000E+00	0.0000E+00	1.000E+03%		6.92E+00
HF-181 #A	3.7041E-01	3.7041E-01	1.259E+02%		2.11E+00
Ta-182 #A	1.7163E+00	1.7163E+00	9.138E+01%		6.51E+00
Hg-203 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.38E+00
TL-208	4.5918E+00	4.5918E+00	1.161E+01%		7.05E-01
PM-146 #A	9.6730E-01	9.6730E-01	4.395E+01%		1.63E+00
Y-88 #A	-2.5458E-01	-2.5458E-01	2.543E+02%		1.41E+00
Cd-113m#A	-6.1793E+03	-6.1793E+03	7.828E+01%		1.61E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		4.71E+01
Cf-251 #A	-2.0567E+00	-2.0567E+00	1.071E+02%		5.64E+00
Cf-249 #A	4.5433E-01	4.5433E-01	1.070E+02%		2.42E+00
Sn-126 #A	5.2518E-01	5.2518E-01	1.021E+03%		1.82E+01
PB-210 #A	3.0744E+01	3.0744E+01	4.432E+01%		3.46E+01
PB-212	1.5305E+01	1.5305E+01	6.237E+00%		1.57E+00
PB-214	7.6948E+00	7.6948E+00	1.351E+01%		2.09E+00
BI-207 #A	2.4684E-01	2.4684E-01	3.085E+02%		1.76E+00
BI-212 #A	5.0322E+00	5.0322E+00	1.499E+02%		2.58E+01
U-235 #A	1.8507E+00	1.8507E+00	1.048E+02%		1.44E+01
BI-214	1.1033E+01	1.1033E+01	9.876E+00%		1.13E+00
BI-210M#A	6.3156E-01	6.3156E-01	9.762E+01%		2.07E+00
AC-228	1.9346E+01	1.9346E+01	9.320E+00%		1.39E+00
TH-227 #A	3.3724E+00	3.3724E+00	1.015E+02%		8.97E+00
TH-229 #A	-9.7709E-01	-9.7709E-01	2.411E+02%		2.26E+01
TH-234 #A	8.0366E+00	8.0366E+00	4.965E+01%		1.76E+01
PA-231 #A	0.0000E+00	0.0000E+00	7.071E+02%		7.46E+01
PA-233 #A	0.0000E+00	0.0000E+00	7.071E+02%		6.11E+00
PA-234 #A	2.0374E+00	2.0374E+00	8.196E+01%		6.40E+00
PA-234M#A	6.4563E+01	6.4563E+01	7.491E+01%		1.95E+02
AM-241 #A	-1.3201E+00	-1.3201E+00	1.262E+02%		5.57E+00
Np-237 #A	1.1794E+00	1.1794E+00	3.439E+02%		1.36E+01
Ir-192 #A	1.1835E-01	1.1835E-01	2.430E+02%		2.55E+00
Cs-136 #A	-7.4598E-01	-7.4600E-01	8.576E+01%		2.15E+00
Np-239 #A	9.9749E-01	9.9765E-01	1.145E+02%		3.84E+00
Nd-147 #A	-4.5548E+00	-4.5549E+00	9.517E+01%		1.03E+01
TL-210 #A	5.5419E-01	5.5419E-01	8.548E+01%		1.60E+00
Kr-85 #A	1.1496E+02	1.1496E+02	1.211E+02%		4.70E+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 (   25.1 to  1999.1 keV)     3.157E+02  Bq/Sample
Total Decayed Activity (   25.1 to  1999.1 keV) 3.1565958E+02  Bq/Sample
```

412881_Gamma_180-86110-A-15-A. 12_Gamma_20190307.spc.



Test America St. Louis Spectrum ID: 2_Gamma_20190268

Sample Description: 412881_Gamma_180-86110-A-16-A
Detector: Detector # 2
Batch ID: 412881
Work Order Number: Gamma
Lot Number: 180-86110-A-16-A

Decay to Time: 2/20/2019 11:48 Live Time: 1800 sec
Acquisition Time: 2/20/2019 11:48:38 Real Time: 1805 sec
Analysis Time: 2/20/2019 12:19 Dead Time: 0.27 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 2_Soil_TunaCan.Clb
Efficiency Cal Desc: 2_Soil_TunaCan_101407
Efficiency Cal Date: 4/20/2018 13:56
Energy Cal Date: 4/20/2018 13:54
Library: Client_Long_Rev15.lib
Bkgd Correction File: 2_2019-01-20_1014.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	3.250E+00	98.4	3.199E+00	3.203E+00	1.089E+01
NA-22	4.399E-01	100.0	4.399E-01	4.404E-01	1.535E+00
K-40	2.499E+02	6.2	1.540E+01	1.991E+01	8.942E+00
Sc-46	1.782E-01	126.3	2.250E-01	2.252E-01	2.214E+00
CR-51	-2.122E+00	157.1	3.335E+00	3.337E+00	1.142E+01
MN-54	2.273E-01	205.4	4.668E-01	4.670E-01	1.201E+00
FE-59	2.265E-02	163.4	3.703E-02	3.704E-02	2.753E+00
Co-56	2.277E-02	66.0	1.502E-02	1.506E-02	1.863E+00
CO-57	0.000E+00	1.#INF	1.216E-01	1.216E-01	1.098E+00
CO-58	-5.895E-01	94.8	5.586E-01	5.594E-01	1.896E+00
CO-60	-1.247E+00	39.3	4.904E-01	4.943E-01	2.407E+00
ZN-65	1.233E+00	112.1	1.381E+00	1.383E+00	4.738E+00
NB-94	8.735E-01	28.9	2.527E-01	2.566E-01	6.952E-01
ZR-95	-3.777E-01	331.9	1.254E+00	1.254E+00	3.105E+00
NB-95	-2.556E-01	198.1	5.064E-01	5.065E-01	1.775E+00
RU-103	2.989E-01	152.8	4.566E-01	4.569E-01	1.169E+00
RH-106	1.023E-06	944413385.4	9.665E+00	9.665E+00	3.314E+01
AG-108M	2.654E-01	130.7	3.468E-01	3.470E-01	8.928E-01
AG-110M	2.438E-01	44.7	1.090E-01	1.097E-01	3.326E+00
SN-113	2.658E-01	295.4	7.852E-01	7.853E-01	2.691E+00
SB-124	-6.855E-01	158.4	1.086E+00	1.086E+00	3.656E+00
SB-125	9.152E-01	125.0	1.144E+00	1.145E+00	2.922E+00
I-131	4.532E-01	141.9	6.429E-01	6.433E-01	8.095E-01
Gd-153	-1.048E+00	148.5	1.556E+00	1.557E+00	5.198E+00
Ga-68	1.255E+01	146.4	1.836E+01	1.838E+01	4.556E+01
Tc-99m	2.891E-01	107.5	3.106E-01	3.111E-01	1.042E+00
BA-133	6.898E-01	141.5	9.758E-01	9.764E-01	2.743E+00
CS-134	-2.425E-01	86.7	2.103E-01	2.106E-01	2.671E+00
CS-137	-6.990E-01	117.5	8.213E-01	8.221E-01	2.782E+00
CE-139	5.070E-01	40.7	2.061E-01	2.078E-01	5.536E-01
Ba-140	1.092E+00	129.7	1.416E+00	1.417E+00	4.961E+00
La-140	2.339E-01	101.5	2.374E-01	2.377E-01	1.544E+00
CE-141	-5.609E-01	120.4	6.754E-01	6.761E-01	2.264E+00

CE-144	0.000E+00	1.#INF	9.454E-01	9.454E-01	1.049E+01
PM-144	5.366E-01	53.3	2.860E-01	2.873E-01	6.836E-01
EU-152	1.427E+00	95.2	1.359E+00	1.361E+00	3.173E+00
EU-154	1.417E+00	79.0	1.120E+00	1.122E+00	1.957E+00
EU-155	1.079E+00	111.7	1.206E+00	1.207E+00	6.520E+00
HF-181	7.123E-02	123.6	8.804E-02	8.811E-02	1.777E+00
Ta-182	4.267E+00	32.0	1.365E+00	1.382E+00	7.481E+00
Hg-203	2.626E-01	129.6	3.402E-01	3.405E-01	1.161E+00
TL-208	5.437E+00	13.0	7.091E-01	7.611E-01	1.141E+00
PM-146	-6.937E-02	1278.4	8.868E-01	8.868E-01	1.411E+00
Y-88	4.110E-01	47.4	1.949E-01	1.963E-01	9.247E-01
Cd-113m	-6.190E+03	126.0	7.800E+03	7.808E+03	2.620E+04
Cd-109	1.944E-01	6410.5	1.246E+01	1.246E+01	4.203E+01
Cf-251	-1.531E+00	117.9	1.805E+00	1.807E+00	4.874E+00
Cf-249	-3.206E-01	223.5	7.165E-01	7.167E-01	2.453E+00
Sn-126	3.844E+00	102.7	3.948E+00	3.954E+00	1.320E+01
PB-210	1.835E+01	73.5	1.348E+01	1.353E+01	3.694E+01
PB-212	1.527E+01	6.2	9.395E-01	1.232E+00	1.532E+00
PB-214	7.303E+00	13.9	1.017E+00	1.082E+00	2.219E+00
BI-207	1.223E-01	761.5	9.315E-01	9.315E-01	2.307E+00
BI-212	-5.146E+00	151.3	7.784E+00	7.788E+00	2.680E+01
U-235	-3.262E-01	786.7	2.566E+00	2.566E+00	8.811E+00
BI-214	6.920E+00	15.6	1.078E+00	1.134E+00	1.932E+00
BI-210M	-2.195E-01	121.1	2.657E-01	2.660E-01	3.049E+00
AC-228	1.551E+01	9.8	1.518E+00	1.709E+00	3.091E+00
TH-227	9.261E-01	194.2	1.798E+00	1.799E+00	1.156E+01
TH-229	6.167E+00	99.6	6.142E+00	6.151E+00	1.714E+01
TH-234	2.675E+00	168.6	4.509E+00	4.512E+00	1.520E+01
PA-231	9.347E+00	156.4	1.461E+01	1.462E+01	6.633E+01
PA-233	5.489E-01	221.3	1.215E+00	1.215E+00	5.846E+00
PA-234	2.412E+00	89.1	2.148E+00	2.152E+00	6.240E+00
PA-234M	4.185E+01	86.4	3.616E+01	3.622E+01	2.577E+02
AM-241	-9.138E-01	145.2	1.327E+00	1.328E+00	3.566E+00
Np-237	-2.463E+00	159.6	3.932E+00	3.934E+00	1.313E+01
Ir-192	3.035E-01	103.5	3.142E-01	3.147E-01	1.067E+00
Cs-136	-6.711E-01	99.1	6.650E-01	6.661E-01	1.610E+00
Np-239	1.173E+00	152.5	1.789E+00	1.790E+00	5.989E+00
Nd-147	-4.635E+00	96.3	4.466E+00	4.473E+00	1.109E+01
TL-210	1.318E-01	213.0	2.808E-01	2.809E-01	2.242E+00
Kr-85	-1.343E+01	1004.8	1.349E+02	1.349E+02	4.683E+02
Total	4.219E+02				

Analyst: Joey Sausto

Sample description
412881_Gamma_180-86110-A-16-A

Spectrum Filename: C:\User\SPC\Det2\2_Gamma_20190268.An1

Acquisition information

Start time:	2/20/2019 11:48:38 AM
Live time:	1800
Real time:	1805
Dead time:	0.27 %
Detector ID:	2

Detector system
Ge 2 SN/164

Calibration

Filename:	2_Soil_TunaCan.Clb

2_Soil_TunaCan_101407

Energy Calibration

Created:	4/20/2018 1:54:10 PM
Zero offset:	0.101 keV
Gain:	0.250 keV/channel
Quadratic:	-4.975E-09 keV/channel^2

Efficiency Calibration

Created:	4/20/2018 1:56:20 PM
Type:	Polynomial
Uncertainty:	1.003 %
Coefficients:	-0.414971 -4.933446 0.551852
	-0.058768 0.002630 -0.000046

Library Files

Main analysis library:	Client_Long_Rev15.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.60keV)
Stop channel:	8000 (2000.01keV)
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	2/20/2019 11:48:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	2_2019-01-20_1014.PBC 1/20/2019 10:14:02 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1743

***** 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	26.	73.46	0.92	1.826E-02	46.54	4.250	PBC<MDA	PB210
63.29	-2.	886.77	0.85	3.262E-02	63.29	3.810	PBC<MDA	TH234
64.36	22.	102.71	0.85	3.313E-02	64.28	9.700	PBC<MDA	Sn126
74.79	154.	12.97	0.86	3.745E-02				
77.14	203.	10.58	0.86	3.819E-02				
87.34	87.	23.05	0.70	4.062E-02	86.49	13.100	9.154E+00	Np237
					86.54	30.700	3.905E+00	EU155
					86.94	9.040	1.324E+01	Sn126
					87.57	37.500	3.182E+00	Sn126
					88.04	3.790	3.142E+01	Cd109
92.46	11.	168.59	0.87	4.144E-02	92.59	5.584	PBC<MDA	TH234
93.22	22.	148.50	0.87	4.154E-02	93.35	5.561	PBC<MDA	AC228
105.31	21.	153.24	0.88	4.240E-02	105.31	21.200	PBC<MDA	EU155
106.13	20.	152.53	0.88	4.242E-02	106.13	22.700	PBC<MDA	Np239
123.10	18.	100.48	0.90	4.194E-02	123.10	40.790	PBC<MDA	EU154
131.29	19.	130.95	0.90	4.126E-02	131.29	18.000	PBC<MDA	PA234
140.51	18.	107.46	0.91	4.029E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	-3.	786.71	0.91	3.990E-02	143.79	10.960	PBC<MDA	U235
162.66	14.	129.72	0.93	3.746E-02	162.66	6.220	PBC<MDA	Ba140
165.68	27.	40.66	1.13	3.703E-02	165.85	79.900	PBC<MDA	CE139
185.72	66.	26.08	0.95	3.435E-02	185.72	54.000	1.979E+00	U235
193.51	9.	190.49	0.95	3.333E-02	193.51	4.400	PBC<MDA	TH229
210.85	17.	99.61	0.97	3.117E-02	210.85	2.990	PBC<MDA	TH229
235.97	14.	233.13	0.99	2.836E-02	235.97	12.300	PBC<MDA	TH227
238.52	332.	6.81	1.03	2.809E-02	238.63	43.300	1.516E+01	PB212
241.94	14.	229.39	0.99	2.774E-02	242.00	7.430	PBC<MDA	PB214
244.69	14.	230.11	0.99	2.747E-02	244.69	7.580	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
270.06	38.	37.91	0.32	2.515E-02				
277.88	35.	35.45	1.02	2.455E-02	277.28	6.310	PBC<MDA	TL208
279.20	9.	129.57	1.02	2.439E-02	279.20	81.460	PBC<MDA	Hg203
284.30	9.	141.86	1.03	2.399E-02	284.30	6.140	PBC<MDA	I131
295.00	72.	22.02	0.62	2.319E-02	295.09	19.300	8.966E+00	PB214
					296.00	79.000	2.197E+00	TL210
300.07	10.	216.87	1.04	2.282E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.009E+01	PA231
					300.18	6.200	4.007E+00	PA233
300.18	10.	221.34	1.04	2.282E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.009E+01	PA231
					300.18	6.200	4.007E+00	PA233
300.46	25.	42.93	1.46	2.283E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	2.434E+01	PA231
					300.18	6.200	PBC<MDA	PA233
302.65	10.	225.30	1.04	2.264E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.369E+00	BA133
302.85	10.	229.56	1.04	2.263E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.369E+00	BA133
304.85	10.	233.43	1.04	2.249E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	9.034E-01	BI210M
304.90	8.	294.64	1.04	2.249E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	7.272E-01	BI210M
316.49	10.	103.53	1.05	2.172E-02	316.49	87.040	PBC<MDA	Ir192
328.76	12.	111.07	1.06	2.096E-02	328.76	20.300	PBC<MDA	La140
338.36	76.	16.85	0.47	2.041E-02	338.32	12.010	1.723E+01	AC228
340.57	2.	956.56	1.07	2.028E-02	340.57	46.900	PBC<MDA	Cs136
345.83	11.	165.52	1.07	2.000E-02	345.83	15.070	PBC<MDA	HF181
351.57	86.	17.06	1.02	1.967E-02	351.93	37.600	6.449E+00	PB214
356.00	11.	165.34	1.08	1.946E-02	356.00	62.050	PBC<MDA	BA133
364.48	5.	154.36	1.09	1.904E-02	364.48	81.700	PBC<MDA	I131
391.69	5.	295.37	1.11	1.780E-02	391.69	64.000	PBC<MDA	SN113
427.88	8.	125.00	1.14	1.641E-02	427.88	29.600	PBC<MDA	SB125
433.94	7.	130.67	1.14	1.620E-02	433.94	90.480	PBC<MDA	AG108M
477.60	9.	98.44	1.17	1.484E-02	477.60	10.520	PBC<MDA	BE7
487.02	8.	101.49	1.18	1.458E-02	487.02	45.500	PBC<MDA	La140
497.05	7.	152.75	1.19	1.431E-02	497.05	90.900	PBC<MDA	RU103
510.60	33.	36.92	0.79	1.397E-02	511.86	20.000	6.632E+00	RH106
569.32	6.	113.04	1.24	1.268E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.207E+00	PA234
					569.70	97.740	2.692E-01	BI207
583.17	103.	13.04	1.29	1.241E-02	583.02	84.500	5.437E+00	TL208
609.45	69.	15.58	1.68	1.194E-02	609.31	46.090	6.920E+00	BI214
636.97	1.	681.91	1.29	1.149E-02	636.97	7.170	PBC<MDA	I131
696.54	10.	53.29	1.34	1.063E-02	696.54	99.000	PBC<MDA	PM144
702.63	11.	49.20	1.34	1.055E-02	702.63	97.900	PBC<MDA	NB94
723.36	8.	117.35	1.36	1.029E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.048E-01	AG108M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					723.36	20.220	2.269E+00	EU154
763.94	8.	87.91	1.38	9.823E-03	763.94	22.280	PBC<MDA	AG110M
766.41	8.	86.42	1.39	9.796E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.610E+02	PA234M
834.85	4.	205.37	1.43	9.107E-03	834.85	99.980	PBC<MDA	MN54
871.10	18.	30.43	1.46	8.783E-03	871.10	99.890	1.140E+00	NB94
880.53	7.	98.01	1.47	8.703E-03	880.53	6.000	PBC<MDA	PA234
883.24	7.	111.15	1.47	8.680E-03	883.24	9.600	PBC<MDA	PA234
898.04	12.	47.42	1.48	8.558E-03	898.04	93.700	PBC<MDA	Y88
911.11	66.	15.21	1.65	8.453E-03	911.07	29.000	1.507E+01	AC228
946.02	4.	204.63	1.51	8.186E-03	946.02	13.400	PBC<MDA	PA234
969.06	38.	18.61	1.61	8.020E-03	968.97	17.460	1.508E+01	AC228
996.33	4.	179.85	1.54	7.832E-03	996.33	10.600	PBC<MDA	EU154
1048.07	5.	70.95	1.58	7.498E-03	1048.07	80.000	PBC<MDA	Cs136
1063.66	1.	761.55	1.59	7.403E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	5.	146.39	1.60	7.322E-03	1077.40	3.300	PBC<MDA	Ga68
1112.07	8.	100.94	1.62	7.124E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	8.	112.08	1.62	7.104E-03	1115.55	50.600	PBC<MDA	ZN65
1120.55	8.	126.29	1.63	7.077E-03				
1121.30	6.	169.23	1.63	7.073E-03				
1122.66	8.	117.47	1.63	7.078E-03	1120.29	15.100	PBC<MDA	BI214
1173.24	7.	135.44	1.66	6.799E-03	1173.24	99.900	PBC<MDA	CO60
1189.05	21.	32.00	1.67	6.719E-03	1189.05	16.200	1.072E+01	Ta182
1238.28	11.	97.53	1.70	6.483E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	5.	100.00	1.72	6.318E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.249E+00	EU154
1291.60	3.	183.09	1.73	6.244E-03	1291.60	43.200	PBC<MDA	FE59
1384.30	5.	44.72	1.79	5.864E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	2.	343.07	1.80	5.773E-03	1408.00	21.005	PBC<MDA	EU152
1460.80	268.	6.16	1.39	5.580E-03	1460.83	10.670	2.499E+02	K40
1763.93	6.	79.78	2.00	4.648E-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	
298.72	74.82	121.	154.	4.110E+03	12.97	0.856	-	sD
308.13	77.17	128.	203.	5.307E+03	10.58	0.858	-	sD
1079.72	270.06	45.	38.	1.498E+03	37.91	0.322	-	s
2041.86	510.60	45.	33.	2.382E+03	36.92	0.793	-	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_Rev15.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.79	46.55	110.	26.	0.014	73.46	0.920
TH-227	200.14	50.14	283.	-11.	-0.006	212.13	0.835s
AM-241	237.72	59.54	210.	-18.	-0.010	145.19	0.843s
TH-234	252.72	63.29	206.	-2.	-0.001	886.77	0.846
Sn-126	256.69	64.28	250.	22.	0.012	102.71	0.847s
BA-133	323.52	80.99	210.	-14.	-0.008	186.13	0.861s
Np-237	345.52	86.49	692.	-23.	-0.013	159.64	0.866
EU-155	345.73	86.54	582.	21.	0.012	162.66	0.866s
Sn-126	347.32	86.94	110.	67.	0.037	25.15	0.866D
Sn-126	349.84	87.57	578.	15.	0.009	120.93	0.866D
Nd-147	363.96	91.10	637.	-24.	-0.014	147.89	0.869s
TH-234	369.92	92.59	169.	11.	0.006	168.59	0.870D
AC-228	372.96	93.35	525.	22.	0.012	148.50	0.871s
Gd-153	389.56	97.50	610.	-24.	-0.013	148.53	0.875s
Np-239	397.56	99.50	634.	-24.	-0.013	151.05	0.876
Gd-153	412.36	103.20	658.	-24.	-0.013	153.31	0.879s
Np-239	414.35	103.70	681.	-24.	-0.013	155.95	0.879s
EU-155	420.81	105.31	486.	21.	0.011	153.24	0.881s
Np-239	424.07	106.13	471.	20.	0.011	152.53	0.882s
EU-152	486.67	121.78	200.	-15.	-0.008	135.81	0.894s
CO-57	487.79	122.06	215.	0.	0.000	1000.00	0.895
EU-154	491.95	123.10	152.	18.	0.010	100.48	0.895s
PA-234	524.72	131.29	300.	19.	0.011	130.95	0.902s
HF-181	531.64	133.02	319.	0.	0.000	1000.00	0.904s
CE-144	533.70	133.54	319.	0.	0.000	1000.00	0.904s
HF-181	544.74	136.30	319.	0.	0.000	1000.00	0.906s
CO-57	545.43	136.47	332.	-22.	-0.012	121.29	0.906s
Tc-99m	561.58	140.51	182.	18.	0.010	107.46	0.910s
U-235	574.68	143.79	205.	-3.	-0.001	786.71	0.912s
CE-141	581.30	145.44	261.	-19.	-0.011	120.43	0.914s
Ba-140	650.17	162.66	164.	14.	0.008	129.72	0.928s
U-235	653.05	163.38	178.	-17.	-0.010	106.82	0.928s
CE-139	662.27	165.68	33.	27.	0.015	40.66	1.128s
Cf-251	705.93	176.60	117.	-17.	-0.009	117.90	0.939s
U-235	742.41	185.72	78.	66.	0.037	26.08	0.946s
TH-229	773.56	193.51	83.	9.	0.005	190.49	0.953s
U-235	820.85	205.33	105.	-21.	-0.011	84.42	0.962s
TH-229	842.92	210.85	90.	17.	0.010	99.61	0.967s
TH-227	943.39	235.97	536.	14.	0.008	233.13	0.987
PB-212	954.04	238.63	44.	334.	0.186	6.15	0.989D
PB-214	967.50	242.00	524.	14.	0.008	229.39	0.991s
EU-152	978.28	244.69	530.	14.	0.008	230.11	0.994s
TH-227	1024.46	256.24	59.	-5.	-0.003	310.53	1.003s
Cd-113m	1054.30	263.70	226.	-17.	-0.010	126.00	1.009s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	1062.83	265.83	208.	-17.	-0.010	121.08	1.011s
TL-208	1108.63	277.28	61.	35.	0.020	35.45	1.020s
Hg-203	1116.30	279.20	69.	9.	0.005	129.57	1.021s
I-131	1136.69	284.30	44.	9.	0.005	141.86	1.025s
PB-214	1179.49	295.00	42.	72.	0.040	22.02	0.617s
TL-210	1183.49	296.00	230.	10.	0.006	213.00	1.034s
PB-212	1201.33	300.46	22.	25.	0.014	42.93	1.457s
PA-231	1199.77	300.07	240.	10.	0.006	216.87	1.038s
PA-233	1200.21	300.18	250.	10.	0.006	221.34	1.038s
PA-231	1210.09	302.65	260.	10.	0.006	225.30	1.040s
BA-133	1210.90	302.85	270.	10.	0.006	229.56	1.040s
Ba-140	1218.89	304.85	281.	10.	0.006	233.43	1.041s
BI-210M	1219.07	304.90	291.	8.	0.005	294.64	1.041s
Ir-192	1233.25	308.44	299.	0.	0.000	1000.00	1.044s
Ir-192	1265.45	316.49	52.	10.	0.006	103.53	1.050s
CR-51	1279.82	320.08	78.	-8.	-0.005	157.15	1.053s
La-140	1314.53	328.76	52.	12.	0.007	111.07	1.060s
Cf-249	1333.24	333.44	70.	-9.	-0.005	183.35	1.064
AC-228	1352.93	338.36	24.	76.	0.042	16.85	0.468s
Cs-136	1361.76	340.57	182.	2.	0.001	956.56	1.069s
EU-152	1376.62	344.29	184.	0.	0.000	1000.00	1.072s
HF-181	1382.80	345.83	147.	11.	0.006	165.52	1.073s
PB-214	1405.75	351.57	33.	86.	0.048	17.06	1.021
BA-133	1423.48	356.00	149.	11.	0.006	165.34	1.081s
I-131	1457.41	364.48	18.	5.	0.003	154.36	1.088s
BA-133	1534.84	383.84	100.	-14.	-0.008	105.61	1.103s
Cf-249	1551.27	387.95	113.	-7.	-0.004	223.49	1.106s
SN-113	1566.23	391.69	127.	5.	0.003	295.37	1.109s
SB-125	1710.97	427.88	24.	8.	0.004	125.00	1.137s
AG-108M	1735.21	433.94	20.	7.	0.004	130.67	1.141s
Ir-192	1871.70	468.06	37.	-6.	-0.003	213.39	1.167
BE-7	1909.84	477.60	36.	9.	0.005	98.44	1.175s
HF-181	1927.44	482.00	57.	-6.	-0.003	183.58	1.178s
La-140	1947.54	487.02	16.	8.	0.005	101.49	1.182s
RU-103	1987.67	497.05	28.	7.	0.004	152.75	1.189s
RH-106	2046.91	511.86	130.	-26.	-0.014	66.12	2.450s
Nd-147	2123.45	531.00	48.	-15.	-0.008	96.34	1.215s
Ba-140	2148.49	537.26	32.	-2.	-0.001	558.27	1.219s
CS-134	2252.39	563.24	36.	-5.	-0.003	229.92	1.239
CS-134	2276.73	569.32	20.	6.	0.003	113.04	1.243s
PA-234	2277.33	569.47	26.	0.	0.000	1000.00	1.243s
BI-207	2278.25	569.70	35.	-7.	-0.004	122.84	1.244
TL-208	2332.14	583.17	16.	103.	0.057	13.04	1.293
SB-125	2401.44	600.50	276.	-15.	-0.008	90.17	1.266s
SB-124	2410.37	602.73	261.	-15.	-0.008	158.38	1.268s
CS-134	2418.28	604.71	246.	-15.	-0.008	153.83	1.269s
BI-214	2437.26	609.45	12.	69.	0.038	15.58	1.676s
RU-103	2440.64	610.30	231.	-15.	-0.008	148.83	1.274s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-108M	2456.57	614.28	217.	-15.	-0.008	143.86	1.276
PM-144	2471.69	618.06	202.	-4.	-0.002	495.64	1.279s
SB-125	2543.00	635.89	32.	-8.	-0.004	106.07	1.292s
I-131	2547.34	636.97	41.	1.	0.001	681.91	1.293s
AG-110M	2630.49	657.76	75.	-15.	-0.008	85.28	1.308s
CS-137	2646.08	661.66	92.	-12.	-0.007	117.49	1.311s
PM-144	2785.61	696.54	5.	10.	0.006	53.29	1.336s
NB-94	2809.96	702.63	5.	11.	0.006	49.20	1.340s
SB-124	2890.59	722.79	52.	-4.	-0.002	297.61	1.355s
AG-108M	2891.19	722.94	56.	0.	0.000	1000.00	1.355s
EU-154	2892.88	723.36	46.	8.	0.005	117.35	1.355s
ZR-95	2896.24	724.20	47.	0.	0.000	1000.00	1.356s
BI-212	2908.12	727.17	55.	-7.	-0.004	151.25	1.358s
PM-146	2942.32	735.72	22.	-4.	-0.002	264.34	1.364s
PM-146	2988.08	747.16	27.	-12.	-0.007	45.85	1.372s
ZR-95	3026.36	756.73	35.	-4.	-0.002	331.91	1.379s
AG-110M	3055.21	763.94	23.	8.	0.005	87.91	1.384s
NB-95	3062.60	765.79	38.	-5.	-0.003	198.14	1.385s
PA-234M	3065.09	766.41	22.	8.	0.005	86.42	1.386s
EU-152	3115.12	778.92	30.	-8.	-0.005	139.28	1.395s
CS-134	3182.92	795.87	61.	-9.	-0.005	131.56	1.407
CO-58	3242.54	810.77	39.	-10.	-0.005	94.76	1.417s
Cs-136	3273.44	818.50	27.	-11.	-0.006	99.10	1.422s
MN-54	3338.84	834.85	13.	4.	0.002	205.37	1.434s
Co-56	3386.53	846.77	35.	-14.	-0.008	88.81	1.442s
TL-208	3441.70	860.56	39.	-5.	-0.003	125.54	1.452s
NB-94	3483.84	871.10	6.	18.	0.010	30.43	1.459s
PA-234	3521.57	880.53	21.	7.	0.004	98.01	1.465s
PA-234	3532.41	883.24	29.	7.	0.004	111.15	1.467s
AG-110M	3538.19	884.68	56.	-10.	-0.006	108.66	1.468s
Sc-46	3556.57	889.28	46.	-4.	-0.002	233.49	1.471s
Y-88	3591.61	898.04	5.	12.	0.007	47.42	1.477s
AC-228	3643.89	911.11	6.	66.	0.037	15.21	1.646
AG-110M	3749.43	937.49	33.	-14.	-0.008	41.60	1.504s
PA-234	3783.54	946.02	14.	4.	0.002	204.63	1.510s
AC-228	3875.69	969.06	3.	38.	0.021	18.61	1.607
EU-154	3984.78	996.33	30.	4.	0.002	179.85	1.544
PA-234M	4003.46	1001.00	35.	0.	0.000	1000.00	1.547
Co-56	4150.84	1037.84	23.	-4.	-0.002	241.30	1.571s
Cs-136	4191.76	1048.07	5.	5.	0.003	70.95	1.578s
RH-106	4200.92	1050.36	24.	-5.	-0.003	145.94	1.579s
BI-207	4254.12	1063.66	19.	1.	0.001	761.55	1.588s
Ga-68	4309.08	1077.40	9.	5.	0.003	146.39	1.597s
FE-59	4396.49	1099.25	14.	-3.	-0.002	270.80	1.611s
EU-152	4447.79	1112.07	28.	8.	0.004	100.94	1.620s
ZN-65	4461.68	1115.55	36.	8.	0.004	112.08	1.622s
BI-214	4480.64	1120.29	39.	8.	0.004	117.47	1.625
Sc-46	4481.70	1120.55	47.	8.	0.004	126.29	1.625s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	4484.70	1121.30	43.	6.	0.003	169.23	1.626
CO-60	4692.46	1173.24	15.	7.	0.004	135.44	1.659s
Ta-182	4755.72	1189.05	5.	21.	0.012	32.00	1.669s
Ta-182	4885.17	1221.41	25.	-2.	-0.001	554.15	1.689s
Co-56	4952.65	1238.28	20.	11.	0.006	97.53	1.700
NA-22	5097.66	1274.53	10.	5.	0.003	100.00	1.723s
EU-154	5097.70	1274.54	15.	0.	0.000	1000.00	1.723s
FE-59	5165.93	1291.60	5.	3.	0.002	183.09	1.733s
TL-210	5251.56	1313.00	30.	-14.	-0.008	90.07	1.746s
CO-60	5329.57	1332.50	26.	-14.	-0.008	39.34	1.758s
AG-110M	5536.78	1384.30	0.	5.	0.003	44.72	1.789s
EU-152	5631.60	1408.00	5.	2.	0.001	343.07	1.804s
K-40	5842.83	1460.80	2.	268.	0.149	6.16	1.391s
La-140	6384.53	1596.21	5.	-2.	-0.001	669.15	1.912s
BI-214	7057.76	1764.49	10.	6.	0.004	79.78	2.005s
Co-56	7085.20	1771.35	7.	0.	0.000	1000.00	2.008s
Y-88	7344.09	1836.06	0.	0.	0.000	1000.00	2.042s

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	3.2498E+00					5.31E+01	
			477.60	3.250E+00	?(	1.089E+01	9.84E+01	1.05E+01 G
NA-22	C	4.3989E-01					9.50E+02	
			1274.53	4.399E-01	?(	1.535E+00	1.00E+02	9.99E+01 G
K-40	N	2.4991E+02					4.66E+11	
			1460.83	2.499E+02	(P	8.942E+00	6.16E+00	1.07E+01 G
Sc-46	F	1.7817E-01					8.38E+01	
			889.28	-2.711E-01	?(	2.214E+00	2.33E+02	1.00E+02 G
			1120.55	6.274E-01	&(	2.719E+00	1.26E+02	1.00E+02 G
CR-51	F	-2.1222E+00					2.77E+01	
			320.08	-2.122E+00	?(	1.142E+01	1.57E+02	9.94E+00 G
MN-54	C	2.2731E-01					3.12E+02	
			834.85	2.273E-01	?(P	1.201E+00	2.05E+02	1.00E+02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F 2.2654E-02					4.45E+01	
		1099.25	-4.099E-01	?(	2.753E+00	2.71E+02	5.65E+01 G
		1291.60	5.884E-01	?(P	2.735E+00	1.83E+02	4.32E+01 G
Co-56	C 2.2770E-02					7.73E+01	
		846.77	-8.762E-01	?(	1.863E+00	8.88E+01	9.99E+01 G
		1238.28	1.383E+00	?(P	3.078E+00	9.75E+01	6.61E+01 G
		1037.84	-2.253E+00	+	1.311E+01	2.41E+02	1.41E+01 G
		1771.35	0.000E+00	-	1.164E+01	1.00E+03	1.55E+01 A
CO-58	C -5.8951E-01					7.09E+01	
		810.78	-5.895E-01	?(	1.896E+00	9.48E+01	9.95E+01 G
CO-60	F -1.2466E+00					1.93E+03	
		1332.50	-1.247E+00	?(P	2.407E+00	3.93E+01	1.00E+02 G
		1173.24	5.400E-01	+ P	1.717E+00	1.35E+02	9.99E+01 G
ZN-65	F 1.2325E+00					2.44E+02	
		1115.55	1.233E+00	?(	4.738E+00	1.12E+02	5.06E+01 G
NB-94	I 8.7349E-01					7.41E+06	
		702.63	6.017E-01	?(P	6.952E-01	4.92E+01	9.79E+01 G
		871.10	1.140E+00	?(	8.944E-01	3.04E+01	9.99E+01 G
ZR-95	I -3.7770E-01					6.40E+01	
		756.73	-3.777E-01	?(	3.105E+00	3.32E+02	5.45E+01 G
		724.20	0.000E+00	+	4.241E+00	1.00E+03	4.42E+01 G
NB-95	I -2.5557E-01					6.40E+01	
		765.79	-2.556E-01	?(	1.775E+00	1.98E+02	9.98E+01 G
RU-103	I 2.9893E-01					3.93E+01	
		497.05	2.989E-01	?(	1.169E+00	1.53E+02	9.09E+01 G
		610.30	-1.190E+01	+	5.963E+01	1.49E+02	5.75E+00 GA
RH-106	I 1.0233E-06					3.74E+02	
		621.92	1.023E-06	%(	3.314E+01	9.44E+08	9.93E+00 G
		1050.36	-2.373E+01	+	1.215E+02	1.46E+02	1.56E+00 G
		511.86	-5.093E+00	+	1.113E+01	6.61E+01	2.00E+01 GA
AG-108M	C 2.6538E-01					1.53E+05	
		433.94	2.654E-01	?(	8.928E-01	1.31E+02	9.05E+01 G
		722.94	0.000E+00	-	2.232E+00	1.00E+03	9.08E+01 G
		614.28	-7.674E-01	+	3.719E+00	1.44E+02	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	2.4375E-01					2.50E+02	
			884.68	-9.003E-01	?(	3.326E+00	1.09E+02	7.27E+01 G
			657.76	-7.924E-01	+	2.265E+00	8.53E+01	9.46E+01 G
			937.49	-2.750E+00	+ P	5.767E+00	4.16E+01	3.44E+01 G
			1384.30	1.950E+00	?(	2.875E+00	4.47E+01	2.43E+01 G
			763.94	2.115E+00	?(	6.320E+00	8.79E+01	2.23E+01 G
SN-113	F	2.6583E-01					1.15E+02	
			391.69	2.658E-01	&(P	2.691E+00	2.95E+02	6.40E+01 G
SB-124	F	-6.8551E-01					6.02E+01	
			602.73	-6.855E-01	?(	3.656E+00	1.58E+02	9.83E+01 G
			1690.98	-2.290E-01	% P	3.376E+00	1.73E+03	4.78E+01 G
			722.79	-1.746E+00	+	1.820E+01	2.98E+02	1.08E+01 G
SB-125	I	9.1517E-01					1.01E+03	
			427.88	9.152E-01	*(	2.922E+00	1.25E+02	2.96E+01 G
			600.50	-3.828E+00	+ P	2.059E+01	9.02E+01	1.79E+01 G
			635.89	-3.415E+00	+	1.241E+01	1.06E+02	1.13E+01 G
			463.37	2.319E-01	%	1.483E+01	1.82E+03	1.05E+01 G
I-131	I	4.5320E-01					8.02E+00	
			364.48	1.930E-01	?(	8.095E-01	1.54E+02	8.17E+01 G
			284.30	3.394E+00	(	1.268E+01	1.42E+02	6.14E+00 G
			636.97	8.992E-01	?(	2.187E+01	6.82E+02	7.17E+00 G
Gd-153	F	-1.0476E+00					2.42E+02	
			97.50	-1.048E+00	?(	5.198E+00	1.49E+02	3.00E+01 G
			103.20	-1.437E+00	+	7.357E+00	1.53E+02	2.18E+01 G
Ga-68	C	1.2545E+01					4.71E-02	
			1077.40	1.255E+01	?(	4.556E+01	1.46E+02	3.30E+00 G
Tc-99m	I	2.8906E-01					2.51E-01	
			140.51	2.891E-01	*(	1.042E+00	1.07E+02	8.93E+01 G
BA-133	F	6.8982E-01					3.85E+03	
			356.00	4.891E-01	?(	2.743E+00	1.65E+02	6.20E+01 G
			302.85	1.369E+00	?(	1.062E+01	2.30E+02	1.83E+01 G
			383.84	-4.735E+00	+	1.686E+01	1.06E+02	8.94E+00 GA
			80.99	-5.819E-01	+	2.920E+00	1.86E+02	3.41E+01 GA
CS-134	I	-2.4247E-01					7.54E+02	
			795.87	-5.935E-01	?(	2.671E+00	1.32E+02	8.55E+01 G
			604.71	-6.928E-01	&	3.589E+00	1.54E+02	9.76E+01 G
			569.32	1.710E+00	?(	6.710E+00	1.13E+02	1.54E+01 G
			801.95	-3.392E-01	%	1.661E+01	1.91E+03	8.69E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	-2.786E+00	& P	1.602E+01	2.30E+02	8.35E+00 G
CS-137	I	-6.9903E-01					1.10E+04	
			661.66	-6.990E-01	&(	2.782E+00	1.17E+02	8.52E+01 G
CE-139	F	5.0702E-01					1.38E+02	
			165.85	5.070E-01	(	5.536E-01	4.07E+01	7.99E+01 G
Ba-140	I	1.0916E+00					1.28E+01	
			537.26	-3.413E-01	?(	4.961E+00	5.58E+02	2.44E+01 G
			162.66	3.397E+00	(P	1.486E+01	1.30E+02	6.22E+00 G
			304.85	5.895E+00	&(	4.650E+01	2.33E+02	4.29E+00 G
La-140	I	2.3392E-01					1.28E+01	
			1596.21	-2.802E-01	?(P	1.544E+00	6.69E+02	9.54E+01 G
			487.02	6.883E-01	&(	1.788E+00	1.01E+02	4.55E+01 G
			328.76	1.631E+00	&(P	4.720E+00	1.11E+02	2.03E+01 G
			815.77	-2.089E-01	&	9.037E+00	1.22E+03	2.33E+01 G
CE-141	I	-5.6086E-01					3.25E+01	
			145.44	-5.609E-01	?(	2.264E+00	1.20E+02	4.82E+01 G
PM-144	C	5.3660E-01					3.63E+02	
			696.54	5.366E-01	?(P	6.836E-01	5.33E+01	9.90E+01 G
			618.06	-1.937E-01	-	3.277E+00	4.96E+02	9.91E+01 G
EU-152	F	1.4273E+00					4.94E+03	
			121.78	-6.938E-01	?(	3.173E+00	1.36E+02	2.86E+01 G
			344.29	0.000E+00	+	6.883E+00	1.00E+03	2.65E+01 G
			1112.07	4.552E+00	?(	1.573E+01	1.01E+02	1.36E+01 G
			778.92	-3.703E+00	+	1.261E+01	1.39E+02	1.29E+01 G
			964.11	3.935E-01	%	2.061E+01	1.49E+03	1.46E+01 G
			244.69	3.800E+00	?(	2.934E+01	2.30E+02	7.58E+00 G
			1408.00	7.235E-01	? P	6.212E+00	3.43E+02	2.10E+01 GA
EU-154	I	1.4172E+00					3.14E+03	
			123.10	5.807E-01	*(	1.957E+00	1.00E+02	4.08E+01 G
			1274.54	0.000E+00	-	5.187E+00	1.00E+03	3.52E+01 G
			723.36	2.269E+00	?(	9.114E+00	1.17E+02	2.02E+01 G
			873.23	-3.444E-01	%	1.311E+01	1.04E+03	1.23E+01 G
			1004.77	-1.984E-01	%	1.209E+01	1.69E+03	1.80E+01 G
			996.33	3.012E+00	?(	1.904E+01	1.80E+02	1.06E+01 G
EU-155	I	1.0790E+00					1.81E+03	
			105.31	1.271E+00	&(P	6.520E+00	1.53E+02	2.12E+01 G
			86.54	9.462E-01	?(	5.147E+00	1.63E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	7.1233E-02					4.24E+01	
			482.00	-2.797E-01	?(	1.777E+00	1.84E+02	8.05E+01 G
			133.02	0.000E+00	&	2.683E+00	1.00E+03	4.33E+01 G
			345.83	1.946E+00	&(	1.093E+01	1.66E+02	1.51E+01 G
			136.30	0.000E+00	-	2.002E+01	1.00E+03	5.85E+00 G
Ta-182	F	4.2667E+00					1.14E+02	
			1121.30	1.272E+00	&(	7.481E+00	1.69E+02	3.49E+01 G
			1221.41	-6.271E-01	+	8.156E+00	5.54E+02	2.70E+01 G
			1189.05	1.072E+01	?(	6.701E+00	3.20E+01	1.62E+01 G
Hg-203	F	2.6255E-01					4.66E+01	
			279.20	2.626E-01	?(	1.161E+00	1.30E+02	8.15E+01 G
TL-208	N	5.4370E+00					6.98E+02	
			583.02	5.437E+00	(P	1.141E+00	1.30E+01	8.45E+01 G
			277.28	1.267E+01	& P	1.399E+01	3.54E+01	6.31E+00 G
			860.56	-2.572E+00	- P	1.605E+01	1.26E+02	1.24E+01 G
PM-146	C	-6.9369E-02					2.02E+03	
			453.88	-6.937E-02	&(P	1.411E+00	1.28E+03	6.50E+01 G
			747.16	-2.002E+00	+ P	4.364E+00	4.59E+01	3.40E+01 G
			735.72	-8.924E-01	+	5.939E+00	2.64E+02	2.25E+01 G
Y-88	F	4.1104E-01					1.07E+02	
			1836.06	0.000E+00	?(	9.247E-01	1.00E+03	9.92E+01 G
			898.04	8.462E-01	?(P	8.941E-01	4.74E+01	9.37E+01 G
Cd-113m		-6.1904E+03					5.33E+03	
			263.70	-6.190E+03	(	2.620E+04	1.26E+02	6.00E-03 K
Cd-109	F	1.9442E-01					4.53E+02	
							Derived Ave Activity	
			88.04	1.944E-01	}(	4.203E+01	6.41E+03	3.79E+00 G
Cf-251	T	-1.5313E+00					3.28E+05	
			176.60	-1.531E+00	(	4.874E+00	1.18E+02	1.70E+01 G
			227.00	2.005E-01	%	1.450E+01	2.74E+03	6.30E+00 GA
Cf-249	T	-3.2062E-01					1.28E+05	
			387.95	-3.206E-01	?(	2.453E+00	2.23E+02	6.60E+01 G
			333.44	-1.500E+00	+	7.203E+00	1.83E+02	1.55E+01 G
Sn-126		3.8435E+00					3.65E+07	
			87.57	5.640E-01	}	4.180E+00	1.21E+02	3.75E+01 GA
			64.28	3.844E+00	?(	1.320E+01	1.03E+02	9.70E+00 G
			86.94	1.021E+01		7.815E+00	2.51E+01	9.04E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	1.8353E+01					8.14E+03	
			46.54	1.835E+01	(P	3.694E+01	7.35E+01	4.25E+00 G
PB-212	N	1.5273E+01					6.98E+02	
			238.63	1.527E+01	(P	1.532E+00	6.15E+00	4.33E+01 G
			300.03	1.826E+01	+ P	1.837E+01	4.29E+01	3.28E+00 GA
PB-214	N	7.3026E+00					5.84E+05	
			351.93	6.449E+00	(P	2.219E+00	1.71E+01	3.76E+01 G
			295.09	8.966E+00	(P	4.078E+00	2.20E+01	1.93E+01 G
			242.00	3.830E+00	-	2.949E+01	2.29E+02	7.43E+00 GA
BI-207	C	1.2232E-01					1.18E+04	
			1063.66	1.223E-01	?(P	2.307E+00	7.62E+02	7.45E+01 G
			569.70	-3.215E-01	&	1.361E+00	1.23E+02	9.77E+01 G
BI-212	N	-5.1463E+00					6.98E+02	
			727.17	-5.146E+00	(	2.680E+01	1.51E+02	7.55E+00 G
			785.42	1.508E+00	&	1.104E+02	2.86E+03	1.28E+00 GA
U-235	N	-3.2619E-01					2.57E+11	
			143.79	-3.262E-01	(P	8.811E+00	7.87E+02	1.10E+01 G
			205.33	-7.172E+00	+ P	1.760E+01	8.44E+01	5.01E+00 G
			163.38	-5.077E+00	+ P	1.898E+01	1.07E+02	5.08E+00 G
			185.72	1.979E+00	P	1.313E+00	2.61E+01	5.40E+01 GA
BI-214	N	6.9201E+00					5.84E+05	
			609.31	6.920E+00	(P	1.932E+00	1.56E+01	4.61E+01 G
			1120.29	4.104E+00	& P	1.654E+01	1.17E+02	1.51E+01 G
			1764.49	5.040E+00	- P	1.362E+01	7.98E+01	1.54E+01 G
BI-210M	T	-2.1947E-01					1.10E+09	
			265.83	-7.496E-01	&(	3.049E+00	1.21E+02	5.00E+01 G
			304.90	7.272E-01	?(	7.250E+00	2.95E+02	2.80E+01 G
AC-228	N	1.5514E+01					2.10E+03	
			911.07	1.507E+01	(	3.091E+00	1.52E+01	2.90E+01 G
			968.97	1.508E+01	(	4.277E+00	1.86E+01	1.75E+01 G
			338.32	1.723E+01	(	5.788E+00	1.69E+01	1.20E+01 G
			93.35	5.302E+00	-	2.633E+01	1.48E+02	5.56E+00 XA
TH-227	N	9.2613E-01					7.95E+03	
			256.24	-1.405E+00	?(	1.156E+01	3.11E+02	7.00E+00 G
			235.97	2.253E+00	&(	1.762E+01	2.33E+02	1.23E+01 G
			50.14	-3.462E+00	&	2.479E+01	2.12E+02	8.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	6.1667E+00					2.68E+06	
			193.51	3.284E+00	&(	1.714E+01	1.90E+02	4.40E+00 G
			210.85	1.041E+01	&(	2.797E+01	9.96E+01	2.99E+00 G
TH-234	N	2.6748E+00					1.63E+12	
			92.59	2.675E+00	(P	1.520E+01	1.69E+02	5.58E+00 G
			63.29	-1.024E+00	- P	3.113E+01	8.87E+02	3.81E+00 G
PA-231	N	9.3468E+00					1.20E+07	
			302.65	8.708E+00	?(	6.633E+01	2.25E+02	2.88E+00 G
			300.07	1.009E+01	(	7.406E+01	2.17E+02	2.46E+00 G
PA-233	C	5.4892E-01					7.82E+08	
			312.01	-4.659E-02	%(P	5.846E+00	1.60E+03	3.60E+01 G
			300.18	4.007E+00	(	2.999E+01	2.21E+02	6.20E+00 G
PA-234	N	2.4121E+00					1.63E+12	
			131.29	1.421E+00	&(	6.240E+00	1.31E+02	1.80E+01 G
			946.02	2.026E+00	?(	1.020E+01	2.05E+02	1.34E+01 G
			569.47	0.000E+00	-	1.415E+01	1.00E+03	8.20E+00 G
			883.24	4.810E+00	?(	1.840E+01	1.11E+02	9.60E+00 G
			880.53	7.666E+00	?	2.578E+01	9.80E+01	6.00E+00 GA
PA-234M	N	4.1846E+01					1.63E+12	
			1001.00	0.000E+00	?(	2.577E+02	1.00E+03	8.37E-01 G
			766.41	1.610E+02	&(	4.723E+02	8.64E+01	2.94E-01 G
AM-241	T	-9.1380E-01					1.58E+05	
			59.54	-9.138E-01	?(	3.566E+00	1.45E+02	3.59E+01 G
Np-237	F	-2.4628E+00					2.14E+06	
			86.49	-2.463E+00	(	1.313E+01	1.60E+02	1.31E+01 G
Ir-192	F	3.0349E-01					7.40E+01	
			316.49	3.035E-01	(	1.067E+00	1.04E+02	8.70E+01 G
			468.06	-4.025E-01	&	2.197E+00	2.13E+02	5.18E+01 G
			308.44	0.000E+00	-	6.551E+00	1.00E+03	3.18E+01 G
Cs-136	F	-6.7109E-01					1.30E+01	
			818.50	-6.711E-01	?(	1.610E+00	9.91E+01	1.00E+02 G
			1048.07	5.081E-01	+	1.200E+00	7.10E+01	8.00E+01 G
			340.57	1.168E-01	+	3.830E+00	9.57E+02	4.69E+01 G
Np-239	T	1.1729E+00					2.36E+00	
			103.70	-1.305E+00	+	6.798E+00	1.56E+02	2.40E+01 X
			106.13	1.173E+00	(	5.989E+00	1.53E+02	2.27E+01 G
			99.50	-2.092E+00	+	1.055E+01	1.51E+02	1.50E+01 X

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Nd-147      -4.6350E+00                                      1.11E+01
                          531.00-4.635E+00 ?(  1.109E+01 9.63E+01 1.30E+01 G
                           91.10-1.160E+00 +   5.727E+00 1.48E+02 2.83E+01 G

TL-210   N   1.3184E-01                                      5.84E+05
                          799.60-9.904E-03 %(  2.242E+00 6.38E+03 9.90E+01 G
                          296.00 3.094E-01 ?(  2.230E+00 2.13E+02 7.90E+01 G
                         1313.00-6.020E+00 +   1.214E+01 9.01E+01 2.10E+01 GA

Kr-85    I  -1.3428E+01                                      3.92E+03
                          513.98-1.343E+01 %(  4.683E+02 1.00E+03 4.30E-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	283.	-11.	-0.006	212.13	-3.462E+00	
AM-241	59.54	210.	-18.	-0.010	145.19	-9.138E-01	
BA-133	80.99	210.	-14.	-0.008	186.13	-5.819E-01	
Np-237	86.49	692.	-23.	-0.013	159.64	-2.463E+00	
EU-155	86.54	582.	21.	0.012	162.66	9.462E-01	
Nd-147	91.10	637.	-24.	-0.014	147.89	-1.160E+00	
Gd-153	97.50	610.	-24.	-0.013	148.53	-1.048E+00	
Np-239	99.50	634.	-24.	-0.013	151.05	-2.092E+00	
Gd-153	103.20	658.	-24.	-0.013	153.31	-1.437E+00	
Np-239	103.70	681.	-24.	-0.013	155.95	-1.305E+00	
EU-155	105.31	486.	21.	0.011	153.24	1.271E+00	P
Np-239	106.13	471.	20.	0.011	152.53	1.173E+00	
EU-152	121.78	200.	-15.	-0.008	135.81	-6.938E-01	
EU-154	123.10	152.	18.	0.010	100.48	5.807E-01	
PA-234	131.29	300.	19.	0.011	130.95	1.421E+00	
CO-57	136.47	332.	-22.	-0.012	121.29	-2.758E+00	
Tc-99m	140.51	182.	18.	0.010	107.46	2.891E-01	
U-235	143.79	205.	-3.	-0.001	786.71	-3.262E-01	P
CE-141	145.44	261.	-19.	-0.011	120.43	-5.609E-01	
Ba-140	162.66	164.	14.	0.008	129.72	3.397E+00	P
U-235	163.38	178.	-17.	-0.010	106.82	-5.077E+00	P
Cf-251	176.60	117.	-17.	-0.009	117.90	-1.531E+00	
U-235	185.72	78.	66.	0.037	26.08	1.979E+00	P
TH-229	193.51	83.	9.	0.005	190.49	3.284E+00	
U-235	205.33	105.	-21.	-0.011	84.42	-7.172E+00	P
TH-229	210.85	90.	17.	0.010	99.61	1.041E+01	
TH-227	235.97	536.	14.	0.008	233.13	2.253E+00	
EU-152	244.69	530.	14.	0.008	230.11	3.800E+00	
TH-227	256.24	59.	-5.	-0.003	310.53	-1.405E+00	
Cd-113m	263.70	226.	-17.	-0.010	126.00	-6.190E+03	
BI-210M	265.83	208.	-17.	-0.010	121.08	-7.496E-01	
Hg-203	279.20	69.	9.	0.005	129.57	2.626E-01	
I-131	284.30	44.	9.	0.005	141.86	3.394E+00	
TL-210	296.00	230.	10.	0.006	213.00	3.094E-01	
PA-231	300.07	240.	10.	0.006	216.87	1.009E+01	
PA-233	300.18	250.	10.	0.006	221.34	4.007E+00	
PA-231	302.65	260.	10.	0.006	225.30	8.708E+00	
BA-133	302.85	270.	10.	0.006	229.56	1.369E+00	
Ba-140	304.85	281.	10.	0.006	233.43	5.895E+00	
BI-210M	304.90	291.	8.	0.005	294.64	7.272E-01	
Ir-192	316.49	52.	10.	0.006	103.53	3.035E-01	
CR-51	320.08	78.	-8.	-0.005	157.15	-2.122E+00	
La-140	328.76	52.	12.	0.007	111.07	1.631E+00	P
Cf-249	333.44	70.	-9.	-0.005	183.35	-1.500E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cs-136	340.57	182.	2.	0.001	956.56	1.168E-01	
HF-181	345.83	147.	11.	0.006	165.52	1.946E+00	
BA-133	356.00	149.	11.	0.006	165.34	4.891E-01	
I-131	364.48	18.	5.	0.003	154.36	1.930E-01	
BA-133	383.84	100.	-14.	-0.008	105.61	-4.735E+00	
Cf-249	387.95	113.	-7.	-0.004	223.49	-3.206E-01	
SN-113	391.69	127.	5.	0.003	295.37	2.658E-01	P
SB-125	427.88	24.	8.	0.004	125.00	9.152E-01	
AG-108M	433.94	20.	7.	0.004	130.67	2.654E-01	
Ir-192	468.06	37.	-6.	-0.003	213.39	-4.025E-01	
BE-7	477.60	36.	9.	0.005	98.44	3.250E+00	
HF-181	482.00	57.	-6.	-0.003	183.58	-2.797E-01	
La-140	487.02	16.	8.	0.005	101.49	6.883E-01	
RU-103	497.05	28.	7.	0.004	152.75	2.989E-01	
RH-106	511.86	130.	-26.	-0.014	66.12	-5.093E+00	
Nd-147	531.00	48.	-15.	-0.008	96.34	-4.635E+00	
Ba-140	537.26	32.	-2.	-0.001	558.27	-3.413E-01	
CS-134	563.24	36.	-5.	-0.003	229.92	-2.786E+00	P
CS-134	569.32	20.	6.	0.003	113.04	1.710E+00	
BI-207	569.70	35.	-7.	-0.004	122.84	-3.215E-01	
SB-125	600.50	276.	-15.	-0.008	90.17	-3.828E+00	P
SB-124	602.73	261.	-15.	-0.008	158.38	-6.855E-01	
CS-134	604.71	246.	-15.	-0.008	153.83	-6.928E-01	
RU-103	610.30	231.	-15.	-0.008	148.83	-1.190E+01	
AG-108M	614.28	217.	-15.	-0.008	143.86	-7.674E-01	
PM-144	618.06	202.	-4.	-0.002	495.64	-1.937E-01	
SB-125	635.89	32.	-8.	-0.004	106.07	-3.415E+00	
I-131	636.97	41.	1.	0.001	681.91	8.992E-01	
AG-110M	657.76	75.	-15.	-0.008	85.28	-7.924E-01	
CS-137	661.66	92.	-12.	-0.007	117.49	-6.990E-01	
PM-144	696.54	5.	10.	0.006	53.29	5.366E-01	P
SB-124	722.79	52.	-4.	-0.002	297.61	-1.746E+00	
EU-154	723.36	46.	8.	0.005	117.35	2.269E+00	
BI-212	727.17	55.	-7.	-0.004	151.25	-5.146E+00	
PM-146	735.72	22.	-4.	-0.002	264.34	-8.924E-01	
PM-146	747.16	27.	-12.	-0.007	45.85	-2.002E+00	P
ZR-95	756.73	35.	-4.	-0.002	331.91	-3.777E-01	
AG-110M	763.94	23.	8.	0.005	87.91	2.115E+00	
NB-95	765.79	38.	-5.	-0.003	198.14	-2.556E-01	
PA-234M	766.41	22.	8.	0.005	86.42	1.610E+02	
EU-152	778.92	30.	-8.	-0.005	139.28	-3.703E+00	
CS-134	795.87	61.	-9.	-0.005	131.56	-5.935E-01	
CO-58	810.77	39.	-10.	-0.005	94.76	-5.895E-01	
Cs-136	818.50	27.	-11.	-0.006	99.10	-6.711E-01	
MN-54	834.85	13.	4.	0.002	205.37	2.273E-01	P
Co-56	846.77	35.	-14.	-0.008	88.81	-8.762E-01	
PA-234	880.53	21.	7.	0.004	98.01	7.666E+00	
PA-234	883.24	29.	7.	0.004	111.15	4.810E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
AG-110M	884.68	56.	-10.	-0.006	108.66	-9.003E-01		
Sc-46	889.28	46.	-4.	-0.002	233.49	-2.711E-01		
Y-88	898.04	5.	12.	0.007	47.42	8.462E-01		P
AG-110M	937.49	33.	-14.	-0.008	41.60	-2.750E+00		P
PA-234	946.02	14.	4.	0.002	204.63	2.026E+00		
EU-154	996.33	30.	4.	0.002	179.85	3.012E+00		
Co-56	1037.84	23.	-4.	-0.002	241.30	-2.253E+00		
Cs-136	1048.07	5.	5.	0.003	70.95	5.081E-01		
RH-106	1050.36	24.	-5.	-0.003	145.94	-2.373E+01		
BI-207	1063.66	19.	1.	0.001	761.55	1.223E-01		P
Ga-68	1077.40	9.	5.	0.003	146.39	1.255E+01		
FE-59	1099.25	14.	-3.	-0.002	270.80	-4.099E-01		
EU-152	1112.07	28.	8.	0.004	100.94	4.552E+00		
ZN-65	1115.55	36.	8.	0.004	112.08	1.233E+00		
Sc-46	1120.55	47.	8.	0.004	126.29	6.274E-01		
Ta-182	1121.30	43.	6.	0.003	169.23	1.272E+00		
CO-60	1173.24	15.	7.	0.004	135.44	5.400E-01		P
Ta-182	1189.05	5.	21.	0.012	32.00	1.072E+01		
Ta-182	1221.41	25.	-2.	-0.001	554.15	-6.271E-01		
Co-56	1238.28	20.	11.	0.006	97.53	1.383E+00		P
NA-22	1274.53	10.	5.	0.003	100.00	4.399E-01		
FE-59	1291.60	5.	3.	0.002	183.09	5.884E-01		P
TL-210	1313.00	30.	-14.	-0.008	90.07	-6.020E+00		
CO-60	1332.50	26.	-14.	-0.008	39.34	-1.247E+00		P
AG-110M	1384.30	0.	5.	0.003	44.72	1.950E+00		
EU-152	1408.00	5.	2.	0.001	343.07	7.235E-01		P
La-140	1596.21	5.	-2.	-0.001	669.15	-2.802E-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	3.2498E+00	3.2498E+00	9.844E+01%	1.09E+01
NA-22	#A	4.3989E-01	4.3989E-01	1.000E+02%	1.53E+00
K-40		2.4991E+02	2.4991E+02	6.163E+00%	8.94E+00
Sc-46	#A	1.7817E-01	1.7817E-01	1.263E+02%	2.21E+00
CR-51	#A	-2.1222E+00	-2.1222E+00	1.571E+02%	1.14E+01
MN-54	#A	2.2731E-01	2.2731E-01	2.054E+02%	1.20E+00
FE-59	#A	2.2654E-02	2.2654E-02	1.634E+02%	2.75E+00
Co-56	#A	2.2770E-02	2.2770E-02	6.595E+01%	1.86E+00
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.10E+00
CO-58	#A	-5.8951E-01	-5.8951E-01	9.476E+01%	1.90E+00
CO-60	#A	-1.2466E+00	-1.2466E+00	3.934E+01%	2.41E+00
ZN-65	#A	1.2325E+00	1.2325E+00	1.121E+02%	4.74E+00
NB-94	#	8.7349E-01	8.7349E-01	2.893E+01%	6.95E-01

ZR-95	#A	-3.7770E-01	-3.7770E-01	3.319E+02%	3.11E+00
NB-95	#A	-2.5557E-01	-2.5557E-01	1.981E+02%	1.77E+00
RU-103	#A	2.9893E-01	2.9893E-01	1.528E+02%	1.17E+00
RH-106	#A	1.0233E-06	1.0233E-06	9.444E+08%	3.31E+01
AG-108M	#A	2.6538E-01	2.6538E-01	1.307E+02%	8.93E-01
AG-110M	#A	2.4375E-01	2.4375E-01	4.472E+01%	3.33E+00
SN-113	#A	2.6583E-01	2.6583E-01	2.954E+02%	2.69E+00
SB-124	#A	-6.8551E-01	-6.8551E-01	1.584E+02%	3.66E+00
SB-125	#A	9.1517E-01	9.1517E-01	1.250E+02%	2.92E+00
I-131	#A	4.5318E-01	4.5320E-01	1.419E+02%	8.09E-01
Gd-153	#A	-1.0476E+00	-1.0476E+00	1.485E+02%	5.20E+00
Ga-68	#A	1.2464E+01	1.2545E+01	1.464E+02%	4.56E+01
Tc-99m	#A	2.8871E-01	2.8906E-01	1.075E+02%	1.04E+00
BA-133	#A	6.8982E-01	6.8982E-01	1.415E+02%	2.74E+00
CS-134	#A	-2.4247E-01	-2.4247E-01	8.673E+01%	2.67E+00
CS-137	#A	-6.9903E-01	-6.9903E-01	1.175E+02%	2.78E+00
CE-139	#A	5.0702E-01	5.0702E-01	4.066E+01%	5.54E-01
Ba-140	#A	1.0916E+00	1.0916E+00	1.297E+02%	4.96E+00
La-140	#A	2.3391E-01	2.3392E-01	1.015E+02%	1.54E+00
CE-141	#A	-5.6085E-01	-5.6086E-01	1.204E+02%	2.26E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.05E+01
PM-144	#A	5.3660E-01	5.3660E-01	5.329E+01%	6.84E-01
EU-152	#A	1.4273E+00	1.4273E+00	9.521E+01%	3.17E+00
EU-154	#A	1.4172E+00	1.4172E+00	7.903E+01%	1.96E+00
EU-155	#A	1.0790E+00	1.0790E+00	1.117E+02%	6.52E+00
HF-181	#A	7.1232E-02	7.1233E-02	1.236E+02%	1.78E+00
Ta-182	#A	4.2667E+00	4.2667E+00	3.200E+01%	7.48E+00
Hg-203	#A	2.6255E-01	2.6255E-01	1.296E+02%	1.16E+00
TL-208		5.4370E+00	5.4370E+00	1.304E+01%	1.14E+00
PM-146	#A	-6.9369E-02	-6.9369E-02	1.278E+03%	1.41E+00
Y-88	#A	4.1104E-01	4.1104E-01	4.742E+01%	9.25E-01
Cd-113m	#A	-6.1904E+03	-6.1904E+03	1.260E+02%	2.62E+04
Cd-109	#A	1.9442E-01	1.9442E-01	6.410E+03%	4.20E+01
Cf-251	#A	-1.5313E+00	-1.5313E+00	1.179E+02%	4.87E+00
Cf-249	#A	-3.2062E-01	-3.2062E-01	2.235E+02%	2.45E+00
Sn-126	A	3.8435E+00	3.8435E+00	1.027E+02%	1.32E+01
PB-210	A	1.8353E+01	1.8353E+01	7.346E+01%	3.69E+01
PB-212		1.5273E+01	1.5273E+01	6.151E+00%	1.53E+00
PB-214		7.3026E+00	7.3026E+00	1.393E+01%	2.22E+00
BI-207	#A	1.2232E-01	1.2232E-01	7.615E+02%	2.31E+00
BI-212	#A	-5.1463E+00	-5.1463E+00	1.513E+02%	2.68E+01
U-235	#A	-3.2619E-01	-3.2619E-01	7.867E+02%	8.81E+00
BI-214		6.9201E+00	6.9201E+00	1.558E+01%	1.93E+00
BI-210M	#A	-2.1947E-01	-2.1947E-01	1.211E+02%	3.05E+00
AC-228		1.5514E+01	1.5514E+01	9.783E+00%	3.09E+00
TH-227	#A	9.2613E-01	9.2613E-01	1.942E+02%	1.16E+01
TH-229	#A	6.1667E+00	6.1667E+00	9.961E+01%	1.71E+01
TH-234	#A	2.6748E+00	2.6748E+00	1.686E+02%	1.52E+01
PA-231	#A	9.3468E+00	9.3468E+00	1.564E+02%	6.63E+01

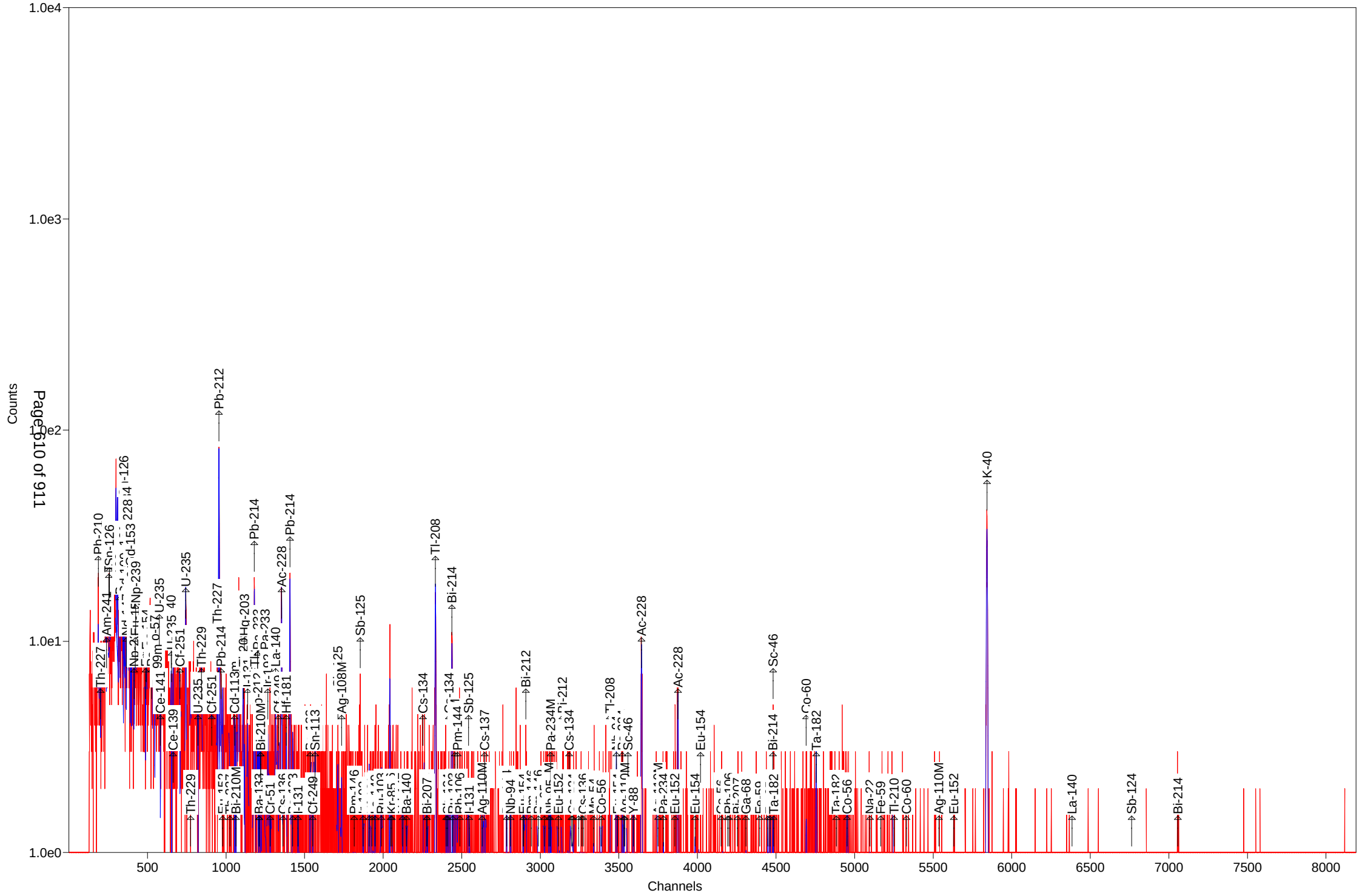
PA-233 #A	5.4892E-01	5.4892E-01	2.213E+02%		5.85E+00
PA-234 #A	2.4121E+00	2.4121E+00	8.905E+01%		6.24E+00
PA-234M#A	4.1846E+01	4.1846E+01	8.642E+01%		2.58E+02
AM-241 #A	-9.1380E-01	-9.1380E-01	1.452E+02%		3.57E+00
Np-237 #A	-2.4628E+00	-2.4628E+00	1.596E+02%		1.31E+01
Ir-192 #A	3.0349E-01	3.0349E-01	1.035E+02%		1.07E+00
Cs-136 #A	-6.7107E-01	-6.7109E-01	9.910E+01%		1.61E+00
Np-239 #A	1.1727E+00	1.1729E+00	1.525E+02%		5.99E+00
Nd-147 #A	-4.6348E+00	-4.6350E+00	9.634E+01%		1.11E+01
TL-210 #A	1.3184E-01	1.3184E-01	2.130E+02%		2.24E+00
Kr-85 #A	-1.3428E+01	-1.3428E+01	1.005E+03%		4.68E+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 2000.0 keV) 3.192E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.0 keV) 3.1922055E+02 Bq/Sample

412881_Gamma_180-86110-A-16-A. 2_Gamma_20190268.spc.



Test America St. Louis Spectrum ID: 5_Gamma_20190287

Sample Description: 412881_Gamma_180-86110-A-17-A
Detector: Detector # 5
Batch ID: 412881
Work Order Number: Gamma
Lot Number: 180-86110-A-17-A

Decay to Time: 2/20/2019 11:50 Live Time: 1800 sec
Acquisition Time: 2/20/2019 11:51:00 Real Time: 1806 sec
Analysis Time: 2/20/2019 12:21 Dead Time: 0.31 %
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_Rev15.lib
Bkgd Correction File: 5_2019-01-20_1014.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	3.377E+00	87.9	2.969E+00	2.974E+00	1.009E+01
NA-22	3.560E-01	103.3	3.676E-01	3.681E-01	1.308E+00
K-40	7.976E+01	11.6	9.243E+00	1.010E+01	9.188E+00
Sc-46	-6.699E-01	95.2	6.375E-01	6.384E-01	2.167E+00
CR-51	-6.582E-01	596.7	3.928E+00	3.928E+00	1.369E+01
MN-54	5.044E-01	94.8	4.782E-01	4.789E-01	1.153E+00
FE-59	-4.550E-01	289.6	1.318E+00	1.318E+00	3.148E+00
Co-56	1.074E+00	22.7	2.441E-01	2.503E-01	5.076E-01
CO-57	-2.326E-01	110.9	2.578E-01	2.581E-01	8.714E-01
CO-58	-6.931E-01	61.8	4.287E-01	4.302E-01	2.115E+00
CO-60	2.067E-01	118.5	2.449E-01	2.451E-01	7.427E-01
ZN-65	0.000E+00	1.#INF	2.425E-01	2.425E-01	4.984E+00
NB-94	3.450E-01	37.8	1.304E-01	1.316E-01	1.471E+00
ZR-95	-4.984E-01	201.9	1.006E+00	1.007E+00	2.543E+00
NB-95	6.403E-01	90.7	5.810E-01	5.819E-01	1.967E+00
RU-103	-1.787E-01	174.1	3.112E-01	3.113E-01	1.055E+00
RH-106	4.215E+00	201.7	8.501E+00	8.504E+00	2.902E+01
AG-108M	2.394E-01	110.1	2.636E-01	2.639E-01	6.991E-01
AG-110M	2.747E-01	86.4	2.372E-01	2.377E-01	2.509E+00
SN-113	4.916E-01	121.2	5.959E-01	5.965E-01	2.037E+00
SB-124	-5.821E-01	82.7	4.812E-01	4.822E-01	3.336E+00
SB-125	-7.893E-01	175.9	1.388E+00	1.389E+00	3.096E+00
I-131	6.371E-01	117.9	7.514E-01	7.521E-01	1.027E+00
Gd-153	5.386E-01	119.7	6.449E-01	6.458E-01	2.936E+00
Ga-68	1.498E+01	108.0	1.618E+01	1.620E+01	3.934E+01
Tc-99m	-2.992E-01	126.2	3.775E-01	3.779E-01	1.270E+00
BA-133	-6.125E-01	142.8	8.748E-01	8.754E-01	2.966E+00
CS-134	1.173E+00	57.1	6.705E-01	6.732E-01	2.005E+00
CS-137	2.233E-01	247.8	5.533E-01	5.535E-01	1.951E+00
CE-139	2.616E-01	125.9	3.292E-01	3.301E-01	1.115E+00
Ba-140	-1.157E+00	151.5	1.754E+00	1.755E+00	4.542E+00
La-140	-2.368E-01	121.1	2.868E-01	2.871E-01	1.697E+00
CE-141	4.968E-01	130.1	6.461E-01	6.466E-01	2.178E+00

CE-144	0.000E+00	1.#INF	1.131E+00	1.131E+00	8.643E+00
PM-144	2.367E-01	161.4	3.820E-01	3.822E-01	1.305E+00
EU-152	1.092E+00	122.2	1.334E+00	1.335E+00	2.072E+00
EU-154	9.768E-01	95.9	9.370E-01	9.384E-01	1.853E+00
EU-155	9.504E-01	163.4	1.553E+00	1.554E+00	5.238E+00
HF-181	9.409E-03	381.3	3.588E-02	3.588E-02	1.644E+00
Ta-182	2.045E+00	35.4	7.232E-01	7.304E-01	6.113E+00
Hg-203	-4.106E-01	103.3	4.240E-01	4.246E-01	1.433E+00
TL-208	4.814E+00	11.2	5.377E-01	5.928E-01	4.392E-01
PM-146	8.165E-02	198.7	1.622E-01	1.623E-01	1.828E+00
Y-88	1.605E-01	117.9	1.892E-01	1.894E-01	9.809E-01
Cd-113m	-5.238E+03	89.2	4.672E+03	4.685E+03	1.575E+04
Cd-109	0.000E+00	1.#INF	4.828E+00	4.828E+00	3.578E+01
Cf-251	2.197E-01	567.2	1.246E+00	1.246E+00	3.535E+00
Cf-249	-5.189E-01	108.1	5.608E-01	5.614E-01	1.910E+00
Sn-126	-4.057E+00	110.1	4.468E+00	4.473E+00	1.497E+01
PB-210	2.107E+01	42.4	8.936E+00	9.021E+00	2.411E+01
PB-212	7.774E+00	10.4	8.055E-01	9.496E-01	1.685E+00
PB-214	6.249E+00	13.9	8.713E-01	9.299E-01	1.918E+00
BI-207	4.443E-01	133.9	5.950E-01	5.955E-01	1.472E+00
BI-212	-4.703E-02	16645.2	7.829E+00	7.829E+00	2.346E+01
U-235	1.432E-01	163.8	2.347E-01	2.348E-01	1.057E+01
BI-214	8.947E+00	11.8	1.055E+00	1.153E+00	1.455E+00
BI-210M	3.363E-01	143.8	4.836E-01	4.840E-01	1.673E+00
AC-228	5.192E+00	25.9	1.344E+00	1.369E+00	5.765E+00
TH-227	2.830E+00	88.6	2.506E+00	2.512E+00	8.918E+00
TH-229	3.036E+00	136.8	4.153E+00	4.160E+00	1.598E+01
TH-234	1.293E+01	31.6	4.090E+00	4.153E+00	1.297E+01
PA-231	-1.215E+01	167.8	2.040E+01	2.041E+01	6.896E+01
PA-233	8.334E-01	177.0	1.475E+00	1.476E+00	5.006E+00
PA-234	1.698E-01	370.2	6.285E-01	6.286E-01	5.561E+00
PA-234M	3.572E+01	115.0	4.109E+01	4.113E+01	2.879E+02
AM-241	-1.331E+00	58.4	7.775E-01	7.805E-01	3.156E+00
Np-237	-2.012E+00	167.0	3.360E+00	3.362E+00	1.129E+01
Ir-192	-4.415E-01	90.8	4.007E-01	4.015E-01	1.350E+00
Cs-136	1.375E-01	33.3	4.583E-02	4.651E-02	2.633E+00
Np-239	-9.531E-01	163.9	1.563E+00	1.564E+00	5.264E+00
Nd-147	3.583E-01	881.3	3.158E+00	3.158E+00	8.438E+00
TL-210	0.000E+00	1.#INF	1.326E-01	1.326E-01	1.927E+00
Kr-85	6.501E+01	199.8	1.299E+02	1.299E+02	4.478E+02
Total	2.916E+02				

Analyst: Joey Sausto

TestAmerica Inc Spectrum name: 5_Gamma_20190287.An1

Sample description
412881_Gamma_180-86110-A-17-A

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20190287.An1

Acquisition information
Start time: 2/20/2019 11:51:00 AM
Live time: 1800
Real time: 1806
Dead time: 0.31 %
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_Rev15.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	2/20/2019 11:50:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2019-01-20_1014.PBC 1/20/2019 10:14:28 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 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. Bq/Sampl	Nuc
46.44	29.	42.42	0.80	1.782E-02	46.54	4.250	PBC<MDA	PB210
50.14	11.	110.67	0.79	2.012E-02	50.14	8.000	PBC<MDA	TH227
63.56	50.	29.93	0.34	2.725E-02	63.29	3.810	PBC<MDA	TH234
					64.28	9.700	1.039E+01	Sn126
74.63	47.	30.53	0.81	3.145E-02				
77.13	89.	16.61	0.82	3.220E-02				
92.71	51.	32.33	1.44	3.529E-02	92.59	5.584	1.445E+01	TH234
					93.35	5.561	1.447E+01	AC228
97.50	5.	354.27	0.84	3.577E-02	97.50	30.000	PBC<MDA	Gd153
99.50	8.	186.55	0.84	3.592E-02	99.50	15.000	PBC<MDA	Np239
103.20	13.	119.75	0.84	3.612E-02	103.20	21.800	PBC<MDA	Gd153
103.70	13.	125.74	0.84	3.614E-02	103.70	24.000	PBC<MDA	Np239
105.31	13.	163.38	0.84	3.618E-02	105.31	21.200	PBC<MDA	EU155
121.78	7.	151.37	0.86	3.584E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.329E-01	CO57
123.10	8.	181.51	0.86	3.575E-02	123.10	40.790	PBC<MDA	EU154
133.02	4.	406.53	0.87	3.492E-02	133.02	43.300	PBC<MDA	HF181
145.44	14.	130.06	0.88	3.351E-02	145.44	48.200	PBC<MDA	CE141
165.85	12.	125.86	0.91	3.133E-02	165.85	79.900	PBC<MDA	CE139
176.60	2.	567.16	0.92	2.975E-02	176.60	17.000	PBC<MDA	Cf251
185.72	33.	46.75	0.93	2.854E-02	185.72	54.000	PBC<MDA	U235
193.51	9.	136.77	0.93	2.758E-02	193.51	4.400	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
205.33	7.	165.16	0.94	2.626E-02	205.33	5.010	PBC<MDA	U235
210.85	2.	690.77	0.95	2.569E-02	210.85	2.990	PBC<MDA	TH229
227.00	10.	102.47	0.97	2.417E-02	227.00	6.300	PBC<MDA	Cf251
235.97	11.	215.50	0.98	2.341E-02	235.97	12.300	PBC<MDA	TH227
238.72	153.	12.47	1.14	2.319E-02	238.63	43.300	8.449E+00	PB212
242.01	11.	210.03	0.98	2.293E-02	242.00	7.430	PBC<MDA	PB214
244.69	10.	220.51	0.98	2.272E-02	244.69	7.580	PBC<MDA	EU152
256.24	8.	109.04	1.00	2.186E-02	256.24	7.000	PBC<MDA	TH227
265.83	6.	143.82	1.00	2.121E-02	265.83	50.000	PBC<MDA	BI210M
276.92	16.	40.82	0.60	2.048E-02	277.28	6.310	PBC<MDA	TL208
284.30	3.	302.40	1.02	2.006E-02	284.30	6.140	PBC<MDA	I131
294.99	50.	22.39	1.16	1.945E-02	295.09	19.300	7.425E+00	PB214
299.77	12.	54.43	1.47	1.918E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
312.01	10.	176.99	1.05	1.857E-02	312.01	36.000	PBC<MDA	PA233
328.76	5.	181.11	1.07	1.778E-02	328.76	20.300	PBC<MDA	La140
338.38	27.	25.88	1.45	1.736E-02	338.32	12.010	7.190E+00	AC228
340.57	8.	154.96	1.08	1.727E-02	340.57	46.900	PBC<MDA	Cs136
351.95	64.	16.62	1.20	1.680E-02	351.93	37.600	5.646E+00	PB214
364.48	8.	117.93	1.10	1.632E-02	364.48	81.700	PBC<MDA	I131
383.84	2.	539.38	1.12	1.563E-02	383.84	8.940	PBC<MDA	BA133
391.69	9.	121.22	1.12	1.537E-02	391.69	64.000	PBC<MDA	SN113
433.94	6.	110.10	1.16	1.411E-02	433.94	90.480	PBC<MDA	AG108M
468.06	4.	318.10	1.20	1.325E-02	468.06	51.750	PBC<MDA	Ir192
477.60	8.	87.91	1.20	1.303E-02	477.60	10.520	PBC<MDA	BE7
511.86	52.	19.64	2.48	1.230E-02	511.86	20.000	1.182E+01	RH106
513.98	6.	199.82	1.24	1.226E-02	513.98	0.430	PBC<MDA	Kr85
531.00	1.	881.29	1.25	1.193E-02	531.00	13.000	PBC<MDA	Nd147
569.32	8.	72.75	1.29	1.125E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.664E+00	PA234
					569.70	97.740	3.914E-01	BI207
569.47	2.	370.17	1.29	1.125E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.057E+00	PA234
					569.70	97.740	8.874E-02	BI207
583.05	81.	11.17	1.16	1.103E-02	583.02	84.500	4.814E+00	TL208
609.43	81.	11.79	0.91	1.063E-02	609.31	46.090	9.214E+00	BI214
					610.30	5.750	7.396E+01	RU103
618.06	9.	161.39	1.33	1.051E-02	618.06	99.100	PBC<MDA	PM144
621.92	8.	201.72	1.33	1.045E-02	621.92	9.930	PBC<MDA	RH106
636.97	4.	172.37	1.34	1.025E-02	636.97	7.170	PBC<MDA	I131
657.76	8.	86.36	1.36	9.974E-03	657.76	94.640	PBC<MDA	AG110M
661.66	3.	247.81	1.37	9.924E-03	661.66	85.210	PBC<MDA	CS137
702.63	3.	301.60	1.40	9.438E-03	702.63	97.900	PBC<MDA	NB94
735.72	3.	198.65	1.43	9.081E-03	735.72	22.500	PBC<MDA	PM146
765.79	10.	90.73	1.45	8.781E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.175E+02	PA234M
766.41	7.	115.04	1.45	8.776E-03	765.79	99.790	PBC<MDA	NB95

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					766.41	0.294	1.472E+02	PA234M
778.92	3.	250.62	1.46	8.657E-03	778.92	12.940	PBC<MDA	EU152
795.87	6.	116.66	1.48	8.503E-03	795.87	85.530	PBC<MDA	CS134
801.95	7.	102.36	1.48	8.448E-03	801.95	8.690	PBC<MDA	CS134
834.85	7.	94.80	1.51	8.168E-03	834.85	99.980	PBC<MDA	MN54
846.77	5.	47.21	1.52	8.072E-03	846.77	99.935	PBC<MDA	Co56
859.76	1.	800.00	1.53	7.963E-03	860.56	12.420	PBC<MDA	TL208
871.10	7.	37.80	1.54	7.882E-03	871.10	99.890	PBC<MDA	NB94
880.53	3.	200.50	1.54	7.812E-03	880.53	6.000	PBC<MDA	PA234
898.04	4.	117.87	1.56	7.684E-03	898.04	93.700	PBC<MDA	Y88
911.02	21.	48.11	1.57	7.591E-03	911.07	29.000	PBC<MDA	AC228
968.73	8.	96.62	1.61	7.209E-03	968.97	17.460	PBC<MDA	AC228
1004.77	6.	95.92	1.64	6.992E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	10.	32.24	1.66	6.805E-03	1037.84	14.130	5.714E+00	Co56
1048.07	9.	33.33	1.67	6.749E-03	1048.07	80.000	9.261E-01	Cs136
1063.66	4.	133.92	1.68	6.666E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	5.	108.01	1.69	6.594E-03	1077.40	3.300	PBC<MDA	Ga68
1120.55	4.	220.14	1.72	6.380E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	3.076E-01	Sc46
					1121.30	34.900	8.819E-01	Ta182
1120.79	8.	86.62	1.72	6.381E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	7.375E-01	Sc46
					1121.30	34.900	2.114E+00	Ta182
1121.30	6.	117.64	1.72	6.376E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	5.217E-01	Sc46
					1121.30	34.900	1.495E+00	Ta182
1173.24	5.	118.49	1.76	6.138E-03	1173.24	99.900	PBC<MDA	CO60
1189.05	8.	35.36	1.77	6.069E-03	1189.05	16.200	4.520E+00	Ta182
1221.41	4.	152.39	1.79	5.934E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	8.	37.11	1.80	5.866E-03	1238.28	66.070	1.203E+00	Co56
1274.53	4.	103.25	1.83	5.725E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.011E+00	EU154
1313.00	5.	44.72	1.85	5.583E-03	1313.00	21.000	PBC<MDA	TL210
1384.30	1.	796.87	1.90	5.340E-03	1384.30	24.290	PBC<MDA	AG110M
1460.56	78.	11.59	1.47	5.103E-03	1460.83	10.670	7.976E+01	K40
1764.58	10.	35.64	2.11	4.351E-03	1764.49	15.400	8.145E+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
298.15	74.62	78.	47.	1.485E+03	30.53	0.812	- sD
308.17	77.12	65.	89.	2.771E+03	16.61	0.815	- 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_Rev15.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	185.29	46.44	42.	29.	0.016	42.42	0.797s
TH-227	200.11	50.14	48.	11.	0.006	110.67	0.787s
AM-241	237.72	59.54	110.	-22.	-0.012	58.43	0.797s
TH-234	253.85	63.56	74.	34.	0.019	45.53	0.342s
Sn-126	256.71	64.28	222.	-20.	-0.011	110.13	0.802s
BA-133	323.61	80.99	141.	-19.	-0.011	78.24	0.819s
Np-237	345.63	86.49	362.	-16.	-0.009	167.01	0.825s
EU-155	345.84	86.54	346.	0.	0.000	1000.00	0.825s
Sn-126	347.43	86.94	321.	-13.	-0.007	196.87	0.825s
Sn-126	349.95	87.57	308.	0.	0.000	1000.00	0.826s
Cd-109	351.83	88.04	308.	0.	0.000	1000.00	0.826s
Nd-147	364.08	91.10	308.	0.	0.000	1000.00	0.829s
TH-234	370.05	92.59	86.	33.	0.018	43.95	0.831D
AC-228	373.09	93.35	291.	17.	0.009	145.08	0.832s
Gd-153	389.70	97.50	134.	5.	0.003	354.27	0.836s
Np-239	397.71	99.50	117.	8.	0.005	186.55	0.838
Gd-153	412.52	103.20	123.	13.	0.007	119.75	0.842s
Np-239	414.52	103.70	136.	13.	0.007	125.74	0.842s
EU-155	420.98	105.31	223.	13.	0.007	163.38	0.844s
Np-239	424.25	106.13	260.	-14.	-0.008	163.95	0.845s
EU-152	486.90	121.78	58.	7.	0.004	151.37	0.861s
CO-57	488.03	122.06	95.	-13.	-0.007	110.86	0.861s
EU-154	492.18	123.10	97.	8.	0.004	181.51	0.862s
PA-234	524.99	131.29	169.	-3.	-0.001	691.47	0.871s
HF-181	531.91	133.02	153.	4.	0.002	406.53	0.872s
CE-144	533.97	133.54	152.	0.	0.000	1000.00	0.873s
HF-181	545.02	136.30	152.	0.	0.000	1000.00	0.876s
CO-57	545.72	136.47	152.	0.	0.000	1000.00	0.876s
Tc-99m	561.88	140.51	194.	-16.	-0.009	126.19	0.880s
U-235	574.99	143.79	210.	-8.	-0.004	283.01	0.883s
CE-141	581.61	145.44	169.	14.	0.008	130.06	0.885s
Ba-140	650.54	162.66	132.	-15.	-0.008	113.38	0.902s
U-235	653.42	163.38	147.	-15.	-0.008	143.39	0.903s
CE-139	663.32	165.85	104.	12.	0.007	125.86	0.905s
Cf-251	706.34	176.60	40.	2.	0.001	567.16	0.916
U-235	742.85	185.72	63.	33.	0.018	46.75	0.925s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-229	774.03	193.51	48.	9.	0.005	136.77	0.933s
U-235	821.35	205.33	40.	7.	0.004	165.16	0.945s
TH-229	843.44	210.85	47.	2.	0.001	690.77	0.950s
Cf-251	908.08	227.00	30.	10.	0.006	102.47	0.966s
TH-227	943.98	235.97	262.	11.	0.006	215.50	0.975s
PB-212	954.64	238.63	35.	141.	0.078	10.36	0.978D
PB-214	968.10	242.00	252.	11.	0.006	210.03	0.981
EU-152	978.89	244.69	251.	10.	0.006	220.51	0.984s
TH-227	1025.11	256.24	22.	8.	0.005	109.04	0.995s
Cd-113m	1054.97	263.70	52.	-12.	-0.007	89.20	1.002s
BI-210M	1063.50	265.83	39.	6.	0.004	143.82	1.005s
TL-208	1107.88	276.92	10.	16.	0.009	40.82	0.604s
Hg-203	1117.00	279.20	74.	-12.	-0.007	103.26	1.017s
I-131	1137.41	284.30	30.	3.	0.002	302.40	1.022s
PB-214	1180.21	294.99	20.	50.	0.028	22.39	1.159
TL-210	1184.24	296.00	233.	-12.	-0.007	183.20	1.034s
PB-212	1199.33	299.77	10.	12.	0.007	54.43	1.470s
PA-231	1200.53	300.07	221.	-12.	-0.007	177.87	1.038s
PA-233	1200.97	300.18	209.	-12.	-0.007	173.11	1.038s
PA-231	1210.86	302.65	197.	-12.	-0.007	167.83	1.040s
Ba-140	1219.66	304.85	184.	0.	0.000	1000.00	1.042s
BI-210M	1219.85	304.90	184.	0.	0.000	1000.00	1.042s
Ir-192	1234.03	308.44	184.	0.	0.000	1000.00	1.046
PA-233	1248.32	312.01	152.	10.	0.006	176.99	1.049s
Ir-192	1266.25	316.49	60.	-13.	-0.007	90.76	1.053s
CR-51	1280.63	320.08	81.	-2.	-0.001	596.67	1.057s
La-140	1315.35	328.76	22.	5.	0.003	181.11	1.065s
Cf-249	1334.08	333.44	33.	-5.	-0.003	219.54	1.070s
AC-228	1353.84	338.38	7.	27.	0.015	25.88	1.451s
Cs-136	1362.62	340.57	82.	8.	0.005	154.96	1.077s
EU-152	1377.49	344.29	91.	0.	0.000	1000.00	1.080s
HF-181	1383.66	345.83	105.	-11.	-0.006	139.82	1.082
PB-214	1408.15	351.95	17.	64.	0.036	16.62	1.197
BA-133	1424.36	356.00	126.	-11.	-0.006	142.83	1.091s
I-131	1458.32	364.48	22.	8.	0.004	117.93	1.099s
BA-133	1535.78	383.84	48.	2.	0.001	539.38	1.117s
Cf-249	1552.22	387.95	48.	-10.	-0.005	108.08	1.121s
SN-113	1567.19	391.69	51.	9.	0.005	121.22	1.125s
SB-125	1711.99	427.88	20.	-6.	-0.003	175.88	1.158s
AG-108M	1736.25	433.94	8.	6.	0.003	110.10	1.164s
PM-146	1816.05	453.88	32.	-3.	-0.002	373.67	1.182s
SB-125	1854.01	463.37	58.	-13.	-0.007	48.90	1.191s
Ir-192	1872.79	468.06	62.	4.	0.002	318.10	1.195s
BE-7	1910.94	477.59	23.	8.	0.005	87.91	1.204s
HF-181	1928.56	482.00	36.	-1.	-0.001	645.17	1.208s
La-140	1948.65	487.02	24.	-4.	-0.002	150.28	1.212s
RU-103	1988.80	497.05	17.	-4.	-0.002	174.09	1.221s
RH-106	2048.06	511.86	27.	52.	0.029	19.64	2.485s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Kr-85	2056.53	513.98	73.	6.	0.003	199.82	1.237s
Nd-147	2124.62	531.00	20.	1.	0.001	881.29	1.252s
Ba-140	2149.67	537.26	20.	-6.	-0.003	151.54	1.258
CS-134	2253.60	563.24	28.	-12.	-0.007	53.79	1.280s
CS-134	2277.94	569.32	12.	8.	0.004	72.75	1.286s
PA-234	2278.54	569.47	20.	2.	0.001	370.17	1.286s
BI-207	2279.47	569.70	22.	0.	0.000	1000.00	1.286s
TL-208	2332.88	583.05	0.	81.	0.045	11.17	1.162
SB-125	2402.69	600.50	178.	-10.	-0.006	187.69	1.313s
SB-124	2411.61	602.73	169.	-11.	-0.006	82.67	1.315s
CS-134	2419.53	604.71	158.	-10.	-0.006	176.45	1.317s
BI-214	2438.41	609.43	5.	81.	0.045	11.79	0.906s
RU-103	2441.89	610.30	148.	-10.	-0.006	170.22	1.322
AG-108M	2457.82	614.28	138.	-7.	-0.004	256.17	1.325s
PM-144	2472.94	618.06	106.	9.	0.005	161.39	1.328s
RH-106	2488.37	621.92	122.	8.	0.004	201.72	1.332s
SB-125	2544.26	635.89	24.	-7.	-0.004	103.95	1.344s
I-131	2548.61	636.97	28.	4.	0.002	172.37	1.345s
AG-110M	2631.76	657.76	21.	8.	0.005	86.36	1.362s
CS-137	2647.36	661.66	34.	3.	0.002	247.81	1.366
NB-94	2811.25	702.63	22.	3.	0.002	301.60	1.400s
SB-124	2891.88	722.79	29.	-4.	-0.002	213.01	1.417s
AG-108M	2892.48	722.94	32.	0.	0.000	1000.00	1.417s
EU-154	2894.17	723.36	32.	0.	0.000	1000.00	1.418s
PM-146	2943.61	735.72	9.	3.	0.002	198.65	1.428s
PM-146	2989.37	747.16	22.	-11.	-0.006	94.19	1.437s
ZR-95	3027.65	756.73	17.	-4.	-0.002	201.91	1.445s
AG-110M	3056.50	763.94	43.	-14.	-0.008	69.94	1.451s
NB-95	3063.89	765.79	37.	10.	0.006	90.73	1.453s
PA-234M	3066.38	766.41	28.	7.	0.004	115.04	1.453s
EU-152	3116.41	778.92	9.	3.	0.001	250.62	1.463s
BI-212	3142.41	785.42	24.	-6.	-0.003	108.48	1.468s
CS-134	3184.20	795.87	26.	6.	0.004	116.66	1.477s
TL-210	3199.12	799.60	32.	0.	0.000	1000.00	1.480s
CS-134	3208.53	801.95	24.	7.	0.004	102.36	1.482s
CO-58	3243.82	810.78	39.	-10.	-0.006	61.85	1.489s
La-140	3263.80	815.77	49.	-2.	-0.001	270.46	1.493s
Cs-136	3274.72	818.50	62.	-10.	-0.006	110.31	1.495s
MN-54	3340.10	834.85	9.	7.	0.004	94.80	1.508s
Co-56	3387.78	846.77	0.	5.	0.003	47.21	1.518s
TL-208	3442.95	860.56	14.	1.	0.001	800.00	1.529s
NB-94	3485.08	871.10	0.	7.	0.004	37.80	1.537s
EU-154	3493.61	873.23	7.	0.	0.000	1000.00	1.539s
PA-234	3522.80	880.53	21.	3.	0.002	200.50	1.544s
PA-234	3533.64	883.24	24.	0.	0.000	1000.00	1.547s
AG-110M	3539.41	884.68	24.	0.	0.000	1000.00	1.547s
Sc-46	3557.79	889.28	35.	-9.	-0.005	95.17	1.551s
Y-88	3592.83	898.04	5.	4.	0.002	117.87	1.558s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	3644.94	911.07	19.	21.	0.012	48.11	1.568
AG-110M	3750.60	937.49	9.	-2.	-0.001	285.36	1.589s
PA-234	3784.70	946.02	9.	-2.	-0.001	209.65	1.595s
EU-152	3857.05	964.11	44.	-10.	-0.005	101.54	1.609s
AC-228	3876.48	968.97	25.	8.	0.004	96.62	1.612s
EU-154	3985.88	996.33	33.	-2.	-0.001	412.31	1.633s
EU-154	4019.65	1004.77	5.	6.	0.003	95.92	1.639s
Co-56	4151.87	1037.84	0.	10.	0.005	32.24	1.664s
Cs-136	4192.77	1048.07	0.	9.	0.005	33.33	1.671s
RH-106	4201.93	1050.36	9.	0.	0.000	1000.00	1.673s
BI-207	4255.11	1063.66	5.	4.	0.002	133.92	1.682s
Ga-68	4310.04	1077.40	5.	5.	0.003	108.01	1.692s
FE-59	4397.41	1099.25	15.	-3.	-0.002	289.64	1.708s
EU-152	4448.68	1112.07	33.	-1.	-0.001	618.47	1.717s
ZN-65	4462.56	1115.55	32.	0.	0.000	1000.00	1.720s
BI-214	4481.51	1120.29	23.	8.	0.005	86.62	1.723
Sc-46	4482.57	1120.55	28.	4.	0.002	220.14	1.723
Ta-182	4485.56	1121.30	22.	6.	0.003	117.64	1.724s
CO-60	4693.21	1173.24	5.	5.	0.003	118.49	1.760s
Ta-182	4756.42	1189.05	0.	8.	0.004	35.36	1.771s
Ta-182	4885.79	1221.41	5.	4.	0.002	152.39	1.793s
Co-56	4953.23	1238.28	1.	8.	0.005	37.11	1.804s
NA-22	5098.13	1274.53	5.	4.	0.002	103.25	1.828s
EU-154	5098.17	1274.54	9.	0.	0.000	1000.00	1.828s
TL-210	5251.91	1313.00	0.	5.	0.003	44.72	1.854
AG-110M	5536.88	1384.30	5.	1.	0.000	796.87	1.899s
EU-152	5631.62	1408.00	0.	0.	0.000	1000.00	1.914s
K-40	5841.67	1460.56	2.	78.	0.043	11.59	1.467s
La-140	6383.73	1596.21	6.	-4.	-0.002	160.96	2.024s
BI-214	7056.06	1764.49	1.	10.	0.005	35.64	2.114s
Co-56	7083.46	1771.35	11.	0.	0.000	1000.00	2.117s
Y-88	7341.96	1836.06	0.	0.	0.000	1000.00	2.149s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	3.3774E+00				5.31E+01	
			477.60	3.377E+00	&(	1.009E+01 8.79E+01 1.05E+01	G
NA-22	C	3.5604E-01				9.50E+02	
			1274.53	3.560E-01	?(	1.308E+00 1.03E+02 9.99E+01	G

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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	N	7.9760E+01					4.66E+11	
			1460.83	7.976E+01	(P	9.188E+00	1.16E+01	1.07E+01 G
Sc-46	F	-6.6986E-01					8.38E+01	
			889.28	-6.699E-01	?(	2.167E+00	9.52E+01	1.00E+02 G
			1120.55	3.076E-01	+	2.401E+00	2.20E+02	1.00E+02 G
CR-51	F	-6.5824E-01					2.77E+01	
			320.08	-6.582E-01	?(	1.369E+01	5.97E+02	9.94E+00 G
MN-54	C	5.0440E-01					3.12E+02	
			834.85	5.044E-01	&(	1.153E+00	9.48E+01	1.00E+02 G
FE-59	F	-4.5497E-01					4.45E+01	
			1099.25	-4.550E-01	?(	3.148E+00	2.90E+02	5.65E+01 G
			1291.60	8.467E-02	% P	3.127E+00	1.43E+03	4.32E+01 G
Co-56	C	1.0745E+00					7.73E+01	
			846.77	3.339E-01	?(P	5.076E-01	4.72E+01	9.99E+01 G
			1238.28	1.203E+00	?(P	1.057E+00	3.71E+01	6.61E+01 G
			1037.84	5.714E+00	?(P	4.258E+00	3.22E+01	1.41E+01 G
			1771.35	0.000E+00	-	1.503E+01	1.00E+03	1.55E+01 A
CO-57	C	-2.3259E-01					2.72E+02	
			122.06	-2.326E-01	&(	8.714E-01	1.11E+02	8.56E+01 G
			136.47	0.000E+00	+	9.054E+00	1.00E+03	1.07E+01 G
CO-58	C	-6.9314E-01					7.09E+01	
			810.78	-6.931E-01	?(P	2.115E+00	6.18E+01	9.95E+01 G
CO-60	F	2.0666E-01					1.93E+03	
			1332.50	-2.983E-03	%(P	7.427E-01	1.81E+04	1.00E+02 G
			1173.24	4.165E-01	?(P	1.227E+00	1.18E+02	9.99E+01 G
NB-94	I	3.4503E-01					7.41E+06	
			702.63	1.931E-01	?(P	1.471E+00	3.02E+02	9.79E+01 G
			871.10	4.939E-01	?(	5.200E-01	3.78E+01	9.99E+01 G
ZR-95	I	-4.9840E-01					6.40E+01	
			756.73	-4.984E-01	?(	2.543E+00	2.02E+02	5.45E+01 G
			724.20	-5.540E-02	% P	4.017E+00	2.40E+03	4.42E+01 G
NB-95	I	6.4030E-01					6.40E+01	
			765.79	6.403E-01	?(	1.967E+00	9.07E+01	9.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RU-103	I	-1.7874E-01					3.93E+01	
			497.05	-1.787E-01	?(P	1.055E+00	1.74E+02	9.09E+01 G
			610.30	-9.350E+00	&	5.402E+01	1.70E+02	5.75E+00 GA
RH-106	I	4.2146E+00					3.74E+02	
			621.92	4.215E+00	?(P	2.902E+01	2.02E+02	9.93E+00 G
			1050.36	0.000E+00	-	8.823E+01	1.00E+03	1.56E+00 G
			511.86	1.182E+01	?	6.047E+00	1.96E+01	2.00E+01 GA
AG-108M	C	2.3943E-01					1.53E+05	
			433.94	2.394E-01	?(P	6.991E-01	1.10E+02	9.05E+01 G
			722.94	0.000E+00	-	1.938E+00	1.00E+03	9.08E+01 G
			614.28	-3.836E-01	&	3.359E+00	2.56E+02	8.98E+01 G
AG-110M	F	2.7471E-01					2.50E+02	
			884.68	0.000E+00	?(	2.509E+00	1.00E+03	7.27E+01 G
			657.76	4.829E-01	?(	1.416E+00	8.64E+01	9.46E+01 G
			937.49	-5.090E-01	+	3.697E+00	2.85E+02	3.44E+01 G
			1384.30	2.855E-01	?(	5.770E+00	7.97E+02	2.43E+01 G
			763.94	-4.044E+00	+	9.394E+00	6.99E+01	2.23E+01 G
SN-113	F	4.9161E-01					1.15E+02	
			391.69	4.916E-01	?(P	2.037E+00	1.21E+02	6.40E+01 G
SB-124	F	-5.8209E-01					6.02E+01	
			602.73	-5.821E-01	?(P	3.336E+00	8.27E+01	9.83E+01 G
			1690.98	-2.420E-02	% P	1.899E+00	9.66E+03	4.78E+01 G
			722.79	-2.045E+00	+	1.542E+01	2.13E+02	1.08E+01 G
SB-125	I	-7.8928E-01					1.01E+03	
			427.88	-7.893E-01	?(P	3.096E+00	1.76E+02	2.96E+01 G
			600.50	-2.951E+00	+	1.878E+01	1.88E+02	1.79E+01 G
			635.89	-3.431E+00	&	1.227E+01	1.04E+02	1.13E+01 G
			463.37	-5.074E+00	+ P	1.522E+01	4.89E+01	1.05E+01 G
I-131	I	6.3711E-01					8.02E+00	
			364.48	3.264E-01	?(P	1.027E+00	1.18E+02	8.17E+01 G
			284.30	1.541E+00	?(P	1.266E+01	3.02E+02	6.14E+00 G
			636.97	3.404E+00	?(	2.064E+01	1.72E+02	7.17E+00 G
Gd-153	F	5.3856E-01					2.42E+02	
			97.50	2.416E-01	?(	2.936E+00	3.54E+02	3.00E+01 G
			103.20	9.473E-01	&(	3.831E+00	1.20E+02	2.18E+01 G
Ga-68	C	1.4982E+01					4.71E-02	
			1077.40	1.498E+01	?(	3.934E+01	1.08E+02	3.30E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Tc-99m	I	-2.9916E-01					2.51E-01	
			140.51	-2.992E-01	?(	1.270E+00	1.26E+02	8.93E+01 G
BA-133	F	-6.1245E-01					3.85E+03	
			356.00	-6.125E-01	&(	2.966E+00	1.43E+02	6.20E+01 G
			302.85	-1.270E-01	%	1.052E+01	2.41E+03	1.83E+01 G
			383.84	7.307E-01	& P	1.393E+01	5.39E+02	8.94E+00 GA
			80.99	-9.330E-01	+ P	2.847E+00	7.82E+01	3.41E+01 GA
CS-134	I	1.1735E+00					7.54E+02	
			795.87	4.966E-01	?(	2.005E+00	1.17E+02	8.55E+01 G
			604.71	-5.445E-01	+	3.260E+00	1.76E+02	9.76E+01 G
			569.32	2.486E+00	?(	6.052E+00	7.28E+01	1.54E+01 G
			801.95	5.513E+00	?(	1.939E+01	1.02E+02	8.69E+00 G
			563.24	-7.059E+00	+ P	1.611E+01	5.38E+01	8.35E+00 G
CS-137	I	2.2329E-01					1.10E+04	
			661.66	2.233E-01	?(P	1.951E+00	2.48E+02	8.52E+01 G
CE-139	F	2.6156E-01					1.38E+02	
			165.85	2.616E-01	?(	1.115E+00	1.26E+02	7.99E+01 G
Ba-140	I	-1.1572E+00					1.28E+01	
			537.26	-1.157E+00	&(	4.542E+00	1.52E+02	2.44E+01 G
			162.66	-4.225E+00	+	1.614E+01	1.13E+02	6.22E+00 G
			304.85	0.000E+00	+	4.510E+01	1.00E+03	4.29E+00 G
La-140	I	-2.3676E-01					1.28E+01	
			1596.21	-4.509E-01	?(	1.697E+00	1.61E+02	9.54E+01 G
			487.02	-3.989E-01	+ P	2.441E+00	1.50E+02	4.55E+01 G
			328.76	7.696E-01	?(	3.782E+00	1.81E+02	2.03E+01 G
			815.77	-6.831E-01	& P	1.013E+01	2.70E+02	2.33E+01 G
CE-141	I	4.9677E-01					3.25E+01	
			145.44	4.968E-01	?(	2.178E+00	1.30E+02	4.82E+01 G
PM-144	C	2.3673E-01					3.63E+02	
			696.54	-1.968E-02	%(	1.305E+00	2.56E+03	9.90E+01 G
			618.06	4.929E-01	?(	2.711E+00	1.61E+02	9.91E+01 G
EU-152	F	1.0916E+00					4.94E+03	
			121.78	3.980E-01	?(	2.072E+00	1.51E+02	2.86E+01 G
			344.29	0.000E+00	-	5.778E+00	1.00E+03	2.65E+01 G
			1112.07	-8.455E-01	+	1.878E+01	6.18E+02	1.36E+01 G
			778.92	1.322E+00	?(	8.404E+00	2.51E+02	1.29E+01 G
			964.11	-5.089E+00	+	1.757E+01	1.02E+02	1.46E+01 G
			244.69	3.313E+00	&(	2.470E+01	2.21E+02	7.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1408.00	0.000E+00	-	3.703E+00	1.00E+03	2.10E+01 GA
EU-154	I	9.7682E-01					3.14E+03	
			123.10	2.984E-01	?(	1.853E+00	1.82E+02	4.08E+01 G
			1274.54	0.000E+00	-	4.603E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	8.713E+00	1.00E+03	2.02E+01 G
			873.23	0.000E+00	-	8.656E+00	1.00E+03	1.23E+01 G
			1004.77	2.513E+00	?(	5.792E+00	9.59E+01	1.80E+01 G
			996.33	-1.489E+00	+	2.194E+01	4.12E+02	1.06E+01 G
EU-155	I	9.5044E-01					1.81E+03	
			105.31	9.504E-01	?(P	5.238E+00	1.63E+02	2.12E+01 G
			86.54	0.000E+00	&	4.708E+00	1.00E+03	3.07E+01 G
HF-181	F	9.4091E-03					4.24E+01	
			482.00	-7.116E-02	?(	1.644E+00	6.45E+02	8.05E+01 G
			133.02	1.592E-01	?(	2.217E+00	4.07E+02	4.33E+01 G
			345.83	-2.301E+00	+	1.093E+01	1.40E+02	1.51E+01 G
			136.30	0.000E+00	-	1.652E+01	1.00E+03	5.85E+00 G
Ta-182	F	2.0454E+00					1.14E+02	
			1121.30	1.495E+00	?(	6.113E+00	1.18E+02	3.49E+01 G
			1221.41	1.271E+00	?(	4.672E+00	1.52E+02	2.70E+01 G
			1189.05	4.520E+00	?(	4.164E+00	3.54E+01	1.62E+01 G
Hg-203	F	-4.1063E-01					4.66E+01	
			279.20	-4.106E-01	&(	1.433E+00	1.03E+02	8.15E+01 G
TL-208	N	4.8140E+00					6.98E+02	
			583.02	4.814E+00	(P	4.392E-01	1.12E+01	8.45E+01 G
			277.28	6.879E+00	+	7.500E+00	4.08E+01	6.31E+00 G
			860.56	5.617E-01	&	1.132E+01	8.00E+02	1.24E+01 G
PM-146	C	8.1653E-02					2.02E+03	
			453.88	-1.886E-01	&(	1.828E+00	3.74E+02	6.50E+01 G
			747.16	-1.944E+00	+	4.448E+00	9.42E+01	3.40E+01 G
			735.72	8.624E-01	?(P	4.502E+00	1.99E+02	2.25E+01 G
Y-88	F	1.6051E-01					1.07E+02	
			1836.06	0.000E+00	?(	9.809E-01	1.00E+03	9.92E+01 G
			898.04	3.304E-01	?(P	9.902E-01	1.18E+02	9.37E+01 G
Cd-113m		-5.2384E+03					5.33E+03	
			263.70	-5.238E+03	&(	1.575E+04	8.92E+01	6.00E-03 K
Cf-251	T	2.1971E-01					3.28E+05	
			176.60	2.197E-01	&(	3.535E+00	5.67E+02	1.70E+01 G
			227.00	3.648E+00	?	1.030E+01	1.02E+02	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	-5.1889E-01					1.28E+05	
			387.95	-5.189E-01	?(	1.910E+00	1.08E+02	6.60E+01 G
			333.44	-1.019E+00	+	6.009E+00	2.20E+02	1.55E+01 G
Sn-126		-4.0573E+00					3.65E+07	
			87.57	0.000E+00	+	3.624E+00	1.00E+03	3.75E+01 GA
			64.28	-4.057E+00	?(	1.497E+01	1.10E+02	9.70E+00 G
			86.94	-2.320E+00	+	1.539E+01	1.97E+02	9.04E+00 GA
PB-210	N	2.1066E+01					8.14E+03	
			46.54	2.107E+01	*(P	2.411E+01	4.24E+01	4.25E+00 G
PB-212	N	7.7741E+00					6.98E+02	
			238.63	7.774E+00	(P	1.685E+00	1.04E+01	4.33E+01 G
			300.03	1.054E+01	+ P	1.544E+01	5.44E+01	3.28E+00 GA
PB-214	N	6.2493E+00					5.84E+05	
			351.93	5.646E+00	(P	1.918E+00	1.66E+01	3.76E+01 G
			295.09	7.425E+00	(	3.473E+00	2.24E+01	1.93E+01 G
			242.00	3.520E+00	-	2.499E+01	2.10E+02	7.43E+00 GA
BI-207	C	4.4434E-01					1.18E+04	
			1063.66	4.443E-01	?(P	1.472E+00	1.34E+02	7.45E+01 G
			569.70	0.000E+00	-	1.242E+00	1.00E+03	9.77E+01 G
BI-212	N	-4.7035E-02					6.98E+02	
			727.17	-4.703E-02	&(P	2.346E+01	1.66E+04	7.55E+00 G
			785.42	-2.981E+01	+ P	1.287E+02	1.08E+02	1.28E+00 GA
U-235	N	1.4325E-01					2.57E+11	
			143.79	-1.142E+00	(P	1.057E+01	2.83E+02	1.10E+01 G
			205.33	2.955E+00	&(	1.359E+01	1.65E+02	5.01E+00 G
			163.38	-5.292E+00	+ P	2.087E+01	1.43E+02	5.08E+00 G
			185.72	1.178E+00		1.435E+00	4.67E+01	5.40E+01 GA
BI-214	N	8.9466E+00					5.84E+05	
			609.31	9.214E+00	(P	1.455E+00	1.18E+01	4.61E+01 G
			1120.29	4.882E+00	-	1.435E+01	8.66E+01	1.51E+01 G
			1764.49	8.145E+00	?(P	6.434E+00	3.56E+01	1.54E+01 G
BI-210M	T	3.3626E-01					1.10E+09	
			265.83	3.363E-01	?(P	1.673E+00	1.44E+02	5.00E+01 G
			304.90	0.000E+00	-	6.910E+00	1.00E+03	2.80E+01 G
AC-228	N	5.1917E+00					2.10E+03	
			911.07	5.384E+00	?(	5.765E+00	4.81E+01	2.90E+01 G
			968.97	3.498E+00	?(	1.155E+01	9.66E+01	1.75E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          338.32 7.190E+00  (P 4.010E+00 2.59E+01 1.20E+01 G
                           93.35 4.767E+00 ?   2.323E+01 1.45E+02 5.56E+00 XA

TH-227   N   2.8298E+00                                     7.95E+03
                          256.24 3.078E+00  (  8.918E+00 1.09E+02 7.00E+00 G
                          235.97 2.070E+00 ?(  1.507E+01 2.15E+02 1.23E+01 G
                           50.14 3.781E+00 *(  1.208E+01 1.11E+02 8.00E+00 G

TH-229   N   3.0363E+00                                     2.68E+06
                          193.51 4.226E+00 ?(P 1.598E+01 1.37E+02 4.40E+00 G
                          210.85 1.286E+00 ?(P 2.512E+01 6.91E+02 2.99E+00 G

TH-234   N   1.2927E+01                                     1.63E+12
                           92.59 9.230E+00  (P 1.297E+01 4.39E+01 5.58E+00 G
                           63.29 1.835E+01 *(P 2.299E+01 4.55E+01 3.81E+00 G

PA-231   N  -1.2154E+01                                     1.20E+07
                          302.65-1.215E+01 ?(  6.896E+01 1.68E+02 2.88E+00 G
                          300.07-1.410E+01 +   8.471E+01 1.78E+02 2.46E+00 G

PA-233   C   8.3342E-01                                     7.82E+08
                          312.01 8.334E-01 ?(P 5.006E+00 1.77E+02 3.60E+01 G
                          300.18-5.595E+00 +   3.273E+01 1.73E+02 6.20E+00 G

PA-234   N   1.6979E-01                                     1.63E+12
                          131.29-2.345E-01 ?(  5.561E+00 6.91E+02 1.80E+01 G
                          946.02-1.365E+00 + P 9.590E+00 2.10E+02 1.34E+01 G
                          569.47 1.057E+00 ?(  1.426E+01 3.70E+02 8.20E+00 G
                          883.24 0.000E+00 -   1.897E+01 1.00E+03 9.60E+00 G
                          880.53 3.951E+00 ?   2.832E+01 2.00E+02 6.00E+00 GA

PA-234M  N   3.5723E+01                                     1.63E+12
                         1001.00-3.434E+00 %(P 2.879E+02 1.42E+03 8.37E-01 G
                          766.41 1.472E+02 ?(  5.846E+02 1.15E+02 2.94E-01 G

AM-241   T  -1.3306E+00                                     1.58E+05
                           59.54-1.331E+00  (P 3.156E+00 5.84E+01 3.59E+01 G

Np-237   F  -2.0121E+00                                     2.14E+06
                           86.49-2.012E+00 &(  1.129E+01 1.67E+02 1.31E+01 G

Ir-192   F  -4.4147E-01                                     7.40E+01
                          316.49-4.415E-01  (  1.350E+00 9.08E+01 8.70E+01 G
                          468.06 2.874E-01 +   3.189E+00 3.18E+02 5.18E+01 G
                          308.44 0.000E+00 +   6.153E+00 1.00E+03 3.18E+01 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Cs-136   F   1.3750E-01                                      1.30E+01
                          818.50-7.024E-01 ?(  2.633E+00 1.10E+02 1.00E+02 G
                         1048.07 9.261E-01 ?(  7.584E-01 3.33E+01 8.00E+01 G
                          340.57 5.832E-01 &(  3.090E+00 1.55E+02 4.69E+01 G

Np-239   T  -9.5311E-01                                      2.36E+00
                          103.70 8.607E-01 &   3.655E+00 1.26E+02 2.40E+01 X
                          106.13-9.531E-01 ?(  5.264E+00 1.64E+02 2.27E+01 G
                           99.50 8.594E-01 ?   5.470E+00 1.87E+02 1.50E+01 X

Nd-147       3.5831E-01                                      1.11E+01
                          531.00 3.583E-01 ?(  8.438E+00 8.81E+02 1.30E+01 G
                           91.10 0.000E+00 -   4.729E+00 1.00E+03 2.83E+01 G

Kr-85    I   6.5007E+01                                      3.92E+03
                          513.98 6.501E+01 &(  4.478E+02 2.00E+02 4.30E-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	48.	11.	0.006	110.67	3.781E+00	
AM-241	59.54	110.	-22.	-0.012	58.43	-1.331E+00	P
Sn-126	64.28	222.	-20.	-0.011	110.13	-4.057E+00	
BA-133	80.99	141.	-19.	-0.011	78.24	-9.330E-01	P
Np-237	86.49	362.	-16.	-0.009	167.01	-2.012E+00	
Sn-126	86.94	321.	-13.	-0.007	196.87	-2.320E+00	
Gd-153	97.50	134.	5.	0.003	354.27	2.416E-01	
Np-239	99.50	117.	8.	0.005	186.55	8.594E-01	
Gd-153	103.20	123.	13.	0.007	119.75	9.473E-01	
Np-239	103.70	136.	13.	0.007	125.74	8.607E-01	
EU-155	105.31	223.	13.	0.007	163.38	9.504E-01	P
Np-239	106.13	260.	-14.	-0.008	163.95	-9.531E-01	
EU-152	121.78	58.	7.	0.004	151.37	3.980E-01	
CO-57	122.06	95.	-13.	-0.007	110.86	-2.326E-01	
EU-154	123.10	97.	8.	0.004	181.51	2.984E-01	
PA-234	131.29	169.	-3.	-0.001	691.47	-2.345E-01	
HF-181	133.02	153.	4.	0.002	406.53	1.592E-01	
Tc-99m	140.51	194.	-16.	-0.009	126.19	-2.992E-01	
U-235	143.79	210.	-8.	-0.004	283.01	-1.142E+00	P
CE-141	145.44	169.	14.	0.008	130.06	4.968E-01	
Ba-140	162.66	132.	-15.	-0.008	113.38	-4.225E+00	
U-235	163.38	147.	-15.	-0.008	143.39	-5.292E+00	P
CE-139	165.85	104.	12.	0.007	125.86	2.616E-01	
Cf-251	176.60	40.	2.	0.001	567.16	2.197E-01	
U-235	185.72	63.	33.	0.018	46.75	1.178E+00	
TH-229	193.51	48.	9.	0.005	136.77	4.226E+00	P
U-235	205.33	40.	7.	0.004	165.16	2.955E+00	
TH-229	210.85	47.	2.	0.001	690.77	1.286E+00	P
Cf-251	227.00	30.	10.	0.006	102.47	3.648E+00	
TH-227	235.97	262.	11.	0.006	215.50	2.070E+00	
EU-152	244.69	251.	10.	0.006	220.51	3.313E+00	
TH-227	256.24	22.	8.	0.005	109.04	3.078E+00	
Cd-113m	263.70	52.	-12.	-0.007	89.20	-5.238E+03	
BI-210M	265.83	39.	6.	0.004	143.82	3.363E-01	P
Hg-203	279.20	74.	-12.	-0.007	103.26	-4.106E-01	
I-131	284.30	30.	3.	0.002	302.40	1.541E+00	P
TL-210	296.00	233.	-12.	-0.007	183.20	-4.323E-01	
PA-231	300.07	221.	-12.	-0.007	177.87	-1.410E+01	
PA-233	300.18	209.	-12.	-0.007	173.11	-5.595E+00	
PA-231	302.65	197.	-12.	-0.007	167.83	-1.215E+01	
PA-233	312.01	152.	10.	0.006	176.99	8.334E-01	P
Ir-192	316.49	60.	-13.	-0.007	90.76	-4.415E-01	
CR-51	320.08	81.	-2.	-0.001	596.67	-6.582E-01	
La-140	328.76	22.	5.	0.003	181.11	7.696E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Cf-249	333.44	33.	-5.	-0.003	219.54	-1.019E+00		
Cs-136	340.57	82.	8.	0.005	154.96	5.832E-01		
HF-181	345.83	105.	-11.	-0.006	139.82	-2.301E+00		
BA-133	356.00	126.	-11.	-0.006	142.83	-6.125E-01		
I-131	364.48	22.	8.	0.004	117.93	3.264E-01		P
BA-133	383.84	48.	2.	0.001	539.38	7.307E-01		P
Cf-249	387.95	48.	-10.	-0.005	108.08	-5.189E-01		
SN-113	391.69	51.	9.	0.005	121.22	4.916E-01		P
SB-125	427.88	20.	-6.	-0.003	175.88	-7.893E-01		P
AG-108M	433.94	8.	6.	0.003	110.10	2.394E-01		P
PM-146	453.88	32.	-3.	-0.002	373.67	-1.886E-01		
SB-125	463.37	58.	-13.	-0.007	48.90	-5.074E+00		P
Ir-192	468.06	62.	4.	0.002	318.10	2.874E-01		
BE-7	477.59	23.	8.	0.005	87.91	3.377E+00		
HF-181	482.00	36.	-1.	-0.001	645.17	-7.116E-02		
La-140	487.02	24.	-4.	-0.002	150.28	-3.989E-01		P
RU-103	497.05	17.	-4.	-0.002	174.09	-1.787E-01		P
RH-106	511.86	27.	52.	0.029	19.64	1.182E+01		
Kr-85	513.98	73.	6.	0.003	199.82	6.501E+01		
Nd-147	531.00	20.	1.	0.001	881.29	3.583E-01		
Ba-140	537.26	20.	-6.	-0.003	151.54	-1.157E+00		
CS-134	563.24	28.	-12.	-0.007	53.79	-7.059E+00		P
CS-134	569.32	12.	8.	0.004	72.75	2.486E+00		
PA-234	569.47	20.	2.	0.001	370.17	1.057E+00		
SB-125	600.50	178.	-10.	-0.006	187.69	-2.951E+00		
SB-124	602.73	169.	-11.	-0.006	82.67	-5.821E-01		P
CS-134	604.71	158.	-10.	-0.006	176.45	-5.445E-01		
RU-103	610.30	148.	-10.	-0.006	170.22	-9.350E+00		
AG-108M	614.28	138.	-7.	-0.004	256.17	-3.836E-01		
PM-144	618.06	106.	9.	0.005	161.39	4.929E-01		
RH-106	621.92	122.	8.	0.004	201.72	4.215E+00		P
SB-125	635.89	24.	-7.	-0.004	103.95	-3.431E+00		
I-131	636.97	28.	4.	0.002	172.37	3.404E+00		
AG-110M	657.76	21.	8.	0.005	86.36	4.829E-01		
CS-137	661.66	34.	3.	0.002	247.81	2.233E-01		P
NB-94	702.63	22.	3.	0.002	301.60	1.931E-01		P
SB-124	722.79	29.	-4.	-0.002	213.01	-2.045E+00		
PM-146	735.72	9.	3.	0.002	198.65	8.624E-01		P
PM-146	747.16	22.	-11.	-0.006	94.19	-1.944E+00		
ZR-95	756.73	17.	-4.	-0.002	201.91	-4.984E-01		
AG-110M	763.94	43.	-14.	-0.008	69.94	-4.044E+00		
NB-95	765.79	37.	10.	0.006	90.73	6.403E-01		
PA-234M	766.41	28.	7.	0.004	115.04	1.472E+02		
EU-152	778.92	9.	3.	0.001	250.62	1.322E+00		
BI-212	785.42	24.	-6.	-0.003	108.48	-2.981E+01		P
CS-134	795.87	26.	6.	0.004	116.66	4.966E-01		
CS-134	801.95	24.	7.	0.004	102.36	5.513E+00		
CO-58	810.78	39.	-10.	-0.006	61.85	-6.931E-01		P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
La-140	815.77	49.	-2.	-0.001	270.46	-6.831E-01		P
Cs-136	818.50	62.	-10.	-0.006	110.31	-7.024E-01		
MN-54	834.85	9.	7.	0.004	94.80	5.044E-01		
NB-94	871.10	0.	7.	0.004	37.80	4.939E-01		
PA-234	880.53	21.	3.	0.002	200.50	3.951E+00		
Sc-46	889.28	35.	-9.	-0.005	95.17	-6.699E-01		
Y-88	898.04	5.	4.	0.002	117.87	3.304E-01		P
AG-110M	937.49	9.	-2.	-0.001	285.36	-5.090E-01		
PA-234	946.02	9.	-2.	-0.001	209.65	-1.365E+00		P
EU-152	964.11	44.	-10.	-0.005	101.54	-5.089E+00		
EU-154	996.33	33.	-2.	-0.001	412.31	-1.489E+00		
EU-154	1004.77	5.	6.	0.003	95.92	2.513E+00		
Cs-136	1048.07	0.	9.	0.005	33.33	9.261E-01		
BI-207	1063.66	5.	4.	0.002	133.92	4.443E-01		P
Ga-68	1077.40	5.	5.	0.003	108.01	1.498E+01		
FE-59	1099.25	15.	-3.	-0.002	289.64	-4.550E-01		
EU-152	1112.07	33.	-1.	-0.001	618.47	-8.455E-01		
Sc-46	1120.55	28.	4.	0.002	220.14	3.076E-01		
Ta-182	1121.30	22.	6.	0.003	117.64	1.495E+00		
CO-60	1173.24	5.	5.	0.003	118.49	4.165E-01		P
Ta-182	1189.05	0.	8.	0.004	35.36	4.520E+00		
Ta-182	1221.41	5.	4.	0.002	152.39	1.271E+00		
NA-22	1274.53	5.	4.	0.002	103.25	3.560E-01		
TL-210	1313.00	0.	5.	0.003	44.72	2.369E+00		
AG-110M	1384.30	5.	1.	0.000	796.87	2.855E-01		
La-140	1596.21	6.	-4.	-0.002	160.96	-4.509E-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	3.3774E+00	3.3774E+00	8.791E+01%	1.01E+01
NA-22	#A	3.5604E-01	3.5604E-01	1.033E+02%	1.31E+00
K-40		7.9760E+01	7.9760E+01	1.159E+01%	9.19E+00
Sc-46	#A	-6.6985E-01	-6.6986E-01	9.517E+01%	2.17E+00
CR-51	#A	-6.5823E-01	-6.5824E-01	5.967E+02%	1.37E+01
MN-54	#A	5.0440E-01	5.0440E-01	9.480E+01%	1.15E+00
FE-59	#A	-4.5497E-01	-4.5497E-01	2.896E+02%	3.15E+00
Co-56	#	1.0745E+00	1.0745E+00	2.272E+01%	5.08E-01
CO-57	#A	-2.3259E-01	-2.3259E-01	1.109E+02%	8.71E-01
CO-58	#A	-6.9313E-01	-6.9314E-01	6.185E+01%	2.12E+00
CO-60	#A	2.0666E-01	2.0666E-01	1.185E+02%	7.43E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.98E+00
NB-94	#A	3.4503E-01	3.4503E-01	3.780E+01%	1.47E+00
ZR-95	#A	-4.9840E-01	-4.9840E-01	2.019E+02%	2.54E+00

NB-95	#A	6.4030E-01	6.4030E-01	9.073E+01%	1.97E+00
RU-103	#A	-1.7874E-01	-1.7874E-01	1.741E+02%	1.05E+00
RH-106	#A	4.2146E+00	4.2146E+00	2.017E+02%	2.90E+01
AG-108M	#A	2.3943E-01	2.3943E-01	1.101E+02%	6.99E-01
AG-110M	#A	2.7471E-01	2.7471E-01	8.636E+01%	2.51E+00
SN-113	#A	4.9161E-01	4.9161E-01	1.212E+02%	2.04E+00
SB-124	#A	-5.8209E-01	-5.8209E-01	8.267E+01%	3.34E+00
SB-125	#A	-7.8928E-01	-7.8928E-01	1.759E+02%	3.10E+00
I-131	#A	6.3707E-01	6.3711E-01	1.179E+02%	1.03E+00
Gd-153	#A	5.3856E-01	5.3856E-01	1.197E+02%	2.94E+00
Ga-68	#A	1.4830E+01	1.4982E+01	1.080E+02%	3.93E+01
Tc-99m	#A	-2.9859E-01	-2.9916E-01	1.262E+02%	1.27E+00
BA-133	#A	-6.1245E-01	-6.1245E-01	1.428E+02%	2.97E+00
CS-134	#A	1.1735E+00	1.1735E+00	5.713E+01%	2.00E+00
CS-137	#A	2.2329E-01	2.2329E-01	2.478E+02%	1.95E+00
CE-139	#A	2.6156E-01	2.6156E-01	1.259E+02%	1.12E+00
Ba-140	#A	-1.1571E+00	-1.1572E+00	1.515E+02%	4.54E+00
La-140	#A	-2.3675E-01	-2.3676E-01	1.211E+02%	1.70E+00
CE-141	#A	4.9676E-01	4.9677E-01	1.301E+02%	2.18E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.64E+00
PM-144	#A	2.3673E-01	2.3673E-01	1.614E+02%	1.31E+00
EU-152	#A	1.0916E+00	1.0916E+00	1.222E+02%	2.07E+00
EU-154	#A	9.7682E-01	9.7682E-01	9.592E+01%	1.85E+00
EU-155	#A	9.5044E-01	9.5044E-01	1.634E+02%	5.24E+00
HF-181	#A	9.4090E-03	9.4091E-03	3.813E+02%	1.64E+00
Ta-182	#A	2.0454E+00	2.0454E+00	3.536E+01%	6.11E+00
Hg-203	#A	-4.1063E-01	-4.1063E-01	1.033E+02%	1.43E+00
TL-208		4.8140E+00	4.8140E+00	1.117E+01%	4.39E-01
PM-146	#A	8.1653E-02	8.1653E-02	1.987E+02%	1.83E+00
Y-88	#A	1.6051E-01	1.6051E-01	1.179E+02%	9.81E-01
Cd-113m	#A	-5.2384E+03	-5.2384E+03	8.920E+01%	1.57E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.58E+01
Cf-251	#A	2.1971E-01	2.1971E-01	5.672E+02%	3.54E+00
Cf-249	#A	-5.1889E-01	-5.1889E-01	1.081E+02%	1.91E+00
Sn-126	#A	-4.0573E+00	-4.0573E+00	1.101E+02%	1.50E+01
PB-210	#A	2.1066E+01	2.1066E+01	4.242E+01%	2.41E+01
PB-212		7.7741E+00	7.7741E+00	1.036E+01%	1.69E+00
PB-214		6.2493E+00	6.2493E+00	1.394E+01%	1.92E+00
BI-207	#A	4.4434E-01	4.4434E-01	1.339E+02%	1.47E+00
BI-212	#A	-4.7035E-02	-4.7035E-02	1.665E+04%	2.35E+01
U-235	#A	1.4325E-01	1.4325E-01	1.638E+02%	1.06E+01
BI-214		8.9466E+00	8.9466E+00	1.179E+01%	1.46E+00
BI-210M	#A	3.3626E-01	3.3626E-01	1.438E+02%	1.67E+00
AC-228	#A	5.1917E+00	5.1917E+00	2.588E+01%	5.76E+00
TH-227	#A	2.8298E+00	2.8298E+00	8.856E+01%	8.92E+00
TH-229	#A	3.0363E+00	3.0363E+00	1.368E+02%	1.60E+01
TH-234	#A	1.2927E+01	1.2927E+01	3.164E+01%	1.30E+01
PA-231	#A	-1.2154E+01	-1.2154E+01	1.678E+02%	6.90E+01
PA-233	#A	8.3342E-01	8.3342E-01	1.770E+02%	5.01E+00

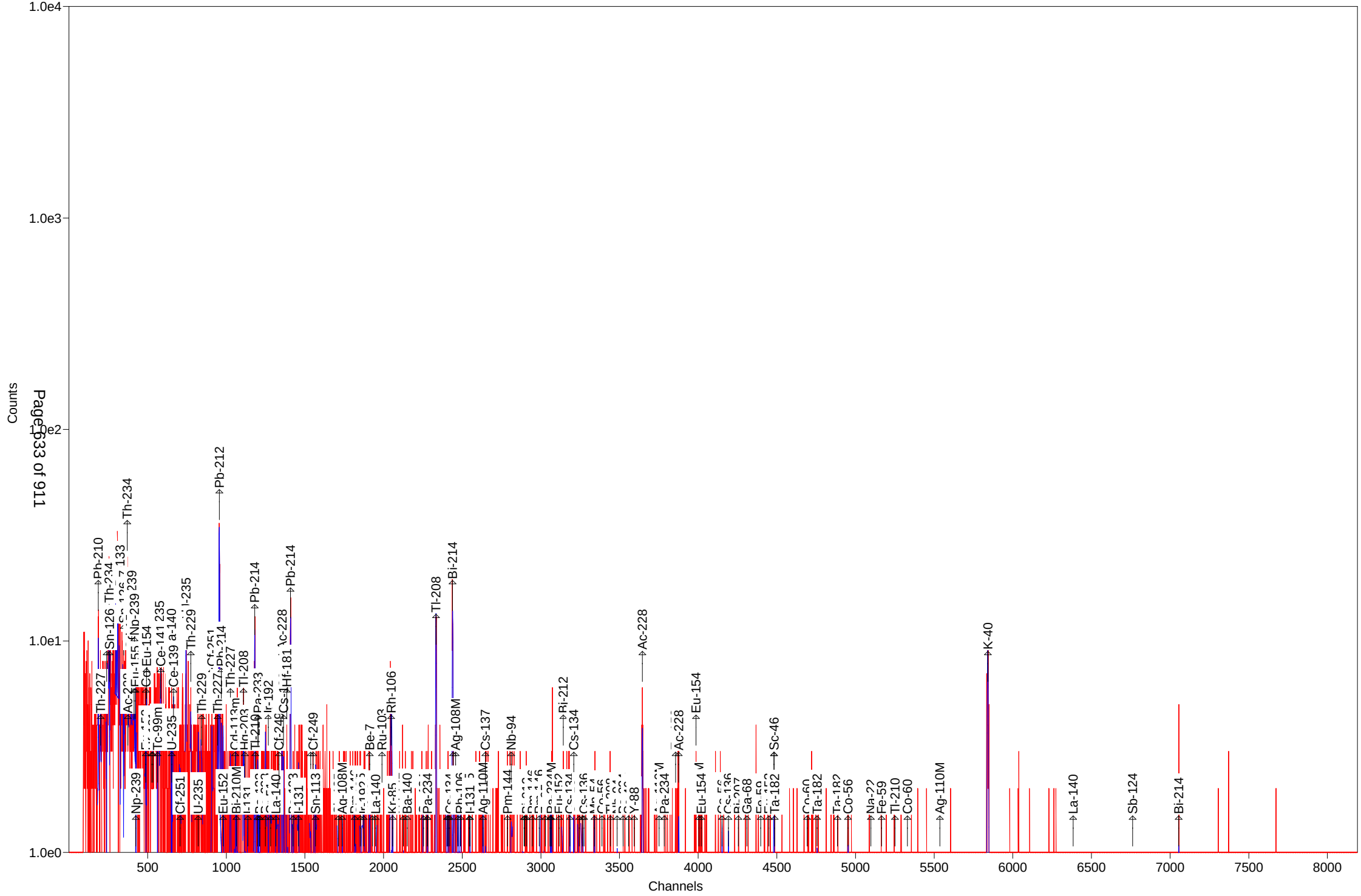
PA-234 #A	1.6979E-01	1.6979E-01	3.702E+02%		5.56E+00
PA-234M#A	3.5723E+01	3.5723E+01	1.150E+02%		2.88E+02
AM-241 #A	-1.3306E+00	-1.3306E+00	5.843E+01%		3.16E+00
Np-237 #A	-2.0121E+00	-2.0121E+00	1.670E+02%		1.13E+01
Ir-192 #A	-4.4147E-01	-4.4147E-01	9.076E+01%		1.35E+00
Cs-136 #A	1.3750E-01	1.3750E-01	3.333E+01%		2.63E+00
Np-239 #A	-9.5292E-01	-9.5311E-01	1.639E+02%		5.26E+00
Nd-147 #A	3.5830E-01	3.5831E-01	8.813E+02%		8.44E+00
TL-210 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.93E+00
Kr-85 #A	6.5007E+01	6.5007E+01	1.998E+02%		4.48E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.8 keV) 1.467E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 1.4672888E+02 Bq/Sample

412881_Gamma_180-86110-A-17-A. 5_Gamma_20190287.spc.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1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Channels
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
Pb-212
Th-234
Ph-210
Th-227
Pb-214
Bi-214
Tl-208
Ac-228
K-40
Eu-154
Sc-46
Ag-110M
La-140
Sb-124
Bi-214
Np-239
Cf-251
U-235
Eu-152
Sn-113
Cs-137
Nb-94
Pm-144
Co-56
Na-22
Fe-59
Tl-210
Co-60
Ga-68
Ta-182
Be-7
Ru-103
Rh-106
Ag-108M
Cs-134
Y-88
Pa-234
Ac-228
Eu-154
Ce-141
Ce-139
Tc-99m
Th-229
Th-227
Th-208
Pb-214
Pb-212
Th-234
Np-239
Eu-154
Ce-141
Ce-139
U-235
Th-229
Th-227
Th-208
Pb-214
Pb-212
Th-234
Ph-210
Th-227

Daily Checks

Test America
St. Louis
Quality Control Check

Spectrum: 2_20190219009_QCAsLeft
Description: Quality control Check (QC Source 'B') Post Stabilization
Acquired: 2/20/2019 12:50:21 AM
Detector: Detector # 2
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	59.58	59.79	60.04	PASS
FWHM	0.75	0.00	0.00	0.83	1.85	1.95	PASS
ActivityDiff	670.10	-5.00	-4.00	0.99	4.00	5.00	PASS
QA-662							
FWHM	1.28	0.00	0.00	1.30	2.98	3.08	PASS
ActivityDiff	628.20	-5.00	-4.00	0.28	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5328.90	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.33	1333.01	1333.26	PASS
FWHM	1.73	0.00	0.00	1.67	3.93	4.03	PASS
ActivityDiff	1225.40	-5.00	-4.00	1.23	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 2_20190220001_BG
Description: Background Contamination Check
Acquired: 2/20/2019 1:33:52 AM
Detector: Detector # 2
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	1.69	1.21	1.37	1.56	2.00	2.16	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 2_20190220008_QCAsLeft
Description: Quality control Check (QC Source 'B') Post Stabilization
Acquired: 2/21/2019 12:50:06 AM
Detector: Detector # 2
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	59.60	59.79	60.04	PASS
FWHM	0.75	0.00	0.00	0.82	1.85	1.95	PASS
ActivityDiff	670.10	-5.00	-4.00	0.39	4.00	5.00	PASS
QA-662							
FWHM	1.28	0.00	0.00	1.31	2.98	3.08	PASS
ActivityDiff	628.20	-5.00	-4.00	-0.02	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.40	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.46	1333.01	1333.26	PASS
FWHM	1.73	0.00	0.00	1.68	3.93	4.03	PASS
ActivityDiff	1225.40	-5.00	-4.00	-0.71	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 2_20190221001_BG
Description: Background Contamination Check
Acquired: 2/21/2019 1:18:53 AM
Detector: Detector # 2
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	1.69	1.21	1.37	1.52	2.00	2.16	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 5_20190219008_QCAsLeft
Description: Quality control Check (QC Source 'A') Post Stabilization
Acquired: 2/20/2019 12:49:36 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	59.60	59.79	60.04	PASS
FWHM	0.74	0.00	0.00	0.73	1.84	1.94	PASS
ActivityDiff	636.60	-5.00	-4.00	-0.77	4.00	5.00	PASS
QA-662							
FWHM	1.36	0.00	0.00	1.34	3.06	3.16	PASS
ActivityDiff	596.80	-5.00	-4.00	0.60	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5328.60	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.21	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.92	4.10	4.20	PASS
ActivityDiff	1164.20	-5.00	-4.00	-2.53	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 5_20190220001_BG
Description: Background Contamination Check
Acquired: 2/20/2019 1:35:30 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	1.43	1.55	1.60	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 5_20190221001_QCAsLeft
Description: Quality control Check (QC Source 'A') Post Stabilization
Acquired: 2/21/2019 12:52:45 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	0.73	1.84	1.94	PASS
ActivityDiff	636.60	-5.00	-4.00	1.24	4.00	5.00	PASS
QA-662							
FWHM	1.36	0.00	0.00	1.36	3.06	3.16	PASS
ActivityDiff	596.80	-5.00	-4.00	-0.61	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5328.70	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.22	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.97	4.10	4.20	PASS
ActivityDiff	1164.20	-5.00	-4.00	0.03	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 5_20190221002_BG
Description: Background Contamination Check
Acquired: 2/21/2019 1:17:07 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	1.40	1.55	1.60	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 7_20190219001_QCAsLeft
Description: Quality control Check (QC Source 'C') Post Stabilization
Acquired: 2/19/2019 1:19:15 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	238.00	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.63	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	1.10	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	0.86	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.67	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	-0.51	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.20	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.38	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.13	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	0.19	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 7_20190219002_BG
Description: Background Contamination Check
Acquired: 2/19/2019 2:07:09 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: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 7_20190220001_QCAsLeft
Description: Quality control Check (QC Source 'C') Post Stabilization
Acquired: 2/20/2019 12:50:47 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	1.05	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	3.77	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.64	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	0.72	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5328.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.21	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.09	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	0.74	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 7_20190220002_BG
Description: Background Contamination Check
Acquired: 2/20/2019 1:33:33 AM
Detector: Detector # 7
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.28	1.40	1.45	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 8_20190220001_QCAsLeft
Description: Quality control Check (QC Source 'D') Post Stabilization
Acquired: 2/20/2019 12:52:18 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	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.55	59.79	60.04	PASS
FWHM	1.10	0.00	0.00	0.89	2.20	2.30	PASS
ActivityDiff	650.60	-5.00	-4.00	1.62	4.00	5.00	PASS
QA-662							
FWHM	1.53	0.00	0.00	1.35	3.23	3.33	PASS
ActivityDiff	609.90	-5.00	-4.00	3.72	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.60	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.40	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.82	4.10	4.20	PASS
ActivityDiff	1189.70	-5.00	-4.00	1.91	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 8_20190220002_BG
Description: Background Contamination Check
Acquired: 2/20/2019 1:32:28 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: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 8_20190220014_QCAsLeft
Description: Quality control Check (QC Source 'D') Post Stabilization
Acquired: 2/21/2019 12:50:25 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	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.55	59.79	60.04	PASS
FWHM	1.10	0.00	0.00	0.91	2.20	2.30	PASS
ActivityDiff	650.60	-5.00	-4.00	1.38	4.00	5.00	PASS
QA-662							
FWHM	1.53	0.00	0.00	1.43	3.23	3.33	PASS
ActivityDiff	609.90	-5.00	-4.00	2.89	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.90	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.46	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.91	4.10	4.20	PASS
ActivityDiff	1189.70	-5.00	-4.00	0.56	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 8_20190221001_BG
Description: Background Contamination Check
Acquired: 2/21/2019 1:19:49 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	1.52	1.68	1.74	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 9_20190219009_BG
Description: Background Contamination Check
Acquired: 2/20/2019 12:26:09 AM
Detector: Detector # 9
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.89	1.53	1.65	1.86	2.14	2.26	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

ERROR: undefinedfilename
OFFENDING COMMAND: C:\Users\STLCOU~1\AppData\Local\Temp\PDFCreator\Spool\287862BAF14D44A7B

STACK:

Test America
St. Louis
Quality Control Check

Spectrum: 9_20190220001_QCAsLeft
Description: Quality control Check (QC Source 'E') Post Stabilization
Acquired: 2/20/2019 1:51:36 AM
Detector: Detector # 9
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	1.08	0.00	0.00	0.95	2.18	2.28	PASS
ActivityDiff	649.44	-5.00	-4.00	0.30	4.00	5.00	PASS
QA-662							
FWHM	1.62	0.00	0.00	1.48	3.32	3.42	PASS
ActivityDiff	607.56	-5.00	-4.00	-0.47	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.80	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.37	1333.01	1333.26	PASS
FWHM	2.12	0.00	0.00	2.08	4.32	4.42	PASS
ActivityDiff	1191.31	-5.00	-4.00	-0.47	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 12_20190220001_BG
Description: Background Contamination Check
Acquired: 2/20/2019 12:27:05 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	2.00	1.89	1.93	2.00	2.07	2.10	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 12_20190220002_QCAsLeft
Description: Quality control Check (QC Source 'H') Post Stabilization
Acquired: 2/20/2019 1:51:16 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	59.57	59.79	60.04	PASS
FWHM	0.90	0.00	0.00	0.83	2.00	2.10	PASS
ActivityDiff	691.00	-5.00	-4.00	0.33	4.00	5.00	PASS
QA-662							
FWHM	1.48	0.00	0.00	1.50	3.18	3.28	PASS
ActivityDiff	659.00	-5.00	-4.00	-1.84	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	1332.27	1333.01	1333.26	PASS
FWHM	2.00	0.00	0.00	2.00	4.20	4.30	PASS
ActivityDiff	1274.00	-5.00	-4.00	1.42	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 14_20190219001_QCAsLeft
Description: Quality control Check (QC Source 'E') Post Stabilization
Acquired: 2/19/2019 1:18:33 AM
Detector: Detector #14
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.67	59.79	60.04	PASS
FWHM	0.76	0.00	0.00	0.87	1.86	1.96	PASS
ActivityDiff	671.90	-5.00	-4.00	0.41	4.00	5.00	PASS
QA-662							
FWHM	1.35	0.00	0.00	1.44	3.05	3.15	PASS
ActivityDiff	628.85	-5.00	-4.00	-0.59	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.60	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.41	1333.01	1333.26	PASS
FWHM	1.91	0.00	0.00	1.90	4.11	4.21	PASS
ActivityDiff	1224.59	-5.00	-4.00	0.23	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 14_20190219002_BG
Description: Background Contamination Check
Acquired: 2/19/2019 2:02:46 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	1.68	1.90	1.94	Low OOT

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 16_20190219001_QCAsLeft
Description: Quality control Check (QC Source 'G') Post Stabilization
Acquired: 2/19/2019 1:14:05 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	238.10	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.62	59.79	60.04	PASS
FWHM	0.96	0.00	0.00	1.02	2.06	2.16	PASS
ActivityDiff	602.10	-5.00	-4.00	2.47	4.00	5.00	PASS
QA-662							
FWHM	1.53	0.00	0.00	1.70	3.23	3.33	PASS
ActivityDiff	571.13	-5.00	-4.00	0.12	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5328.80	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.31	1333.01	1333.26	PASS
FWHM	2.09	0.00	0.00	2.58	4.29	4.39	PASS
ActivityDiff	1139.05	-5.00	-4.00	3.92	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 16_20190219002_BG
Description: Background Contamination Check
Acquired: 2/19/2019 2:03:17 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	2.57	2.80	2.86	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 17_20190219001_QCAsLeft
Description: Quality control Check (QC Source 'H') Post Stabilization
Acquired: 2/19/2019 1:16:34 AM
Detector: Detector #17
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.63	59.79	60.04	PASS
FWHM	0.77	0.00	0.00	0.77	1.87	1.97	PASS
ActivityDiff	691.00	-5.00	-4.00	-0.91	4.00	5.00	PASS
QA-662							
FWHM	1.37	0.00	0.00	1.36	3.07	3.17	PASS
ActivityDiff	659.00	-5.00	-4.00	-2.00	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.70	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.54	1333.01	1333.26	PASS
FWHM	1.88	0.00	0.00	1.88	4.08	4.18	PASS
ActivityDiff	1274.00	-5.00	-4.00	-0.41	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 17_20190219002_BG
Description: Background Contamination Check
Acquired: 2/19/2019 2:04:38 AM
Detector: Detector #17
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.32	2.18	2.23	2.26	2.42	2.46	PASS

Analyst: Morgan Reichert Reviewer: kody Saulters

Initial Calibrations

Gamma Verification per Geometry

Detector: Ge2
Geometry: Tuna Can
Reference date: 1/1/2018
Calibration Standard: 108513
Standard volume g / vial: 1550
Standard volume transferred in g / geometry: 342.2
lab ID# of cal standard: #1402359 / Tuna Can_2018_00001

Isotope	Certified Activity - Bq	Geometry Activity - Bq	Count Results	%recovery
Pb-210	72410	15986	15990	100.0
Am-241	5770	1274	1263	99.1
Cd-109	79700	17596	18110	102.9
Co-57	1809	399	391.7	98.1
Ce-139	2723	601	595.1	99.0
Hg-203	5868	1296	1294	99.9
Sn-113	4658	1028	1059	103.0
Cs-137	2283	504	516	102.4
Y-88	7810	1724	1689	98.0
Co-60	3574	789	775.8	98.3
Co-60	3574	789	774.6	98.2
Y-88	7810	1724	1760	102.1

Reviewed By: Jody Watson

Date: 4/23/2018

Calibration Data from file: 2_Soil_TunaCan.Clb
Energy Calibration Date: 4/20/2018 Time: 1:56:12 PM
Efficiency Calibration Date: 4/20/2018 Time: 1:56:20 PM

Calibration Description:
2_Soil_TunaCan_101407

Energy Calibration Fit
Energy = 0.1005 +0.250028*Channel -4.97473e-009*Channel**2
FWHM (ch) = 3.1737 +0.000840*Channel -2.16998e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.87	46.54	46.57	-0.07%	0.82	0.83	-1.01%
237.88	59.54	59.58	-0.06%	0.84	0.84	-0.85%
351.71	88.03	88.04	-0.01%	0.86	0.87	-0.27%
487.70	122.06	122.04	0.02%	0.90	0.89	0.18%
662.91	165.85	165.84	0.00%	0.92	0.93	-0.73%
1116.03	279.17	279.13	0.01%	1.03	1.02	0.73%
1566.05	391.69	391.64	0.01%	1.14	1.11	2.44%
2646.01	661.66	661.64	0.00%	1.32	1.31	0.83%
3591.70	898.02	898.06	-0.00%	1.46	1.48	-0.87%
4692.54	1173.24	1173.26	-0.00%	1.62	1.66	-2.21%
5329.62	1332.50	1332.51	-0.00%	1.78	1.76	1.20%
7343.84	1836.01	1835.99	0.00%	2.05	2.04	0.18%

Efficiency Calibration Fit
Polynomial Uncertainty = 1.0026 %
Coefficients:
-0.414971 -4.933446 0.551852 -0.058768 0.002630 -0.000046

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.8282E-002	1.8238E-002	0.24%
59.54	3.0217E-002	3.0485E-002	-0.89%
88.03	4.2084E-002	4.0747E-002	3.18%
122.06	4.1203E-002	4.2009E-002	-1.96%
165.85	3.6656E-002	3.7027E-002	-1.01%
279.17	2.4402E-002	2.4396E-002	0.03%
391.69	1.8337E-002	1.7804E-002	2.91%
661.66	1.1379E-002	1.1116E-002	2.32%
898.02	8.3829E-003	8.5580E-003	-2.09%
1173.24	6.6850E-003	6.7987E-003	-1.70%
1332.50	5.9600E-003	6.0709E-003	-1.86%
1836.01	4.5575E-003	4.4637E-003	2.06%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.50	4.25	8.11E+003	15986.00	679.41	4.20%	1/1/2018 11:00:00 AM
Am-241	59.50	35.70	1.58E+005	1273.90	454.78	3.60%	1/1/2018 11:00:00 AM
Cd-109	88.00	3.61	4.61E+002	17596.00	635.22	4.10%	1/1/2018 11:00:00 AM
Co-57	122.10	85.60	2.72E+002	399.38	341.87	3.40%	1/1/2018 11:00:00 AM
Ce-139	165.90	79.90	1.38E+002	601.20	480.36	3.60%	1/1/2018 11:00:00 AM
Hg-203	279.20	81.50	4.66E+001	1295.50	1055.83	3.50%	1/1/2018 11:00:00 AM
Sn-113	391.70	64.00	1.15E+002	1028.40	658.18	3.90%	1/1/2018 11:00:00 AM
Cs-137	661.70	85.21	1.10E+004	504.03	429.48	4.10%	1/1/2018 11:00:00 AM
Y-88	898.00	93.70	1.07E+002	1724.30	1615.67	3.70%	1/1/2018 11:00:00 AM
Co-60	1173.20	99.90	1.93E+003	789.05	788.26	3.90%	1/1/2018 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	789.05	788.89	3.90%	1/1/2018 11:00:00 AM
Y-88	1836.10	99.20	1.07E+002	1724.30	1710.51	3.70%	1/1/2018 11:00:00 AM

Test America St. Louis Spectrum ID: 2_TunaCan_20180010

Sample Description: 2_TunaCan_108513
Detector: Detector # 2
Batch ID: 2
Work Order Number: TunaCan
Lot Number: 108513

Decay to Time: 1/1/2018 11:00 Live Time: 3600 sec
Acquisition Time: 3/22/2018 02:01:23 Real Time: 3667 sec
Analysis Time: 4/20/2018 14:00 Dead Time: 1.83 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 2_Soil_TunaCan.Clb
Efficiency Cal Desc: 2_Soil_TunaCan_101407
Efficiency Cal Date: 4/20/2018 13:56
Energy Cal Date: 4/20/2018 13:54
Library: DET_EnergyStandardMix & Pb.lib
Bkgd Correction File: 2_2016-11-06_0311.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
Pb-210	1.599E+04	0.6	9.424E+01	1.031E+03	1.847E+02
AM-241	1.263E+03	0.7	8.421E+00	8.043E+01	1.521E+01
CD-109	1.811E+04	0.4	6.867E+01	1.126E+03	9.736E+01
CO-57	3.917E+02	0.7	2.807E+00	2.268E+01	4.688E+00
Ce-139	5.951E+02	0.6	3.823E+00	3.380E+01	5.755E+00
Hg-203	1.294E+03	0.7	9.594E+00	7.484E+01	1.351E+01
SN-113	1.059E+03	0.8	8.237E+00	6.299E+01	1.076E+01
CS-137	5.160E+02	1.1	5.874E+00	2.719E+01	8.322E+00
Y-898	1.689E+03	0.7	1.238E+01	8.671E+01	1.372E+01
Co-1173	7.758E+02	0.9	6.916E+00	3.922E+01	6.976E+00
Co-1332	7.746E+02	0.9	7.163E+00	3.924E+01	6.756E+00
Y-1836	1.760E+03	0.8	1.416E+01	1.013E+02	6.868E+00
Total	4.422E+04				

Analyst: Jody Watson

Sample description
2_TunaCan_108513

Spectrum Filename: C:\User\SPC\Det2\2_TunaCan_20180010.An1

Acquisition information

Start time:	3/22/2018 2:01:23 AM
Live time:	3600
Real time:	3667
Dead time:	1.83 %
Detector ID:	2

Detector system
Ge 2 SN/164

Calibration

Filename:	2_Soil_TunaCan.Clb

2_Soil_TunaCan_101407

Energy Calibration

Created:	4/20/2018 1:54:10 PM
Zero offset:	0.101 keV
Gain:	0.250 keV/channel
Quadratic:	-4.975E-09 keV/channel^2

Efficiency Calibration

Created:	4/20/2018 1:56:20 PM
Type:	Polynomial
Uncertainty:	1.003 %
Coefficients:	-0.414971 -4.933446 0.551852
	-0.058768 0.002630 -0.000046

Library Files

Main analysis library:	DET_EnergyStandardMix & Pb.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.60keV)
Stop channel:	8000 (2000.00keV)
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	1/1/2018 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	2_2016-11-06_0311.PBC 11/6/2016 3:11:26 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.0221

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.62	44323.	0.59	0.83	1.828E-02	46.54	4.250	1.599E+04	Pb210
49.67	262.	56.28	0.83	2.215E-02				
59.61	48072.	0.57	0.84	3.051E-02	59.54	35.700	1.227E+03	AM241
63.26	133.	84.38	0.53	3.261E-02				
70.84	1917.	8.83	0.85	3.602E-02				
72.92	3381.	4.90	0.85	3.679E-02				
75.06	852.	17.67	0.86	3.752E-02				
82.55	1666.	9.67	0.86	3.962E-02				
85.00	2541.	6.47	0.86	4.016E-02				
88.05	85104.	0.38	0.87	4.075E-02	88.03	3.610	1.811E+04	CD109
122.04	41386.	0.72	0.90	4.201E-02	122.06	85.600	3.917E+02	CO57
136.42	4993.	4.03	0.90	4.074E-02				
165.84	42444.	0.64	0.92	3.703E-02	165.85	79.900	5.951E+02	Ce139
175.24	41.	157.44	0.40	3.575E-02				
189.89	220.	43.10	0.51	3.380E-02				
199.36	307.	35.91	1.86	3.258E-02				
238.58	364.	27.37	0.79	2.809E-02				
255.12	1412.	6.21	1.00	2.647E-02				
258.87	199.	40.65	1.00	2.613E-02				
279.13	28359.	0.74	1.03	2.440E-02	279.17	81.500	1.294E+03	Hg203
346.64	83.	80.15	0.65	1.995E-02				
352.00	190.	41.23	0.51	1.967E-02				
369.76	208.	45.15	0.55	1.878E-02				
391.64	26895.	0.78	1.14	1.781E-02	391.69	64.000	1.059E+03	SN113
420.53	48.	93.88	0.68	1.667E-02				
440.85	113.	61.42	0.36	1.596E-02				
467.57	126.	59.92	0.62	1.513E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
583.16	154.	48.59	1.10	1.241E-02				
661.64	17506.	1.14	1.32	1.112E-02	661.66	85.210	5.160E+02	CS137
726.17	98.	51.60	0.63	1.026E-02				
814.23	735.	12.15	1.56	9.303E-03				
873.82	243.	36.39	0.36	8.760E-03				
898.06	29049.	0.73	1.46	8.558E-03	898.02	93.700	1.689E+03	Y898
917.04	94.	58.43	0.29	8.407E-03				
984.82	77.	44.29	0.93	7.910E-03				
992.71	94.	38.13	0.67	7.856E-03				
1006.17	95.	57.14	0.31	7.766E-03				
1173.26	18434.	0.89	1.62	6.799E-03	1173.24	99.900	7.758E+02	Co1173
1258.73	90.	45.19	2.14	6.389E-03				
1277.77	145.	29.63	4.05	6.304E-03				
1332.51	16448.	0.92	1.78	6.071E-03	1332.50	99.982	7.746E+02	Co1332
1835.99	16720.	0.80	2.05	4.464E-03	1836.01	99.200	1.760E+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	
198.38	49.62	10765.	274.	1.235E+04	53.97	0.835	-	sD
252.61	63.26	5722.	133.	4.070E+03	84.38	0.528	-	sc
282.95	70.83	13365.	1917.	5.324E+04	8.83	0.852	-	D
291.24	72.90	12037.	3381.	9.190E+04	4.90	0.854	-	D
299.82	75.05	10895.	852.	2.271E+04	17.67	0.856	-	sD
329.80	82.54	12146.	1669.	4.212E+04	9.66	0.862	-	D
339.61	84.99	12245.	2543.	6.331E+04	6.47	0.864	-	sD
545.24	136.42	9285.	4993.	1.225E+05	4.03	0.900	-	
700.50	175.24	2063.	41.	1.147E+03	157.44	0.404	-	c
759.10	189.89	3278.	220.	6.500E+03	43.10	0.505	-	s
796.95	199.36	3948.	307.	9.423E+03	35.91	1.860	-	s
953.85	238.58	3380.	364.	1.297E+04	27.37	0.791	-	
1019.98	255.13	3131.	1412.	5.333E+04	6.21	1.002	-	D
1035.00	258.89	3179.	199.	7.624E+03	40.65	1.005	-	sD
1386.03	346.64	1642.	83.	4.177E+03	80.15	0.652	-	sc
1407.47	352.00	1977.	190.	9.646E+03	41.23	0.513	-	s
1478.53	369.76	2341.	208.	1.106E+04	45.15	0.550	-	s
1681.59	420.53	934.	48.	2.909E+03	93.88	0.681	-	sc
1762.86	440.85	1568.	113.	7.079E+03	61.42	0.359	-	s
1869.74	467.57	1774.	126.	8.363E+03	59.92	0.617	-	s
2332.08	583.16	1562.	154.	1.242E+04	48.59	1.101	-	s
2904.14	726.17	871.	98.	9.569E+03	51.60	0.628	-	s
3256.36	814.23	1551.	735.	7.901E+04	12.15	1.562	-	
3494.72	873.82	1572.	243.	2.778E+04	36.39	0.357	-	s
3667.60	917.04	923.	94.	1.118E+04	58.43	0.286	-	s
3938.76	984.82	461.	77.	9.693E+03	44.29	0.926	-	s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
3970.32	992.71	482.	94.	1.203E+04	38.13	0.668	- s
4024.16	1006.17	849.	95.	1.219E+04	57.14	0.314	- s
5034.48	1258.73	377.	90.	1.411E+04	45.19	2.139	- s
5110.62	1277.77	378.	145.	2.300E+04	29.63	4.054	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.74	46.54	11937.	44323.	12.312	0.59	0.832D
AM-241	237.88	59.58	16183.	49453.	13.737	0.67	0.836
CD-109	351.68	88.03	9528.	85104.	23.640	0.38	0.867D
CO-57	487.70	122.04	11175.	41386.	11.496	0.72	0.896
Ce-139	662.91	165.84	7657.	42444.	11.790	0.64	0.924
Hg-203	1116.03	279.13	3961.	28359.	7.877	0.74	1.029
SN-113	1566.05	391.64	3372.	26895.	7.471	0.78	1.137
CS-137	2646.01	661.64	3601.	17506.	4.863	1.14	1.322
Y-898	3591.70	898.06	2508.	29049.	8.069	0.73	1.465
Co-1173	4692.54	1173.26	1224.	18434.	5.120	0.89	1.623
Co-1332	5329.62	1332.51	912.	16448.	4.569	0.92	1.779
Y-1836	7343.84	1835.99	180.	16720.	4.644	0.80	2.046

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	1.5992E+04				8.15E+03	
			46.54	1.599E+04	(P	1.847E+02 5.89E-01 4.25E+00 G	
AM-241		1.2627E+03				1.58E+05	
			59.54	1.263E+03	(P	1.521E+01 6.67E-01 3.57E+01 G	
CD-109		1.8108E+04				4.63E+02	
			88.03	1.811E+04	(	9.736E+01 3.79E-01 3.61E+00 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	3.9167E+02					2.72E+02	
		122.06	3.917E+02	(	4.688E+00	7.17E-01	8.56E+01 G
Ce-139	5.9510E+02					1.38E+02	
		165.85	5.951E+02	(	5.755E+00	6.42E-01	7.99E+01 G
Hg-203	1.2940E+03					4.66E+01	
		279.17	1.294E+03	(P	1.351E+01	7.41E-01	8.15E+01 G
SN-113	1.0591E+03					1.15E+02	
		391.69	1.059E+03	(P	1.076E+01	7.78E-01	6.40E+01 G
CS-137	5.1597E+02					1.10E+04	
		661.66	5.160E+02	(	8.322E+00	1.14E+00	8.52E+01 G
Y-898	1.6888E+03					1.07E+02	
		898.02	1.689E+03	(	1.372E+01	7.33E-01	9.37E+01 G
Co-1173	7.7584E+02					1.93E+03	
		1173.24	7.758E+02	(P	6.976E+00	8.91E-01	9.99E+01 G
Co-1332	7.7461E+02					1.93E+03	
		1332.50	7.746E+02	(P	6.756E+00	9.25E-01	1.00E+02 G
Y-1836	1.7603E+03					1.07E+02	
		1836.01	1.760E+03	(	6.868E+00	8.05E-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

Peak Codes:
G - Gamma Ray

F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
Pb-210	1.5884E+04	1.5992E+04	5.893E-01%	1.85E+02
AM-241	1.2622E+03	1.2627E+03	6.670E-01%	1.52E+01
CD-109	1.6071E+04	1.8108E+04	3.792E-01%	9.74E+01
CO-57	3.1969E+02	3.9167E+02	7.166E-01%	4.69E+00
Ce-139	3.9851E+02	5.9510E+02	6.424E-01%	5.76E+00
Hg-203	3.9619E+02	1.2940E+03	7.414E-01%	1.35E+01
SN-113	6.5565E+02	1.0591E+03	7.778E-01%	1.08E+01
CS-137	5.1338E+02	5.1597E+02	1.138E+00%	8.32E+00
Y-898	1.0063E+03	1.6888E+03	7.331E-01%	1.37E+01
Co-1173	7.5391E+02	7.7584E+02	8.914E-01%	6.98E+00
Co-1332	7.5272E+02	7.7461E+02	9.248E-01%	6.76E+00
Y-1836	1.0489E+03	1.7603E+03	8.046E-01%	6.87E+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 2000.0 keV) 3.906E+04 Bq/Sample
Total Decayed Activity (37.6 to 2000.0 keV) 4.4218129E+04 Bq/Sample

Gamma Verification per Geometry

Detector: Ge5

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard Rad12-0007

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14353	96.2
Am-241	2037	418	0.3590	1163	1230.2	105.7
Cd-109	2881	591	0.0361	16363	16101	98.4
Co-57	1511	310	0.8560	362	347.72	96.1
Ce-139	2139	439	0.7990	549	538.4	98.1
Hg-203	4651	954	0.8146	1171	1208.4	103.2
Sn-113	3015	618	0.6400	966	972.07	100.6
Cs-137	1938	397	0.8510	467	462.35	99.0
Y-88	7264	1489	0.9370	1589	1559.3	98.1
Co-60	3580	734	0.9997	734	722.51	98.4
Co-60	3581	734	0.9999	734	739.67	100.7
Y-88	7690	1577	0.9920	1589	1613.8	101.5

Reviewed By: Jody Watson

Date: 3/27/2012

Calibration Data from file: 5_Soil_TunaCan.Clb
Energy Calibration Date: 3/27/2012 Time: 5:20:02 PM
Efficiency Calibration Date: 3/27/2012 Time: 5:20:37 PM

Calibration Description:
5_Soil_TunaCan_90099_032612

Energy Calibration Fit
Energy = 0.1351 +0.249831*Channel +2.72022e-008*Channel**2
FWHM (ch) = 2.8138 +0.001050*Channel -2.57606e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
186.01	46.54	46.61	-0.15%	0.74	0.75	-1.17%
237.86	59.54	59.56	-0.04%	0.74	0.77	-4.07%
351.46	88.03	87.95	0.10%	0.80	0.79	1.28%
487.52	122.06	121.94	0.10%	0.85	0.83	2.66%
663.26	165.85	165.85	0.00%	0.88	0.87	0.98%
1116.90	279.17	279.20	-0.01%	0.97	0.99	-2.35%
1567.36	391.69	391.78	-0.02%	1.12	1.10	1.78%
2647.45	661.66	661.74	-0.01%	1.38	1.35	1.91%
3592.51	898.02	898.01	0.00%	1.55	1.56	-1.11%
4692.96	1173.24	1173.18	0.00%	1.77	1.79	-1.18%
5329.72	1332.50	1332.44	0.00%	1.93	1.92	0.31%
7342.77	1836.01	1836.05	-0.00%	2.29	2.29	0.24%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.8682 %
Ln(Eff) = 0.6466 -0.783045*Ln(Eng) -0.0041175*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.4296 %
Ln(Eff) = -24.6225 +9.075211*Ln(Eng) -0.966442*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.7205E-002	1.7882E-002	-3.93%
59.54	2.6619E-002	2.5335E-002	4.82%
88.03	3.4045E-002	3.4617E-002	-1.68%
122.06	3.4394E-002	3.5819E-002	-4.15%
165.85	========== Knee ==========		
165.85	3.0704E-002	3.1331E-002	-2.04%
279.17	2.1030E-002	2.0365E-002	3.17%
391.69	1.5475E-002	1.5370E-002	0.68%
661.66	9.8486E-003	9.9244E-003	-0.77%
898.02	7.5404E-003	7.6837E-003	-1.90%
1173.24	6.0360E-003	6.1381E-003	-1.69%
1332.50	5.5560E-003	5.5144E-003	0.75%
1836.01	4.2722E-003	4.2078E-003	1.51%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  3/27/2012 5:22:03 PM
TestAmerica                      Spectrum name: 5_TunaCan_20120810.An1

Sample description
     5_TunaCan_90099_032612


Spectrum Filename: C:\User\SPC\Det5\5_TunaCan_20120810.An1

Acquisition information
       Start time:                 3/26/2012 3:05:42 PM
       Live time:               3600
       Real time:               3652
       Dead time:                  1.44 %
       Detector ID:                   5

Detector system
     Ge 5 SN/157


Calibration
       Filename:                   5_Soil_TunaCan.Clb
     5_Soil_TunaCan_90099_032612


       Energy Calibration
            Created:               3/27/2012 5:20:02 PM
            Zero offset:           0.135 keV
            Gain:                  0.250 keV/channel
            Quadratic:             2.720E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/27/2012 5:20:37 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.87 %
            Log(Eff):              6.466115E-01 + (-7.830454E-01*Log(E) ) +
                                   ( -4.117504E-03*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.43 %
            Log(Eff):             -2.462251E+01 + ( 9.075211E+00*Log(E) ) +
                                   ( -9.664422E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.61keV )
       Stop channel:            8000 (  2000.53keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0527

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.61	38986.	0.74	0.74	1.793E-02	46.54	4.250	1.435E+04	Pb210
59.56	40041.	0.74	0.74	2.535E-02	59.54	35.700	1.230E+03	AM241
70.85	1493.	9.22	0.78	3.019E-02				
72.87	2354.	5.96	0.78	3.089E-02				
87.95	63754.	0.53	0.80	3.460E-02	88.03	3.610	1.610E+04	CD109
121.94	30888.	0.76	0.85	3.583E-02	122.06	85.600	3.477E+02	CO57
136.41	3768.	3.80	0.89	3.457E-02				
165.85	31597.	0.74	0.88	3.066E-02	165.85	79.900	5.384E+02	Ce139
279.20	20358.	0.87	0.97	2.036E-02	279.17	81.500	1.208E+03	Hg203
391.78	20611.	0.93	1.12	1.537E-02	391.69	64.000	9.721E+02	SN113
661.74	14000.	1.10	1.38	9.923E-03	661.66	85.210	4.623E+02	CS137
898.01	23228.	0.82	1.55	7.684E-03	898.02	93.700	1.559E+03	Y898
1173.18	15468.	0.93	1.77	6.138E-03	1173.24	99.900	7.225E+02	Co1173
1332.44	14238.	0.98	1.93	5.515E-03	1332.50	99.982	7.397E+02	Co1332
1836.04	13938.	0.87	2.30	4.208E-03	1836.01	99.200	1.614E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
291.16	72.88	8722.	2253.	7.295E+04	7.09	0.801	-
545.44	136.41	5274.	3768.	1.090E+05	3.80	0.888	-

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.01	46.61	12895.	38986.	10.829	0.74	0.743
AM-241	237.86	59.56	13293.	40041.	11.122	0.74	0.735
CD-109	351.46	87.95	12894.	63754.	17.710	0.53	0.805
CO-57	487.52	121.94	6935.	30888.	8.580	0.76	0.852
Ce-139	663.26	165.85	5616.	31597.	8.777	0.74	0.883
Hg-203	1116.90	279.20	2848.	20358.	5.655	0.87	0.966
SN-113	1567.36	391.78	3046.	20611.	5.725	0.93	1.119
CS-137	2647.45	661.74	1982.	14000.	3.889	1.10	1.380
Y-898	3592.51	898.01	1944.	23228.	6.452	0.82	1.547
Co-1173	4692.96	1173.18	847.	15468.	4.297	0.93	1.774
Co-1332	5329.75	1332.44	693.	14238.	3.955	0.98	1.927
Y-1836	7342.72	1836.04	102.	13938.	3.872	0.87	2.295

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq			COMMENTS
Pb-210	N	1.4353E+04						8.15E+03	
			46.54	1.435E+04	(	1.958E+02	7.44E-01	4.25E+00	G
AM-241		1.2302E+03						1.58E+05	
			59.54	1.230E+03	(	1.659E+01	7.44E-01	3.57E+01	G
CD-109		1.6101E+04						4.63E+02	
			88.03	1.610E+04	(	1.343E+02	5.28E-01	3.61E+00	G
CO-57		3.4772E+02						2.72E+02	
			122.06	3.477E+02	(	4.399E+00	7.60E-01	8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3840E+02					1.38E+02	
		165.85	5.384E+02	(	5.997E+00	7.36E-01	7.99E+01 G
Hg-203	1.2084E+03					4.66E+01	
		279.17	1.208E+03	(	1.492E+01	8.69E-01	8.15E+01 G
SN-113	9.7207E+02					1.15E+02	
		391.69	9.721E+02	(	1.226E+01	9.31E-01	6.40E+01 G
CS-137	4.6235E+02					1.10E+04	
		661.66	4.623E+02	(	6.941E+00	1.10E+00	8.52E+01 G
Y-898	1.5593E+03					1.07E+02	
		898.02	1.559E+03	(	1.397E+01	8.19E-01	9.37E+01 G
Co-1173	7.2251E+02					1.93E+03	
		1173.24	7.225E+02	(	6.463E+00	9.30E-01	9.99E+01 G
Co-1332	7.3967E+02					1.93E+03	
		1332.50	7.397E+02	(	6.515E+00	9.82E-01	1.00E+02 G
Y-1836	1.6138E+03					1.07E+02	
		1836.01	1.614E+03	(	5.776E+00	8.71E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4250E+04	1.4353E+04	7.439E-01%	1.96E+02
AM-241	1.2297E+03	1.2302E+03	7.442E-01%	1.66E+01
CD-109	1.4172E+04	1.6101E+04	5.277E-01%	1.34E+02
CO-57	2.7983E+02	3.4772E+02	7.604E-01%	4.40E+00
Ce-139	3.5061E+02	5.3840E+02	7.359E-01%	6.00E+00
Hg-203	3.4071E+02	1.2084E+03	8.687E-01%	1.49E+01
SN-113	5.8200E+02	9.7207E+02	9.315E-01%	1.23E+01
CS-137	4.5987E+02	4.6235E+02	1.097E+00%	6.94E+00
Y-898	8.9620E+02	1.5593E+03	8.189E-01%	1.40E+01
Co-1173	7.0069E+02	7.2251E+02	9.300E-01%	6.46E+00
Co-1332	7.1733E+02	7.3967E+02	9.821E-01%	6.52E+00
Y-1836	9.2756E+02	1.6138E+03	8.711E-01%	5.78E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.5 keV) 3.491E+04 Bq
Total Decayed Activity (37.6 to 2000.5 keV) 3.9848164E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector: 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: Ge7

Geometry: 1L Marn

Reference date 1/1/2012

Calibration Standard: 90062

Standard volume g / vial 1

Standard volume transferred in g / geometry 1

lab ID# of cal standard 6707

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	Abundance	Activity Bq/L	Count Results	%recovery
Am-241	1821	1821	0.359	**5072.4**	5093.3	100.4
Cd-109	2602	2602	0.0361	**72077.6**	69699	96.7
Co-57	1364	1364	0.856	**1593.5**	1580.4	99.2
Ce-139	1932	1932	0.799	**2418.0**	2383.5	98.6
Hg-203	4200	4200	0.8146	**5155.9**	5281.6	102.4
Sn-113	2722	2722	0.64	**4253.1**	4257.7	100.1
Cs-137	1750	1750	0.851	**2056.4**	2033.3	98.9
Mn-54	3114	3114	0.9998	**3114.6**	3150.2	101.1
Y-88	6559	6559	0.937	**7000.0**	6734.2	96.2
Zn-65	3134	3134	0.506	**6193.7**	6490.5	104.8
Co-60	3233	3233	0.99974	**3233.8**	3132.2	96.9
Co-60	3233	3233	0.99986	**3233.5**	3149.5	97.4
Y-88	6944	6944	0.992	**7000.0**	7117.9	101.7

Reviewed By: Megan McAfee

Date: 3/26/2012

Calibration Data from file: 7_Liquid_Marinelli 1L.Clb
Energy Calibration Date: 3/28/2012 Time: 9:18:12 AM
Efficiency Calibration Date: 3/28/2012 Time: 9:18:24 AM

Calibration Description:
7_1Lmarn_90062_032612

Energy Calibration Fit
Energy = 0.1874 +0.249932*Channel +7.03104e-009*Channel**2
FWHM (ch) = 3.4322 +0.000971*Channel -1.53808e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
237.59	59.54	59.57	-0.05%	0.88	0.92	-3.43%
351.44	88.03	88.03	0.01%	0.94	0.94	0.22%
487.37	122.06	122.00	0.05%	0.98	0.98	0.43%
662.51	165.85	165.77	0.05%	1.02	1.02	-0.14%
1116.55	279.17	279.26	-0.03%	1.14	1.12	1.21%
1566.60	391.69	391.75	-0.02%	1.24	1.23	0.70%
2646.39	661.66	661.65	0.00%	1.51	1.47	2.26%
3339.20	834.85	834.84	0.00%	1.63	1.63	0.15%
3592.04	898.02	898.04	-0.00%	1.68	1.68	0.00%
4462.03	1115.55	1115.53	0.00%	1.85	1.86	-0.81%
4692.79	1173.24	1173.22	0.00%	1.89	1.91	-0.96%
5329.78	1332.50	1332.47	0.00%	2.03	2.04	-0.79%
7343.85	1836.01	1836.03	-0.00%	2.45	2.43	0.65%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.4210 %
Ln(Eff) = -0.7055 -0.284825*Ln(Eng) -0.04424*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.4307 %
Ln(Eff) = -14.8444 +5.183775*Ln(Eng) -0.573052*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
59.54	3.9481E-002	3.9540E-002	-0.15%
88.03	4.4466E-002	4.4045E-002	0.95%
122.06	4.1797E-002	4.2138E-002	-0.82%
165.85	========== Knee ==========		
165.85	3.5751E-002	3.6265E-002	-1.44%
279.17	2.5027E-002	2.4411E-002	2.46%
391.69	1.8652E-002	1.8630E-002	0.12%
661.66	1.1897E-002	1.2017E-002	-1.00%
834.85	9.9346E-003	9.8167E-003	1.19%
898.02	8.8561E-003	9.2042E-003	-3.93%
1115.55	7.9420E-003	7.5782E-003	4.58%
1173.24	7.0066E-003	7.2392E-003	-3.32%
1332.50	6.2752E-003	6.4426E-003	-2.67%
1836.01	4.8544E-003	4.7733E-003	1.67%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Am-241	59.54	35.70	1.58E+005	5100.80	1821.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	72078.00	2602.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	1593.50	1364.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	2418.00	1932.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	5153.40	4200.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	4253.10	2722.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	2053.70	1750.00	4.00%	1/1/2012 11:00:00 AM
Mn-54	834.85	99.98	3.12E+002	3114.60	3114.00	3.30%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	7000.00	6559.00	3.90%	1/1/2012 11:00:00 AM
Zn-65	1115.55	50.60	2.44E+002	6193.70	3134.00	3.50%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	3236.20	3233.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	3233.60	3233.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	7000.00	6944.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  3/28/2012 9:26:09 AM    Page  1
TestAmerica                     Spectrum name: 7_1Lmarn_20120463.An1

Sample description
     7_1Lmarn_90062_032612


Spectrum Filename: C:\User\Cal\Spectra\Det7\7_1Lmarn_20120463.An1

Acquisition information
       Start time:                 3/26/2012 6:37:24 AM
       Live time:               3600
       Real time:               4044
       Dead time:                 10.97 %
       Detector ID:                    7

Detector system
     Ge 7 SN/154


Calibration
       Filename:                   7_Liquid_Marinelli 1L.Clb
     7_1Lmarn_90062_032612


       Energy Calibration
            Created:               3/28/2012 9:18:12 AM
            Zero offset:           0.187 keV
            Gain:                  0.250 keV/channel
            Quadratic:             7.031E-09 keV/channel^2

       Efficiency Calibration
            Created:               3/28/2012 9:18:24 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.42 %
            Log(Eff):             -7.054602E-01 + (-2.848254E-01*Log(E) ) +
                                   ( -4.423998E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   0.43 %
            Log(Eff):             -1.484435E+01 + ( 5.183775E+00*Log(E) ) +
                                   ( -5.730519E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Mn, Zn.L
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.68keV )
       Stop channel:            8000 (  2000.10keV )
       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 9:26:09 AM    Page  2
TestAmerica                     Spectrum name: 7_1Lmarn_20120463.An1
                                      Page 1
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```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       1/1/2012 11:00:00 AM
       Decay during acquisition:      NO
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.   13 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 Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
37.93	20996.	2.35	0.98	2.809E-02				
49.58	10390.	5.72	1.78	3.540E-02				
59.57	258725.	0.32	0.88	3.955E-02	59.54	35.700	5.093E+03	AM241
70.77	8653.	4.55	0.93	4.237E-02				
72.95	14085.	2.76	0.93	4.274E-02				
82.51	7182.	5.10	0.94	4.379E-02				
84.92	9567.	3.85	0.94	4.393E-02				
88.04	365268.	0.19	0.94	4.405E-02	88.03	3.610	7.246E+04	CD109
122.00	165308.	0.41	0.98	4.215E-02	122.06	85.600	1.580E+03	CO57
136.39	20328.	2.30	0.95	4.037E-02				
165.77	162197.	0.40	1.02	3.618E-02	165.85	79.900	2.383E+03	Ce139
255.17	5383.	4.05	1.10	2.619E-02				
279.26	107214.	0.47	1.14	2.441E-02	279.17	81.500	5.282E+03	Hg203
391.75	109651.	0.43	1.24	1.863E-02	391.69	64.000	4.258E+03	SN113
511.09	7966.	4.06	2.42	1.496E-02				
661.65	74553.	0.54	1.51	1.202E-02	661.66	85.210	2.033E+03	CS137
813.91	2256.	8.87	1.49	1.004E-02				
834.90	92175.	0.36	1.63	9.815E-03	834.85	99.980	3.149E+03	Mn54
898.04	120447.	0.39	1.68	9.204E-03	898.02	93.700	6.734E+03	Y898
1115.53	70435.	0.55	1.85	7.578E-03	1115.55	50.600	6.491E+03	Zn65
1173.22	79095.	0.48	1.89	7.239E-03	1173.24	99.900	3.132E+03	Co1173
1324.75	2192.	6.90	2.97	6.477E-03				
1332.47	70838.	0.46	2.03	6.443E-03	1332.50	99.982	3.150E+03	Co1332
1836.01	69898.	0.41	2.46	4.773E-03	1836.01	99.200	7.118E+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
151.03	37.93	57996.	20996.	7.475E+05	2.35	0.976	- s
197.64	49.58	98022.	10390.	2.935E+05	5.72	1.780	- s
282.39	70.75	73097.	8653.	2.042E+05	4.55	0.926	- D

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 9:26:09 AM Page 3
TestAmerica Spectrum name: 7_1Lmarn_20120463.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
291.11	72.93	68727.	14085.	3.295E+05	2.76	0.928	-	D
329.40	82.50	63478.	7182.	8.098E+04	5.10	0.937	-	lD
339.04	84.91	63224.	9567.	2.997E+04	3.85	0.940	-	lD
544.97	136.39	49365.	20328.	5.036E+05	2.30	0.951	-	
1020.02	255.13	23704.	5677.	2.168E+05	5.36	1.096	-	s
2044.04	511.09	18658.	7966.	5.325E+05	4.06	2.416	-	s
3255.49	813.91	8727.	2256.	2.248E+05	8.87	1.494	-	
5298.91	1324.75	3552.	2192.	3.385E+05	6.90	2.967	-	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_EnergyStandardMix & Mn, Zn.L

********** 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	237.59	59.57	108036.	258725.	71.868	0.32	0.885
CD-109	351.44	88.03	94147.	351348.	97.597	0.25	0.945
CO-57	487.37	122.00	62912.	165308.	45.919	0.41	0.979
Ce-139	662.50	165.77	52768.	162197.	45.055	0.40	1.015
Hg-203	1116.55	279.26	29908.	107214.	29.782	0.47	1.138
SN-113	1566.60	391.75	21940.	109651.	30.459	0.43	1.237
CS-137	2646.39	661.65	16600.	74553.	20.709	0.54	1.507
Mn-54	3339.24	834.85	10174.	92207.	25.613	0.36	1.626D
Y-898	3592.02	898.04	15389.	120447.	33.458	0.39	1.681
Zn-65	4462.01	1115.53	9956.	70435.	19.565	0.55	1.851
Co-1173	4692.77	1173.22	7268.	79095.	21.971	0.48	1.895
Co-1332	5329.78	1332.47	4608.	70838.	19.677	0.46	2.027
Y-1836	7343.76	1836.01	1125.	69898.	19.416	0.41	2.456

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
AM-241		5.0933E+03				1.58E+05	
			59.54	5.093E+03	(	3.021E+01 3.21E-01 3.57E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 9:26:09 AM Page 4
TestAmerica Spectrum name: 7_1Lmarn_20120463.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments

```
CD-109        6.9699E+04                                    4.63E+02
                             88.03 6.970E+04  (  2.842E+02 2.48E-01 3.61E+00 G

CO-57         1.5804E+03                                    2.72E+02
                            122.06 1.580E+03  (  1.120E+01 4.05E-01 8.56E+01 G

Ce-139        2.3835E+03                                    1.38E+02
                            165.85 2.383E+03  (  1.577E+01 4.02E-01 7.99E+01 G

Hg-203        5.2816E+03                                    4.66E+01
                            279.17 5.282E+03  (  3.983E+01 4.73E-01 8.15E+01 G

SN-113        4.2577E+03                                    1.15E+02
                            391.69 4.258E+03  (  2.691E+01 4.34E-01 6.40E+01 G

CS-137        2.0333E+03                                    1.10E+04
                            661.66 2.033E+03  (  1.645E+01 5.37E-01 8.52E+01 G

Mn-54         3.1502E+03                                    3.12E+02
                            834.85 3.150E+03  (  1.615E+01 3.64E-01 1.00E+02 G

Y-898         6.7342E+03                                    1.07E+02
                            898.02 6.734E+03  (  3.247E+01 3.90E-01 9.37E+01 G

Zn-65     F   6.4905E+03                                    2.44E+02
                           1115.55 6.491E+03  (  4.310E+01 5.47E-01 5.06E+01 G

Co-1173       3.1322E+03                                    1.93E+03
                           1173.24 3.132E+03  (  1.584E+01 4.77E-01 9.99E+01 G

Co-1332       3.1495E+03                                    1.93E+03
                           1332.50 3.150E+03  (  1.419E+01 4.58E-01 1.00E+02 G

Y-1836        7.1179E+03                                    1.07E+02
                           1836.01 7.118E+03  (  1.619E+01 4.08E-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
                                       Page 4
```

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 Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
AM-241	5.0914E+03	5.0933E+03	3.213E-01%	3.02E+01
CD-109	6.1380E+04	6.9699E+04	2.480E-01%	2.84E+02
CO-57	1.2730E+03	1.5804E+03	4.051E-01%	1.12E+01
Ce-139	1.5549E+03	2.3835E+03	4.024E-01%	1.58E+01
Hg-203	1.4969E+03	5.2816E+03	4.726E-01%	3.98E+01
SN-113	2.5546E+03	4.2577E+03	4.342E-01%	2.69E+01
CS-137	2.0225E+03	2.0333E+03	5.371E-01%	1.64E+01
Mn-54	2.6097E+03	3.1502E+03	3.638E-01%	1.62E+01
Y-898	3.8795E+03	6.7342E+03	3.898E-01%	3.25E+01
Zn-65	5.1023E+03	6.4905E+03	5.470E-01%	4.31E+01
Co-1173	3.0380E+03	3.1322E+03	4.766E-01%	1.58E+01
Co-1332	3.0548E+03	3.1495E+03	4.583E-01%	1.42E+01
Y-1836	4.1005E+03	7.1179E+03	4.075E-01%	1.62E+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

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TestAmerica Spectrum name: 7_1Lmarn_20120463.An1

---------- S U M M A R Y ----------

Total Activity (877.5 to 2000.1 keV) 9.716E+04 Bq
Total Decayed Activity (877.5 to 2000.1 keV) 1.2010304E+05 Bq

Gamma Verification per Geometry

Detector:	Ge8
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14960	100.2
Am-241	2037	418	0.3590	1163	1240.5	106.6
Cd-109	2881	591	0.0361	16363	16066	98.2
Co-57	1511	310	0.8560	362	345.12	95.4
Ce-139	2139	439	0.7990	549	536.34	97.7
Hg-203	4651	954	0.8146	1171	1218.2	104.1
Sn-113	3015	618	0.6400	966	967.15	100.1
Cs-137	1938	397	0.8510	467	465.86	99.8
Y-88	7264	1489	0.9370	1589	1552.1	97.6
Co-60	3580	734	0.9997	734	724.48	98.7
Co-60	3581	734	0.9999	734	729.98	99.4
Y-88	7690	1577	0.9920	1589	1627.2	102.4

Reviewed By: Jody Watson

Date: 3/28/2012

Calibration Data from file: 8_Soil_TunaCan.Clb
Energy Calibration Date: 3/28/2012 Time: 10:35:07 AM
Efficiency Calibration Date: 3/28/2012 Time: 10:35:20 AM

Calibration Description:
8_Soil_TunaCan_90099_032712

Energy Calibration Fit
Energy = 0.0505 +0.250025*Channel +8.06699e-010*Channel**2
FWHM (ch) = 3.6351 +0.000832*Channel -2.49195e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.74	46.54	46.49	0.11%	0.94	0.95	-0.61%
237.86	59.54	59.52	0.03%	0.95	0.96	-1.36%
351.89	88.03	88.03	-0.00%	0.97	0.98	-1.63%
488.04	122.06	122.07	-0.01%	1.01	1.01	0.12%
663.26	165.85	165.88	-0.02%	1.07	1.04	2.17%
1116.59	279.17	279.23	-0.02%	1.15	1.13	1.73%
1566.40	391.69	391.69	-0.00%	1.22	1.22	0.24%
2645.92	661.66	661.60	0.01%	1.39	1.42	-1.95%
3591.62	898.02	898.05	-0.00%	1.61	1.58	2.16%
4692.17	1173.24	1173.23	0.00%	1.74	1.75	-0.61%
5329.14	1332.50	1332.49	0.00%	1.82	1.84	-1.05%
7342.97	1836.01	1836.02	-0.00%	2.11	2.10	0.42%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.3942 %
Ln(Eff) = -0.1099 -0.495854*Ln(Eng) -0.0257227*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.7131 %
Ln(Eff) = -25.2530 +9.398253*Ln(Eng) -1.00003*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.9170E-002	2.0055E-002	-4.62%
59.54	3.0526E-002	2.8813E-002	5.61%
88.03	3.9175E-002	3.9918E-002	-1.90%
122.06	3.9509E-002	4.1457E-002	-4.93%
165.85	========== Knee ==========		
165.85	3.5429E-002	3.6291E-002	-2.43%
279.17	2.5270E-002	2.4275E-002	3.94%
391.69	1.8582E-002	1.8550E-002	0.17%
661.66	1.2089E-002	1.2090E-002	-0.01%
898.02	9.1435E-003	9.3604E-003	-2.37%
1173.24	7.3487E-003	7.4527E-003	-1.42%
1332.50	6.6398E-003	6.6776E-003	-0.57%
1836.01	5.1654E-003	5.0457E-003	2.32%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  3/28/2012 10:36:01 AM
TestAmerica                      Spectrum name: 8_TunaCan_20120676.An1

Sample description
     8_TunaCan_90099_032712


Spectrum Filename: C:\User\SPC\Det8\8_TunaCan_20120676.An1

Acquisition information
       Start time:                 3/27/2012 10:58:29 AM
       Live time:               3600
       Real time:               3655
       Dead time:                  1.49 %
       Detector ID:                   8

Detector system
     Ge 8 SN/174


Calibration
       Filename:                   8_Soil_TunaCan.Clb
     8_Soil_TunaCan_90099_032712


       Energy Calibration
            Created:               3/28/2012 10:35:07 AM
            Zero offset:           0.050 keV
            Gain:                  0.250 keV/channel
            Quadratic:             8.067E-10 keV/channel^2

       Efficiency Calibration
            Created:               3/28/2012 10:35:20 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.39 %
            Log(Eff):             -1.098764E-01 + (-4.958544E-01*Log(E) ) +
                                   ( -2.572270E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.71 %
            Log(Eff):             -2.525301E+01 + ( 9.398253E+00*Log(E) ) +
                                   ( -1.000034E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.55keV )
       Stop channel:            8000 (  2000.30keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0205

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.54	43426.	0.60	0.95	2.002E-02	46.54	4.250	1.426E+04	Pb210
59.52	45918.	0.77	0.95	2.880E-02	59.54	35.700	1.240E+03	AM241
72.86	2434.	6.68	0.97	3.542E-02				
88.03	73269.	0.53	0.97	3.992E-02	88.03	3.610	1.607E+04	CD109
122.07	35407.	0.77	1.01	4.146E-02	122.06	85.600	3.451E+02	CO57
136.51	4312.	4.44	1.06	3.999E-02				
165.88	36308.	0.76	1.07	3.629E-02	165.85	79.900	5.363E+02	Ce139
279.23	24162.	0.88	1.15	2.427E-02	279.17	81.500	1.218E+03	Hg203
391.69	24625.	0.77	1.22	1.855E-02	391.69	64.000	9.671E+02	SN113
661.60	17184.	1.10	1.39	1.209E-02	661.66	85.210	4.659E+02	CS137
898.05	28015.	0.71	1.61	9.360E-03	898.02	93.700	1.552E+03	Y898
1173.23	18826.	0.79	1.74	7.453E-03	1173.24	99.900	7.245E+02	Co1173
1332.49	17010.	0.84	1.82	6.678E-03	1332.50	99.982	7.300E+02	Co1332
1836.02	16762.	0.79	2.11	5.046E-03	1836.01	99.200	1.627E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
291.19	72.85	12003.	2434.	6.872E+04	6.68	0.969	-	D
545.78	136.51	8432.	4312.	1.078E+05	4.44	1.059	-	

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.74	46.49	17505.	45568.	12.658	0.76	0.942
AM-241	237.86	59.52	18397.	45918.	12.755	0.77	0.945
CD-109	351.89	88.03	17370.	73269.	20.353	0.53	0.966
CO-57	488.04	122.07	9639.	35407.	9.835	0.77	1.010
Ce-139	663.26	165.88	8356.	36308.	10.085	0.76	1.067
Hg-203	1116.59	279.23	4382.	24162.	6.712	0.88	1.153
SN-113	1566.40	391.69	2677.	24625.	6.840	0.77	1.223
CS-137	2645.92	661.60	3145.	17184.	4.773	1.10	1.389
Y-898	3591.62	898.05	1881.	28015.	7.782	0.71	1.611
Co-1173	4692.17	1173.23	650.	18826.	5.229	0.79	1.738
Co-1332	5329.14	1332.49	576.	17010.	4.725	0.84	1.822
Y-1836	7342.97	1836.02	111.	16762.	4.656	0.79	2.110

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Peak Code	MDA Value Bq	COMMENTS
Pb-210	N	1.4960E+04				8.15E+03	
			46.54	1.496E+04	(	2.033E+02 7.55E-01 4.25E+00	G
AM-241		1.2405E+03				1.58E+05	
			59.54	1.240E+03	(	1.715E+01 7.72E-01 3.57E+01	G
CD-109		1.6066E+04				4.63E+02	
			88.03	1.607E+04	(	1.353E+02 5.26E-01 3.61E+00	G
CO-57		3.4512E+02				2.72E+02	
			122.06	3.451E+02	(	4.486E+00 7.68E-01 8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3634E+02					1.38E+02	
		165.85	5.363E+02	(	6.333E+00	7.56E-01	7.99E+01 G
Hg-203	1.2182E+03					4.66E+01	
		279.17	1.218E+03	(	1.569E+01	8.81E-01	8.15E+01 G
SN-113	9.6715E+02					1.15E+02	
		391.69	9.671E+02	(	9.575E+00	7.73E-01	6.40E+01 G
CS-137	4.6586E+02					1.10E+04	
		661.66	4.659E+02	(	7.158E+00	1.10E+00	8.52E+01 G
Y-898	1.5521E+03					1.07E+02	
		898.02	1.552E+03	(	1.135E+01	7.10E-01	9.37E+01 G
Co-1173	7.2448E+02					1.93E+03	
		1173.24	7.245E+02	(	4.676E+00	7.93E-01	9.99E+01 G
Co-1332	7.2998E+02					1.93E+03	
		1332.50	7.300E+02	(	4.916E+00	8.45E-01	1.00E+02 G
Y-1836	1.6272E+03					1.07E+02	
		1836.01	1.627E+03	(	5.029E+00	7.91E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
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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:	Ge9
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14240	95.4
Am-241	2037	418	0.3590	1163	1244.5	107.0
Cd-109	2881	591	0.0361	16363	15902	97.2
Co-57	1511	310	0.8560	362	347.48	96.0
Ce-139	2139	439	0.7990	549	535.87	97.6
Hg-203	4651	954	0.8146	1171	1216.7	103.9
Sn-113	3015	618	0.6400	966	970.65	100.5
Cs-137	1938	397	0.8510	467	466.58	99.9
Y-88	7264	1489	0.9370	1589	1552.5	97.7
Co-60	3580	734	0.9997	734	727.12	99.0
Co-60	3581	734	0.9999	734	719.75	98.0
Y-88	7690	1577	0.9920	1589	1638.8	103.1

Reviewed By: Jody Watson

Date: 6/14/2012

Calibration Data from file: 9_Soil_TunaCan.Clb
Energy Calibration Date: 6/14/2012 Time: 10:19:40 AM
Efficiency Calibration Date: 6/14/2012 Time: 10:19:51 AM

Calibration Description:
9_Soil_TunaCan_90099_050312

Energy Calibration Fit
Energy = 0.0875 +0.250109*Channel -2.0385e-008*Channel**2
FWHM (ch) = 4.1690 +0.000934*Channel -2.36522e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.85	46.54	46.57	-0.06%	1.07	1.09	-1.37%
237.85	59.54	59.58	-0.06%	1.08	1.10	-1.96%
351.79	88.03	88.07	-0.05%	1.12	1.12	-0.18%
487.79	122.06	122.08	-0.02%	1.14	1.16	-1.17%
662.64	165.85	165.81	0.02%	1.23	1.19	2.51%
1115.53	279.17	279.07	0.04%	1.30	1.30	0.44%
1565.74	391.69	391.64	0.01%	1.43	1.39	2.81%
2645.81	661.66	661.69	-0.00%	1.60	1.62	-0.83%
3591.21	898.02	898.02	0.00%	1.80	1.80	-0.02%
4692.44	1173.24	1173.26	-0.00%	2.01	2.01	0.18%
5329.80	1332.50	1332.54	-0.00%	2.09	2.12	-1.38%
7344.77	1836.01	1835.98	0.00%	2.45	2.44	0.55%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.3038 %
Ln(Eff) = -0.8080 -0.236727*Ln(Eng) -0.0395064*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.4241 %
Ln(Eff) = -23.8792 +8.875647*Ln(Eng) -0.94011*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.4596E-002	2.5767E-002	-4.76%
59.54	3.8891E-002	3.6589E-002	5.92%
88.03	4.9059E-002	5.0504E-002	-2.95%
122.06	5.0886E-002	5.3031E-002	-4.22%
165.85	========== Knee ==========		
165.85	4.6197E-002	4.7361E-002	-2.52%
279.17	3.4900E-002	3.3566E-002	3.82%
391.69	2.6668E-002	2.6526E-002	0.53%
661.66	1.8125E-002	1.8099E-002	0.14%
898.02	1.4012E-002	1.4341E-002	-2.34%
1173.24	1.1507E-002	1.1627E-002	-1.05%
1332.50	1.0296E-002	1.0501E-002	-2.00%
1836.01	8.3305E-003	8.0796E-003	3.01%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  6/14/2012 10:20:07 AM
TestAmerica, Inc                Spectrum name: 9_TunaCan_20120147.An1

Sample description
     9_TunaCan_90099_050312


Spectrum Filename: C:\User\SPC\Det9\9_TunaCan_20120147.An1

Acquisition information
       Start time:                 5/3/2012 1:37:42 PM
       Live time:               3600
       Real time:               3661
       Dead time:                  1.65 %
       Detector ID:                    9

Detector system
     Ge 9 SN/100113


Calibration
       Filename:                   9_Soil_TunaCan.Clb
     9_Soil_TunaCan_90099_050312


       Energy Calibration
            Created:               6/14/2012 10:19:40 AM
            Zero offset:           0.088 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.039E-08 keV/channel^2

       Efficiency Calibration
            Created:               6/14/2012 10:19:51 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.30 %
            Log(Eff):             -8.079856E-01 + (-2.367265E-01*Log(E) ) +
                                   ( -3.950640E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.42 %
            Log(Eff):             -2.387916E+01 + ( 8.875647E+00*Log(E) ) +
                                   ( -9.401100E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.60keV )
       Stop channel:            8000 (  1999.66keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0265

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.57	55553.	0.67	1.07	2.579E-02	46.54	4.250	1.424E+04	Pb210
59.56	58492.	0.66	1.08	3.660E-02	59.54	35.700	1.245E+03	AM241
88.07	86792.	0.48	1.12	5.052E-02	88.03	3.610	1.590E+04	CD109
122.08	41484.	0.73	1.14	5.303E-02	122.06	85.600	3.475E+02	CO57
136.48	5266.	4.55	1.22	5.150E-02				
165.81	39272.	0.74	1.23	4.626E-02	165.85	79.900	5.359E+02	Ce139
279.06	19221.	1.24	1.30	3.358E-02	279.17	81.500	1.217E+03	Hg203
391.64	28263.	0.86	1.43	2.653E-02	391.69	64.000	9.707E+02	SN113
661.69	25703.	0.90	1.61	1.810E-02	661.66	85.210	4.666E+02	CS137
898.02	33728.	0.69	1.80	1.434E-02	898.02	93.700	1.552E+03	Y898
1173.24	29087.	0.72	2.01	1.163E-02	1173.24	99.900	7.271E+02	Co1173
1332.54	26026.	0.70	2.09	1.050E-02	1332.50	99.982	7.198E+02	Co1332
1835.94	21237.	0.73	2.46	8.080E-03	1836.01	99.200	1.639E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
545.34	136.48	10776.	5266.	1.023E+05	4.55	1.225	-

ORTEC g v - i (1087) Env32 G53W4.25 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.85	46.57	18837.	55553.	15.431	0.67	1.071
AM-241	237.79	59.56	19448.	58492.	16.248	0.66	1.078
CD-109	351.79	88.07	19261.	86792.	24.109	0.48	1.122
CO-57	487.79	122.08	11232.	41484.	11.523	0.73	1.142
Ce-139	662.64	165.81	9084.	39272.	10.909	0.74	1.225
Hg-203	1115.51	279.06	6250.	19221.	5.339	1.24	1.302
SN-113	1565.73	391.64	4864.	28263.	7.851	0.86	1.434
CS-137	2645.81	661.69	4037.	25703.	7.140	0.90	1.605
Y-898	3591.21	898.02	2958.	33728.	9.369	0.69	1.803
Co-1173	4692.36	1173.24	1710.	29087.	8.080	0.72	2.014
Co-1332	5329.80	1332.54	1048.	26026.	7.229	0.70	2.088
Y-1836	7344.62	1835.94	304.	21237.	5.899	0.73	2.457

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq			COMMENTS
Pb-210	N	1.4240E+04					8.15E+03		
			46.54	1.424E+04	(	1.646E+02	6.67E-01	4.25E+00	G
AM-241		1.2445E+03					1.58E+05		
			59.54	1.245E+03	(	1.388E+01	6.60E-01	3.57E+01	G
CD-109		1.5902E+04					4.63E+02		
			88.03	1.590E+04	(	1.190E+02	4.84E-01	3.61E+00	G
CO-57		3.4748E+02					2.72E+02		
			122.06	3.475E+02	(	4.159E+00	7.31E-01	8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3587E+02					1.38E+02	
		165.85	5.359E+02	(	6.097E+00	7.41E-01	7.99E+01 G
Hg-203	1.2167E+03					4.66E+01	
		279.17	1.217E+03	(	2.349E+01	1.24E+00	8.15E+01 G
SN-113	9.7065E+02					1.15E+02	
		391.69	9.707E+02	(	1.125E+01	8.60E-01	6.40E+01 G
CS-137	4.6658E+02					1.10E+04	
		661.66	4.666E+02	(	5.424E+00	8.98E-01	8.52E+01 G
Y-898	1.5525E+03					1.07E+02	
		898.02	1.552E+03	(	1.179E+01	6.92E-01	9.37E+01 G
Co-1173	7.2712E+02					1.93E+03	
		1173.24	7.271E+02	(	4.884E+00	7.20E-01	9.99E+01 G
Co-1332	7.1975E+02					1.93E+03	
		1332.50	7.198E+02	(	4.248E+00	6.98E-01	1.00E+02 G
Y-1836	1.6388E+03					1.07E+02	
		1836.01	1.639E+03	(	6.479E+00	7.29E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4091E+04	1.4240E+04	6.667E-01%	1.65E+02
AM-241	1.2439E+03	1.2445E+03	6.605E-01%	1.39E+01
CD-109	1.3223E+04	1.5902E+04	4.843E-01%	1.19E+02
CO-57	2.5385E+02	3.4748E+02	7.313E-01%	4.16E+00
Ce-139	2.8828E+02	5.3587E+02	7.410E-01%	6.10E+00
Hg-203	1.9517E+02	1.2167E+03	1.239E+00%	2.35E+01
SN-113	4.6244E+02	9.7065E+02	8.599E-01%	1.13E+01
CS-137	4.6297E+02	4.6658E+02	8.981E-01%	5.42E+00
Y-898	6.9723E+02	1.5525E+03	6.917E-01%	1.18E+01
Co-1173	6.9559E+02	7.2712E+02	7.204E-01%	4.88E+00
Co-1332	6.8854E+02	7.1975E+02	6.982E-01%	4.25E+00
Y-1836	7.3602E+02	1.6388E+03	7.291E-01%	6.48E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.7 keV) 3.304E+04 Bq
Total Decayed Activity (37.6 to 1999.7 keV) 3.9561668E+04 Bq

Analyzed by: _____
admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc

Gamma Verification per Geometry

Detector: **Ge12**
Geometry: **Tuna Can**
Reference date: **1/1/2018**
Calibration Standard: **108513**
Standard volume g / vial: **1550**
Standard volume transferred in g / geometry: **342.2**
lab ID# of cal standard: **#1402359 / Tuna Can_2018_00001**

Isotope	Certified Activity - Bq	Geometry Activity - Bq	Count Results	%recovery
Pb-210	72410	15986	16000	100.1
Am-241	5770	1274	1261	99.0
Cd-109	79700	17596	18250	103.7
Co-57	1809	399	393.1	98.4
Ce-139	2723	601	585.9	97.5
Hg-203	5868	1296	1312	101.3
Sn-113	4658	1028	1059	103.0
Cs-137	2283	504	509.8	101.1
Y-88	7810	1724	1705	98.9
Co-60	3574	789	776.5	98.4
Co-60	3574	789	765.4	97.0
Y-88	7810	1724	1769	102.6

Reviewed By: Jody Watson

Date: 4/23/2018

Calibration Data from file: 12_Soil_TunaCan.Clb
Energy Calibration Date: 4/20/2018 Time: 11:53:01 AM
Efficiency Calibration Date: 4/20/2018 Time: 11:53:09 AM

Calibration Description:
12_TunaCan_108513

Energy Calibration Fit
Energy = 0.0591 +0.250183*Channel -3.73476e-008*Channel**2
FWHM (ch) = 3.2115 +0.001032*Channel -1.75096e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.95	46.54	46.58	-0.09%	0.84	0.85	-1.23%
237.82	59.54	59.56	-0.03%	0.86	0.86	-0.65%
351.66	88.03	88.03	-0.01%	0.89	0.89	-0.96%
487.75	122.06	122.08	-0.01%	0.92	0.93	-0.62%
662.97	165.85	165.91	-0.03%	0.97	0.97	0.22%
1115.42	279.17	279.07	0.04%	1.11	1.09	2.13%
1565.35	391.69	391.59	0.02%	1.20	1.20	0.60%
2645.53	661.66	661.66	-0.00%	1.49	1.45	2.30%
3591.22	898.02	898.04	-0.00%	1.66	1.67	-0.91%
4692.62	1173.24	1173.25	-0.00%	1.85	1.92	-3.60%
5330.40	1332.50	1332.57	-0.01%	2.09	2.05	1.92%
7346.34	1836.01	1835.97	0.00%	2.46	2.46	0.18%

Efficiency Calibration Fit
Polynomial Uncertainty = 1.0201 %
Coefficients:
-0.363508 -4.707999 0.462125 -0.051256 0.002384 -0.000043

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.8052E-002	1.7999E-002	0.29%
59.54	2.7878E-002	2.8172E-002	-1.06%
88.03	3.7143E-002	3.5814E-002	3.58%
122.06	3.6658E-002	3.7240E-002	-1.59%
165.85	3.3189E-002	3.4052E-002	-2.60%
279.17	2.4853E-002	2.4494E-002	1.45%
391.69	1.9499E-002	1.8934E-002	2.90%
661.66	1.2936E-002	1.2789E-002	1.13%
898.02	1.0139E-002	1.0253E-002	-1.13%
1173.24	8.2922E-003	8.4265E-003	-1.62%
1332.50	7.4182E-003	7.6470E-003	-3.08%
1836.01	6.0193E-003	5.8663E-003	2.54%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.50	4.25	8.11E+003	15986.00	679.41	4.20%	1/1/2018 11:00:00 AM
Am-241	59.50	35.70	1.58E+005	1273.90	454.78	3.60%	1/1/2018 11:00:00 AM
Cd-109	88.00	3.61	4.61E+002	17596.00	635.22	4.10%	1/1/2018 11:00:00 AM
Co-57	122.10	85.60	2.72E+002	399.38	341.87	3.40%	1/1/2018 11:00:00 AM
Ce-139	165.90	79.90	1.38E+002	601.20	480.36	3.60%	1/1/2018 11:00:00 AM
Hg-203	279.20	81.50	4.66E+001	1295.50	1055.83	3.50%	1/1/2018 11:00:00 AM
Sn-113	391.70	64.00	1.15E+002	1028.40	658.18	3.90%	1/1/2018 11:00:00 AM
Cs-137	661.70	85.21	1.10E+004	504.03	429.48	4.10%	1/1/2018 11:00:00 AM
Y-88	898.00	93.70	1.07E+002	1724.30	1615.67	3.70%	1/1/2018 11:00:00 AM
Co-60	1173.20	99.90	1.93E+003	789.05	788.26	3.90%	1/1/2018 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	789.05	788.89	3.90%	1/1/2018 11:00:00 AM
Y-88	1836.10	99.20	1.07E+002	1724.30	1710.51	3.70%	1/1/2018 11:00:00 AM

Test America St. Louis Spectrum ID: 12_TunaCan_20180005

Sample Description: 12_TunaCan_108513
Detector: Detector #12
Batch ID: 12
Work Order Number: TunaCan
Lot Number: 108513

Decay to Time: 1/1/2018 11:00 Live Time: 3600 sec
Acquisition Time: 4/18/2018 13:54:19 Real Time: 3652 sec
Analysis Time: 4/20/2018 11:55 Dead Time: 1.41 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: DET_EnergyStandardMix & Pb.lib
Bkgd Correction File: 12_2017-05-07_0806.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
Pb-210	1.600E+04	0.6	9.485E+01	1.031E+03	1.853E+02
AM-241	1.261E+03	0.7	9.223E+00	8.039E+01	1.659E+01
CD-109	1.825E+04	0.4	7.598E+01	1.135E+03	1.134E+02
CO-57	3.931E+02	0.8	3.042E+00	2.279E+01	5.110E+00
Ce-139	5.859E+02	0.7	4.357E+00	3.335E+01	6.791E+00
Hg-203	1.312E+03	1.1	1.414E+01	7.659E+01	2.206E+01
SN-113	1.059E+03	0.9	9.013E+00	6.310E+01	1.205E+01
CS-137	5.098E+02	0.9	4.734E+00	2.665E+01	6.233E+00
Y-898	1.705E+03	0.8	1.331E+01	8.765E+01	1.505E+01
Co-1173	7.765E+02	0.9	6.740E+00	3.922E+01	6.891E+00
Co-1332	7.654E+02	0.8	6.419E+00	3.866E+01	6.071E+00
Y-1836	1.769E+03	0.8	1.413E+01	1.018E+02	8.211E+00
Total	4.438E+04				

Analyst: Jody Watson

Sample description
12_TunaCan_108513

Spectrum Filename: C:\User\SPC\Det12\12_TunaCan_20180005.An1

Acquisition information

Start time:	4/18/2018 1:54:19 PM
Live time:	3600
Real time:	3652
Dead time:	1.41 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCan_108513

Energy Calibration

Created:	4/20/2018 11:13:27 AM
Zero offset:	0.059 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/20/2018 11:53:09 AM
Type:	Polynomial
Uncertainty:	1.020 %
Coefficients:	-0.363508 -4.707999 0.462125
	-0.051256 0.002384 -0.000043

Library Files

Main analysis library:	DET_EnergyStandardMix & Pb.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	100 (25.08keV)
Stop channel:	8000 (1999.13keV)
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	1/1/2018 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2017-05-07_0806.PBC 5/7/2017 8:06:54 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0332

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
27.87	601.	9.86	0.70	3.939E-03				
33.44	3191.	3.58	0.84	8.062E-03				
36.78	534.	21.42	0.84	1.059E-02				
38.00	764.	15.14	0.84	1.151E-02				
46.62	43669.	0.59	0.85	1.805E-02	46.54	4.250	1.600E+04	Pb210
49.75	200.	71.91	0.85	2.153E-02				
59.56	45621.	0.73	0.86	2.818E-02	59.54	35.700	1.261E+03	AM241
70.78	903.	16.81	0.88	3.227E-02				
72.97	1715.	8.94	0.88	3.286E-02				
74.88	161.	95.77	0.88	3.334E-02				
77.23	29.	497.10	0.88	3.389E-02				
82.47	1429.	10.54	0.89	3.493E-02				
84.79	2014.	7.84	0.89	3.532E-02				
88.06	72330.	0.42	0.89	3.581E-02	88.03	3.610	1.825E+04	CD109
90.37	144.	87.05	0.90	3.612E-02				
122.08	34326.	0.77	0.92	3.724E-02	122.06	85.600	3.931E+02	CO57
136.51	4200.	4.35	0.96	3.651E-02				
165.91	33460.	0.74	0.97	3.405E-02	165.85	79.900	5.859E+02	Ce139
206.00	117.	63.94	0.45	3.024E-02				
238.46	443.	25.54	0.90	2.744E-02				
255.00	1168.	12.03	0.88	2.617E-02				
279.07	19187.	1.08	1.11	2.450E-02	279.17	81.500	1.312E+03	Hg203
286.67	107.	74.95	0.64	2.401E-02				
351.85	322.	30.50	1.33	2.056E-02				
391.59	24235.	0.85	1.20	1.894E-02	391.69	64.000	1.059E+03	SN113
500.18	113.	56.68	0.53	1.573E-02				
583.01	248.	32.33	0.89	1.403E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
601.08	176.	44.64	0.64	1.372E-02				
643.04	164.	48.09	0.69	1.306E-02				
661.66	19866.	0.93	1.49	1.279E-02	661.66	85.210	5.098E+02	CS137
695.58	154.	52.24	0.30	1.233E-02				
712.59	169.	39.74	0.69	1.212E-02				
814.18	641.	15.80	1.86	1.101E-02				
890.80	44.	76.23	0.45	1.031E-02				
898.03	29383.	0.78	1.66	1.025E-02	898.02	93.700	1.705E+03	Y898
924.59	170.	51.69	2.08	1.004E-02				
1059.91	148.	40.90	0.51	9.087E-03				
1173.24	22640.	0.87	1.85	8.426E-03	1173.24	99.900	7.765E+02	Co1173
1217.40	45.	61.22	0.33	8.195E-03				
1271.51	36.	60.60	1.04	7.928E-03				
1301.67	34.	60.56	0.43	7.787E-03				
1332.57	20270.	0.84	2.09	7.647E-03	1332.50	99.982	7.654E+02	Co1332
1491.52	180.	28.09	0.33	6.994E-03				
1835.92	18468.	0.80	2.47	5.867E-03	1836.01	99.200	1.769E+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	
111.16	27.87	1248.	601.	1.526E+05	9.86	0.703	-	s
133.41	33.32	4927.	3191.	3.959E+05	3.58	0.838	-	sD
146.77	36.66	6263.	534.	5.040E+04	21.42	0.841	-	sD
151.64	37.88	6317.	764.	6.642E+04	15.14	0.842	-	sD
198.79	49.71	10292.	213.	9.912E+03	67.59	0.855	-	sc
282.69	70.80	11078.	903.	2.799E+04	16.81	0.876	-	D
291.44	72.99	10900.	1715.	5.219E+04	8.94	0.878	-	D
299.07	74.90	11841.	161.	4.837E+03	95.77	0.880	-	c
308.48	77.26	10683.	29.	8.685E+02	497.10	0.883	-	c
329.43	82.44	10620.	1431.	4.097E+04	10.52	0.888	-	D
338.70	84.76	11438.	2016.	5.707E+04	7.83	0.890	-	sD
361.04	90.35	7839.	145.	4.014E+03	86.78	0.896	-	sc
545.45	136.51	7622.	4200.	1.150E+05	4.35	0.964	-	
823.26	206.00	2348.	117.	3.869E+03	63.94	0.454	-	s
953.03	238.46	3718.	443.	1.615E+04	25.54	0.897	-	s
1019.19	255.00	4459.	1168.	4.464E+04	12.03	0.878	-	
1145.82	286.67	2108.	107.	4.456E+03	74.95	0.636	-	s
1406.43	351.85	2440.	322.	1.569E+04	30.50	1.334	-	
1999.63	500.18	1252.	113.	7.164E+03	56.68	0.530	-	s
2330.90	583.01	1545.	248.	1.767E+04	32.33	0.894	-	s
2403.19	601.08	1564.	176.	1.283E+04	44.64	0.638	-	s
2571.03	643.04	1587.	164.	1.258E+04	48.09	0.694	-	s
2781.20	695.58	1652.	154.	1.250E+04	52.24	0.304	-	s
2849.27	712.59	1184.	169.	1.395E+04	39.74	0.695	-	s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
3255.67	814.18	1648.	641.	5.823E+04	15.80	1.859	- s
3562.26	890.80	503.	44.	4.283E+03	76.23	0.452	- sc
3697.47	924.59	1556.	170.	1.690E+04	51.69	2.082	- s
4239.01	1059.91	879.	148.	1.629E+04	40.90	0.508	- s
4869.35	1217.40	238.	45.	5.491E+03	61.22	0.330	- s
5085.97	1271.51	165.	36.	4.541E+03	60.60	1.043	- s
5206.71	1301.67	156.	34.	4.366E+03	60.56	0.434	- s
5966.81	1491.52	462.	180.	2.581E+04	28.09	0.329	- 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	185.79	46.54	11653.	43669.	12.130	0.59	0.851D
AM-241	237.82	59.56	16449.	45621.	12.672	0.73	0.859
CD-109	351.65	88.03	9195.	72330.	20.092	0.42	0.894D
CO-57	487.75	122.08	9060.	34326.	9.535	0.77	0.923
Ce-139	662.97	165.91	6830.	33460.	9.295	0.74	0.975
Hg-203	1115.42	279.07	4712.	19187.	5.330	1.08	1.109
SN-113	1565.35	391.59	3432.	24235.	6.732	0.85	1.204
CS-137	2645.53	661.66	2656.	19866.	5.518	0.93	1.489
Y-898	3591.19	898.03	3033.	29383.	8.162	0.78	1.658
Co-1173	4692.59	1173.24	1810.	22640.	6.289	0.87	1.852
Co-1332	5330.41	1332.57	1150.	20270.	5.631	0.84	2.092
Y-1836	7346.14	1835.92	317.	18468.	5.130	0.80	2.475

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
Pb-210	N	1.6003E+04				8.15E+03	
			46.54	1.600E+04	(P	1.853E+02 5.93E-01 4.25E+00 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	1.2606E+03					1.58E+05	
		59.54	1.261E+03	(	1.659E+01	7.32E-01	3.57E+01 G
CD-109	1.8246E+04					4.63E+02	
		88.03	1.825E+04	(	1.134E+02	4.16E-01	3.61E+00 G
CO-57	3.9307E+02					2.72E+02	
		122.06	3.931E+02	(	5.110E+00	7.74E-01	8.56E+01 G
Ce-139	5.8589E+02					1.38E+02	
		165.85	5.859E+02	(	6.791E+00	7.44E-01	7.99E+01 G
Hg-203	1.3123E+03					4.66E+01	
		279.17	1.312E+03	(	2.206E+01	1.08E+00	8.15E+01 G
SN-113	1.0590E+03					1.15E+02	
		391.69	1.059E+03	(	1.205E+01	8.51E-01	6.40E+01 G
CS-137	5.0981E+02					1.10E+04	
		661.66	5.098E+02	(	6.233E+00	9.29E-01	8.52E+01 G
Y-898	1.7049E+03					1.07E+02	
		898.02	1.705E+03	(	1.505E+01	7.81E-01	9.37E+01 G
Co-1173	7.7646E+02					1.93E+03	
		1173.24	7.765E+02	(	6.891E+00	8.68E-01	9.99E+01 G
Co-1332	7.6541E+02					1.93E+03	
		1332.50	7.654E+02	(	6.071E+00	8.39E-01	1.00E+02 G
Y-1836	1.7690E+03					1.07E+02	
		1836.01	1.769E+03	(	8.211E+00	7.99E-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

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
Pb-210	1.5857E+04	1.6003E+04	5.927E-01%	1.85E+02
AM-241	1.2600E+03	1.2606E+03	7.317E-01%	1.66E+01
CD-109	1.5540E+04	1.8246E+04	4.164E-01%	1.13E+02
CO-57	2.9911E+02	3.9307E+02	7.739E-01%	5.11E+00
Ce-139	3.4161E+02	5.8589E+02	7.437E-01%	6.79E+00
Hg-203	2.6699E+02	1.3123E+03	1.078E+00%	2.21E+01
SN-113	5.5555E+02	1.0590E+03	8.510E-01%	1.20E+01
CS-137	5.0637E+02	5.0981E+02	9.286E-01%	6.23E+00
Y-898	8.4955E+02	1.7049E+03	7.808E-01%	1.50E+01
Co-1173	7.4709E+02	7.7646E+02	8.681E-01%	6.89E+00
Co-1332	7.3646E+02	7.6541E+02	8.386E-01%	6.07E+00
Y-1836	8.8152E+02	1.7690E+03	7.985E-01%	8.21E+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 (25.1 to 1999.1 keV) 3.784E+04 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 4.4384840E+04 Bq/Sample

Gamma Verification per Geometry

Detector: Ge14

Geometry: 1L Marn

Reference date 1/1/2012

Calibration Standard: 90062

Standard volume g / vial 1

Standard volume transferred in g / geometry 1

lab ID# of cal standard 6707

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	Abundance	Activity Bq/L	Count Results	%recovery
Am-241	1821	1821	0.359	**5072.4**	5099.7	100.5
Cd-109	2602	2602	0.0361	**72077.6**	70211	97.4
Co-57	1364	1364	0.856	**1593.5**	1591.3	99.9
Ce-139	1932	1932	0.799	**2418.0**	2382.7	98.5
Hg-203	4200	4200	0.8146	**5155.9**	5295.7	102.7
Sn-113	2722	2722	0.64	**4253.1**	4241.5	99.7
Cs-137	1750	1750	0.851	**2056.4**	2032.3	98.8
Mn-54	3114	3114	0.9998	**3114.6**	3210.8	103.1
Y-88	6559	6559	0.937	**7000.0**	6624.4	94.6
Zn-65	3134	3134	0.506	**6193.7**	6501.5	105.0
Co-60	3233	3233	0.99974	**3233.8**	3130	96.8
Co-60	3233	3233	0.99986	**3233.5**	3161.8	97.8
Y-88	6944	6944	0.992	**7000.0**	7104.9	101.5

Reviewed By: Rachael Schneider

Date: 3/15/2012

Calibration Data from file: 14_Liquid_Marinelli 1L.Clb
Energy Calibration Date: 3/14/2012 Time: 4:58:19 PM
Efficiency Calibration Date: 3/14/2012 Time: 4:58:47 PM

Calibration Description:
14_1LMarinelli_90062_030612

Energy Calibration Fit
Energy = 0.1952 +0.250028*Channel -1.58918e-008*Channel**2
FWHM (ch) = 2.9497 +0.000953*Channel -2.15433e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
237.80	59.54	59.65	-0.19%	0.77	0.79	-3.71%
351.28	88.03	88.02	0.01%	0.82	0.82	-0.46%
487.13	122.06	121.99	0.06%	0.84	0.85	-1.44%
662.38	165.85	165.80	0.03%	0.93	0.89	3.74%
1115.87	279.17	279.18	-0.00%	1.01	1.00	0.86%
1565.85	391.69	391.66	0.01%	1.12	1.10	1.65%
2646.08	661.66	661.68	-0.00%	1.33	1.33	-0.08%
3338.98	834.85	834.86	-0.00%	1.46	1.47	-0.99%
3591.90	898.02	898.06	-0.00%	1.53	1.52	0.21%
4462.13	1115.55	1115.54	0.00%	1.68	1.69	-0.54%
4693.00	1173.24	1173.23	0.00%	1.73	1.74	-0.64%
5330.38	1332.50	1332.49	0.00%	1.87	1.85	0.68%
7345.88	1836.01	1836.01	-0.00%	2.20	2.20	0.11%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.6436 %
Ln(Eff) = -1.4280 -0.041364*Ln(Eng) -0.0595801*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.0669 %
Ln(Eff) = -13.8330 +4.786779*Ln(Eng) -0.529374*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
59.54	4.4501E-002	4.4511E-002	-0.02%
88.03	4.9213E-002	4.9141E-002	0.15%
122.06	4.7083E-002	4.7143E-002	-0.13%
165.85	========== Knee ==========		
165.85	4.0337E-002	4.0931E-002	-1.47%
279.17	2.9507E-002	2.8704E-002	2.72%
391.69	2.2339E-002	2.2397E-002	-0.26%
661.66	1.4693E-002	1.4848E-002	-1.05%
834.85	1.2525E-002	1.2245E-002	2.23%
898.02	1.0895E-002	1.1511E-002	-5.65%
1115.55	1.0017E-002	9.5425E-003	4.74%
1173.24	8.8285E-003	9.1281E-003	-3.39%
1332.50	7.9683E-003	8.1493E-003	-2.27%
1836.01	6.1643E-003	6.0723E-003	1.49%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Am-241	59.54	35.70	1.58E+005	5100.80	1821.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	72078.00	2602.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	1593.50	1364.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	2418.00	1932.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	5153.40	4200.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	4253.10	2722.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	2053.70	1750.00	4.00%	1/1/2012 11:00:00 AM
Mn-54	834.85	99.98	3.12E+002	3114.60	3114.00	3.30%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	7000.00	6559.00	3.90%	1/1/2012 11:00:00 AM
Zn-65	1115.55	50.60	2.44E+002	6193.70	3134.00	3.50%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	3236.20	3233.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	3233.60	3233.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	7000.00	6944.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  3/14/2012 5:01:08 PM    Page  1
TestAmerica, Inc.               Spectrum name: 14_Marn1L_20120214.An1

Sample description
     14_Marn1L_90062_030612


Spectrum Filename: C:\User\Cal\Spectra\Det14\14_Marn1L_20120214.An1

Acquisition information
       Start time:                 3/6/2012 11:06:57 PM
       Live time:               3600
       Real time:               4175
       Dead time:                 13.77 %
       Detector ID:                   14

Detector system
     Ge14 SN/11080670


Calibration
       Filename:                   14_Liquid_Marinelli 1L.Clb
     14_1LMarinelli_90062_030612


       Energy Calibration
            Created:               3/14/2012 4:58:19 PM
            Zero offset:           0.195 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.589E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/14/2012 4:58:47 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.64 %
            Log(Eff):             -1.428037E+00 + (-4.136370E-02*Log(E) ) +
                                   ( -5.958012E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   0.07 %
            Log(Eff):             -1.383299E+01 + ( 4.786779E+00*Log(E) ) +
                                   ( -5.293738E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Mn, Zn.L
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.70keV )
       Stop channel:            8000 (  1999.40keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (1087) Env32  G53W4.25  3/14/2012 5:01:08 PM    Page  2
TestAmerica, Inc.               Spectrum name: 14_Marn1L_20120214.An1
                                      Page 1
```

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       1/1/2012 11:00:00 AM
       Decay during acquisition:      NO
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.   13 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0292
```

***** 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
38.07	21654.	2.26	0.75	3.259E-02				
49.67	9700.	5.85	1.48	4.025E-02				
59.65	291645.	0.29	0.77	4.455E-02	59.54	35.700	5.100E+03	AM241
70.89	11685.	3.35	0.80	4.746E-02				
72.96	19771.	1.98	0.81	4.782E-02				
82.52	8416.	4.51	0.82	4.888E-02				
85.00	10172.	3.72	0.82	4.903E-02				
88.04	416870.	0.17	0.82	4.914E-02	88.03	3.610	7.201E+04	CD109
121.99	195618.	0.35	0.84	4.715E-02	122.06	85.600	1.591E+03	CO57
136.40	24070.	1.86	0.86	4.530E-02				
165.80	201696.	0.34	0.93	4.092E-02	165.85	79.900	2.383E+03	Ce139
199.08	5460.	6.64	0.97	3.628E-02				
255.08	6879.	4.87	1.03	3.060E-02				
279.18	168439.	0.32	1.01	2.870E-02	279.17	81.500	5.296E+03	Hg203
391.66	147525.	0.33	1.12	2.240E-02	391.69	64.000	4.242E+03	SN113
511.09	8266.	3.88	2.16	1.825E-02				
661.68	92186.	0.51	1.33	1.485E-02	661.66	85.210	2.032E+03	CS137
813.92	2750.	5.30	1.46	1.251E-02				
834.87	121393.	0.31	1.47	1.224E-02	834.85	99.980	3.185E+03	Mn54
898.06	168004.	0.33	1.53	1.151E-02	898.02	93.700	6.624E+03	Y898
1115.54	93846.	0.44	1.68	9.543E-03	1115.55	50.600	6.502E+03	Zn65
1173.23	100357.	0.37	1.73	9.128E-03	1173.24	99.900	3.130E+03	Co1173
1324.84	3723.	5.11	3.11	8.192E-03				
1332.49	90580.	0.40	1.87	8.149E-03	1332.50	99.982	3.162E+03	Co1332
1836.01	100634.	0.33	2.20	6.072E-03	1836.01	99.200	7.105E+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
151.47	38.07	68514.	21654.	6.644E+05	2.26	0.749	- s
197.90	49.67	98774.	9700.	2.410E+05	5.85	1.481	- s

282.79	70.90	72030.	10225.	2.154E+05	4.40	0.796	-	D

ORTEC g v - i (1087) Env32 G53W4.25 3/14/2012 5:01:08 PM Page 3
TestAmerica, Inc. Spectrum name: 14_Marn1L_20120214.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
291.07	72.97	66878.	18325.	3.832E+05	2.42	0.793	-	D
329.18	82.50	76800.	5506.	1.126E+05	8.82	1.048	-	sD
339.19	84.98	66692.	10172.	4.523E+04	3.72	0.818	-	lD
544.79	136.40	50098.	24070.	5.313E+05	1.86	0.859	-	
795.47	199.08	36038.	5460.	1.505E+05	6.64	0.972	-	s
1019.50	255.08	28728.	6879.	2.248E+05	4.87	1.025	-	
2043.63	511.09	21035.	8266.	4.528E+05	3.88	2.156	-	s
3255.08	813.89	12208.	3401.	2.718E+05	7.58	1.641	-	s
5299.75	1324.84	4748.	3723.	4.544E+05	5.11	3.107	-	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 & Mn, Zn.L

********** 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	237.80	59.65	116745.	291645.	81.013	0.29	0.765
CD-109	351.28	88.02	93268.	406468.	112.908	0.22	0.817
CO-57	487.13	121.99	67906.	195618.	54.338	0.35	0.840
Ce-139	662.38	165.80	56766.	201696.	56.027	0.34	0.928
Hg-203	1115.87	279.18	28497.	168439.	46.789	0.32	1.005
SN-113	1565.85	391.66	20811.	147525.	40.979	0.33	1.116
CS-137	2646.08	661.68	22769.	92186.	25.607	0.51	1.329
Mn-54	3338.98	834.86	14954.	122362.	33.989	0.37	1.458
Y-898	3591.89	898.06	20498.	168004.	46.668	0.33	1.527
Zn-65	4462.13	1115.54	10931.	93846.	26.068	0.44	1.683
Co-1173	4693.00	1173.23	6251.	100357.	27.877	0.37	1.725
Co-1332	5330.38	1332.49	5298.	90580.	25.161	0.40	1.866
Y-1836	7345.86	1836.01	1482.	100634.	27.954	0.33	2.198

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Activity Bq	Code	MDA Value Bq	COMMENTS
AM-241		5.0997E+03				1.58E+05	
			59.54	5.100E+03	(	2.789E+01 2.95E-01 3.57E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/14/2012 5:01:08 PM Page 4
TestAmerica, Inc. Spectrum name: 14_Marn1L_20120214.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments

```
CD-109       7.0211E+04                                      4.63E+02
                           88.03 7.021E+04  (  2.463E+02 2.15E-01 3.61E+00 G

CO-57        1.5913E+03                                      2.72E+02
                          122.06 1.591E+03  (  9.901E+00 3.54E-01 8.56E+01 G

Ce-139       2.3827E+03                                      1.38E+02
                          165.85 2.383E+03  (  1.315E+01 3.35E-01 7.99E+01 G

Hg-203       5.2957E+03                                      4.66E+01
                          279.17 5.296E+03  (  2.482E+01 3.18E-01 8.15E+01 G

SN-113       4.2415E+03                                      1.15E+02
                          391.69 4.242E+03  (  1.941E+01 3.33E-01 6.40E+01 G

CS-137       2.0323E+03                                      1.10E+04
                          661.66 2.032E+03  (  1.556E+01 5.10E-01 8.52E+01 G

Mn-54        3.2108E+03                                      3.12E+02
                          834.85 3.211E+03  (  1.502E+01 3.74E-01 1.00E+02 G

Y-898        6.6244E+03                                      1.07E+02
                          898.02 6.624E+03  (  2.641E+01 3.30E-01 9.37E+01 G

Zn-65    F   6.5015E+03                                      2.44E+02
                         1115.55 6.502E+03  (  3.394E+01 4.44E-01 5.06E+01 G

Co-1173      3.1300E+03                                      1.93E+03
                         1173.24 3.130E+03  (  1.158E+01 3.73E-01 9.99E+01 G

Co-1332      3.1618E+03                                      1.93E+03
                         1332.50 3.162E+03  (  1.193E+01 3.99E-01 1.00E+02 G

Y-1836       7.1049E+03                                      1.07E+02
                         1836.01 7.105E+03  (  1.286E+01 3.32E-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
                                       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

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
AM-241	5.0982E+03	5.0997E+03	2.948E-01%	2.79E+01
CD-109	6.3647E+04	7.0211E+04	2.150E-01%	2.46E+02
CO-57	1.3465E+03	1.5913E+03	3.536E-01%	9.90E+00
Ce-139	1.7132E+03	2.3827E+03	3.352E-01%	1.31E+01
Hg-203	2.0000E+03	5.2957E+03	3.181E-01%	2.48E+01
SN-113	2.8588E+03	4.2415E+03	3.329E-01%	1.94E+01
CS-137	2.0240E+03	2.0323E+03	5.102E-01%	1.56E+01
Mn-54	2.7764E+03	3.2108E+03	3.741E-01%	1.50E+01
Y-898	4.3268E+03	6.6244E+03	3.304E-01%	2.64E+01
Zn-65	5.3988E+03	6.5015E+03	4.445E-01%	3.39E+01
Co-1173	3.0570E+03	3.1300E+03	3.728E-01%	1.16E+01
Co-1332	3.0881E+03	3.1618E+03	3.985E-01%	1.19E+01
Y-1836	4.6406E+03	7.1049E+03	3.322E-01%	1.29E+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

ORTEC g v - i (1087) Env32 G53W4.25 3/14/2012 5:01:08 PM Page 6
TestAmerica, Inc. Spectrum name: 14_Marn1L_20120214.An1

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.4 keV) 1.020E+05 Bq
Total Decayed Activity (37.7 to 1999.4 keV) 1.2058714E+05 Bq

Gamma Verification per Geometry

Detector: Ge16

Geometry: 1L Marn

Reference date 1/1/2012

Calibration Standard: 90062

Standard volume g / vial 1

Standard volume transferred in g / geometry 1

lab ID# of cal standard 6707

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	Abundance	Activity Bq/L	Count Results	%recovery
Am-241	1821	1821	0.359	**5072.4**	5015.2	98.9
Cd-109	2602	2602	0.0361	**72077.6**	69098	95.9
Co-57	1364	1364	0.856	**1593.5**	1601.3	100.5
Ce-139	1932	1932	0.799	**2418.0**	2391.1	98.9
Hg-203	4200	4200	0.8146	**5155.9**	5262.6	102.1
Sn-113	2722	2722	0.64	**4253.1**	4232.8	99.5
Cs-137	1750	1750	0.851	**2056.4**	2036.7	99.0
Mn-54	3114	3114	0.9998	**3114.6**	3232.6	103.8
Y-88	6559	6559	0.937	**7000.0**	6514.5	93.1
Zn-65	3134	3134	0.506	**6193.7**	6635.9	107.1
Co-60	3233	3233	0.99974	**3233.8**	3077.5	95.2
Co-60	3233	3233	0.99986	**3233.5**	3114.5	96.3
Y-88	6944	6944	0.992	**7000.0**	7137.4	102.0

Reviewed By: Rachael Schneider

Date: 4/3/2012

Calibration Data from file: 16_Liquid_Marinelli 1L.Clb
Energy Calibration Date: 4/2/2012 Time: 6:09:11 PM
Efficiency Calibration Date: 4/2/2012 Time: 6:09:24 PM

Calibration Description:
16_1Lmarn_90062_032712

Energy Calibration Fit
Energy = -0.0068 +0.250063*Channel -1.97784e-008*Channel**2
FWHM (ch) = 3.8412 +0.000871*Channel -1.25435e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
238.12	59.54	59.54	0.01%	1.01	1.01	-0.57%
352.22	88.03	88.07	-0.04%	1.03	1.04	-0.82%
488.32	122.06	122.10	-0.03%	1.08	1.07	1.06%
663.48	165.85	165.90	-0.03%	1.12	1.10	1.25%
1116.17	279.17	279.08	0.03%	1.19	1.20	-0.51%
1566.25	391.69	391.60	0.02%	1.29	1.29	-0.31%
2646.59	661.66	661.67	-0.00%	1.52	1.51	0.19%
3339.48	834.85	834.85	-0.00%	1.65	1.65	0.11%
3592.25	898.02	898.03	-0.00%	1.69	1.70	-0.64%
4462.73	1115.55	1115.56	-0.00%	1.86	1.87	-0.63%
4693.62	1173.24	1173.26	-0.00%	1.90	1.91	-0.62%
5331.05	1332.50	1332.53	-0.00%	2.07	2.03	1.76%
7346.38	1836.01	1835.98	0.00%	2.38	2.39	-0.34%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.4245 %
Ln(Eff) = -2.3147 +0.284801*Ln(Eng) -0.0811499*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.2610 %
Ln(Eff) = -12.6035 +4.382261*Ln(Eng) -0.488912*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
59.54	5.7326E-002	5.7274E-002	0.09%
88.03	6.1456E-002	6.1813E-002	-0.58%
122.06	5.9034E-002	5.8742E-002	0.49%
165.85	========== Knee ==========		
165.85	5.0286E-002	5.0846E-002	-1.11%
279.17	3.8262E-002	3.7455E-002	2.11%
391.69	2.9847E-002	2.9986E-002	-0.47%
661.66	2.0315E-002	2.0485E-002	-0.84%
834.85	1.7702E-002	1.7055E-002	3.66%
898.02	1.4961E-002	1.6073E-002	-7.43%
1115.55	1.4365E-002	1.3406E-002	6.67%
1173.24	1.2209E-002	1.2839E-002	-5.16%
1332.50	1.1066E-002	1.1489E-002	-3.82%
1836.01	8.7552E-003	8.5852E-003	1.94%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Am-241	59.54	35.70	1.58E+005	5100.80	1821.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	72078.00	2602.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	1593.50	1364.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	2418.00	1932.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	5153.40	4200.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	4253.10	2722.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	2053.70	1750.00	4.00%	1/1/2012 11:00:00 AM
Mn-54	834.85	99.98	3.12E+002	3114.60	3114.00	3.30%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	7000.00	6559.00	3.90%	1/1/2012 11:00:00 AM
Zn-65	1115.55	50.60	2.44E+002	6193.70	3134.00	3.50%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	3236.20	3233.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	3233.60	3233.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	7000.00	6944.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  4/2/2012 6:09:53 PM     Page  1
TestAmerica, Inc.               Spectrum name: 16_Marn1L_20120257.An1

Sample description
     16_Marn1L_90062_032712


Spectrum Filename: C:\User\SPC\Det16\16_Marn1L_20120257.An1

Acquisition information
       Start time:                 3/27/2012 3:43:12 PM
       Live time:               3600
       Real time:               4253
       Dead time:                 15.35 %
       Detector ID:                   16

Detector system
     Ge16 SN/11012217


Calibration
       Filename:                   16_Liquid_Marinelli 1L.Clb
     16_1Lmarn_90062_032712


       Energy Calibration
            Created:               4/2/2012 6:09:11 PM
            Zero offset:          -0.007 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.978E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/2/2012 6:09:24 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   2.42 %
            Log(Eff):             -2.314705E+00 + ( 2.848008E-01*Log(E) ) +
                                   ( -8.114986E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   0.26 %
            Log(Eff):             -1.260350E+01 + ( 4.382261E+00*Log(E) ) +
                                   ( -4.889120E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Mn, Zn.L
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.50keV )
       Stop channel:            8000 (  1999.23keV )
       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  4/2/2012 6:09:53 PM     Page  2
TestAmerica, Inc.               Spectrum name: 16_Marn1L_20120257.An1
                                      Page 1
```

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       1/1/2012 11:00:00 AM
       Decay during acquisition:      NO
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.   13 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0239
```

***** 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
37.83	30994.	1.94	1.11	4.347E-02				
49.52	16296.	4.51	1.90	5.246E-02				
56.55	9875.	5.10	1.01	5.605E-02				
59.58	372591.	0.20	1.01	5.727E-02	59.54	35.700	5.064E+03	AM241
70.84	10335.	4.30	1.02	6.035E-02				
72.96	17658.	2.60	1.02	6.071E-02				
82.50	10170.	4.38	1.03	6.167E-02				
84.88	12549.	3.45	1.03	6.176E-02				
88.08	502632.	0.16	1.04	6.181E-02	88.03	3.610	7.120E+04	CD109
122.10	232662.	0.34	1.08	5.874E-02	122.06	85.600	1.601E+03	CO57
136.54	29103.	1.83	1.06	5.635E-02				
165.90	226558.	0.31	1.12	5.084E-02	165.85	79.900	2.391E+03	Ce139
199.13	7237.	5.62	1.32	4.590E-02				
255.07	7532.	5.00	1.12	3.962E-02				
279.08	160585.	0.38	1.19	3.746E-02	279.17	81.500	5.263E+03	Hg203
391.60	174011.	0.36	1.29	2.999E-02	391.69	64.000	4.233E+03	SN113
511.03	14656.	2.70	2.70	2.485E-02				
661.67	127292.	0.48	1.52	2.049E-02	661.66	85.210	2.037E+03	CS137
834.85	163887.	0.33	1.65	1.706E-02	834.85	99.980	3.233E+03	Mn54
898.03	201661.	0.29	1.69	1.607E-02	898.02	93.700	6.515E+03	Y898
1115.56	126897.	0.38	1.86	1.341E-02	1115.55	50.600	6.636E+03	Zn65
1173.26	137755.	0.35	1.90	1.284E-02	1173.24	99.900	3.077E+03	Co1173
1324.86	3898.	4.83	2.78	1.155E-02				
1332.53	124857.	0.33	2.07	1.149E-02	1332.50	99.982	3.114E+03	Co1332
1835.98	124938.	0.31	2.38	8.585E-03	1836.01	99.200	7.137E+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
151.30	37.83	85759.	30994.	7.130E+05	1.94	1.111	- s
198.06	49.52	136436.	16296.	3.106E+05	4.51	1.898	- s

226.17	56.51	121941.	9875.-	9.845E+03	5.10	1.010	-	D

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
283.31	70.84	93409.	10335.	1.712E+05	4.30	1.022	-	D
291.81	72.96	96786.	17658.	2.908E+05	2.60	1.024	-	D
329.95	82.48	94240.	10170.	8.117E+04	4.38	1.032	-	lD
339.46	84.86	87407.	12549.	3.048E+04	3.45	1.034	-	lD
546.08	136.54	63267.	29103.	5.165E+05	1.83	1.064	-	
796.39	199.13	43208.	7237.	1.577E+05	5.62	1.316	-	
1020.15	255.07	35111.	7532.	1.901E+05	5.00	1.125	-	
2043.98	511.03	26576.	14656.	5.897E+05	2.70	2.704	-	s
5300.35	1324.86	5255.	3898.	3.376E+05	4.83	2.783	-	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_EnergyStandardMix & Mn, Zn.L

********** 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	238.12	59.54	164069.	369020.	102.506	0.29	1.006
CD-109	352.22	88.07	125895.	487826.	135.507	0.21	1.028
CO-57	488.32	122.10	84352.	232662.	64.628	0.34	1.078
Ce-139	663.48	165.90	60532.	226558.	62.933	0.31	1.118
Hg-203	1116.16	279.08	41732.	160585.	44.607	0.38	1.194
SN-113	1566.24	391.60	35115.	174011.	48.336	0.36	1.290
CS-137	2646.59	661.67	34986.	127292.	35.359	0.48	1.518
Mn-54	3339.48	834.85	20555.	163887.	45.524	0.33	1.654
Y-898	3592.25	898.03	23155.	201661.	56.017	0.29	1.691
Zn-65	4462.73	1115.56	13927.	126897.	35.249	0.38	1.858
Co-1173	4693.62	1173.26	10843.	137755.	38.265	0.35	1.901
Co-1332	5331.05	1332.53	6246.	124857.	34.682	0.33	2.068
Y-1836	7346.37	1835.98	2517.	124938.	34.705	0.31	2.381

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
AM-241		5.0152E+03				1.58E+05	
			59.54	5.015E+03	(	2.569E+01 2.89E-01 3.57E+01	G

```
CD-109       6.9098E+04                                        4.63E+02
                          88.03 6.910E+04  (  2.346E+02 2.10E-01 3.61E+00 G

CO-57        1.6013E+03                                        2.72E+02
                         122.06 1.601E+03  (  9.333E+00 3.40E-01 8.56E+01 G

Ce-139       2.3911E+03                                        1.38E+02
                         165.85 2.391E+03  (  1.213E+01 3.12E-01 7.99E+01 G

Hg-203       5.2626E+03                                        4.66E+01
                         279.17 5.263E+03  (  3.129E+01 3.78E-01 8.15E+01 G

SN-113       4.2328E+03                                        1.15E+02
                         391.69 4.233E+03  (  2.131E+01 3.56E-01 6.40E+01 G

CS-137       2.0367E+03                                        1.10E+04
                         661.66 2.037E+03  (  1.399E+01 4.79E-01 8.52E+01 G

Mn-54        3.2326E+03                                        3.12E+02
                         834.85 3.233E+03  (  1.323E+01 3.31E-01 1.00E+02 G

Y-898        6.5145E+03                                        1.07E+02
                         898.02 6.515E+03  (  2.299E+01 2.94E-01 9.37E+01 G

Zn-65    F   6.6359E+03                                        2.44E+02
                        1115.55 6.636E+03  (  2.890E+01 3.77E-01 5.06E+01 G

Co-1173      3.0775E+03                                        1.93E+03
                        1173.24 3.077E+03  (  1.090E+01 3.45E-01 9.99E+01 G

Co-1332      3.1145E+03                                        1.93E+03
                        1332.50 3.114E+03  (  9.254E+00 3.29E-01 1.00E+02 G

Y-1836       7.1374E+03                                        1.07E+02
                        1836.01 7.137E+03  (  1.351E+01 3.08E-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
                                       Page 4
```

```
  I - Fission Product                    P - Positron Decay
  N - Naturally Occurring Isotope        S - Single-Escape
  P - Photon Reaction                    D - Double-Escape
  C - Charged Particle Reaction          K - Key Line
  M - No MDA Calculation                 A - Not in Average
  R - Coincidence Corrected              C - Coincidence Peak
  H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


*************** D I S C A R D E D  I S O T O P E  P E A K S ***************
Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
          Energy   Counts     Counts     Cts/Sec  1 Sigma %
_____________________________________________________________________________
  P - Peakbackground subtraction

*****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count  Time Corrected  Uncertainty  1 Sigma
Nuclide     Activity       Activity       Counting                    MDA
               Bq             Bq

_____________________________________________________________________________
AM-241       5.0133E+03    5.0152E+03    2.887E-01%                 2.57E+01
CD-109       6.0726E+04    6.9098E+04    2.105E-01%                 2.35E+02
CO-57        1.2853E+03    1.6013E+03    3.401E-01%                 9.33E+00
Ce-139       1.5491E+03    2.3911E+03    3.118E-01%                 1.21E+01
Hg-203       1.4613E+03    5.2626E+03    3.784E-01%                 3.13E+01
SN-113       2.5187E+03    4.2328E+03    3.564E-01%                 2.13E+01
CS-137       2.0256E+03    2.0367E+03    4.793E-01%                 1.40E+01
Mn-54        2.6697E+03    3.2326E+03    3.309E-01%                 1.32E+01
Y-898        3.7194E+03    6.5145E+03    2.943E-01%                 2.30E+01
Zn-65        5.1962E+03    6.6359E+03    3.771E-01%                 2.89E+01
Co-1173      2.9835E+03    3.0775E+03    3.453E-01%                 1.09E+01
Co-1332      3.0193E+03    3.1145E+03    3.288E-01%                 9.25E+00
```



```
Y-1836       4.0750E+03    7.1374E+03    3.084E-01%                 1.35E+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 (   78.0 to  1999.2 keV)     9.624E+04  Bq
Total Decayed Activity (   78.0 to  1999.2 keV) 1.1935008E+05  Bq
```

Gamma Verification per Geometry

Detector: Ge17

Geometry: 1L Marn

Reference date 1/1/2012

Calibration Standard: 90062

Standard volume g / vial 1

Standard volume transferred in g / geometry 1

lab ID# of cal standard 6707

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	Abundance	Activity Bq/L	Count Results	%recovery
Am-241	1821	1821	0.359	**5072.4**	5112.5	100.8
Cd-109	2602	2602	0.0361	**72077.6**	71031	98.5
Co-57	1364	1364	0.856	**1593.5**	1613.4	101.3
Ce-139	1932	1932	0.799	**2418.0**	2392	98.9
Hg-203	4200	4200	0.8146	**5155.9**	5257.5	102.0
Sn-113	2722	2722	0.64	**4253.1**	4231.2	99.5
Cs-137	1750	1750	0.851	**2056.4**	2042.9	99.3
Mn-54	3114	3114	0.9998	**3114.6**	3228.2	103.6
Y-88	6559	6559	0.937	**7000.0**	6547.6	93.5
Zn-65	3134	3134	0.506	**6193.7**	6547.5	105.7
Co-60	3233	3233	0.99974	**3233.8**	3100.4	95.9
Co-60	3233	3233	0.99986	**3233.5**	3131	96.8
Y-88	6944	6944	0.992	**7000.0**	7133.8	101.9

Reviewed By: Elizabeth M. Hoerchler

Date: 3/8/2012

Calibration Data from file: 17_Liquid_Marinelli 1L.Clb
Energy Calibration Date: 3/7/2012 Time: 11:47:12 AM
Efficiency Calibration Date: 3/7/2012 Time: 11:47:27 AM

Calibration Description:
17_1L marn_90062_030512

Energy Calibration Fit
Energy = 0.1347 +0.250093*Channel -2.1148e-008*Channel**2
FWHM (ch) = 2.9716 +0.000920*Channel -1.82029e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
237.91	59.54	59.63	-0.16%	0.80	0.80	0.12%
351.76	88.03	88.11	-0.09%	0.81	0.82	-1.28%
487.42	122.06	122.03	0.02%	0.86	0.85	0.15%
662.29	165.85	165.76	0.05%	0.91	0.89	1.82%
1115.54	279.17	279.10	0.03%	1.00	0.99	0.87%
1565.73	391.69	391.66	0.01%	1.10	1.09	0.88%
2645.69	661.66	661.66	0.00%	1.28	1.32	-2.99%
3338.60	834.85	834.86	-0.00%	1.38	1.46	-5.41%
3591.45	898.02	898.06	-0.00%	1.55	1.51	2.83%
4461.68	1115.55	1115.55	-0.00%	1.71	1.68	1.99%
4692.56	1173.24	1173.25	-0.00%	1.74	1.72	1.25%
5329.94	1332.50	1332.52	-0.00%	1.84	1.84	-0.14%
7345.24	1836.01	1835.99	0.00%	2.17	2.19	-0.50%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.0885 %
Ln(Eff) = -2.0941 +0.178816*Ln(Eng) -0.0728314*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.6563 %
Ln(Eff) = -12.0102 +4.016685*Ln(Eng) -0.443977*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
59.54	4.9398E-002	4.9285E-002	0.23%
88.03	5.2818E-002	5.3594E-002	-1.47%
122.06	5.2447E-002	5.1796E-002	1.24%
165.85	========== Knee ==========		
165.85	4.5346E-002	4.5833E-002	-1.07%
279.17	3.4160E-002	3.3471E-002	2.02%
391.69	2.6577E-002	2.6711E-002	-0.50%
661.66	1.8130E-002	1.8226E-002	-0.53%
834.85	1.5743E-002	1.5188E-002	3.53%
898.02	1.3397E-002	1.4321E-002	-6.89%
1115.55	1.2652E-002	1.1968E-002	5.41%
1173.24	1.0986E-002	1.1467E-002	-4.38%
1332.50	9.9524E-003	1.0279E-002	-3.28%
1836.01	7.8699E-003	7.7211E-003	1.89%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Am-241	59.54	35.70	1.58E+005	5100.80	1821.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	72078.00	2602.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	1593.50	1364.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	2418.00	1932.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	5153.40	4200.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	4253.10	2722.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	2053.70	1750.00	4.00%	1/1/2012 11:00:00 AM
Mn-54	834.85	99.98	3.12E+002	3114.60	3114.00	3.30%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	7000.00	6559.00	3.90%	1/1/2012 11:00:00 AM
Zn-65	1115.55	50.60	2.44E+002	6193.70	3134.00	3.50%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	3236.20	3233.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	3233.60	3233.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	7000.00	6944.00	4.00%	1/1/2012 11:00:00 AM

17_1LMarn_20120191

```
     ORTEC g v - i (1087) Env32  G53W4.25  3/7/2012 11:48:20 AM    Page  1
TestAmerica, Inc.                Spectrum name: 17_1LMarn_20120191.An1

Sample description
     17_1LMarn_90062_030512


Spectrum Filename: C:\User\SPC\Det17\17_1LMarn_20120191.An1

Acquisition information
       Start time:                 3/5/2012 2:23:43 PM
       Live time:               3600
       Real time:               4296
       Dead time:                 16.19 %
       Detector ID:                   17

Detector system
     Ge17 SN/11080671


Calibration
       Filename:                   17_Liquid_Marinelli 1L.Clb
     17_1L marn_90062_030512


       Energy Calibration
            Created:               3/7/2012 11:47:12 AM
            Zero offset:           0.135 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.115E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/7/2012 11:47:27 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   2.09 %
            Log(Eff):             -2.094103E+00 + ( 1.788156E-01*Log(E) ) +
                                   ( -7.283143E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   0.66 %
            Log(Eff):             -1.201018E+01 + ( 4.016685E+00*Log(E) ) +
                                   ( -4.439774E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Mn, Zn.L
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.65keV )
       Stop channel:            8000 (  1999.53keV )
       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  3/7/2012 11:48:20 AM    Page  2
TestAmerica, Inc.                Spectrum name: 17_1LMarn_20120191.An1
                                       Page 1
```

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       1/1/2012 11:00:00 AM
       Decay during acquisition:      NO
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.   13 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0383
```

***** 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
38.01	28332.	1.83	0.82	3.787E-02				
49.65	10470.	5.54	1.42	4.526E-02				
59.63	323741.	0.27	0.80	4.932E-02	59.54	35.700	5.112E+03	AM241
70.90	13184.	3.06	0.81	5.203E-02				
73.01	22392.	1.88	0.81	5.237E-02				
82.52	6082.	6.51	0.82	5.335E-02				
88.11	449400.	0.21	0.83	5.360E-02	88.03	3.610	7.103E+04	CD109
122.03	218662.	0.35	0.90	5.180E-02	122.06	85.600	1.613E+03	CO57
136.42	26924.	1.83	0.87	5.010E-02				
165.76	228303.	0.31	0.93	4.603E-02	165.85	79.900	2.392E+03	Ce139
198.99	6240.	5.78	1.08	4.125E-02				
255.05	7674.	4.40	1.06	3.545E-02				
279.10	198991.	0.30	1.05	3.348E-02	279.17	81.500	5.258E+03	Hg203
391.66	176956.	0.32	1.13	2.671E-02	391.69	64.000	4.231E+03	SN113
510.97	13673.	2.59	2.45	2.212E-02				
661.66	113755.	0.46	1.36	1.823E-02	661.66	85.210	2.043E+03	CS137
813.91	2992.	9.03	1.66	1.550E-02				
834.86	153063.	0.34	1.50	1.519E-02	834.85	99.980	3.228E+03	Mn54
898.06	208430.	0.28	1.55	1.432E-02	898.02	93.700	6.548E+03	Y898
1115.55	118990.	0.39	1.71	1.197E-02	1115.55	50.600	6.548E+03	Zn65
1173.24	124948.	0.35	1.74	1.147E-02	1173.24	99.900	3.100E+03	Co1173
1324.83	3875.	5.01	2.78	1.033E-02				
1332.52	113188.	0.35	1.84	1.028E-02	1332.50	99.982	3.131E+03	Co1332
1835.98	129623.	0.30	2.18	7.721E-03	1836.01	99.200	7.134E+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
151.45	38.01	68392.	28332.	7.482E+05	1.83	0.816	- s
197.99	49.65	103012.	10470.	2.313E+05	5.54	1.416	- s
282.92	70.89	76458.	11270.	2.166E+05	4.12	0.818	- D

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TestAmerica, Inc. Spectrum name: 17_1LMarn_20120191.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
291.38	73.00	78615.	19753.	3.772E+05	2.49	0.799	-	D
329.30	82.49	80588.	7080.	1.327E+05	7.05	1.043	-	s
544.96	136.42	58536.	26924.	5.374E+05	1.83	0.869	-	
795.19	198.99	37191.	6240.	1.513E+05	5.78	1.080	-	
1019.36	255.05	30402.	7674.	2.165E+05	4.40	1.059	-	
2042.93	510.97	23019.	13673.	6.182E+05	2.59	2.451	-	s
3254.77	813.91	13996.	2992.	1.930E+05	9.03	1.661	-	
5299.18	1324.83	5645.	3875.	3.751E+05	5.01	2.776	-	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 & Mn, Zn.L

********** 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	237.91	59.63	117664.	323741.	89.928	0.27	0.802
CD-109	351.76	88.11	113683.	449400.	124.833	0.21	0.828
CO-57	487.42	122.03	82520.	218662.	60.739	0.35	0.901
Ce-139	662.29	165.76	62517.	228303.	63.417	0.31	0.935
Hg-203	1115.56	279.10	34927.	198991.	55.275	0.30	1.051
SN-113	1565.73	391.66	28892.	176956.	49.155	0.32	1.130
CS-137	2645.69	661.66	26757.	113755.	31.599	0.46	1.357
Mn-54	3338.59	834.86	18685.	153063.	42.518	0.34	1.501
Y-898	3591.45	898.06	21083.	208430.	57.897	0.28	1.554
Zn-65	4461.67	1115.55	13488.	118990.	33.053	0.39	1.713
Co-1173	4692.55	1173.24	9210.	124948.	34.708	0.35	1.744
Co-1332	5329.94	1332.52	6347.	113188.	31.441	0.35	1.836
Y-1836	7345.22	1835.98	2492.	129623.	36.006	0.30	2.176

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
AM-241		5.1125E+03				1.58E+05	
			59.54	5.112E+03	(	2.529E+01 2.68E-01 3.57E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/7/2012 11:48:20 AM Page 4
TestAmerica, Inc. Spectrum name: 17_1LMarn_20120191.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
CD-109	7.1031E+04				4.63E+02	

```
                                88.03 7.103E+04  (  2.488E+02 2.14E-01 3.61E+00 G

CO-57        1.6134E+03                                       2.72E+02
                               122.06 1.613E+03  (  9.897E+00 3.51E-01 8.56E+01 G

Ce-139       2.3920E+03                                       1.38E+02
                               165.85 2.392E+03  (  1.224E+01 3.13E-01 7.99E+01 G

Hg-203       5.2575E+03                                       4.66E+01
                               279.17 5.258E+03  (  2.308E+01 2.97E-01 8.15E+01 G

SN-113       4.2312E+03                                       1.15E+02
                               391.69 4.231E+03  (  1.900E+01 3.23E-01 6.40E+01 G

CS-137       2.0429E+03                                       1.10E+04
                               661.66 2.043E+03  (  1.374E+01 4.57E-01 8.52E+01 G

Mn-54        3.2282E+03                                       3.12E+02
                               834.85 3.228E+03  (  1.349E+01 3.36E-01 1.00E+02 G

Y-898        6.5476E+03                                       1.07E+02
                               898.02 6.548E+03  (  2.134E+01 2.81E-01 9.37E+01 G

Zn-65    F   6.5475E+03                                       2.44E+02
                              1115.55 6.548E+03  (  2.993E+01 3.94E-01 5.06E+01 G

Co-1173      3.1004E+03                                       1.93E+03
                              1173.24 3.100E+03  (  1.116E+01 3.53E-01 9.99E+01 G

Co-1332      3.1310E+03                                       1.93E+03
                              1332.50 3.131E+03  (  1.034E+01 3.50E-01 1.00E+02 G

Y-1836       7.1338E+03                                       1.07E+02
                              1836.01 7.134E+03  (  1.295E+01 3.02E-01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
```



```
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
                                       Page 4
```

17_1LMarn_20120191

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
AM-241	5.1110E+03	5.1125E+03	2.684E-01%	2.53E+01
CD-109	6.4522E+04	7.1031E+04	2.138E-01%	2.49E+02
CO-57	1.3699E+03	1.6134E+03	3.513E-01%	9.90E+00
Ce-139	1.7317E+03	2.3920E+03	3.127E-01%	1.22E+01
Hg-203	2.0263E+03	5.2575E+03	2.974E-01%	2.31E+01
SN-113	2.8753E+03	4.2312E+03	3.228E-01%	1.90E+01
CS-137	2.0346E+03	2.0429E+03	4.566E-01%	1.37E+01
Mn-54	2.7999E+03	3.2282E+03	3.364E-01%	1.35E+01
Y-898	4.3147E+03	6.5476E+03	2.806E-01%	2.13E+01
Zn-65	5.4581E+03	6.5475E+03	3.943E-01%	2.99E+01
Co-1173	3.0297E+03	3.1004E+03	3.525E-01%	1.12E+01
Co-1332	3.0595E+03	3.1310E+03	3.496E-01%	1.03E+01
Y-1836	4.7010E+03	7.1338E+03	3.016E-01%	1.30E+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

ORTEC g v - i (1087) Env32 G53W4.25 3/7/2012 11:48:20 AM Page 6
TestAmerica, Inc. Spectrum name: 17_1LMarn_20120191.An1

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 1.030E+05 Bq
Total Decayed Activity (37.6 to 1999.5 keV) 1.2136901E+05 Bq

Initial Calibration Verifications

2nd Source Verification

Detector: **Ge2**
Geometry: **Tunacan**
Reference date: **10/1/2006**
Calibration Standard: **74139-334**
Standard volume g / vial: **1550**
Standard volume transferred in g / geometry: **341.9**
lab ID# of cal standard: **1282974**

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	449	0.359	1250	1220	97.6
Cs-137	1926	425	0.851	499	487.7	97.7
Co-60	3612	797	0.999856	797	797.7	100.1

Reviewed By: Jody Watson

Date: 5/4/2018

Test America St. Louis Spectrum ID: 2_TunaCan_20180038

Sample Description: 2_TunaCan_ICV
Detector: Detector # 2
Batch ID: 2
Work Order Number: TunaCan
Lot Number: ICV

Decay to Time: 10/1/2006 11:00 Live Time: 5000 sec
Acquisition Time: 5/4/2018 10:31:30 Real Time: 5033 sec
Analysis Time: 5/4/2018 13:30 Dead Time: 0.66 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 2_Soil_TunaCan.Clb
Efficiency Cal Desc: 2_Soil_TunaCan_101407
Efficiency Cal Date: 4/20/2018 13:56
Energy Cal Date: 4/20/2018 13:54
Library: DET_EnergyStandardMix & Pb.lib
Bkgd Correction File: 2_2018-04-08_0858.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
Pb-210	1.496E+04	0.6	8.977E+01	9.646E+02	1.664E+02
AM-241	1.220E+03	0.5	6.188E+00	7.751E+01	9.027E+00
CD-109	2.326E+04	27.0	6.277E+03	6.441E+03	1.627E+04
CO-57	1.000E+100	120.1	4.721E-01	4.727E-01	1.245E+00
Ce-139	1.000E+100	434.8	4.997E-01	4.997E-01	1.325E+00
Hg-203	1.000E+100	157.5	7.075E-01	7.080E-01	1.782E+00
SN-113	1.000E+100	845.3	9.492E-01	9.492E-01	2.774E+00
CS-137	4.877E+02	0.8	3.928E+00	2.540E+01	2.869E+00
Y-898	1.000E+100	92.1	1.146E+00	1.148E+00	2.556E+00
Co-1173	7.729E+02	1.5	1.128E+01	4.009E+01	9.216E+00
Co-1332	7.977E+02	1.4	1.131E+01	4.131E+01	5.225E+00
Y-1836	1.000E+100	174.2	5.770E-01	5.773E-01	1.243E+00
Total	6.000E+100				

Analyst: Jody Watson

Sample description
2_TunaCan_ICV

Spectrum Filename: C:\User\SPC\Det2\2_TunaCan_20180038.An1

Acquisition information

Start time:	5/4/2018 10:31:30 AM
Live time:	5000
Real time:	5033
Dead time:	0.66 %
Detector ID:	2

Detector system
Ge 2 SN/164

Calibration

Filename:	2_Soil_TunaCan.Clb

2_Soil_TunaCan_101407

Energy Calibration

Created:	4/20/2018 1:54:10 PM
Zero offset:	0.101 keV
Gain:	0.250 keV/channel
Quadratic:	-4.975E-09 keV/channel^2

Efficiency Calibration

Created:	4/20/2018 1:56:20 PM
Type:	Polynomial
Uncertainty:	1.003 %
Coefficients:	-0.414971 -4.933446 0.551852
	-0.058768 0.002630 -0.000046

Library Files

Main analysis library:	DET_EnergyStandardMix & Pb.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.60keV)
Stop channel:	8000 (2000.01keV)
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	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	2_2018-04-08_0858.PBC 4/8/2018 8:58:33 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1063

***** 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	40453.	0.60	0.83	1.831E-02	46.54	4.250	1.496E+04	Pb210
49.47	198.	66.51	0.83	2.193E-02				
59.59	65141.	0.51	0.83	3.052E-02	59.54	35.700	1.220E+03	AM241
74.95	168.	37.79	0.86	3.749E-02				
77.16	320.	19.16	0.86	3.818E-02				
87.99	301.	26.99	1.70	4.075E-02	88.03	3.610	2.326E+04	CD109
92.77	265.	30.03	1.16	4.147E-02				
115.87	87.	63.78	0.45	4.233E-02				
122.06	71.	120.13	0.89	4.201E-02	122.06	85.600	HL>Cutoff	CO57
165.85	17.	434.80	0.93	3.703E-02	165.85	79.900	HL>Cutoff	Ce139
238.69	433.	13.82	0.85	2.807E-02				
257.80	43.	63.39	0.38	2.622E-02				
352.08	189.	28.54	0.95	1.966E-02				
360.48	40.	63.56	0.59	1.924E-02				
583.33	133.	26.24	1.30	1.241E-02				
609.71	130.	24.19	0.90	1.194E-02				
661.79	17680.	0.81	1.34	1.111E-02	661.66	85.210	4.877E+02	CS137
676.63	27.	67.31	0.34	1.090E-02				
726.90	58.	53.21	0.34	1.025E-02				
866.52	24.	59.80	0.30	8.822E-03				
898.02	50.	92.10	1.48	8.558E-03	898.02	93.700	HL>Cutoff	Y898
912.00	135.	32.05	2.38	8.446E-03				
1173.50	5718.	1.46	1.70	6.797E-03	1173.24	99.900	7.729E+02	Co1173
1332.77	5273.	1.42	1.73	6.070E-03	1332.50	99.982	7.977E+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
197.67	49.43	8615.	236.	1.077E+04	55.95	0.835	-	sD
299.39	74.95	1908.	180.	4.809E+03	35.11	0.856	-	D
308.22	77.16	1712.	333.	8.731E+03	18.39	0.858	-	D
370.65	92.77	1815.	265.	6.383E+03	30.03	1.156	-	s
463.05	115.87	1113.	87.	2.048E+03	63.78	0.450	-	s
954.29	238.69	996.	433.	1.542E+04	13.82	0.854	-	
1030.71	257.80	350.	43.	1.640E+03	63.39	0.377	-	c
1407.81	352.08	749.	189.	9.631E+03	28.54	0.953	-	
1441.40	360.48	285.	40.	2.097E+03	63.56	0.590	-	s
2332.78	583.33	296.	133.	1.072E+04	26.24	1.299	-	
2438.29	609.71	248.	130.	1.093E+04	24.19	0.895	-	s
2705.95	676.63	117.	27.	2.507E+03	67.31	0.337	-	s
2907.04	726.90	218.	58.	5.707E+03	53.21	0.342	-	s
3465.51	866.52	91.	24.	2.720E+03	59.80	0.303	-	s
3647.47	912.00	370.	135.	1.594E+04	32.05	2.380	-	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	185.74	46.54	9207.	40453.	8.091	0.60	0.832D
AM-241	237.95	59.59	10587.	65141.	13.028	0.51	0.827
CD-109	351.52	87.99	1989.	301.	0.060	26.99	1.698s
CO-57	487.79	122.06	2253.	71.	0.014	120.13	0.895s
Ce-139	662.93	165.85	1720.	17.	0.003	434.80	0.930
Hg-203	1116.18	279.17	1401.	-45.	-0.009	157.47	1.021s
SN-113	1566.22	391.69	1111.	-6.	-0.001	845.30	1.109s
CS-137	2646.59	661.79	472.	17680.	3.536	0.81	1.340
Y-898	3591.54	898.02	458.	50.	0.010	92.10	1.477s
Co-1173	4693.49	1173.50	197.	5718.	1.144	1.46	1.695
Co-1332	5330.65	1332.77	47.	5273.	1.055	1.42	1.729
Y-1836	7343.89	1836.01	28.	-7.	-0.001	174.19	2.042s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

```
*****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average      ------------- Peak -------------
Name    Code  Activity    Energy   Activity Code MDA Value
              Bq/Sample    keV     Bq/Sample     Bq/Sample      COMMENTS
_____________________________________________________________________________

Pb-210    N   1.4964E+04                                   8.15E+03
                           46.54 1.496E+04  (P 1.664E+02 6.00E-01 4.25E+00 G

AM-241        1.2195E+03                                   1.58E+05
                           59.54 1.220E+03  (P 9.027E+00 5.07E-01 3.57E+01 G

CD-109        2.3256E+04                                   4.63E+02
                           88.03 2.326E+04 *(  1.627E+04 2.70E+01 3.61E+00 G

CO-57         3.9303E-01                                   2.72E+02
                          122.06 3.930E-01 &(  1.245E+00 1.20E+02 8.56E+01 G

Ce-139        1.1492E-01                                   1.38E+02
                          165.85 1.149E-01 ?(  1.325E+00 4.35E+02 7.99E+01 G

Hg-203       -4.4930E-01                                   4.66E+01
                          279.17-4.493E-01  (  1.782E+00 1.57E+02 8.15E+01 G

SN-113       -1.1229E-01                                   1.15E+02
                          391.69-1.123E-01 ?(P 2.774E+00 8.45E+02 6.40E+01 G

CS-137        4.8765E+02                                   1.10E+04
                          661.66 4.877E+02  (  2.869E+00 8.05E-01 8.52E+01 G

Y-898         1.2441E+00                                   1.07E+02
                          898.02 1.244E+00 &(P 2.556E+00 9.21E+01 9.37E+01 G

Co-1173       7.7294E+02                                   1.93E+03
                         1173.24 7.729E+02  (  9.216E+00 1.46E+00 9.99E+01 G

Co-1332       7.9768E+02                                   1.93E+03
                         1332.50 7.977E+02  (  5.225E+00 1.42E+00 1.00E+02 G

Y-1836       -3.3123E-01                                   1.07E+02
                         1836.01-3.312E-01 ?(  1.243E+00 1.74E+02 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
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	
CO-57	122.06	2253.	71.	0.014	120.13	0.000E+00	
Ce-139	165.85	1720.	17.	0.003	434.80	0.000E+00	
Hg-203	279.17	1401.	-45.	-0.009	157.47	0.000E+00	
SN-113	391.69	1111.	-6.	-0.001	845.30	0.000E+00	P
Y-898	898.02	458.	50.	0.010	92.10	0.000E+00	P
Y-1836	1836.01	28.	-7.	-0.001	174.19	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 1 Sigma Counting	MDA Bq/Sample
Pb-210	1.0438E+04	1.4964E+04	5.999E-01%	1.66E+02
AM-241	1.1971E+03	1.2195E+03	5.074E-01%	9.03E+00
CD-109 #	4.0926E+01	2.3256E+04	2.699E+01%	1.63E+04
CO-57 #A	3.9303E-01	>12 Halflives	1.201E+02%	1.25E+00
Ce-139 #A	1.1492E-01	>12 Halflives	4.348E+02%	1.32E+00
Hg-203 #A	-4.4930E-01	>12 Halflives	1.575E+02%	1.78E+00
SN-113 #A	-1.1229E-01	>12 Halflives	8.453E+02%	2.77E+00
CS-137	3.7333E+02	4.8765E+02	8.054E-01%	2.87E+00
Y-898 #A	1.2441E+00	>12 Halflives	9.210E+01%	2.56E+00

Co-1173	1.6837E+02	7.7294E+02	1.460E+00%	9.22E+00
Co-1332	1.7376E+02	7.9768E+02	1.418E+00%	5.23E+00
Y-1836 #A	-3.3123E-01	>12 Halflives	1.742E+02%	1.24E+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 2000.0 keV) 1.239E+04 Bq/Sample
Total Decayed Activity (37.6 to 2000.0 keV) 4.1498754E+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

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     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
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Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2012-02-26_0305.PBC 2/26/2012 3:05:30 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 33.1557

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.81	1005.	12.08	0.62	1.151E-02				
46.61	72616.	0.49	0.73	1.792E-02	46.54	4.250	1.421E+04	Pb210
49.73	1326.	15.18	0.68	1.987E-02				
59.57	75329.	0.49	0.74	2.535E-02	59.54	35.700	1.161E+03	AM241
87.94	40851.	0.68	0.80	3.460E-02	88.03	3.610	1.542E+04	CD109
96.44	148.	47.31	0.80	3.568E-02				
99.01	160.	48.52	0.81	3.589E-02				
105.59	109.	69.79	0.52	3.619E-02				
121.94	9225.	1.66	0.84	3.583E-02	122.06	85.600	3.348E+02	CO57
129.89	126.	62.97	0.30	3.522E-02				
136.43	1263.	7.42	0.90	3.457E-02				
165.86	1574.	6.14	0.84	3.133E-02	165.85	79.900	5.319E+02	Ce139
238.72	327.	27.04	0.86	2.319E-02				
247.25	57.	84.47	0.31	2.252E-02				
259.02	93.	60.17	0.97	2.167E-02				
260.46	98.	58.62	0.97	2.157E-02				
322.65	45.	91.14	0.46	1.806E-02				
351.63	256.	27.79	1.06	1.681E-02				
391.95	494.	16.33	1.15	1.536E-02	391.69	64.000	9.501E+02	SN113
407.02	43.	90.43	0.56	1.489E-02				
412.80	202.	35.90	0.77	1.471E-02				
420.83	123.	52.91	0.72	1.448E-02				
510.72	188.	44.32	0.50	1.232E-02				
542.81	148.	28.69	0.36	1.171E-02				
583.30	161.	33.50	0.69	1.103E-02				
661.70	25605.	0.71	1.39	9.924E-03	661.66	85.210	4.424E+02	CS137
762.61	129.	36.06	0.79	8.812E-03				
796.90	151.	38.71	0.30	8.493E-03				
886.67	129.	46.77	0.30	7.766E-03				
897.77	428.	19.21	1.38	7.686E-03	898.02	93.700	1.665E+03	Y898
932.49	230.	35.52	0.82	7.445E-03				

1008.65	104.	56.29	0.28	6.970E-03				
1173.15	23044.	0.73	1.79	6.138E-03	1173.24	99.900	7.002E+02	Co1173
1332.39	20769.	0.71	1.87	5.515E-03	1332.50	99.982	7.019E+02	Co1332
1836.05	245.	7.47	1.56	4.208E-03	1836.01	99.200	1.642E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
146.78	36.81	4847.	1005.	8.731E+04	12.08	0.625	-
198.52	49.73	12365.	1326.	6.673E+04	15.18	0.681	- s
385.40	96.42	1874.	90.	2.532E+03	71.31	0.588	- sc
395.68	98.99	2103.	121.	3.381E+03	58.44	0.394	- s

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TestAmerica Spectrum name: 5_TunaCan2nd_20120813.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
422.09	105.59	2271.	109.	3.012E+03	69.79	0.518	- sc
519.32	129.89	2194.	126.	3.592E+03	62.97	0.298	- s
545.51	136.43	2377.	1263.	3.654E+04	7.42	0.900	- s
954.90	238.72	2247.	327.	1.410E+04	27.04	0.863	- sM
989.00	247.25	1031.	57.	2.516E+03	84.47	0.312	- sc
1036.13	259.01	1532.	93.	4.309E+03	60.17	0.968	- D
1041.90	260.46	1588.	98.	4.525E+03	58.62	0.970	- D
1290.76	322.65	744.	45.	2.473E+03	91.14	0.455	- c
1406.70	351.63	1442.	256.	1.523E+04	27.79	1.058	- s
1628.36	407.02	667.	43.	2.866E+03	90.43	0.562	- sc
1651.47	412.80	1438.	202.	1.370E+04	35.90	0.775	- s
1683.60	420.83	1291.	123.	8.472E+03	52.91	0.720	- s
2043.25	510.72	1553.	188.	1.523E+04	44.32	0.503	- s
2171.67	542.81	587.	148.	1.267E+04	28.69	0.362	- s
2333.63	583.30	785.	161.	1.460E+04	33.50	0.694	- s
3050.97	762.61	614.	129.	1.468E+04	36.06	0.794	- s
3188.11	796.90	856.	151.	1.782E+04	38.71	0.295	- s
3547.15	886.67	963.	129.	1.665E+04	46.77	0.296	- s
3730.41	932.49	1438.	230.	3.096E+04	35.52	0.818	- s
4035.01	1008.65	864.	104.	1.490E+04	56.29	0.275	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.01	46.61	16470.	72552.	10.077	0.49	0.733
AM-241	237.88	59.57	15419.	75329.	10.462	0.49	0.735
CD-109	351.46	87.94	8772.	40851.	5.674	0.68	0.804
CO-57	487.54	121.94	3880.	9225.	1.281	1.66	0.838
Ce-139	663.30	165.86	2329.	1574.	0.219	6.14	0.840
SN-113	1568.04	391.95	1640.	494.	0.069	16.33	1.153
CS-137	2647.28	661.70	1362.	25582.	3.553	0.71	1.394
Y-898	3591.55	897.77	1410.	428.	0.060	19.21	1.376

Co-1173	4692.83	1173.15	788.	23044.	3.201	0.73	1.786
Co-1332	5329.55	1332.39	98.	20769.	2.885	0.71	1.870
Y-1836	7342.76	1836.05	15.	245.	0.034	7.47	1.556s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

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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.	876.	5.571E+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 - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.3857E+04					8.15E+03
			46.54	1.386E+04	(P	1.480E+02	6.34E-01 4.25E+00 G
AM-241		1.1504E+03					1.58E+05
			59.54	1.150E+03	(	1.036E+01	5.81E-01 3.57E+01 G
CD-109		1.5217E+04					4.63E+02
			88.03	1.522E+04	(	1.799E+02	7.73E-01 3.61E+00 G
CO-57		3.1712E+02					2.72E+02
			122.06	3.171E+02	(	1.205E+01	2.04E+00 8.56E+01 G
Ce-139		5.1801E+02					1.38E+02
			165.85	5.180E+02	(	7.941E+01	6.45E+00 7.99E+01 G
Hg-203		-4.5441E-01					4.66E+01
			279.17	-4.544E-01	?(	2.347E+00	1.56E+02 8.15E+01 G
SN-113		9.3315E+02					1.15E+02
			391.69	9.332E+02	(	4.178E+02	1.96E+01 6.40E+01 G
CS-137		4.4047E+02					1.10E+04
			661.66	4.405E+02	(	3.706E+00	8.56E-01 8.52E+01 G
Y-898		1.6944E+03					1.07E+02
			898.02	1.694E+03	(	8.216E+02	2.35E+01 9.37E+01 G
Co-1173		6.8172E+02					1.93E+03
			1173.24	6.817E+02	(	4.436E+00	8.58E-01 9.99E+01 G
Co-1332		6.9210E+02					1.93E+03
			1332.50	6.921E+02	(	2.586E+00	8.49E-01 1.00E+02 G
Y-1836		1.7801E+03					1.07E+02
			1836.01	1.780E+03	(	2.065E+02	9.19E+00 9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	278.81	2119.	-42.	-0.012	155.58	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.2927E+04	1.3857E+04	6.344E-01%		1.48E+02
AM-241	1.1462E+03	1.1504E+03	5.808E-01%		1.04E+01
CD-109	4.4794E+03	1.5217E+04	7.727E-01%		1.80E+02
CO-57	3.9561E+01	3.1712E+02	2.043E+00%		1.20E+01
Ce-139	8.4971E+00	5.1801E+02	6.453E+00%		7.94E+01
Hg-203 #A	-4.5441E-01	>12 Halflives	1.5558E+02%	2.3474E+00	
SN-113	6.8413E+00	9.3315E+02	1.960E+01%		4.18E+02
CS-137	4.1835E+02	4.4047E+02	8.557E-01%		3.71E+00
Y-898	8.3979E+00	1.6944E+03	2.353E+01%		8.22E+02
Co-1173	5.0814E+02	6.8172E+02	8.581E-01%		4.44E+00
Co-1332	5.1588E+02	6.9210E+02	8.485E-01%		2.59E+00
Y-1836	8.8227E+00	1.7801E+03	9.190E+00%		2.07E+02

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.2 keV) 2.007E+04 Bq/Sample
Total Decayed Activity (37.6 to 2000.2 keV) 3.7281199E+04 Bq/Sample

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Second Source Verification

Detector:	Ge7
Geometry:	1L Marn
Reference date	1/1/2011
Calibration Standard:	83924-334
Standard volume g / vial	1
Standard volume transferred in g / geometry	1
lab ID# of cal standard	6675

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	Abundance	Activity Bq/L	Count Results	%recovery
Am-241	1830	1830	0.359	**5097.5**	5064.7	99.4
Cs-137	1705	1705	0.851	**2003.5**	1974.8	98.6
Co-60	3293	3293	0.99974	**3293.9**	3224.4	97.9
Co-60	3294	3294	0.99986	**3294.5**	3228.8	98.0

Reviewed By: Megan McAfee

Date: 4/5/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  4/3/2012 8:09:21 AM     Page  1
TestAmerica                     Spectrum name: 7_1Lmarn2nd_20120523.An1

Sample description
     7_1Lmarn2nd_83924-334_040212


Spectrum Filename: C:\User\SPC\Det7\7_1Lmarn2nd_20120523.An1

Acquisition information
       Start time:                 4/2/2012 2:43:08 PM
       Live time:               7200
       Real time:               7709
       Dead time:                  6.60 %
       Detector ID:                    7

Detector system
     Ge 7 SN/154


Calibration
       Filename:                   7_Liquid_Marinelli 1L.Clb
     7_1Lmarn_90062_032612


       Energy Calibration
            Created:               3/28/2012 9:18:12 AM
            Zero offset:           0.187 keV
            Gain:                  0.250 keV/channel
            Quadratic:             7.031E-09 keV/channel^2

       Efficiency Calibration
            Created:               3/28/2012 9:18:24 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.42 %
            Log(Eff):             -7.054602E-01 + (-2.848254E-01*Log(E) ) +
                                   ( -4.423998E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   0.43 %
            Log(Eff):             -1.484435E+01 + ( 5.183775E+00*Log(E) ) +
                                   ( -5.730519E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Mn, Zn.L
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.68keV )
       Stop channel:            8000 (  2000.10keV )
       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  4/3/2012 8:09:21 AM     Page  2
TestAmerica                     Spectrum name: 7_1Lmarn2nd_20120523.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	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2012-04-01_0533.PBC 4/1/2012 5:33:35 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0302

***** 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
36.43	3528.	8.11	0.89	2.696E-02				
37.87	4819.	6.33	0.89	2.806E-02				
42.90	850.	39.80	0.39	3.156E-02				
49.61	22317.	3.24	1.78	3.541E-02				
59.56	513708.	0.20	0.87	3.954E-02	59.54	35.700	5.065E+03	AM241
66.30	486.	67.51	0.38	4.145E-02				
77.88	972.	42.49	0.64	4.339E-02				
88.01	406256.	0.22	0.93	4.404E-02	88.03	3.610	7.040E+04	CD109
122.00	128434.	0.44	0.98	4.215E-02	122.06	85.600	1.587E+03	CO57
136.37	15240.	2.23	0.97	4.037E-02				
165.78	49846.	0.96	1.00	3.618E-02	165.85	79.900	2.388E+03	Ce139
170.81	156.	93.30	0.31	3.548E-02				
198.91	1359.	20.81	1.11	3.167E-02				
216.38	511.	53.39	0.29	2.972E-02				
225.00	424.	43.72	0.57	2.884E-02				
235.83	344.	47.73	0.65	2.782E-02				
255.11	1122.	21.90	0.63	2.619E-02				
279.47	1059.	21.56	1.15	2.439E-02	279.17	81.500	6.606E+03	Hg203
310.33	357.	52.58	0.82	2.246E-02				
391.75	24138.	1.65	1.24	1.863E-02	391.69	64.000	4.413E+03	SN113
472.35	388.	47.11	0.40	1.597E-02				
477.47	212.	66.81	0.43	1.583E-02				
500.69	264.	57.74	0.61	1.522E-02				
511.06	4978.	5.72	2.29	1.496E-02				
558.51	102.	92.01	0.46	1.388E-02				
597.84	146.	71.13	0.52	1.311E-02				
661.68	141450.	0.32	1.47	1.202E-02	661.66	85.210	1.975E+03	CS137
724.87	115.	70.60	0.54	1.111E-02				
828.41	306.	39.09	0.49	9.884E-03				
834.88	77158.	0.59	1.63	9.816E-03	834.85	99.980	3.012E+03	Mn54
898.08	21460.	1.63	1.71	9.204E-03	898.02	93.700	6.754E+03	Y898

954.58	398.	42.37	0.34	8.718E-03				
1115.57	49573.	0.78	1.87	7.578E-03	1115.55	50.600	6.569E+03	Zn65
1173.26	142414.	0.30	1.91	7.239E-03	1173.24	99.900	3.224E+03	Co1173
1189.08	147.	45.22	0.46	7.151E-03				
1199.08	67.	61.19	0.67	7.097E-03				
1246.07	162.	33.31	1.97	6.853E-03				
1251.95	100.	45.66	1.98	6.823E-03				
1320.19	83.	48.25	2.03	6.498E-03				
1324.82	263.	22.63	2.04	6.477E-03				
1332.52	127020.	0.30	2.01	6.442E-03	1332.50	99.982	3.229E+03	Co1332
1522.24	110.	39.93	0.31	5.694E-03				
1836.08	12210.	1.03	2.43	4.773E-03	1836.01	99.200	6.999E+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	
145.03	36.46	39179.	3528.	1.309E+05	8.11	0.893	-	D
150.78	37.90	44171.	4819.	1.717E+05	6.33	0.894	-	D

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TestAmerica Spectrum name: 7_1Lmarn2nd_20120523.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
170.90	42.90	45388.	850.	2.692E+04	39.80	0.388	-	s
197.73	49.61	142965.	22317.	6.303E+05	3.24	1.783	-	s
264.52	66.30	42956.	486.	1.174E+04	67.51	0.375	-	s
310.85	77.88	56534.	972.	2.240E+04	42.49	0.642	-	s
544.89	136.37	27355.	15240.	3.775E+05	2.23	0.970	-	
682.65	170.81	9642.	156.	4.382E+03	93.30	0.315	-	c
795.10	198.91	22460.	1359.	4.291E+04	20.81	1.113	-	
864.99	216.38	22202.	511.	1.721E+04	53.39	0.287	-	s
899.46	225.00	13540.	424.	1.468E+04	43.72	0.573	-	s
942.81	235.83	11431.	344.	1.238E+04	47.73	0.647	-	s
1019.95	255.11	17792.	1122.	4.286E+04	21.90	0.629	-	s
1240.85	310.33	11626.	357.	1.590E+04	52.58	0.816	-	s
1889.05	472.35	10437.	388.	2.430E+04	47.11	0.400	-	s
1909.56	477.47	7467.	212.	1.341E+04	66.81	0.432	-	s
2002.45	500.69	7658.	264.	1.735E+04	57.74	0.606	-	s
2043.92	511.06	15755.	4978.	3.328E+05	5.72	2.285	-	s
2233.76	558.51	4005.	102.	7.335E+03	92.01	0.456	-	sc
2391.11	597.84	4560.	146.	1.114E+04	71.13	0.523	-	sc
2899.28	724.87	2989.	115.	1.035E+04	70.60	0.541	-	sc
3313.47	828.41	4937.	306.	3.094E+04	39.09	0.489	-	sM
3818.18	954.58	7992.	398.	4.560E+04	42.37	0.339	-	s
4756.20	1189.08	1424.	147.	2.056E+04	45.22	0.459	-	s
4796.24	1199.08	737.	67.	9.394E+03	61.19	0.666	-	s
4983.38	1245.87	1280.	201.	2.938E+04	39.02	0.270	-	s
5006.88	1251.75	1011.	134.	1.964E+04	48.24	0.468	-	s
5280.66	1320.19	769.	83.	1.284E+04	48.25	2.033	-	D
5299.17	1324.82	1646.	263.	4.068E+04	22.63	2.036	-	D
6088.83	1522.24	473.	110.	1.929E+04	39.93	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 & Mn, Zn.L

********** 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	237.54	59.56	133662.	513708.	71.348	0.20	0.869
CD-109	351.37	88.01	88190.	406256.	56.424	0.22	0.933
CO-57	487.38	122.00	42014.	128434.	17.838	0.44	0.979
Ce-139	662.53	165.78	35420.	49846.	6.923	0.96	0.997
Hg-203	1117.41	279.47	15318.	1059.	0.147	21.56	1.154s
SN-113	1566.61	391.75	23045.	24138.	3.352	1.65	1.236

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TestAmerica Spectrum name: 7_1Lmarn2nd_20120523.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	2646.50	661.68	12931.	141450.	19.646	0.32	1.470
Mn-54	3339.35	834.88	17455.	77158.	10.716	0.59	1.627
Y-898	3592.18	898.08	16384.	21460.	2.980	1.63	1.714
Zn-65	4462.19	1115.57	12614.	49573.	6.885	0.78	1.871
Co-1173	4692.95	1173.26	5998.	142414.	19.780	0.30	1.906
Co-1332	5329.99	1332.52	2348.	127020.	17.642	0.30	2.013
Y-1836	7344.06	1836.08	428.	12210.	1.696	1.03	2.425

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Nuclide Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	Peak MDA Value Bq/Sample	COMMENTS
AM-241		5.0647E+03				1.58E+05	
			59.54	5.065E+03	(	1.682E+01 2.01E-01 3.57E+01	G
CD-109		7.0396E+04				4.63E+02	
			88.03	7.040E+04	(	2.403E+02 2.25E-01 3.61E+00	G
CO-57		1.5868E+03				2.72E+02	
			122.06	1.587E+03	(	1.183E+01 4.39E-01 8.56E+01	G
Ce-139		2.3884E+03				1.38E+02	
			165.85	2.388E+03	(	4.215E+01 9.56E-01 7.99E+01	G
Hg-203		6.6061E+03				4.66E+01	
			279.17	6.606E+03	*(	3.616E+03 2.16E+01 8.15E+01	G
SN-113		4.4128E+03				1.15E+02	
			391.69	4.413E+03	(	1.298E+02 1.65E+00 6.40E+01	G
CS-137		1.9748E+03				1.10E+04	
			661.66	1.975E+03	(	7.436E+00 3.24E-01 8.52E+01	G
Mn-54		3.0118E+03				3.12E+02	
			834.85	3.012E+03	(	2.414E+01 5.87E-01 1.00E+02	G
Y-898		6.7536E+03				1.07E+02	
			898.02	6.754E+03	(	1.886E+02 1.63E+00 9.37E+01	G

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Zn-65    F   6.5691E+03                                        2.44E+02
                         1115.55 6.569E+03  (  6.971E+01 7.83E-01 5.06E+01 G
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      ORTEC g v - i (3263) Env32  G53W4.25  4/3/2012 8:09:21 AM     Page  5
 TestAmerica                     Spectrum name: 7_1Lmarn2nd_20120523.An1

 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Co-1173      3.2244E+03                                        1.93E+03
                         1173.24 3.224E+03  (  8.232E+00 3.03E-01 9.99E+01 G

Co-1332      3.2288E+03                                        1.93E+03
                         1332.50 3.229E+03  (  5.808E+00 3.02E-01 1.00E+02 G

Y-1836       6.9991E+03                                        1.07E+02
                         1836.01 6.999E+03  (  5.678E+01 1.03E+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  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction
```

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      ORTEC g v - i (3263) Env32  G53W4.25  4/3/2012 8:09:21 AM     Page  6
 TestAmerica                     Spectrum name: 7_1Lmarn2nd_20120523.An1


 *****   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   *****
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7_1Lmarn2nd_20120523

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
AM-241	5.0546E+03	5.0647E+03	2.014E-01%	1.68E+01
CD-109	3.5486E+04	7.0396E+04	2.246E-01%	2.40E+02
CO-57	4.9453E+02	1.5868E+03	4.387E-01%	1.18E+01
Ce-139	2.3893E+02	2.3884E+03	9.557E-01%	4.22E+01
Hg-203 #	7.3907E+00	6.6061E+03	2.156E+01%	3.62E+03
SN-113	2.8118E+02	4.4128E+03	1.650E+00%	1.30E+02
CS-137	1.9186E+03	1.9748E+03	3.243E-01%	7.44E+00
Mn-54	1.0919E+03	3.0118E+03	5.870E-01%	2.41E+01
Y-898	3.4559E+02	6.7536E+03	1.631E+00%	1.89E+02
Zn-65	1.7955E+03	6.5691E+03	7.825E-01%	6.97E+01
Co-1173	2.7351E+03	3.2244E+03	3.032E-01%	8.23E+00
Co-1332	2.7388E+03	3.2288E+03	3.018E-01%	5.81E+00
Y-1836	3.5815E+02	6.9991E+03	1.031E+00%	5.68E+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 (1332.3 to 2000.1 keV) 5.255E+04 Bq/Sample
Total Decayed Activity (1332.3 to 2000.1 keV) 1.2221653E+05 Bq/Sample

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
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Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	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.

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TestAmerica Spectrum name: 8_TunaCan2nd_20120697.An1
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```
 *****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
 ____________________________________________________________________________

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

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- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.3 keV) 2.045E+04 Bq/Sample
Total Decayed Activity (37.6 to 2000.3 keV) 3.8690848E+04 Bq/Sample

2nd Source Verification

Detector:	Ge9
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1169.4	100.4
Cs-137	1926	396	0.851	465	444.52	95.6
Co-60	3611	742	0.99974	742	687.72	92.7
Co-60	3612	742	0.999856	742	692.56	93.3

Reviewed By: Jody Watson

Date: 6/14/2012

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     ORTEC g v - i (3263) Env32  G53W4.25  6/14/2012 1:20:45 PM    Page  1
TestAmerica, Inc                Spectrum name: 9_TunaCan_20120371.An1

Sample description
     9_TunaCan_90099_061412


Spectrum Filename: C:\User\SPC\Det9\9_TunaCan_20120371.An1

Acquisition information
       Start time:                 6/14/2012 10:54:15 AM
       Live time:               3600
       Real time:               3629
       Dead time:                  0.81 %
       Detector ID:                    9

Detector system
     Ge 9 SN/100113


Calibration
       Filename:                   9_Soil_TunaCan.Clb
     9_Soil_TunaCan_90099_050312


       Energy Calibration
            Created:               6/14/2012 10:19:40 AM
            Zero offset:           0.088 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.039E-08 keV/channel^2

       Efficiency Calibration
            Created:               6/14/2012 10:19:51 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.30 %
            Log(Eff):             -8.079856E-01 + (-2.367265E-01*Log(E) ) +
                                   ( -3.950640E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.42 %
            Log(Eff):             -2.387916E+01 + ( 8.875647E+00*Log(E) ) +
                                   ( -9.401100E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.60keV )
       Stop channel:            8000 (  1999.66keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

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TestAmerica, Inc                Spectrum name: 9_TunaCan_20120371.An1
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Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2012-05-27_0502.PBC 5/27/2012 5:02:59 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0390

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.54	860.	12.66	1.34	1.634E-02				
46.62	48876.	0.54	1.09	2.580E-02	46.54	4.250	1.338E+04	Pb210
50.03	116.	122.12	1.09	2.886E-02				
59.57	54776.	0.62	1.11	3.661E-02	59.54	35.700	1.169E+03	AM241
63.90	47.	193.18	0.35	3.962E-02				
88.09	26880.	0.87	1.14	5.052E-02	88.03	3.610	1.566E+04	CD109
122.10	5522.	2.86	1.15	5.303E-02	122.06	85.600	3.312E+02	CO57
136.38	729.	11.64	1.25	5.151E-02				
165.67	814.	10.74	1.30	4.629E-02	165.85	79.900	5.417E+02	Ce139
295.46	252.	33.13	0.56	3.229E-02				
316.16	66.	75.82	0.25	3.082E-02				
356.41	45.	97.50	1.36	2.835E-02				
358.68	42.	110.02	1.37	2.822E-02				
379.76	37.	75.05	0.46	2.711E-02				
391.75	310.	24.80	1.08	2.652E-02	391.69	64.000	1.113E+03	SN113
454.98	83.	53.05	0.37	2.383E-02				
568.66	103.	37.41	0.47	2.026E-02				
626.42	84.	49.00	0.45	1.885E-02				
661.66	23324.	0.76	1.61	1.810E-02	661.66	85.210	4.445E+02	CS137
821.54	239.	27.43	0.39	1.536E-02				
876.16	66.	52.19	0.61	1.462E-02				
898.25	346.	23.61	1.52	1.434E-02	898.02	93.700	2.406E+03	Y898
937.90	34.	79.64	0.44	1.387E-02				
1071.41	38.	61.01	0.57	1.249E-02				
1085.31	68.	35.74	1.00	1.237E-02				
1098.64	14.	140.33	0.47	1.225E-02				
1173.23	20836.	0.81	2.05	1.163E-02	1173.24	99.900	6.877E+02	Co1173
1332.49	18966.	0.75	2.11	1.050E-02	1332.50	99.982	6.926E+02	Co1332
1835.90	150.	10.23	1.72	8.080E-03	1836.01	99.200	1.745E+03	Y1836

9_TunaCan_20120371

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
145.76	36.54	3297.	860.	5.262E+04	12.66	1.336	- s
199.48	49.98	8660.	956.	3.313E+04	18.50	0.958	- sM
255.13	63.90	2893.	47.	1.186E+03	193.18	0.347	- sc
544.97	136.38	1941.	729.	1.415E+04	11.64	1.247	-

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TestAmerica, Inc Spectrum name: 9_TunaCan_20120371.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
1181.07	295.46	1550.	252.	7.804E+03	33.13	0.562	- s
1263.87	316.16	856.	66.	2.136E+03	75.82	0.245	- sc
1424.84	356.47	930.	45.	1.579E+03	97.50	1.363	- sc
1433.89	358.73	1025.	42.	1.473E+03	110.02	1.365	- sc
1518.22	379.76	367.	37.	1.365E+03	75.05	0.460	- sc
1819.03	454.98	702.	83.	3.496E+03	53.05	0.375	- s
2273.73	568.66	433.	103.	5.068E+03	37.41	0.468	- s
2504.73	626.42	460.	84.	4.455E+03	49.00	0.451	- s
3285.25	821.54	812.	239.	1.556E+04	27.43	0.391	- s
3503.76	876.16	400.	66.	4.538E+03	52.19	0.608	- s
3750.76	937.90	332.	34.	2.488E+03	79.64	0.436	- sc
4284.91	1071.41	226.	38.	3.015E+03	61.01	0.571	- s
4340.51	1085.31	224.	68.	5.498E+03	35.74	1.000	- s
4393.86	1098.64	186.	14.	1.143E+03	140.33	0.472	- sc

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.86	46.57	13300.	51041.	14.178	0.65	1.116
AM-241	237.82	59.57	11784.	54776.	15.216	0.62	1.111
CD-109	351.87	88.09	5995.	26880.	7.467	0.87	1.137
CO-57	487.85	122.10	3767.	5522.	1.534	2.86	1.155
Ce-139	662.09	165.67	1864.	814.	0.226	10.74	1.299
Hg-203	1120.44	280.29	2362.	-52.	-0.014	133.84	1.296s
SN-113	1565.85	391.67	1962.	266.	0.074	24.38	1.393
CS-137	2645.72	661.66	1258.	23324.	6.479	0.76	1.614
Y-898	3592.12	898.25	1148.	346.	0.096	23.61	1.524s
Co-1173	4692.30	1173.23	840.	20836.	5.788	0.81	2.049
Co-1332	5329.58	1332.49	131.	18966.	5.268	0.75	2.109
Y-1836	7344.43	1835.90	14.	150.	0.042	10.23	1.719s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

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```
 *****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
 ____________________________________________________________________________

Pb-210   N   1.3971E+04                                     8.15E+03
                            46.54 1.397E+04  (  1.478E+02 6.46E-01 4.25E+00 G

AM-241       1.1694E+03                                     1.58E+05
                            59.54 1.169E+03  (  1.086E+01 6.16E-01 3.57E+01 G

CD-109       1.5657E+04                                     4.63E+02
                            88.03 1.566E+04  (  2.117E+02 8.71E-01 3.61E+00 G

CO-57        3.3118E+02                                     2.72E+02
                           122.06 3.312E+02  (  1.731E+01 2.86E+00 8.56E+01 G

Ce-139       5.4173E+02                                     1.38E+02
                           165.85 5.417E+02  (  1.357E+02 1.07E+01 7.99E+01 G

Hg-203      -5.2429E-01                                     4.66E+01
                           279.17-5.243E-01 ?(  2.327E+00 1.34E+02 8.15E+01 G

SN-113       9.5260E+02                                     1.15E+02
                           391.69 9.526E+02 ?(  7.503E+02 2.44E+01 6.40E+01 G

CS-137       4.4452E+02                                     1.10E+04
                           661.66 4.445E+02  (  3.202E+00 7.63E-01 8.52E+01 G

Y-898        2.4057E+03                                     1.07E+02
                           898.02 2.406E+03 @(  1.118E+03 2.36E+01 9.37E+01 G

Co-1173      6.8772E+02                                     1.93E+03
                          1173.24 6.877E+02  (  4.547E+00 8.09E-01 9.99E+01 G

Co-1332      6.9256E+02                                     1.93E+03
                          1332.50 6.926E+02  (  2.044E+00 7.49E-01 1.00E+02 G

Y-1836       1.7452E+03                                     1.07E+02
                          1836.01 1.745E+03  (  2.388E+02 1.02E+01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```



```
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
```

library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	280.29	2362.	-52.	-0.014	133.84	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.2947E+04	1.3971E+04	6.459E-01%		1.48E+02
AM-241	1.1648E+03	1.1694E+03	6.156E-01%		1.09E+01
CD-109	4.0954E+03	1.5657E+04	8.713E-01%		2.12E+02
CO-57	3.3792E+01	3.3118E+02	2.862E+00%		1.73E+01
Ce-139	5.9752E+00	5.4173E+02	1.074E+01%		1.36E+02
Hg-203 #A	-5.2429E-01	>12 Halflives	1.3384E+02%	2.3272E+00	
SN-113 #	4.3447E+00	9.5260E+02	2.438E+01%		7.50E+02
CS-137	4.2011E+02	4.4452E+02	7.635E-01%		3.20E+00
Y-898 #	7.1422E+00	2.4057E+03	2.361E+01%		1.12E+03
Co-1173	4.9827E+02	6.8772E+02	8.087E-01%		4.55E+00
Co-1332	5.0178E+02	6.9256E+02	7.487E-01%		2.04E+00
Y-1836	5.1813E+00	1.7452E+03	1.023E+01%		2.39E+02

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TestAmerica, Inc Spectrum name: 9_TunaCan_20120371.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 (379.7 to 1999.7 keV) 1.968E+04 Bq/Sample
Total Decayed Activity (379.7 to 1999.7 keV) 3.8598309E+04 Bq/Sample

2nd Source Verification

Detector: **Ge12**
Geometry: **Tunacan**
Reference date: **10/1/2006**
Calibration Standard: **74139-334**
Standard volume g / vial: **1550**
Standard volume transferred in g / geometry: **341.9**
lab ID# of cal standard: **1282974**

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	449	0.359	1250	1288	103.1
Cs-137	1926	425	0.851	499	509.9	102.1
Co-60	3612	797	0.999856	797	833.8	104.6

Reviewed By: Jody Watson

Date: 4/24/2018

Test America St. Louis Spectrum ID: 12_TunaCan_20180012

Sample Description: 12_TunaCan_ICV
Detector: Detector #12
Batch ID: 12
Work Order Number: TunaCan
Lot Number: ICV

Decay to Time: 10/1/2006 11:00 Live Time: 5000 sec
Acquisition Time: 4/24/2018 09:26:18 Real Time: 5018 sec
Analysis Time: 4/24/2018 10:50 Dead Time: 0.36 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: DET_EnergyStandardMix & Pb.lib
Bkgd Correction File: 12_2017-05-07_0806.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
Pb-210	1.634E+04	0.6	9.464E+01	1.053E+03	1.764E+02
AM-241	1.288E+03	0.4	5.772E+00	8.177E+01	8.914E+00
CD-109	2.726E+04	25.0	6.823E+03	7.030E+03	1.764E+04
CO-57	1.000E+100	153.6	5.398E-01	5.402E-01	1.425E+00
Ce-139	1.000E+100	106.9	5.267E-01	5.274E-01	1.390E+00
Hg-203	1.000E+100	297.5	6.855E-01	6.856E-01	1.730E+00
SN-113	1.000E+100	692.4	1.143E+00	1.143E+00	2.762E+00
CS-137	5.099E+02	0.8	3.904E+00	2.652E+01	3.285E+00
Y-898	1.000E+100	140.9	1.086E+00	1.086E+00	2.342E+00
Co-1173	8.106E+02	1.3	1.069E+01	4.173E+01	9.187E+00
Co-1332	8.338E+02	1.3	1.078E+01	4.290E+01	6.803E+00
Y-1836	1.000E+100	127.2	4.662E-01	4.667E-01	9.202E-01
Total	6.000E+100				

Analyst: Jody Watson

Sample description
12_TunaCan_ICV

Spectrum Filename: C:\User\SPC\Det12\12_TunaCan_20180012.An1

Acquisition information

Start time:	4/24/2018 9:26:18 AM
Live time:	5000
Real time:	5018
Dead time:	0.36 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration

Filename:	12_Soil_TunaCan.Clb

12_TunaCan_108513

Energy Calibration

Created:	4/20/2018 11:13:27 AM
Zero offset:	0.059 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/20/2018 11:53:09 AM
Type:	Polynomial
Uncertainty:	1.020 %
Coefficients:	-0.363508 -4.707999 0.462125
	-0.051256 0.002384 -0.000043

Library Files

Main analysis library:	DET_EnergyStandardMix & Pb.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	100 (25.08keV)
Stop channel:	8000 (1999.13keV)
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	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2017-05-07_0806.PBC 5/7/2017 8:06:54 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 7 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 25.3541

***** 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
28.13	58.	46.71	0.75	4.137E-03				
32.13	394.	18.65	0.81	7.163E-03				
36.69	330.	25.31	0.84	1.059E-02				
46.66	43625.	0.58	0.85	1.811E-02	46.54	4.250	1.634E+04	Pb210
49.83	321.	44.33	0.85	2.160E-02				
59.65	63562.	0.45	0.86	2.820E-02	59.54	35.700	1.288E+03	AM241
70.53	127.	49.58	1.39	3.219E-02				
74.86	220.	28.10	0.88	3.333E-02				
77.21	369.	16.72	0.88	3.387E-02				
87.68	350.	23.71	0.81	3.578E-02	88.03	3.610	3.034E+04	CD109
93.18	213.	27.98	1.16	3.644E-02				
165.85	67.	106.94	0.97	3.405E-02	165.85	79.900	HL>Cutoff	Ce139
238.54	388.	19.10	0.88	2.744E-02				
279.17	23.	297.48	1.09	2.449E-02	279.17	81.500	HL>Cutoff	Hg203
307.48	44.	92.73	0.49	2.278E-02				
312.92	63.	62.15	0.30	2.248E-02				
320.20	50.	55.24	0.61	2.209E-02				
355.42	79.	51.62	0.51	2.040E-02				
384.05	22.	98.42	0.50	1.922E-02				
428.92	42.	63.02	0.59	1.766E-02				
454.01	126.	41.89	2.09	1.692E-02				
493.21	76.	56.00	0.64	1.589E-02				
583.05	231.	19.93	1.19	1.403E-02				
609.57	255.	15.76	1.66	1.358E-02				
661.72	21282.	0.77	1.42	1.279E-02	661.66	85.210	5.099E+02	CS137
898.02	37.	140.94	1.67	1.025E-02	898.02	93.700	HL>Cutoff	Y898
1173.31	7459.	1.32	1.92	8.426E-03	1173.24	99.900	8.106E+02	Co1173

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1332.58	6951.	1.30	1.98	7.647E-03	1332.50	99.982	8.318E+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	
112.21	28.13	314.	58.	1.406E+04	46.71	0.750	-	s
128.21	32.13	1577.	394.	5.496E+04	18.65	0.810	-	
146.44	36.67	3332.	330.	3.120E+04	25.31	0.841	-	sD
199.29	49.79	9113.	333.	1.539E+04	40.96	0.855	-	sD
281.70	70.53	1447.	127.	3.956E+03	49.58	1.387	-	s
299.02	74.84	1784.	220.	6.587E+03	28.10	0.880	-	D
308.40	77.19	1706.	369.	1.088E+04	16.72	0.883	-	sD
372.24	93.18	1248.	213.	5.837E+03	27.98	1.163	-	sM
953.35	238.54	1339.	388.	1.414E+04	19.10	0.882	-	s
1229.01	307.48	572.	44.	1.931E+03	92.73	0.491	-	sc
1250.75	312.92	513.	63.	2.788E+03	62.15	0.295	-	s
1279.88	320.20	329.	50.	2.263E+03	55.24	0.611	-	s
1420.71	355.42	528.	79.	3.873E+03	51.62	0.511	-	s
1535.20	384.00	232.	22.	1.118E+03	98.42	0.497	-	sc
1714.62	428.92	312.	42.	2.406E+03	63.02	0.590	-	s
1814.96	454.01	760.	126.	7.448E+03	41.89	2.094	-	s
1971.76	493.21	502.	76.	4.813E+03	56.00	0.640	-	s
2331.07	583.05	403.	231.	1.644E+04	19.93	1.194	-	
2437.14	609.57	326.	255.	1.877E+04	15.76	1.660	-	

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	185.79	46.54	10103.	43625.	8.725	0.58	0.851D
AM-241	237.76	59.54	8808.	63562.	12.712	0.45	0.865D
CD-109	350.62	87.77	1861.	315.	0.063	25.03	0.760s
CO-57	487.68	122.06	2320.	-56.	-0.011	153.64	0.928
Ce-139	662.74	165.85	1600.	67.	0.013	106.94	0.973s
Hg-203	1115.81	279.17	1331.	23.	0.005	297.48	1.086s
SN-113	1565.74	391.69	1248.	-10.	-0.002	692.39	1.196s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	2645.75	661.72	832.	21282.	4.256	0.77	1.422
Y-898	3591.15	898.02	555.	37.	0.007	140.94	1.672s
Co-1173	4692.85	1173.31	308.	7459.	1.492	1.32	1.921
Co-1332	5330.42	1332.58	135.	6968.	1.394	1.29	1.978
Y-1836	7346.49	1836.01	27.	-11.	-0.002	127.17	2.459s

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	1.6338E+04				8.15E+03	
			46.54	1.634E+04	(P	1.764E+02 5.79E-01 4.25E+00	G
AM-241		1.2876E+03				1.58E+05	
			59.54	1.288E+03	(	8.914E+00 4.48E-01 3.57E+01	G
CD-109		2.7262E+04				4.63E+02	
			88.03	2.726E+04	*(	1.764E+04 2.50E+01 3.61E+00	G
CO-57		-3.5134E-01				2.72E+02	
			122.06	-3.513E-01	(	1.425E+00 1.54E+02 8.56E+01	G
Ce-139		4.9250E-01				1.38E+02	
			165.85	4.925E-01	?(	1.390E+00 1.07E+02 7.99E+01	G
Hg-203		2.3043E-01				4.66E+01	
			279.17	2.304E-01	&(	1.730E+00 2.97E+02 8.15E+01	G
SN-113		-1.6505E-01				1.15E+02	
			391.69	-1.650E-01	&(	2.762E+00 6.92E+02 6.40E+01	G
CS-137		5.0987E+02				1.10E+04	
			661.66	5.099E+02	(	3.285E+00 7.66E-01 8.52E+01	G
Y-898		7.7025E-01				1.07E+02	
			898.02	7.703E-01	&(	2.342E+00 1.41E+02 9.37E+01	G
Co-1173		8.1058E+02				1.93E+03	
			1173.24	8.106E+02	(	9.187E+00 1.32E+00 9.99E+01	G
Co-1332		8.3376E+02				1.93E+03	
			1332.50	8.338E+02	(	6.803E+00 1.29E+00 1.00E+02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Y-1836	-3.6659E-01					1.07E+02	
		1836.01	-3.666E-01	?(	9.202E-01	1.27E+02	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
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
CO-57	122.06	2320.	-56.	-0.011	153.64	0.000E+00
Ce-139	165.85	1600.	67.	0.013	106.94	0.000E+00
Hg-203	279.17	1331.	23.	0.005	297.48	0.000E+00
SN-113	391.69	1248.	-10.	-0.002	692.39	0.000E+00
Y-898	898.02	555.	37.	0.007	140.94	0.000E+00
Y-1836	1836.01	27.	-11.	-0.002	127.17	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 1 Sigma Counting	MDA Bq/Sample
Pb-210	1.1406E+04	1.6338E+04	5.793E-01%	1.76E+02
AM-241	1.2640E+03	1.2876E+03	4.483E-01%	8.91E+00
CD-109 #	4.8702E+01	2.7262E+04	2.503E+01%	1.76E+04
CO-57 #A	-3.5134E-01	>12 Halflives	1.536E+02%	1.43E+00
Ce-139 #A	4.9250E-01	>12 Halflives	1.069E+02%	1.39E+00
Hg-203 #A	2.3043E-01	>12 Halflives	2.975E+02%	1.73E+00
SN-113 #A	-1.6505E-01	>12 Halflives	6.924E+02%	2.76E+00
CS-137	3.9058E+02	5.0987E+02	7.657E-01%	3.29E+00
Y-898 #A	7.7025E-01	>12 Halflives	1.409E+02%	2.34E+00
Co-1173	1.7721E+02	8.1058E+02	1.318E+00%	9.19E+00
Co-1332	1.8227E+02	8.3376E+02	1.293E+00%	6.80E+00
Y-1836 #A	-3.6659E-01	>12 Halflives	1.272E+02%	9.20E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.1 keV) 1.347E+04 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 4.7041629E+04 Bq/Sample

Second Source Verification

Detector:	Ge14
Geometry:	1L Marn
Reference date	1/1/2011
Calibration Standard:	83924-334
Standard volume g / vial	1
Standard volume transferred in g / geometry	1
lab ID# of cal standard	6707

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	Abundance	Activity Bq/L	Count Results	%recovery
Am-241	1830	1830	0.359	**5097.5**	4967.3	97.4
Cs-137	1705	1705	0.851	**2003.5**	1968.3	98.2
Co-60	3293	3293	0.99974	**3293.9**	3103.7	94.2
Co-60	3294	3294	0.99986	**3294.5**	3166.5	96.1

Reviewed By: Megan McAfee

Date: 4/24/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  4/17/2012 11:26:44 AM   Page  1
TestAmerica, Inc.               Spectrum name: 14_Marn1L2nd_20120346.An1

Sample description
     14_Marn1L_83924-334_2nd_041212


Spectrum Filename: C:\User\SPC\Det14\14_Marn1L2nd_20120346.An1

Acquisition information
       Start time:                 4/12/2012 3:08:24 AM
       Live time:               3600
       Real time:               3857
       Dead time:                  6.67 %
       Detector ID:                   14

Detector system
     Ge14 SN/11080670


Calibration
       Filename:                   14_Liquid_Marinelli 1L.Clb
     14_1LMarinelli_90062_030612


       Energy Calibration
            Created:               3/14/2012 4:58:19 PM
            Zero offset:           0.195 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.589E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/14/2012 4:58:47 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.64 %
            Log(Eff):             -1.428037E+00 + (-4.136370E-02*Log(E) ) +
                                   ( -5.958012E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   0.07 %
            Log(Eff):             -1.383299E+01 + ( 4.786779E+00*Log(E) ) +
                                   ( -5.293738E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Mn, Zn.L
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.70keV )
       Stop channel:            8000 (  1999.40keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  4/17/2012 11:26:44 AM   Page  2
TestAmerica, Inc.               Spectrum name: 14_Marn1L2nd_20120346.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	1/1/2011 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. 13 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0572

***** 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
36.52	2151.	9.38	0.77	3.130E-02				
37.98	2880.	7.52	0.77	3.250E-02				
48.78	4817.	6.60	0.78	3.976E-02				
49.91	7782.	4.43	0.78	4.037E-02				
59.64	291261.	0.25	0.75	4.455E-02	59.54	35.700	5.102E+03	AM241
78.34	604.	39.20	0.40	4.853E-02				
88.01	222992.	0.28	0.79	4.914E-02	88.03	3.610	7.026E+04	CD109
105.28	316.	47.04	0.70	4.871E-02				
111.69	119.	98.40	0.44	4.821E-02				
121.97	70281.	0.55	0.82	4.715E-02	122.06	85.600	1.590E+03	CO57
130.99	336.	49.79	0.58	4.603E-02				
136.39	8488.	2.60	0.85	4.530E-02				
165.77	26682.	1.10	0.89	4.093E-02	165.85	79.900	2.377E+03	Ce139
199.09	806.	25.82	0.99	3.627E-02				
236.18	363.	55.45	0.54	3.228E-02				
279.22	628.	29.93	0.98	2.870E-02	279.17	81.500	7.674E+03	Hg203
310.46	356.	48.90	0.73	2.659E-02				
328.88	369.	43.27	0.36	2.550E-02				
365.21	256.	52.80	0.53	2.360E-02				
391.64	13213.	2.00	1.13	2.240E-02	391.69	64.000	4.256E+03	SN113
426.40	227.	77.87	0.36	2.100E-02				
444.14	192.	60.53	0.26	2.036E-02				
469.82	353.	38.19	0.74	1.949E-02				
511.03	2129.	5.83	1.20	1.826E-02				
515.49	168.	62.96	1.21	1.813E-02				
519.01	165.	54.74	1.21	1.804E-02				
524.70	177.	48.12	1.21	1.788E-02				
528.12	183.	52.86	1.22	1.779E-02				
564.55	182.	57.58	0.49	1.687E-02				
598.46	136.	67.06	0.56	1.610E-02				
661.62	86475.	0.39	1.32	1.485E-02	661.66	85.210	1.955E+03	CS137

706.30	187.	52.42	0.35	1.407E-02				
726.37	83.	63.44	0.32	1.375E-02				
834.79	47232.	0.58	1.44	1.225E-02	834.85	99.980	3.019E+03	Mn54
876.24	196.	47.00	0.56	1.175E-02				
897.97	12441.	1.84	1.49	1.151E-02	898.02	93.700	6.661E+03	Y898
934.37	235.	46.78	0.26	1.113E-02				
957.07	131.	78.82	0.51	1.090E-02				
1066.08	224.	58.92	0.49	9.929E-03				
1108.85	81.	73.40	0.58	9.593E-03				
1115.47	30186.	0.90	1.72	9.543E-03	1115.55	50.600	6.527E+03	Zn65
1173.16	88330.	0.39	1.70	9.129E-03	1173.24	99.900	3.183E+03	Co1173
1239.13	132.	41.44	0.54	8.696E-03				
1290.41	49.	53.90	0.32	8.387E-03				
1332.41	79724.	0.37	1.85	8.150E-03	1332.50	99.982	3.215E+03	Co1332
1606.25	86.	38.76	0.59	6.875E-03				
1625.37	39.	42.90	0.68	6.801E-03				
1835.92	7412.	1.27	2.30	6.073E-03	1836.01	99.200	7.106E+03	Y1836
1939.28	15.	54.93	0.67	5.768E-03				

********** 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	
145.29	36.49	19301.	2151.	6.872E+04	9.38	0.772	-	D
151.14	37.96	22005.	2880.	8.860E+04	7.52	0.773	-	D

ORTEC g v - i (3263) Env32 G53W4.25 4/17/2012 11:26:44 AM Page 3
TestAmerica, Inc. Spectrum name: 14_Marn1L2nd_20120346.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
194.30	48.77	48065.	4817.	1.212E+05	6.60	0.784	-	D
198.83	49.90	55460.	7782.	1.928E+05	4.43	0.785	-	D
312.55	78.34	22222.	604.	1.246E+04	39.20	0.403	-	s
420.32	105.28	9313.	316.	6.480E+03	47.04	0.697	-	
445.93	111.69	6796.	119.	2.468E+03	98.40	0.445	-	c
523.13	130.99	9770.	336.	7.303E+03	49.79	0.585	-	s
544.75	136.39	12105.	8488.	1.874E+05	2.60	0.855	-	
795.54	199.09	12158.	806.	2.223E+04	25.82	0.993	-	
943.91	236.18	11470.	363.	1.124E+04	55.45	0.542	-	s
1241.00	310.46	8168.	356.	1.339E+04	48.90	0.726	-	s
1314.69	328.88	7180.	369.	1.447E+04	43.27	0.361	-	s
1460.01	365.21	5703.	256.	1.086E+04	52.80	0.530	-	s
1704.83	426.40	7755.	227.	1.081E+04	77.87	0.358	-	s
1775.77	444.14	4682.	192.	9.416E+03	60.53	0.257	-	s
1878.51	469.82	5629.	353.	1.811E+04	38.19	0.745	-	s
2043.01	510.94	7840.	2882.	1.578E+05	6.78	2.130	-	s
2060.86	515.40	2340.	90.	4.945E+03	80.11	0.346	-	sc
2074.92	518.92	2312.	91.	5.026E+03	78.77	0.401	-	sc
2097.65	524.60	2580.	123.	6.878E+03	63.72	0.716	-	s
2111.32	528.01	2916.	159.	8.936E+03	54.28	0.408	-	s
2257.47	564.55	3600.	182.	1.079E+04	57.58	0.487	-	s
2393.16	598.46	3053.	136.	8.424E+03	67.06	0.561	-	s
2824.62	706.30	2986.	187.	1.331E+04	52.42	0.347	-	s
2904.92	726.37	1345.	83.	6.035E+03	63.44	0.319	-	sc
3504.56	876.24	2926.	196.	1.668E+04	47.00	0.558	-	s
3737.15	934.37	3753.	235.	2.115E+04	46.78	0.260	-	s
3828.01	957.07	3510.	131.	1.202E+04	78.82	0.514	-	sc
4264.20	1066.08	3804.	224.	2.251E+04	58.92	0.495	-	s
4435.38	1108.85	1480.	81.	8.444E+03	73.40	0.578	-	sc
4956.75	1239.13	660.	132.	1.518E+04	41.44	0.537	-	s
5161.96	1290.41	247.	49.	5.882E+03	53.90	0.322	-	s

6426.11	1606.25	277.	86.	1.246E+04	38.76	0.587	-	s
6502.66	1625.37	101.	39.	5.686E+03	42.90	0.682	-	s
7759.31	1939.28	26.	15.	2.658E+03	54.93	0.670	-	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 & Mn, Zn.L

********** 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	237.77	59.64	59483.	291261.	80.906	0.25	0.748
CD-109	351.21	88.01	38124.	222992.	61.942	0.28	0.788
CO-57	487.07	121.97	19554.	70281.	19.522	0.55	0.818
Ce-139	662.25	165.77	14453.	26682.	7.412	1.10	0.888
Hg-203	1116.04	279.22	9453.	628.	0.174	29.93	0.982s
SN-113	1565.75	391.64	10900.	13213.	3.670	2.00	1.126
CS-137	2645.83	661.62	6160.	86475.	24.021	0.39	1.322
Mn-54	3338.72	834.79	5919.	47232.	13.120	0.58	1.440
Y-898	3591.53	897.97	7492.	12441.	3.456	1.84	1.488
Zn-65	4461.87	1115.47	6228.	30186.	8.385	0.90	1.722
Co-1173	4692.72	1173.16	3873.	88330.	24.536	0.39	1.704
Co-1332	5330.07	1332.41	974.	79724.	22.146	0.37	1.851
Y-1836	7345.51	1835.92	184.	7412.	2.059	1.27	2.304

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
AM-241		5.1019E+03				1.58E+05	
			59.54	5.102E+03	(	1.996E+01 2.45E-01 3.57E+01	G
CD-109		7.0262E+04				4.63E+02	
			88.03	7.026E+04	(	2.875E+02 2.77E-01 3.61E+00	G
CO-57		1.5904E+03				2.72E+02	
			122.06	1.590E+03	(	1.481E+01 5.54E-01 8.56E+01	G
Ce-139		2.3767E+03				1.38E+02	
			165.85	2.377E+03	(	5.014E+01 1.10E+00 7.99E+01	G
Hg-203		7.6741E+03				4.66E+01	
			279.17	7.674E+03	*(	5.573E+03 2.99E+01 8.15E+01	G
SN-113		4.2555E+03				1.15E+02	

```
                                391.69 4.256E+03  (  1.576E+02 2.00E+00 6.40E+01 G

CS-137       1.9553E+03                                          1.10E+04
                                661.66 1.955E+03  (  8.331E+00 3.93E-01 8.52E+01 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Mn-54        3.0193E+03                                          3.12E+02
                                834.85 3.019E+03  (  2.309E+01 5.83E-01 1.00E+02 G

Y-898        6.6610E+03                                          1.07E+02
                                898.02 6.661E+03  (  2.174E+02 1.84E+00 9.37E+01 G

Zn-65    F   6.5273E+03                                          2.44E+02
                               1115.55 6.527E+03  (  8.011E+01 9.00E-01 5.06E+01 G

Co-1173      3.1829E+03                                          1.93E+03
                               1173.24 3.183E+03  (  1.055E+01 3.89E-01 9.99E+01 G

Co-1332      3.2153E+03                                          1.93E+03
                               1332.50 3.215E+03  (  5.975E+00 3.69E-01 1.00E+02 G

Y-1836       7.1063E+03                                          1.07E+02
                               1836.01 7.106E+03  (  6.328E+01 1.27E+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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
AM-241	5.0915E+03	5.1019E+03	2.450E-01%	2.00E+01
CD-109	3.4917E+04	7.0262E+04	2.771E-01%	2.88E+02
CO-57	4.8377E+02	1.5904E+03	5.543E-01%	1.48E+01
Ce-139	2.2663E+02	2.3767E+03	1.105E+00%	5.01E+01
Hg-203 #	7.4529E+00	7.6741E+03	2.993E+01%	5.57E+03
SN-113	2.5605E+02	4.2555E+03	1.996E+00%	1.58E+02
CS-137	1.8986E+03	1.9553E+03	3.925E-01%	8.33E+00
Mn-54	1.0717E+03	3.0193E+03	5.831E-01%	2.31E+01
Y-898	3.2040E+02	6.6610E+03	1.840E+00%	2.17E+02
Zn-65	1.7366E+03	6.5273E+03	8.998E-01%	8.01E+01
Co-1173	2.6906E+03	3.1829E+03	3.889E-01%	1.05E+01
Co-1332	2.7180E+03	3.2153E+03	3.687E-01%	5.98E+00
Y-1836	3.4182E+02	7.1063E+03	1.270E+00%	6.33E+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 (59.5 to 1999.4 keV) 5.176E+04 Bq/Sample
Total Decayed Activity (59.5 to 1999.4 keV) 1.2292753E+05 Bq/Sample

Second Source Verification

Detector: Ge16

Geometry: 1L Marn

Reference date 1/1/2011

Calibration Standard: 83924-334

Standard volume g / vial 1

Standard volume transferred in g / geometry 1

lab ID# of cal standard 1L Marn_00002

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	Abundance	Activity Bq/L	Count Results	%recovery
Am-241	1830	1830	0.359	**5097.5**	5095.2	100.0
Cs-137	1705	1705	0.851	**2003.5**	2003.6	100.0
Co-60	3293	3293	0.99974	**3293.9**	3267.4	99.2
Co-60	3294	3294	0.99986	**3294.5**	3265.3	99.1

Reviewed By: Jody Watson

Date: _____

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     ORTEC g v - i (3263) Env32  G53W4.25  4/24/2012 10:47:24 AM   Page  1
TestAmerica, Inc.               Spectrum name: 16_1Lmarn2nd_20120385.An1

Sample description
     16_1Lmarn2nd_Rad11_042412


Spectrum Filename: C:\User\SPC\Det16\16_1Lmarn2nd_20120385.An1

Acquisition information
       Start time:                 4/24/2012 8:11:06 AM
       Live time:               3600
       Real time:               3890
       Dead time:                  7.46 %
       Detector ID:                   16

Detector system
     Ge16 SN/11012217


Calibration
       Filename:                   16_Liquid_Marinelli 1L.Clb
     16_1Lmarn_90062_032712


       Energy Calibration
            Created:               4/2/2012 6:09:11 PM
            Zero offset:          -0.007 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.978E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/2/2012 6:09:24 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   2.42 %
            Log(Eff):             -2.314705E+00 + ( 2.848008E-01*Log(E) ) +
                                   ( -8.114986E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   0.26 %
            Log(Eff):             -1.260350E+01 + ( 4.382261E+00*Log(E) ) +
                                   ( -4.889120E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Mn, Zn.L
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.50keV )
       Stop channel:            8000 (  1999.23keV )
       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  4/24/2012 10:47:24 AM   Page  2
TestAmerica, Inc.               Spectrum name: 16_1Lmarn2nd_20120385.An1
                                      Page 1
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Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	16_2012-04-01_0336.PBC 4/1/2012 3:36:15 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0381

***** 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
36.24	2633.	9.05	0.99	4.192E-02				
37.73	3600.	7.28	0.99	4.339E-02				
43.01	1744.	21.30	1.21	4.796E-02				
49.63	17367.	3.62	1.81	5.253E-02				
59.52	364868.	0.24	0.99	5.727E-02	59.54	35.700	4.967E+03	AM241
77.86	1704.	22.69	0.64	6.133E-02				
88.04	270447.	0.27	1.00	6.181E-02	88.03	3.610	6.899E+04	CD109
101.18	167.	75.80	0.36	6.126E-02				
122.08	84451.	0.56	1.05	5.874E-02	122.06	85.600	1.582E+03	CO57
136.49	10430.	2.77	1.05	5.636E-02				
165.86	30802.	1.11	1.08	5.084E-02	165.85	79.900	2.349E+03	Ce139
199.00	1287.	18.47	1.49	4.592E-02				
220.46	244.	83.67	0.48	4.326E-02				
244.11	344.	44.21	0.74	4.070E-02				
278.61	580.	31.95	0.72	3.750E-02				
279.17	24.	799.67	1.20	3.745E-02	279.17	81.500	PBC<MDA	Hg203
294.17	181.	85.14	0.40	3.623E-02				
391.55	16351.	1.89	1.29	2.999E-02	391.69	64.000	4.234E+03	SN113
511.07	3625.	7.09	2.38	2.485E-02				
525.22	222.	43.75	0.56	2.436E-02				
661.61	120063.	0.30	1.51	2.049E-02	661.66	85.210	1.969E+03	CS137
666.12	109.	104.95	1.52	2.038E-02				
701.63	181.	58.10	0.60	1.958E-02				
730.08	88.	91.86	0.38	1.898E-02				
789.34	114.	59.03	0.66	1.784E-02				
834.78	63972.	0.55	1.65	1.706E-02	834.85	99.980	3.017E+03	Mn54
897.97	15428.	1.54	1.68	1.607E-02	898.02	93.700	6.404E+03	Y898
924.86	512.	35.84	0.38	1.569E-02				
935.31	113.	59.08	0.52	1.554E-02				
949.83	207.	52.10	0.44	1.535E-02				
971.39	360.	55.06	0.41	1.506E-02				

1002.30	88.	72.53	0.57	1.468E-02				
1030.28	135.	51.42	0.52	1.434E-02				
1087.52	232.	68.18	0.32	1.370E-02				
1115.47	41218.	0.80	1.85	1.341E-02	1115.55	50.600	6.568E+03	Zn65
1129.46	314.	46.37	0.69	1.327E-02				
1173.16	120613.	0.34	1.91	1.284E-02	1173.24	99.900	3.104E+03	Co1173
1234.16	56.	63.47	0.30	1.229E-02				
1274.33	249.	24.48	1.10	1.195E-02				
1332.42	110205.	0.32	2.04	1.149E-02	1332.50	99.982	3.166E+03	Co1332
1429.54	129.	51.29	0.35	1.079E-02				
1767.54	116.	44.61	0.50	8.895E-03				
1835.87	9468.	1.18	2.26	8.586E-03	1836.01	99.200	6.951E+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	
144.94	36.24	27063.	2633.	6.282E+04	9.05	0.992	-	D
150.93	37.74	32518.	3600.	8.298E+04	7.28	0.993	-	D

ORTEC g v - i (3263) Env32 G53W4.25 4/24/2012 10:47:24 AM Page 3
TestAmerica, Inc. Spectrum name: 16_1Lmarn2nd_20120385.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
172.01	43.01	42984.	1744.	3.635E+04	21.30	1.213	-	s
198.51	49.63	98747.	17367.	3.306E+05	3.62	1.807	-	s
311.38	77.86	42218.	1704.	2.778E+04	22.69	0.645	-	s
404.67	101.18	7929.	167.	2.726E+03	75.80	0.363	-	sc
545.88	136.49	18327.	10430.	1.851E+05	2.77	1.054	-	
795.88	199.00	15056.	1287.	2.803E+04	18.47	1.487	-	s
881.71	220.46	13032.	244.	5.629E+03	83.67	0.481	-	sc
976.30	244.11	8528.	344.	8.445E+03	44.21	0.740	-	s
1176.53	294.17	7856.	181.	4.995E+03	85.14	0.404	-	sc
2044.14	511.07	12100.	3625.	1.459E+05	7.09	2.382	-	s
2100.73	525.22	3668.	222.	9.092E+03	43.75	0.563	-	s
2664.36	666.11	4888.	226.	1.106E+04	58.38	0.353	-	sM
2806.46	701.63	3626.	181.	9.246E+03	58.10	0.599	-	s
2920.30	730.08	2608.	88.	4.664E+03	91.86	0.378	-	sc
3157.38	789.34	2031.	114.	6.381E+03	59.03	0.661	-	s
3699.64	924.86	7354.	512.	3.260E+04	35.84	0.380	-	s
3741.42	935.31	2172.	113.	7.269E+03	59.08	0.524	-	s
3799.55	949.83	4039.	207.	1.350E+04	52.10	0.442	-	s
3885.79	971.39	7512.	360.	2.386E+04	55.06	0.413	-	s
4009.51	1002.30	1847.	88.	6.007E+03	72.53	0.566	-	sc
4121.46	1030.28	1997.	135.	9.390E+03	51.42	0.518	-	s
4350.52	1087.52	5328.	232.	1.696E+04	68.18	0.319	-	s
4518.33	1129.46	4033.	314.	2.365E+04	46.37	0.690	-	s
4937.37	1234.16	483.	56.	4.557E+03	63.47	0.298	-	s
5098.12	1274.33	833.	249.	2.085E+04	24.48	1.102	-	s
5719.34	1429.54	687.	129.	1.194E+04	51.29	0.347	-	s
7072.37	1767.54	366.	116.	1.304E+04	44.61	0.496	-	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 & Mn, Zn.L

********** 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	238.06	59.52	90566.	364868.	101.352	0.24	0.985
CD-109	352.11	88.04	53425.	270447.	75.124	0.27	1.004
CO-57	488.24	122.08	28256.	84451.	23.459	0.56	1.045
Ce-139	663.35	165.86	18928.	30802.	8.556	1.11	1.077
Hg-203	1116.52	279.17	18155.	24.	0.007	799.67	1.200s
SN-113	1566.04	391.55	14418.	16351.	4.542	1.89	1.286
CS-137	2646.33	661.60	11242.	120008.	33.336	0.37	1.500

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TestAmerica, Inc. Spectrum name: 16_1Lmarn2nd_20120385.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Mn-54	3339.17	834.78	9796.	63972.	17.770	0.55	1.647
Y-898	3592.03	897.97	8456.	15428.	4.285	1.54	1.683
Zn-65	4462.34	1115.47	8938.	41218.	11.450	0.80	1.851
Co-1173	4693.23	1173.16	5375.	120613.	33.504	0.34	1.908
Co-1332	5330.61	1332.42	1667.	110205.	30.613	0.32	2.035
Y-1836	7345.92	1835.87	410.	9468.	2.630	1.18	2.257

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
AM-241		4.9673E+03				1.58E+05	
			59.54	4.967E+03	(	1.913E+01 2.41E-01 3.57E+01	G
CD-109		6.8995E+04				4.63E+02	
			88.03	6.899E+04	(	2.755E+02 2.69E-01 3.61E+00	G
CO-57		1.5822E+03				2.72E+02	
			122.06	1.582E+03	(	1.473E+01 5.63E-01 8.56E+01	G
Ce-139		2.3487E+03				1.38E+02	
			165.85	2.349E+03	(	4.909E+01 1.11E+00 7.99E+01	G
Hg-203		2.6780E+02				4.66E+01	
			279.17	2.678E+02	?(	7.085E+03 8.00E+02 8.15E+01	G
SN-113		4.2336E+03				1.15E+02	
			391.69	4.234E+03	(	1.456E+02 1.89E+00 6.40E+01	G
CS-137		1.9683E+03				1.10E+04	
			661.66	1.968E+03	(	8.148E+00 3.66E-01 8.52E+01	G
Mn-54		3.0166E+03				3.12E+02	
			834.85	3.017E+03	(	2.188E+01 5.51E-01 1.00E+02	G
Y-898		6.4044E+03				1.07E+02	
			898.02	6.404E+03	(	1.790E+02 1.54E+00 9.37E+01	G

```
Zn-65    F   6.5677E+03                                        2.44E+02
                         1115.55 6.568E+03  (  7.063E+01 7.98E-01 5.06E+01 G
```



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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Co-1173      3.1037E+03                                        1.93E+03
                         1173.24 3.104E+03  (  8.862E+00 3.37E-01 9.99E+01 G

Co-1332      3.1665E+03                                        1.93E+03
                         1332.50 3.166E+03  (  5.544E+00 3.18E-01 1.00E+02 G

Y-1836       6.9509E+03                                        1.07E+02
                         1836.01 6.951E+03  (  7.122E+01 1.18E+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  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
```

16_1Lmarn2nd_20120385

Nuclide	Activity Bq/Sample	Activity Bq/Sample	Counting	MDA Bq/Sample
AM-241	4.9569E+03	4.9673E+03	2.409E-01%	1.91E+01
CD-109	3.3666E+04	6.8995E+04	2.688E-01%	2.75E+02
CO-57	4.6653E+02	1.5822E+03	5.626E-01%	1.47E+01
Ce-139	2.1061E+02	2.3487E+03	1.106E+00%	4.91E+01
Hg-203 #A	2.1691E-01	2.6780E+02	7.997E+02%	7.08E+03
SN-113	2.3667E+02	4.2336E+03	1.891E+00%	1.46E+02
CS-137	1.9097E+03	1.9683E+03	3.662E-01%	8.15E+00
Mn-54	1.0421E+03	3.0166E+03	5.513E-01%	2.19E+01
Y-898	2.8454E+02	6.4044E+03	1.538E+00%	1.79E+02
Zn-65	1.6878E+03	6.5677E+03	7.982E-01%	7.06E+01
Co-1173	2.6122E+03	3.1037E+03	3.372E-01%	8.86E+00
Co-1332	2.6650E+03	3.1665E+03	3.182E-01%	5.54E+00
Y-1836	3.0883E+02	6.9509E+03	1.183E+00%	7.12E+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 (43.0 to 1999.2 keV) 5.005E+04 Bq/Sample
Total Decayed Activity (43.0 to 1999.2 keV) 1.1330478E+05 Bq/Sample

Second Source Verification

Detector:	Ge17
Geometry:	1L Marn
Reference date	1/1/2011
Calibration Standard:	83924-334
Standard volume g / vial	1
Standard volume transferred in g / geometry	1
lab ID# of cal standard	6675

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	Abundance	Activity Bq/L	Count Results	%recovery
Am-241	1830	1830	0.359	**5097.5**	5027.9	98.6
Cs-137	1705	1705	0.851	**2003.5**	1932.9	96.5
Co-60	3293	3293	0.99974	**3293.9**	3091.2	93.8
Co-60	3294	3294	0.99986	**3294.5**	3117.6	94.6

Reviewed By: Rachael Schneider

Date: 3/13/2012

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     ORTEC g v - i (3263) Env32  G53W4.25  3/12/2012 2:00:02 PM    Page  1
TestAmerica, Inc.               Spectrum name: 17_1Lmarn2nd_20120209.An1

Sample description
     17_Marn1L_83924-334_2ndsource_030712


Spectrum Filename: C:\User\SPC\Det17\17_1Lmarn2nd_20120209.An1

Acquisition information
       Start time:                 3/7/2012 11:01:01 PM
       Live time:               3600
       Real time:               3890
       Dead time:                  7.45 %
       Detector ID:                   17

Detector system
     Ge17 SN/11080671


Calibration
       Filename:                   17_Liquid_Marinelli 1L.Clb
     17_1L marn_90062_030512


       Energy Calibration
            Created:               3/7/2012 11:47:12 AM
            Zero offset:           0.135 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.115E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/7/2012 11:47:27 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   2.09 %
            Log(Eff):             -2.094103E+00 + ( 1.788156E-01*Log(E) ) +
                                   ( -7.283143E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   0.66 %
            Log(Eff):             -1.201018E+01 + ( 4.016685E+00*Log(E) ) +
                                   ( -4.439774E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Mn, Zn.L
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.65keV )
       Stop channel:            8000 (  1999.53keV )
       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  3/12/2012 2:00:02 PM    Page  2
TestAmerica, Inc.               Spectrum name: 17_1Lmarn2nd_20120209.An1
                                      Page 1
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Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2012-02-26_0520.PBC 2/26/2012 5:20:29 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0396

***** 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
36.45	2365.	8.54	0.78	3.661E-02				
37.91	3372.	6.46	0.78	3.779E-02				
42.41	470.	48.38	0.49	4.106E-02				
49.72	9114.	3.85	0.79	4.524E-02				
51.72	3571.	9.79	0.79	4.620E-02				
59.59	317872.	0.25	0.78	4.930E-02	59.54	35.700	5.028E+03	AM241
75.26	183.	110.61	0.81	5.266E-02				
78.24	841.	28.10	0.81	5.300E-02				
88.07	259579.	0.25	0.82	5.359E-02	88.03	3.610	7.114E+04	CD109
122.01	83297.	0.52	0.87	5.180E-02	122.06	85.600	1.568E+03	CO57
136.38	9862.	2.54	0.87	5.011E-02				
165.72	35094.	0.98	0.92	4.604E-02	165.85	79.900	2.338E+03	Ce139
170.83	203.	73.00	0.47	4.507E-02				
183.81	150.	108.32	0.46	4.321E-02				
198.94	1448.	14.51	1.05	4.125E-02				
254.89	675.	21.65	0.76	3.546E-02				
279.09	1160.	18.10	0.89	3.348E-02	279.17	81.500	7.210E+03	Hg203
391.64	18754.	1.41	1.13	2.671E-02	391.69	64.000	4.098E+03	SN113
421.79	353.	37.95	0.39	2.537E-02				
510.92	3542.	6.09	1.97	2.212E-02				
661.63	105165.	0.37	1.35	1.823E-02	661.66	85.210	1.933E+03	CS137
673.47	274.	46.60	0.48	1.798E-02				
703.46	162.	53.59	0.73	1.738E-02				
739.87	151.	60.97	0.72	1.671E-02				
834.84	62790.	0.58	1.48	1.519E-02	834.85	99.980	2.993E+03	Mn54
880.57	163.	47.88	0.73	1.455E-02				
898.06	18825.	1.30	1.53	1.432E-02	898.02	93.700	6.445E+03	Y898
1115.54	41217.	0.72	1.70	1.197E-02	1115.55	50.600	6.432E+03	Zn65
1165.48	173.	44.94	0.62	1.153E-02				
1173.22	109141.	0.34	1.73	1.147E-02	1173.24	99.900	3.091E+03	Co1173
1208.90	97.	39.52	0.75	1.118E-02				

1264.54	37.	74.18	0.33	1.075E-02				
1282.13	132.	41.80	0.39	1.063E-02				
1332.49	98744.	0.33	1.80	1.028E-02	1332.50	99.982	3.118E+03	Co1332
1353.89	62.	62.45	0.43	1.014E-02				
1364.68	83.	52.15	0.46	1.007E-02				
1731.88	50.	45.85	0.33	8.143E-03				
1835.98	11538.	1.07	2.13	7.721E-03	1836.01	99.200	6.921E+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
145.21	36.44	19211.	2365.	6.462E+04	8.54	0.776	- D
151.07	37.91	22047.	3372.	8.924E+04	6.46	0.778	- D

ORTEC g v - i (3263) Env32 G53W4.25 3/12/2012 2:00:02 PM Page 3
TestAmerica, Inc. Spectrum name: 17_1Lmarn2nd_20120209.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
169.05	42.41	21991.	470.	1.146E+04	48.38	0.492	- s
197.80	49.60	73487.	10257.	2.267E+05	4.81	1.585	- s
205.80	51.60	54339.	232.	5.021E+03	159.00	0.308	- sc
300.00	75.16	25922.	68.	1.282E+03	377.33	0.000	- sc
311.92	78.14	27362.	920.	1.736E+04	29.53	0.710	-
544.81	136.38	15138.	9862.	1.968E+05	2.54	0.865	-
682.56	170.83	8160.	203.	4.504E+03	73.00	0.467	- c
734.46	183.81	9286.	150.	3.475E+03	108.32	0.457	- c
794.99	198.94	12803.	1448.	3.510E+04	14.51	1.048	- s
1018.72	254.89	7762.	675.	1.904E+04	21.65	0.759	-
1686.21	421.79	5864.	353.	1.391E+04	37.95	0.386	- s
2042.75	510.92	9566.	3542.	1.602E+05	6.09	1.970	- s
2692.97	673.47	4580.	274.	1.524E+04	46.60	0.480	- s
2812.91	703.46	2777.	162.	9.338E+03	53.59	0.726	- s
2958.58	739.87	2952.	151.	9.054E+03	60.97	0.723	- s
3521.48	880.57	2551.	163.	1.123E+04	47.88	0.732	- s
4661.47	1165.48	1769.	173.	1.503E+04	44.94	0.617	- s
4835.24	1208.90	549.	97.	8.678E+03	39.52	0.747	- s
5057.91	1264.54	301.	37.	3.409E+03	74.18	0.331	- sc
5128.29	1282.13	694.	132.	1.237E+04	41.80	0.392	- s
5415.49	1353.89	392.	62.	6.116E+03	62.45	0.430	- s
5458.66	1364.68	417.	83.	8.278E+03	52.15	0.460	- s
6928.47	1731.88	145.	50.	6.181E+03	45.85	0.334	- 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 & Mn, Zn.L

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.76	59.59	73101.	317872.	88.298	0.25	0.778
CD-109	351.63	88.07	39287.	259579.	72.105	0.25	0.824
CO-57	487.32	122.01	24057.	83297.	23.138	0.52	0.871
Ce-139	662.14	165.72	18515.	35094.	9.748	0.98	0.916
Hg-203	1115.50	279.09	11200.	1160.	0.322	18.10	0.891s

SN-113	1565.63	391.64	11029.	18754.	5.209	1.41	1.132
CS-137	2645.58	661.63	8458.	105165.	29.212	0.37	1.349
Mn-54	3338.50	834.84	10383.	62790.	17.442	0.58	1.482
Y-898	3591.45	898.06	8260.	18825.	5.229	1.30	1.526
Zn-65	4461.62	1115.54	7078.	41217.	11.449	0.72	1.701
Co-1173	4692.44	1173.22	4383.	109141.	30.317	0.34	1.729
Co-1332	5329.83	1332.49	1452.	98744.	27.429	0.33	1.799

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TestAmerica, Inc. Spectrum name: 17_1Lmarn2nd_20120209.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Y-1836	7345.18	1835.98	416.	11538.	3.205	1.07	2.125

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
AM-241		5.0279E+03					1.58E+05	
			59.54	5.028E+03	(	1.997E+01	2.46E-01	3.57E+01 G
CD-109		7.1144E+04					4.63E+02	
			88.03	7.114E+04	(	2.539E+02	2.47E-01	3.61E+00 G
CO-57		1.5684E+03					2.72E+02	
			122.06	1.568E+03	(	1.366E+01	5.20E-01	8.56E+01 G
Ce-139		2.3385E+03					1.38E+02	
			165.85	2.338E+03	(	4.243E+01	9.81E-01	7.99E+01 G
Hg-203		7.2096E+03					4.66E+01	
			279.17	7.210E+03	*(	3.082E+03	1.81E+01	8.15E+01 G
SN-113		4.0978E+03					1.15E+02	
			391.69	4.098E+03	(	1.075E+02	1.41E+00	6.40E+01 G
CS-137		1.9329E+03					1.10E+04	
			661.66	1.933E+03	(	7.927E+00	3.67E-01	8.52E+01 G
Mn-54		2.9929E+03					3.12E+02	
			834.85	2.993E+03	(	2.276E+01	5.82E-01	1.00E+02 G
Y-898		6.4454E+03					1.07E+02	
			898.02	6.445E+03	(	1.459E+02	1.30E+00	9.37E+01 G
Zn-65	F	6.4315E+03					2.44E+02	
			1115.55	6.432E+03	(	6.160E+01	7.21E-01	5.06E+01 G
Co-1173		3.0912E+03					1.93E+03	
			1173.24	3.091E+03	(	8.814E+00	3.44E-01	9.99E+01 G
Co-1332		3.1176E+03					1.93E+03	
			1332.50	3.118E+03	(	5.693E+00	3.34E-01	1.00E+02 G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Y-1836       6.9209E+03                                        1.07E+02
                         1836.01 6.921E+03  (  5.864E+01 1.07E+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  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count  Time Corrected  Uncertainty  1 Sigma
 Nuclide     Activity       Activity       Counting                   MDA
                Bq/Sample     Bq/Sample                                 Bq/Sample

 ____________________________________________________________________________
 AM-241       5.0184E+03    5.0279E+03    2.458E-01%                2.00E+01
 CD-109       3.7269E+04    7.1144E+04    2.467E-01%                2.54E+02
 CO-57        5.2187E+02    1.5684E+03    5.199E-01%                1.37E+01
 Ce-139       2.6620E+02    2.3385E+03    9.805E-01%                4.24E+01
```



```
 Hg-203 #     1.1810E+01    7.2096E+03    1.810E+01%                3.08E+03
 SN-113       3.0473E+02    4.0978E+03    1.413E+00%                1.08E+02
```

CS-137	1.8810E+03	1.9329E+03	3.669E-01%	7.93E+00
Mn-54	1.1486E+03	2.9929E+03	5.824E-01%	2.28E+01
Y-898	3.8969E+02	6.4454E+03	1.303E+00%	1.46E+02
Zn-65	1.8907E+03	6.4315E+03	7.214E-01%	6.16E+01
Co-1173	2.6464E+03	3.0912E+03	3.444E-01%	8.81E+00
Co-1332	2.6690E+03	3.1176E+03	3.338E-01%	5.69E+00
Y-1836	4.1844E+02	6.9209E+03	1.071E+00%	5.86E+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 (   42.4 to  1999.5 keV)     5.444E+04  Bq/Sample
Total Decayed Activity (   42.4 to  1999.5 keV) 1.2231852E+05  Bq/Sample
```

Monthly Backgrounds

Test America
St. Louis
Background Check

Spectrum: 2_20190119001_BGLong
Description: Background Long PBC Count
Acquired: 1/19/2019 2:10:06 PM
Detector: Detector # 2
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	1.69	1.21	1.37	1.57	2.00	2.16	PASS

Analyst: Joey Sausto Reviewer:

(Page 1 of 8)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det2\2_20190119001_BGLong.An1

Acquisition information
Start time: 1/19/2019 2:10:06 PM
Live time: 72000
Real time: 72176
Dead time: 0.24 %
Detector ID: 2

Detector system
Ge 2 SN/164

Calibration
Filename: 2_QC.Clb
2_SourceCheck_B

Energy Calibration
Created: 4/20/2018 1:54:10 PM
Zero offset: 0.101 keV
Gain: 0.250 keV/channel
Quadratic: -4.975E-09 keV/channel^2

Efficiency Calibration
Created: 11/2/2018 12:44:12 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 (37.60keV)
Stop channel: 8000 (2000.01keV)
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. 18 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1164

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
39.70	1189.	5.83	0.85	4.052E-02				
46.53	1240.	5.97	0.86	5.594E-02	46.54	4.250	7.241E+00	PB210
63.30	956.	6.30	0.81	9.383E-02	63.29	3.810	3.717E+00	TH234
72.85	252.	19.01	0.85	1.154E-01				
74.97	685.	7.52	0.86	1.202E-01				
84.71	430.	10.20	0.86	1.420E-01				
87.39	166.	23.59	0.87	1.480E-01	86.49	13.100	1.207E-01	Np237
					86.54	30.700	5.146E-02	EU155
92.60	1302.	5.61	1.02	2.296E-01	92.59	5.584	1.411E+00	TH234
					93.35	5.561	1.339E+00	AC228
143.85	196.	25.18	1.51	7.163E-01	143.79	10.960	3.467E-02	U235
185.73	598.	9.40	0.77	6.612E-01	185.72	54.000	2.328E-02	U235
					185.99	3.280	3.834E-01	Ra226
238.52	230.	18.11	0.87	5.916E-01	238.63	43.300	1.249E-02	PB212
295.22	132.	25.35	0.93	5.169E-01	295.09	19.300	1.837E-02	PB214
351.90	186.	18.63	1.16	4.422E-01	351.93	37.600	1.551E-02	PB214
510.77	1469.	5.61	2.26	2.329E-01	511.86	20.000	4.407E-01	RH106
583.00	133.	24.06	1.81	1.377E-01	583.02	84.500	1.592E-02	TL208
608.91	204.	21.28	1.38	1.036E-01	609.31	46.090	5.965E-02	BI214
1460.20	87.	23.47	3.57	1.404E-02	1460.83	10.670	8.064E-01	K40

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
158.39	39.70	1035.	1189.	2.935E+04	5.83	0.847	-
290.99	72.86	1017.	252.	2.179E+03	19.01	0.854	- D
299.43	74.97	984.	685.	5.697E+03	7.52	0.856	- D
338.41	84.61	745.	430.	3.027E+03	10.20	0.864	- sD
349.13	87.29	688.	166.	1.125E+03	23.59	0.866	- D
2042.52	510.77	603.	1469.	6.307E+03	5.61	2.255	-

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	185.70	46.53	1062.	1240.	0.017	5.97	0.858s
TH-234	252.78	63.30	803.	956.	0.013	6.30	0.810
TH-234	369.95	92.60	1008.	1302.	0.018	5.61	1.023
U-235	574.92	143.85	640.	196.	0.003	25.18	1.506s
U-235	742.41	185.72	669.	584.	0.008	6.87	0.769D
PB-212	953.60	238.52	453.	230.	0.003	18.11	0.874s
PB-214	1180.37	295.22	312.	132.	0.002	25.35	0.928
PB-214	1407.08	351.90	303.	186.	0.003	18.63	1.158s
TL-208	2331.46	583.00	207.	133.	0.002	24.06	1.811s
BI-214	2435.10	608.91	336.	204.	0.003	21.28	1.380
K-40	5840.43	1460.20	55.	87.	0.001	23.47	3.570s

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	8.0636E-01				4.66E+11	
			1460.83	8.064E-01	(	3.454E-01 2.35E+01 1.07E+01	G

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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N	1.5915E-02					6.98E+02	
			583.02	1.592E-02	@(	8.320E-03	2.41E+01	8.45E+01 G
			277.28	0.000E+00	%	2.498E-02	2.59E+02	6.31E+00 G
			860.56	0.000E+00	%	1.458E-01	2.62E+02	1.24E+01 G
PB-210	N	7.2413E+00					8.14E+03	
			46.54	7.241E+00	@(	9.027E-01	5.97E+00	4.25E+00 G
PB-212	N	1.2491E-02					6.98E+02	
			238.63	1.249E-02	@(	5.524E-03	1.81E+01	4.33E+01 G
			300.03	0.000E+00	%	4.645E-02	3.08E+01	3.28E+00 GA
PB-214	N	1.6480E-02					5.84E+05	
			351.93	1.551E-02	(	7.006E-03	1.86E+01	3.76E+01 G
			295.09	1.837E-02	(	1.183E-02	2.54E+01	1.93E+01 G
			242.00	0.000E+00		2.973E-02	0.00E+00	7.43E+00 GA
BI-214	N	5.9647E-02					5.84E+05	
			609.31	5.965E-02	(	2.577E-02	2.13E+01	4.61E+01 G
			1120.29	0.000E+00	%	1.627E-01	2.78E+02	1.51E+01 G
			1764.49	0.000E+00	%	2.618E-01	4.99E+01	1.54E+01 G
TH-234	N	3.7168E+00					1.63E+12	
			63.29	3.717E+00	(	5.236E-01	6.30E+00	3.81E+00 G
			92.59	1.411E+00	-	1.633E-01	5.61E+00	5.58E+00 G
U-235	N	3.4669E-02					2.57E+11	
			185.72	2.271E-02	}	4.793E-03	6.87E+00	5.40E+01 GA
			143.79	3.467E-02	(	2.133E-02	2.52E+01	1.10E+01 G
			205.33	0.000E+00	%	2.958E-02	4.24E+01	5.01E+00 G
			163.38	0.000E+00	%	2.828E-02	8.89E+01	5.08E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.

P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	3.8177E-02		
NA-22	<	3.9548E-02		
K-40	#	8.0636E-01	2.3472E+01%	3.454E-01
Sc-46	<	2.8113E-02		
CR-51	<	1.5718E-02		
MN-54	<	1.8842E-02		
FE-59	<	4.0704E-02		
Co-56	<	2.1793E-02		
CO-57	<	2.7248E-03		
CO-58	<	1.8629E-02		
CO-60	<	2.2838E-02		
ZN-65	<	4.4900E-02		
NB-94	<	1.9108E-02		
ZR-95	<	3.3317E-02		
NB-95	<	3.0168E-02		
RU-103	<	2.6356E-03		
RH-106	<	7.7479E-02		
AG-108M	<	2.2384E-03		
AG-110M	<	3.6208E-02		
SN-113	<	2.6796E-03		
SB-124	<	1.0365E-02		
SB-125	<	6.7629E-03		
I-131	<	2.1821E-03		
BA-133	<	5.1134E-03		

CS-134	<	1.1016E-02		
CS-137	<	3.1355E-02		
CE-139	<	1.5900E-03		
Ba-140	<	1.2322E-02		
La-140	<	3.0054E-02		
CE-141	<	3.5708E-03		
CE-144	<	1.5508E-02		
PM-144	<	2.0401E-02		
EU-152	<	8.5397E-03		
EU-154	<	2.5978E-01		
EU-155	<	1.0873E-02		
HF-181	<	5.9905E-03		
Ta-182	<	9.1650E-02		
Hg-203	<	1.9096E-03		
TL-208	#	1.5915E-02	2.4057E+01%	8.320E-03
pm-146	<	4.5371E-02		
y-88	<	2.1945E-02		
PB-210	#	7.2413E+00	5.9743E+00%	9.027E-01
PB-212	#	1.2491E-02	1.8106E+01%	5.524E-03
PB-214		1.6480E-02	1.5732E+01%	7.006E-03
BI-207	<	6.5745E-03		
BI-212	<	3.6710E-01		
BI-214		5.9647E-02	2.1277E+01%	2.577E-02
BI-210M	<	2.9165E-03		
RA-224	<	6.0159E-02		
AC-228	<	9.7487E-02		
TH-227	<	1.9213E-02		
TH-229	<	3.3867E-02		
TH-234		3.7168E+00	6.3017E+00%	5.236E-01
PA-231	<	6.8308E-02		
PA-233	<	4.0511E-03		
PA-234	<	9.6970E-03		
PA-234M	<	4.4792E+00		
U-235		3.4669E-02	2.5182E+01%	2.133E-02
AM-241	<	5.7372E-02		
Np-237	<	1.0741E-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 2000.0 keV) 1.190E+01 DPS

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Test America
St. Louis
Background Check

Spectrum: 5_20190119001_BGLong
Description: Background Long PBC Count
Acquired: 1/19/2019 2:09:51 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	1.46	1.55	1.60	PASS

Analyst: Joey Sausto Reviewer:

(Page 1 of 7)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det5\5_20190119001_BGLong.An1

Acquisition information

Start time:	1/19/2019 2:09:51 PM
Live time:	72000
Real time:	72203
Dead time:	0.28 %
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. 17 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1496

***** 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
46.72	661.	8.61	0.77	5.700E-02	46.54	4.250	3.804E+00	PB210
59.44	215.	17.61	0.84	7.406E-02	59.54	35.900	1.122E-01	AM241
63.39	635.	7.91	0.84	7.936E-02	63.29	3.810	2.922E+00	TH234
74.82	191.	18.89	0.81	9.474E-02				
77.25	145.	23.79	0.82	9.800E-02				
84.39	176.	24.80	1.03	1.076E-01				
92.52	858.	6.08	0.91	1.129E-01	92.59	5.584	1.890E+00	TH234
					93.35	5.561	1.896E+00	AC228
185.71	364.	12.45	0.71	9.608E-02	185.72	54.000	9.736E-02	U235
					185.99	3.280	1.604E+00	Ra226
238.73	144.	20.04	0.85	8.321E-02	238.63	43.300	5.569E-02	PB212
352.02	272.	14.94	1.30	5.571E-02	351.93	37.600	1.803E-01	PB214
					351.93	37.600	1.803E-01	PB214
510.77	1598.	5.05	2.11	3.837E-02	511.86	20.000	2.897E+00	RH106
609.03	189.	23.02	0.89	3.201E-02	609.31	46.090	1.779E-01	BI214
661.55	193.	14.47	1.11	2.861E-02	661.66	85.210	1.100E-01	CS137
1460.18	73.	26.74	1.46	1.300E-02	1460.83	10.670	7.311E-01	K40
1764.35	47.	25.44	1.75	1.105E-02	1764.49	15.400	3.835E-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	
298.93	74.84	552.	191.	2.011E+03	18.89	0.813	-	D
308.66	77.27	521.	145.	1.478E+03	23.79	0.815	-	D

(Page 3 of 7)

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
337.22	84.39	546.	176.	1.636E+03	24.80	1.026	- sM
2043.70	510.77	602.	1598.	4.164E+04	5.05	2.111	- sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.41	46.72	701.	661.	0.009	8.61	0.767s
AM-241	237.32	59.44	431.	215.	0.003	17.61	0.839s
TH-234	253.13	63.39	540.	635.	0.009	7.91	0.844
TH-234	369.78	92.52	560.	858.	0.012	6.08	0.912s
Ra-226	742.81	185.71	506.	364.	0.005	12.45	0.711
PB-212	955.03	238.73	278.	144.	0.002	20.04	0.852
PB-214	1408.45	352.02	345.	272.	0.004	14.94	1.299s
BI-214	2436.81	609.03	329.	189.	0.003	23.02	0.885s
CS-137	2646.92	661.55	153.	193.	0.003	14.47	1.106s
K-40	5840.15	1460.18	66.	73.	0.001	26.74	1.463s
BI-214	7055.50	1764.35	24.	47.	0.001	25.44	1.746

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	MDA Value DPS	COMMENTS
K-40	N	7.3105E-01				4.66E+11	
			1460.83	7.311E-01	?(	4.063E-01 2.67E+01 1.07E+01	G
CS-137	I	1.0998E-01				1.10E+04	
			661.66	1.100E-01	(	3.439E-02 1.45E+01 8.52E+01	G
PB-210	N	3.8042E+00				8.14E+03	
			46.54	3.804E+00	@(	7.262E-01 8.61E+00 4.25E+00	G

(Page 4 of 7)

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	5.5687E-02					6.98E+02	
			238.63	5.569E-02	(	3.096E-02	2.00E+01	4.33E+01 G
			300.03	0.000E+00	%	3.763E-01	7.14E+02	3.28E+00 GA
PB-214	N	1.8027E-01					5.84E+05	
			351.93	1.803E-01	@(	5.916E-02	1.49E+01	3.76E+01 G
BI-214	N	1.7786E-01					5.84E+05	
			609.31	1.779E-01	(	8.219E-02	2.30E+01	4.61E+01 G
			1120.29	0.000E+00	&	2.621E-01	1.00E+03	1.51E+01 G
			1764.49	3.835E-01	+	2.084E-01	2.54E+01	1.54E+01 G
TH-234	N	2.9215E+00					1.63E+12	
			63.29	2.922E+00	(	5.107E-01	7.91E+00	3.81E+00 G
			92.59	1.890E+00	-	2.489E-01	6.08E+00	5.58E+00 G
Ra-226		1.6039E+00					5.84E+05	
			185.99	1.604E+00	(	4.744E-01	1.25E+01	3.28E+00 G
AM-241	T	1.1219E-01					1.58E+05	
			59.54	1.122E-01	(	5.185E-02	1.76E+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	<	2.1365E-01		
NA-22	<	5.0081E-02		
K-40	#	7.3105E-01	2.6739E+01%	4.063E-01
Sc-46	<	3.8200E-02		
CR-51	<	1.2916E-01		
MN-54	<	2.5800E-02		
FE-59	<	5.1814E-02		
Co-56	<	2.4836E-02		
CO-57	<	1.6197E-02		
CO-58	<	2.4630E-02		
CO-60	<	3.1976E-02		
ZN-65	<	6.5845E-02		
NB-94	<	2.3543E-02		
ZR-95	<	4.1667E-02		
NB-95	<	3.8366E-02		
RU-103	<	1.5769E-02		
RH-106	<	2.0641E-01		
AG-108M	<	1.6173E-02		
AG-110M	<	4.3995E-02		
SN-113	<	2.3940E-02		
SB-124	<	2.3345E-02		
SB-125	<	4.9219E-02		
I-131	<	1.7852E-02		
BA-133	<	3.4273E-02		
CS-134	<	2.5226E-02		
CS-137	#	1.0998E-01	1.4466E+01%	3.439E-02
CE-139	<	1.9019E-02		
Ba-140	<	8.0417E-02		
La-140	<	3.6809E-02		
CE-141	<	2.6609E-02		
CE-144	<	6.5314E-02		
PM-144	<	2.4582E-02		
EU-152	<	8.9793E-02		
EU-154	<	2.6694E-01		

EU-155	<	3.9967E-02		
HF-181	<	1.3480E-02		
Ta-182	<	1.2059E-01		
Hg-203	<	2.0118E-02		
TL-208	<	2.6119E-02		
pm-146	<	7.2327E-02		
y-88	<	2.9273E-02		
PB-210	#	3.8042E+00	8.6053E+00%	7.262E-01
PB-212		5.5687E-02	2.0036E+01%	3.096E-02
PB-214	#	1.8027E-01	1.4943E+01%	5.916E-02
BI-207	<	3.5445E-02		
BI-212	<	3.1718E-01		
BI-214		1.7786E-01	2.3020E+01%	8.219E-02
BI-210M	<	2.0180E-02		
RA-224	<	2.9693E-01		
AC-228	<	7.8976E-02		
TH-227	<	1.2235E-01		
TH-229	<	2.0970E-01		
TH-234		2.9215E+00	7.9133E+00%	5.107E-01
PA-231	<	5.4735E-01		
PA-233	<	3.2220E-02		
PA-234	<	6.9008E-02		
PA-234M	<	3.4485E+00		
Ra-226		1.6039E+00	1.2455E+01%	4.744E-01
U-235	<	8.4189E-02		
AM-241	#	1.1219E-01	1.7611E+01%	5.185E-02
Np-237	<	1.0045E-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) 9.697E+00 DPS

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Test America
St. Louis
Background Check

Spectrum: 7_20190119001_BGLong
Description: Background Long PBC Count
Acquired: 1/19/2019 2:12:42 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	1.28	1.40	1.45	PASS

Analyst: Joey Sausto Reviewer:

(Page 1 of 7)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det7\7_20190119001_BGLong.An1

Acquisition information
Start time: 1/19/2019 2:12:42 PM
Live time: 72000
Real time: 72219
Dead time: 0.30 %
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

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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:	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. 11 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1247

***** 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
46.63	620.	9.61	1.02	8.135E-02	46.54	4.250	2.498E+00	PB210
63.28	739.	8.43	1.16	1.228E-01	63.29	3.810	2.192E+00	TH234
89.97	104.	28.14	0.88	1.852E-01				
92.58	820.	5.63	0.89	1.861E-01	92.59	5.584	1.096E+00	TH234
					93.35	5.561	1.099E+00	AC228
185.66	528.	10.01	1.16	1.633E-01	185.72	54.000	8.321E-02	U235
					185.99	3.280	1.371E+00	Ra226
238.37	300.	15.33	1.24	1.418E-01	238.63	43.300	6.787E-02	PB212
609.49	138.	22.09	1.58	5.309E-02	609.31	46.090	7.833E-02	BI214
					610.30	5.750	6.293E-01	RU103
1461.02	132.	14.60	2.64	1.997E-02	1460.83	10.670	8.606E-01	K40
1764.74	61.	23.81	1.16	1.692E-02	1764.49	15.400	3.252E-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	
359.52	89.99	378.	105.	5.663E+02	27.98	0.883	-	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: DET_Long Background PBC.lib

(Page 3 of 7)

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.08	46.63	703.	620.	0.009	9.61	1.020s
TH-234	252.66	63.28	723.	739.	0.010	8.43	1.159s
TH-234	369.93	92.59	656.	820.	0.011	5.63	0.886D
Ra-226	742.24	185.66	545.	528.	0.007	10.01	1.164s
PB-212	953.11	238.37	473.	300.	0.004	15.33	1.243s
BI-214	2437.66	609.49	190.	138.	0.002	22.09	1.581
K-40	5843.77	1461.02	35.	132.	0.002	14.60	2.639s
BI-214	7058.56	1764.74	25.	61.	0.001	23.81	1.162s

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	8.6056E-01				4.66E+11	
			1460.83	8.606E-01	*(	1.974E-01 1.46E+01 1.07E+01	G
PB-210	N	2.4977E+00				8.14E+03	
			46.54	2.498E+00	*(	5.087E-01 9.61E+00 4.25E+00	G
PB-212	N	6.7873E-02				6.98E+02	
			238.63	6.787E-02	*(	2.356E-02 1.53E+01 4.33E+01	G
			300.03	0.000E+00	&	2.052E-01 1.00E+03 3.28E+00	GA
BI-214	N	7.8329E-02				5.84E+05	
			609.31	7.833E-02	(	3.800E-02 2.21E+01 4.61E+01	G
			1120.29	0.000E+00	%	9.761E-02 3.00E+01 1.51E+01	G
			1764.49	3.252E-01	+	1.386E-01 2.38E+01 1.54E+01	G
TH-234	N	2.1918E+00				1.63E+12	
			63.29	2.192E+00	*(	3.799E-01 8.43E+00 3.81E+00	G
			92.59	1.096E+00	-	1.632E-01 5.63E+00 5.58E+00	G
Ra-226		1.3708E+00				5.84E+05	
			185.99	1.371E+00	*(	2.892E-01 1.00E+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

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```
      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    <    1.4006E-01
NA-22   <    1.1788E-02
K-40   #     8.6056E-01   1.4595E+01%               1.974E-01
Sc-46   <    9.0035E-03
CR-51   <    6.8818E-02
MN-54   <    1.5772E-02
FE-59   <    3.0662E-02
Co-56   <    1.5301E-02
CO-57   <    8.4607E-03
CO-58   <    1.3288E-02
CO-60   <    1.6219E-02
ZN-65   <    1.7964E-02
NB-94   <    1.5154E-02
```

ZR-95	<	2.3124E-02		
NB-95	<	2.5662E-02		
RU-103	<	1.1151E-02		
RH-106	<	1.3116E-01		
AG-108M	<	9.1035E-03		
AG-110M	<	2.9425E-02		
SN-113	<	1.3137E-02		
SB-124	<	1.6029E-02		
SB-125	<	2.6288E-02		
I-131	<	8.6781E-03		
BA-133	<	1.9852E-02		
CS-134	<	1.6976E-02		
CS-137	<	1.6322E-02		
CE-139	<	1.0399E-02		
Ba-140	<	4.2980E-02		
La-140	<	2.0591E-02		
CE-141	<	1.0475E-02		
CE-144	<	6.7038E-02		
PM-144	<	1.5723E-02		
EU-152	<	2.7436E-02		
EU-154	<	1.2485E-01		
EU-155	<	2.2338E-02		
HF-181	<	1.5747E-02		
Ta-182	<	6.9292E-02		
Hg-203	<	7.7925E-03		
TL-208	<	1.4433E-02		
pm-146	<	3.6482E-02		
y-88	<	1.8047E-02		
PB-210	#	2.4977E+00	9.6089E+00%	5.087E-01
PB-212	#	6.7873E-02	1.5333E+01%	2.356E-02
PB-214	<	2.1945E-02		
BI-207	<	1.8501E-02		
BI-212	<	2.5174E-01		
BI-214		7.8329E-02	2.2095E+01%	3.800E-02
BI-210M	<	1.1951E-02		
RA-224	<	2.0623E-01		
AC-228	<	6.3785E-02		
TH-227	<	5.2538E-02		
TH-229	<	1.1722E-01		
TH-234	#	2.1918E+00	8.4252E+00%	3.799E-01
PA-231	<	2.3896E-01		
PA-233	<	1.8004E-02		
PA-234	<	3.5447E-02		
PA-234M	<	3.2826E+00		
Ra-226	#	1.3708E+00	1.0011E+01%	2.892E-01
U-235	<	4.7555E-02		
AM-241	<	3.3630E-02		
Np-237	<	6.8521E-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)     7.067E+00  DPS
```

(Page 7 of 7)

Test America
St. Louis
Background Check

Spectrum: 8_20190119001_BGLong
Description: Background Long PBC Count
Acquired: 1/19/2019 2:16:37 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	1.55	1.68	1.74	PASS

Analyst: Joey Sausto Reviewer:

(Page 1 of 8)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det8\8_20190119001_BGLong.An1

Acquisition information
Start time: 1/19/2019 2:16:37 PM
Live time: 72000
Real time: 73650
Dead time: 2.24 %
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

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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:	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. 17 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0796

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
59.60	458.	8.91	1.02	8.701E-02	59.54	35.900	2.038E-01	AM241
63.33	1020.	4.68	1.03	9.252E-02	63.29	3.810	4.022E+00	TH234
84.55	217.	24.14	0.86	1.238E-01				
92.65	1936.	4.20	1.12	1.295E-01	92.59	5.584	3.718E+00	TH234
					93.35	5.561	3.731E+00	AC228
143.98	278.	18.73	0.63	1.247E-01	143.79	10.960	2.824E-01	U235
185.81	1105.	6.36	1.02	1.107E-01	185.72	54.000	2.565E-01	U235
					185.99	3.280	4.225E+00	Ra226
198.46	195.	27.82	0.54	1.073E-01				
238.70	291.	15.12	0.98	9.637E-02	238.63	43.300	9.673E-02	PB212
296.15	187.	24.06	1.70	8.075E-02	295.09	19.300	1.659E-01	PB214
510.98	1403.	5.47	2.58	4.530E-02	511.86	20.000	2.154E+00	RH106
583.18	151.	22.24	1.31	3.958E-02	583.02	84.500	6.270E-02	TL208
609.26	172.	25.87	1.88	3.750E-02	609.31	46.090	1.382E-01	BI214
					610.30	5.750	1.110E+00	RU103
661.86	268.	11.83	1.44	3.334E-02	661.66	85.210	1.310E-01	CS137
1000.89	128.	27.10	1.28	2.158E-02	1001.00	0.837	9.869E+00	PA234M
1120.85	101.	25.65	0.76	1.933E-02	1120.29	15.100	4.805E-01	BI214
					1120.55	99.987	7.259E-02	Sc46
1173.41	103.	20.54	1.77	1.834E-02	1173.24	99.900	7.784E-02	CO60
1332.49	158.	14.54	2.92	1.637E-02	1332.50	99.980	1.343E-01	CO60
1460.81	136.	18.60	2.03	1.543E-02	1460.83	10.670	1.148E+00	K40
1764.82	72.	22.52	1.43	1.319E-02	1764.49	15.400	4.901E-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	
338.00	84.55	761.	217.	1.756E+03	24.14	0.862	-	
793.69	198.46	687.	195.	1.817E+03	27.82	0.538	-	s
1184.44	296.15	440.	187.	2.314E+03	24.06	1.702	-	l
2043.81	510.98	560.	1403.	3.097E+04	5.47	2.580	-	

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	661.	458.	0.006	9.22	1.022D
TH-234	252.96	63.29	628.	1020.	0.014	4.68	1.025D
TH-234	370.41	92.65	1080.	1936.	0.027	4.20	1.120
U-235	575.76	143.98	664.	278.	0.004	18.73	0.632s
U-235	742.71	185.72	821.	1104.	0.015	4.16	1.015D
PB-212	954.66	238.70	492.	291.	0.004	15.12	0.981
TL-208	2332.62	583.18	217.	151.	0.002	22.24	1.307s
BI-214	2436.98	609.26	350.	172.	0.002	25.87	1.876s
CS-137	2647.36	661.86	170.	268.	0.004	11.83	1.443
PA-234M	4003.57	1000.89	171.	128.	0.002	27.10	1.283s
BI-214	4483.40	1120.85	95.	101.	0.001	25.65	0.757s
CO-60	4693.66	1173.41	73.	103.	0.001	20.54	1.772
CO-60	5330.02	1332.49	59.	158.	0.002	14.54	2.924s
K-40	5843.31	1460.81	72.	136.	0.002	18.60	2.026
BI-214	7059.40	1764.82	28.	72.	0.001	22.52	1.431s

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	1.1475E+00				4.66E+11	
			1460.83	1.148E+00	(	3.565E-01 1.86E+01 1.07E+01	G
CO-60	F	1.3434E-01				1.93E+03	
			1332.50	1.343E-01	*(	3.258E-02 1.45E+01 1.00E+02	G
			1173.24	7.784E-02	-	3.231E-02 2.05E+01 9.99E+01	G
CS-137	I	1.3102E-01				1.10E+04	
			661.66	1.310E-01	(	3.103E-02 1.18E+01 8.52E+01	G
TL-208	N	6.2702E-02				6.98E+02	
			583.02	6.270E-02	*(	2.963E-02 2.22E+01 8.45E+01	G
			277.28	0.000E+00	%	1.592E-01 1.00E+03 6.31E+00	G
			860.56	0.000E+00	%	1.740E-01 1.00E+03 1.24E+01	G
PB-212	N	9.6729E-02				6.98E+02	
			238.63	9.673E-02	(	3.531E-02 1.51E+01 4.33E+01	G
			300.03	0.000E+00	%	3.074E-01 1.59E+02 3.28E+00	GA
BI-214	N	1.3823E-01				5.84E+05	
			609.31	1.382E-01	*(	7.224E-02 2.59E+01 4.61E+01	G
			1120.29	4.805E-01	+	2.290E-01 2.56E+01 1.51E+01	G
			1764.49	4.901E-01	+	1.882E-01 2.25E+01 1.54E+01	G
TH-234	N	3.8416E+00				1.63E+12	
			63.29	4.022E+00	(	4.712E-01 4.68E+00 3.81E+00	G
			92.59	3.718E+00	(	2.993E-01 4.20E+00 5.58E+00	G
PA-234M	N	9.8693E+00				1.63E+12	
			1001.00	9.869E+00	?(	4.890E+00 2.71E+01 8.37E-01	G
			766.41	0.000E+00	&	7.305E+00 1.00E+03 2.94E-01	G
U-235	N	2.8236E-01				2.57E+11	
			185.72	2.564E-01	}	3.164E-02 4.16E+00 5.40E+01	GA
			143.79	2.824E-01	?(	1.247E-01 1.87E+01 1.10E+01	G
			205.33	0.000E+00	&	1.939E-01 3.72E+02 5.01E+00	G
			163.38	0.000E+00	%	1.710E-01 3.23E+01 5.08E+00	G
AM-241	T	2.0370E-01				1.58E+05	
			59.54	2.037E-01	(	5.455E-02 9.22E+00 3.59E+01	G

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```
  ( - 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    <    2.5987E-01
NA-22   <    3.5889E-02
K-40         1.1475E+00   1.8602E+01%               3.565E-01
Sc-46   <    2.1651E-02
CR-51   <    1.0857E-01
MN-54   <    2.2159E-02
FE-59   <    4.7214E-02
Co-56   <    2.1698E-02
CO-57   <    6.8010E-03
CO-58   <    2.1596E-02
```

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CO-60		1.3434E-01	1.4539E+01%	3.258E-02
ZN-65	<	2.8472E-02		
NB-94	<	2.2146E-02		
ZR-95	<	3.8895E-02		
NB-95	<	3.1293E-02		
RU-103	<	1.5900E-02		
RH-106	<	2.8590E-01		
AG-108M	<	1.7744E-02		
AG-110M	<	3.0969E-02		
SN-113	<	2.2087E-02		
SB-124	<	2.1336E-02		
SB-125	<	5.0613E-02		
I-131	<	1.6969E-02		
BA-133	<	1.9089E-02		
CS-134	<	2.8706E-02		
CS-137		1.3102E-01	1.1827E+01%	3.103E-02
CE-139	<	1.0409E-02		
Ba-140	<	6.2149E-02		
La-140	<	2.5770E-02		
CE-141	<	2.1578E-02		
CE-144	<	5.2906E-02		
PM-144	<	2.0110E-02		
EU-152	<	3.9440E-02		
EU-154	<	2.6034E-01		
EU-155	<	3.8049E-02		
HF-181	<	2.4264E-02		
Ta-182	<	1.4001E-01		
Hg-203	<	1.2648E-02		
TL-208	#	6.2702E-02	2.2237E+01%	2.963E-02
pm-146	<	5.5372E-02		
y-88	<	2.5024E-02		
PB-210	<	5.5305E-01		
PB-212		9.6729E-02	1.5121E+01%	3.531E-02
PB-214	<	3.2025E-02		
BI-207	<	2.6295E-02		
BI-212	<	3.9607E-01		
BI-214	#	1.3823E-01	2.5873E+01%	7.224E-02
BI-210M	<	1.7270E-02		
RA-224	<	3.8338E-01		
AC-228	<	7.6606E-02		
TH-227	<	8.2971E-02		
TH-229	<	2.0714E-01		
TH-234		3.8416E+00	3.1436E+00%	4.712E-01
PA-231	<	5.1592E-01		
PA-233	<	2.7578E-02		
PA-234	<	6.2067E-02		
PA-234M	#	9.8693E+00	2.7097E+01%	4.890E+00
U-235		2.8236E-01	1.8735E+01%	1.247E-01
AM-241		2.0370E-01	9.2207E+00%	5.455E-02

Np-237 < 9.9869E-02

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 1.591E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 9_20190119001_BGLong
Description: Background Long PBC Count
Acquired: 1/19/2019 2:07:53 PM
Detector: Detector # 9
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.89	1.53	1.65	1.79	2.14	2.26	PASS

Analyst: Joey Sausto Reviewer:

(Page 1 of 7)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det9\9_20190119001_BGLong.An1

Acquisition information
Start time: 1/19/2019 2:07:53 PM
Live time: 72000
Real time: 72070
Dead time: 0.10 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_QC.Clb
9_QC-E_79670-334_060211

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/3/2011 12:03:10 PM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.59keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

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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:	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. 9 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1895

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
238.09	134.	27.37	0.79	1.230E-01	238.63	43.300	3.507E-02	PB212
294.92	132.	23.62	0.97	1.047E-01	295.09	19.300	9.051E-02	PB214
351.83	293.	16.78	1.55	8.643E-02	351.93	37.600	1.253E-01	PB214
511.03	2349.	3.63	2.79	6.208E-02	511.86	20.000	2.631E+00	RH106
569.37	142.	28.44	2.19	5.641E-02	569.70	97.740	3.577E-02	BI207
					569.32	15.380	2.272E-01	CS134
					569.47	8.200	4.262E-01	PA234
583.16	206.	21.60	3.84	5.512E-02	583.02	84.500	6.153E-02	TL208
609.41	278.	18.55	0.94	5.257E-02	609.31	46.090	1.596E-01	BI214
					610.30	5.750	1.282E+00	RU103
1460.74	268.	12.34	1.86	2.339E-02	1460.83	10.670	1.494E+00	K40
1763.81	158.	15.58	2.01	2.159E-02	1764.49	15.400	6.599E-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	
2043.48	511.03	602.	2349.	3.784E+04	3.63	2.788	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

(Page 3 of 7)

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-212	951.81	238.09	457.	134.	0.002	27.37	0.786s
PB-214	1179.10	294.92	313.	132.	0.002	23.62	0.967
PB-214	1406.69	351.83	490.	293.	0.004	16.78	1.549s
BI-207	2276.84	569.37	319.	142.	0.002	28.44	2.193s
TL-208	2331.99	583.16	334.	206.	0.003	21.60	3.839s
BI-214	2437.00	609.41	462.	278.	0.004	18.55	0.945s
K-40	5843.64	1460.74	110.	268.	0.004	12.34	1.862
BI-214	7056.92	1763.81	56.	158.	0.002	15.58	2.010s

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	1.4941E+00					4.66E+11	
			1460.83	1.494E+00	(	2.877E-01	1.23E+01	1.07E+01 G
TL-208	N	6.1527E-02					6.98E+02	
			583.02	6.153E-02	*(	2.619E-02	2.16E+01	8.45E+01 G
			277.28	0.000E+00	%	1.320E-01	5.34E+01	6.31E+00 G
			860.56	0.000E+00	%	1.470E-01	5.40E+01	1.24E+01 G
PB-212	N	3.5075E-02					6.98E+02	
			238.63	3.507E-02	(	2.671E-02	2.74E+01	4.33E+01 G
			300.03	0.000E+00	%	4.483E-01	0.00E+00	3.28E+00 GA
PB-214	N	1.2527E-01					5.84E+05	
			351.93	1.253E-01	(	4.526E-02	1.68E+01	3.76E+01 G
			295.09	9.051E-02	-	5.857E-02	2.36E+01	1.93E+01 G
			242.00	0.000E+00	?	1.984E-01	0.00E+00	7.43E+00 GA
BI-207	C	3.5772E-02					1.18E+04	
			569.70	3.577E-02	(	2.165E-02	2.84E+01	9.77E+01 G
			1063.66	0.000E+00	&	2.997E-02	1.00E+03	7.45E+01 G
BI-214	N	1.5961E-01					5.84E+05	
			609.31	1.596E-01	(	5.899E-02	1.85E+01	4.61E+01 G
			1120.29	0.000E+00	%	1.461E-01	5.21E+01	1.51E+01 G
			1764.49	6.599E-01	+	1.570E-01	1.56E+01	1.54E+01 G

```
  ( - This peak used in the nuclide activity average.

  * - Peak is too wide, but only one peak in library.
  ! - Peak is part of a multiplet and this area went
      negative during deconvolution.
  ? - Peak is too narrow.
  @ - Peak is too wide at FW25M, but ok at FWHM.
  % - Peak fails sensitivity test.
  $ - Peak identified, but first peak of this nuclide
      failed one or more qualification tests.
  + - Peak activity higher than counting uncertainty range.
  - - Peak activity lower than counting uncertainty range.
  = - Peak outside analysis energy range.
  & - Calculated peak centroid is not close enough to the
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

  Nuclide Codes:                      Peak Codes:
  T - Thermal Neutron Activation      G - Gamma Ray
  F - Fast Neutron Activation         X - X-Ray
  I - Fission Product                 P - Positron Decay
  N - Naturally Occurring Isotope     S - Single-Escape
  P - Photon Reaction                 D - Double-Escape
  C - Charged Particle Reaction       K - Key Line
  M - No MDA Calculation              A - Not in Average
  R - Coincidence Corrected           C - Coincidence Peak
  H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


*************** D I S C A R D E D  I S O T O P E  P E A K S ***************
Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
          Energy   Counts     Counts     Cts/Sec  1 Sigma %
_____________________________________________________________________________
  P - Peakbackground subtraction

*****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
        Time of Count   Uncertainty  1 Sigma
Nuclide    Activity        Counting                    MDA
              DPS
_____________________________________________________________________________
BE-7    <    1.8668E-01
NA-22   <    2.1640E-02
K-40         1.4941E+00   1.2337E+01%               2.877E-01
Sc-46   <    2.0747E-02
CR-51   <    1.0811E-01
MN-54   <    2.1558E-02
FE-59   <    3.2930E-02
Co-56   <    2.2457E-02
CO-57   <    1.1409E-02
CO-58   <    2.6537E-02
```

CO-60	<	2.1527E-02		
ZN-65	<	7.3809E-02		
NB-94	<	2.4772E-02		
ZR-95	<	3.0628E-02		
NB-95	<	3.2295E-02		
RU-103	<	1.2778E-02		
RH-106	<	1.5308E-01		
AG-108M	<	1.3317E-02		
AG-110M	<	2.3983E-02		
SN-113	<	2.0373E-02		
SB-124	<	1.7148E-02		
SB-125	<	4.3206E-02		
I-131	<	1.4303E-02		
BA-133	<	2.2330E-02		
CS-134	<	2.6260E-02		
CS-137	<	1.8704E-02		
CE-139	<	1.4420E-02		
Ba-140	<	5.2385E-02		
La-140	<	2.0380E-02		
CE-141	<	2.5852E-02		
CE-144	<	1.0905E-01		
PM-144	<	2.9732E-02		
EU-152	<	6.2191E-02		
EU-154	<	2.2883E-01		
EU-155	<	3.2168E-02		
HF-181	<	2.0274E-02		
Ta-182	<	8.6208E-02		
Hg-203	<	1.5444E-02		
TL-208	#	6.1527E-02	2.1598E+01%	2.619E-02
pm-146	<	4.5505E-02		
y-88	<	2.1682E-02		
PB-210	<	3.6860E-01		
PB-212		3.5075E-02	2.7373E+01%	2.671E-02
PB-214	#	1.2527E-01	1.6777E+01%	4.526E-02
BI-207	#	3.5772E-02	2.8438E+01%	2.165E-02
BI-212	<	3.9235E-01		
BI-214		1.5961E-01	1.8547E+01%	5.899E-02
BI-210M	<	1.6903E-02		
RA-224	<	3.9884E-01		
AC-228	<	9.6008E-02		
TH-227	<	9.3107E-02		
TH-229	<	1.8082E-01		
TH-234	<	2.9059E-01		
PA-231	<	2.2128E-01		
PA-233	<	2.3848E-02		
PA-234	<	3.7091E-02		
PA-234M	<	2.4931E+00		
Ra-226	<	3.7794E-01		
U-235	<	4.7957E-02		

AM-241 < 3.1336E-02
Np-237 < 3.9790E-02

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.3 keV) 1.911E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 12_20190119001_BGLong
Description: Background Long PBC Count
Acquired: 1/19/2019 2:08:53 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	2.00	1.89	1.93	1.98	2.07	2.10	PASS

Analyst: Joey Sausto Reviewer:

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Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det12\12_20190119001_BGLong.An1

Acquisition information
Start time: 1/19/2019 2:08:53 PM
Live time: 72000
Real time: 72042
Dead time: 0.06 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_QC.Clb
12_SourceCheck_H_2018

Energy Calibration
Created: 4/20/2018 11:13:27 AM
Zero offset: 0.059 keV
Gain: 0.250 keV/channel
Quadratic: -3.735E-08 keV/channel^2

Efficiency Calibration
Created: 4/24/2018 2:08:25 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: Null.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.59keV)
Stop channel: 8000 (1999.13keV)
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 5)

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	

***** 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
46.56	1342.	6.26	0.81	5.834E-02				
63.28	973.	7.14	0.79	7.853E-02				
74.95	287.	14.83	0.88	9.260E-02				
77.09	247.	18.48	0.88	9.518E-02				
92.60	1346.	4.94	1.18	1.066E-01				
139.89	242.	21.86	0.96	9.295E-02				
185.81	776.	9.16	1.20	8.763E-02				
238.43	436.	11.36	1.12	8.153E-02				
351.72	285.	15.52	1.00	6.839E-02				
510.87	2360.	4.73	2.79	4.994E-02				
608.98	333.	15.23	1.18	3.857E-02				

********** 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	
185.88	46.56	1371.	1342.	2.300E+04	6.26	0.812	-	s
252.70	63.28	1100.	973.	1.239E+04	7.14	0.793	-	
299.36	74.93	765.	287.	3.104E+03	14.83	0.880	-	D
307.89	77.07	918.	247.	2.595E+03	18.48	0.882	-	sD
369.92	92.60	924.	1346.	1.262E+04	4.94	1.184	-	s
558.95	139.89	728.	242.	2.598E+03	21.86	0.962	-	s
742.55	185.81	987.	776.	8.860E+03	9.16	1.201	-	s
952.91	238.43	607.	436.	5.352E+03	11.36	1.122	-	
1405.89	351.72	456.	285.	4.167E+03	15.52	1.004	-	
2042.39	510.87	934.	2360.	4.725E+04	4.73	2.791	-	s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
2434.78	608.98	464.	333.	8.638E+03	15.23	1.179	- 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: Null.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

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

(- 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
_____________________________________________________________________________
DUMMY    No in-range peaks
  < - 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  1999.1 keV)     0.000E+00  DPS
```

Test America
St. Louis
Background Check

Spectrum: 14_20190119001_BGLong
Description: Background Long PBC Count
Acquired: 1/19/2019 2:07:37 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	1.74	1.90	1.94	PASS

Analyst: Joey Sausto Reviewer:

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Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det14\14_20190119001_BGLong.An1

Acquisition information
Start time: 1/19/2019 2:07:37 PM
Live time: 72000
Real time: 72023
Dead time: 0.03 %
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:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 14 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2160

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.60	676.	9.34	1.00	6.129E-02	46.54	4.250	3.609E+00	PB210
63.43	609.	10.42	0.96	8.558E-02	63.29	3.810	2.599E+00	TH234
75.11	198.	26.35	0.97	1.024E-01				
92.63	988.	6.68	1.10	1.215E-01	92.59	5.584	2.022E+00	TH234
					93.35	5.561	2.030E+00	AC228
185.49	531.	10.80	1.04	1.072E-01	185.72	54.000	1.274E-01	U235
238.37	244.	19.84	0.68	9.396E-02	238.63	43.300	8.353E-02	PB212
351.58	219.	15.37	1.01	6.555E-02	351.93	37.600	1.235E-01	PB214
510.70	1821.	4.44	2.41	4.542E-02	511.86	20.000	2.790E+00	RH106
583.03	126.	22.37	1.11	3.931E-02	583.02	84.500	5.255E-02	TL208
608.92	221.	19.58	1.48	3.708E-02	609.31	46.090	1.795E-01	BI214
					610.30	5.750	1.442E+00	RU103
1460.54	166.	13.50	2.24	1.557E-02	1460.83	10.670	1.387E+00	K40
1764.01	74.	20.60	1.89	1.327E-02	1764.49	15.400	5.041E-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	
299.81	75.11	889.	198.	1.932E+03	26.35	0.968	-	s
2041.91	510.70	555.	1821.	4.009E+04	4.44	2.406	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

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This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.80	46.60	945.	676.	0.009	9.34	1.005s
TH-234	253.13	63.43	1024.	609.	0.008	10.42	0.960s
TH-234	369.89	92.63	1010.	988.	0.014	6.68	1.104s
U-235	741.25	185.49	752.	531.	0.007	10.80	1.043
PB-212	952.72	238.37	602.	244.	0.003	19.84	0.682s
PB-214	1405.46	351.58	288.	219.	0.003	15.37	1.011
TL-208	2331.24	583.03	181.	126.	0.002	22.37	1.114
BI-214	2434.82	608.92	341.	221.	0.003	19.58	1.478
K-40	5842.41	1460.54	48.	166.	0.002	13.50	2.241
BI-214	7057.17	1764.01	26.	74.	0.001	20.60	1.886

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	1.3874E+00					4.66E+11	
			1460.83	1.387E+00	(	2.925E-01	1.35E+01	1.07E+01 G
TL-208	N	5.2550E-02					6.98E+02	
			583.02	5.255E-02	(	2.737E-02	2.24E+01	8.45E+01 G
			277.28	0.000E+00	&	1.783E-01	1.00E+03	6.31E+00 G
			860.56	0.000E+00	%	1.809E-01	1.00E+03	1.24E+01 G
PB-210	N	3.6091E+00					8.14E+03	
			46.54	3.609E+00	*(	7.793E-01	9.34E+00	4.25E+00 G
PB-212	N	8.3527E-02					6.98E+02	
			238.63	8.353E-02	(	4.000E-02	1.98E+01	4.33E+01 G
			300.03	0.000E+00	%	3.400E-01	6.95E+01	3.28E+00 GA
PB-214	N	1.2348E-01					5.84E+05	
			351.93	1.235E-01	(	4.616E-02	1.54E+01	3.76E+01 G
			295.09	0.000E+00	%	6.472E-02	8.13E+01	1.93E+01 G
			242.00	0.000E+00	&	1.898E-01	0.00E+00	7.43E+00 GA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-214	N 1.7946E-01					5.84E+05	
		609.31	1.795E-01	(	7.215E-02	1.96E+01	4.61E+01 G
		1120.29	0.000E+00	%	1.723E-01	5.21E+01	1.51E+01 G
		1764.49	5.041E-01	+	1.794E-01	2.06E+01	1.54E+01 G
TH-234	N 2.5992E+00					1.63E+12	
		63.29	2.599E+00	(	6.485E-01	1.04E+01	3.81E+00 G
		92.59	2.022E+00	-	3.089E-01	6.68E+00	5.58E+00 G
U-235	N 1.2744E-01					2.57E+11	
		185.72	1.274E-01	$	3.132E-02	1.08E+01	5.40E+01 GA
		143.79	0.000E+00	%	9.099E-02	3.08E+01	1.10E+01 G
		205.33	0.000E+00	%	1.997E-01	3.69E+01	5.01E+00 G
		163.38	0.000E+00	&	2.030E-01	1.00E+03	5.08E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	1.2676E-01		
NA-22	<	1.9707E-02		
K-40		1.3874E+00	1.3497E+01%	2.925E-01
Sc-46	<	1.1855E-02		
CR-51	<	1.2045E-01		
MN-54	<	2.0843E-02		
FE-59	<	4.8660E-02		
Co-56	<	2.0790E-02		
CO-57	<	8.3189E-03		
CO-58	<	3.2598E-02		
CO-60	<	2.5252E-02		
ZN-65	<	6.3413E-02		
NB-94	<	2.3036E-02		
ZR-95	<	3.6028E-02		
NB-95	<	2.2160E-02		
RU-103	<	1.5052E-02		
RH-106	<	1.5530E-01		
AG-108M	<	1.4113E-02		
AG-110M	<	3.9295E-02		
SN-113	<	2.0885E-02		
SB-124	<	2.1022E-02		
SB-125	<	4.1437E-02		
I-131	<	1.4372E-02		
BA-133	<	2.8025E-02		
CS-134	<	2.4635E-02		
CS-137	<	2.4242E-02		
CE-139	<	1.4388E-02		
Ba-140	<	5.7095E-02		
La-140	<	2.4085E-02		
CE-141	<	1.7808E-02		
CE-144	<	1.0011E-01		
PM-144	<	2.4543E-02		
EU-152	<	4.7956E-02		
EU-154	<	1.4229E-01		
EU-155	<	3.6260E-02		
HF-181	<	1.6769E-02		

Ta-182	<	7.5571E-02		
Hg-203	<	1.3577E-02		
TL-208		5.2550E-02	2.2374E+01%	2.737E-02
pm-146	<	5.6262E-02		
y-88	<	2.0141E-02		
PB-210	#	3.6091E+00	9.3365E+00%	7.793E-01
PB-212		8.3527E-02	1.9841E+01%	4.000E-02
PB-214		1.2348E-01	1.5370E+01%	4.616E-02
BI-207	<	3.2962E-02		
BI-212	<	4.5583E-01		
BI-214		1.7946E-01	1.9581E+01%	7.215E-02
BI-210M	<	2.0765E-02		
RA-224	<	3.5782E-01		
AC-228	<	1.0038E-01		
TH-227	<	1.0105E-01		
TH-229	<	2.3856E-01		
TH-234		2.5992E+00	1.0421E+01%	6.485E-01
PA-231	<	5.9500E-01		
PA-233	<	3.0313E-02		
PA-234	<	7.7965E-02		
PA-234M	<	2.7753E+00		
Ra-226	<	6.1282E-01		
U-235		1.2744E-01	1.0799E+01%	3.132E-02
AM-241	<	3.4025E-02		
Np-237	<	1.1219E-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) 8.162E+00 DPS

(Page 7 of 7)

Test America
St. Louis
Background Check

Spectrum: 16_20190119001_BGLong
Description: Background Long PBC Count
Acquired: 1/19/2019 2:10:53 PM
Detector: Detector #16
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.68	2.51	2.56	2.63	2.80	2.86	PASS

Analyst: Joey Sausto Reviewer: Jody Watson

(Page 1 of 8)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det16\16_20190119001_BGLong.An1

Acquisition information

Start time:	1/19/2019 2:10:53 PM
Live time:	72000
Real time:	72231
Dead time:	0.32 %
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:	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: 0.1775

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.42	1498.	5.92	1.04	7.054E-02	46.54	4.250	6.924E+00	PB210
59.53	275.	18.15	0.97	8.959E-02	59.54	35.900	1.188E-01	AM241
63.29	1080.	5.39	0.97	9.504E-02	63.29	3.810	4.144E+00	TH234
74.88	406.	14.55	0.99	1.118E-01				
77.29	260.	21.88	0.99	1.153E-01				
92.59	1482.	5.86	1.16	1.312E-01	92.59	5.584	2.809E+00	TH234
					93.35	5.561	2.819E+00	AC228
185.59	889.	9.43	0.76	1.130E-01	185.72	54.000	2.024E-01	U235
					185.99	3.280	3.334E+00	Ra226
198.36	258.	29.42	1.03	1.097E-01				
238.55	492.	11.12	0.81	9.908E-02	238.63	43.300	1.594E-01	PB212
294.92	228.	29.47	1.07	8.414E-02	295.09	19.300	1.947E-01	PB214
337.74	178.	26.88	1.10	7.266E-02	338.32	12.010	2.833E-01	AC228
351.35	448.	12.97	1.75	6.918E-02	351.93	37.600	2.398E-01	PB214
510.72	2773.	4.07	2.45	4.934E-02	511.86	20.000	3.908E+00	RH106
582.92	266.	19.79	1.66	4.377E-02	583.02	84.500	9.976E-02	TL208
609.23	294.	18.34	1.34	4.175E-02	609.31	46.090	2.122E-01	BI214
					610.30	5.750	1.704E+00	RU103
910.77	144.	22.08	1.49	2.646E-02	911.16	29.000	2.607E-01	AC228
1000.53	160.	25.48	0.86	2.469E-02	1001.00	0.837	1.075E+01	PA234M
1460.43	325.	10.66	2.23	1.797E-02	1460.83	10.670	2.357E+00	K40
1763.46	178.	14.67	3.55	1.550E-02	1764.49	15.400	1.036E+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
299.16	74.89	1540.	406.	3.630E+03	14.55	0.986	- sD
308.79	77.30	1483.	260.	2.253E+03	21.88	0.988	- D
792.87	198.36	1317.	258.	2.350E+03	29.42	1.029	- sM
2041.99	510.90	1031.	2773.	5.619E+04	4.07	2.451	- M

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.37	46.42	1530.	1498.	0.021	5.92	1.045
AM-241	237.83	59.54	1044.	275.	0.004	17.70	0.971D
TH-234	252.82	63.29	1152.	1080.	0.015	5.39	0.975D
TH-234	369.97	92.59	1653.	1482.	0.021	5.86	1.162s
Ra-226	741.83	185.59	1417.	889.	0.012	9.43	0.764s
PB-212	953.56	238.55	791.	492.	0.007	11.12	0.810s
PB-214	1178.99	294.92	948.	228.	0.003	29.47	1.066
AC-228	1350.24	337.74	576.	178.	0.002	26.88	1.098
PB-214	1405.14	351.47	678.	409.	0.006	13.89	1.721s
TL-208	2330.74	582.92	483.	266.	0.004	19.79	1.660
BI-214	2435.97	609.23	581.	294.	0.004	18.34	1.337
AC-228	3642.16	910.77	200.	144.	0.002	22.08	1.491
PA-234M	4001.27	1000.53	231.	160.	0.002	25.48	0.862s
K-40	5841.58	1460.43	139.	325.	0.005	10.66	2.229s
BI-214	7054.48	1763.46	63.	178.	0.002	14.67	3.547s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	MDA Value DPS		COMMENTS
K-40	N	2.3569E+00					4.66E+11	
			1460.83	2.357E+00	@(	4.172E-01	1.07E+01	1.07E+01 G
TL-208	N	9.9757E-02					6.98E+02	
			583.02	9.976E-02	(	3.949E-02	1.98E+01	8.45E+01 G
			277.28	0.000E+00	&	1.962E-01	1.00E+03	6.31E+00 G
			860.56	0.000E+00	&	2.211E-01	1.00E+03	1.24E+01 G
PB-210	N	6.9244E+00					8.14E+03	
			46.54	6.924E+00	(	8.547E-01	5.92E+00	4.25E+00 G
PB-212	N	1.5943E-01					6.98E+02	
			238.63	1.594E-01	(	4.333E-02	1.11E+01	4.33E+01 G
			300.03	0.000E+00	&	5.272E-01	8.73E+01	3.28E+00 GA
PB-214	N	2.1072E-01					5.84E+05	
			351.93	2.189E-01	*(	6.633E-02	1.39E+01	3.76E+01 G
			295.09	1.947E-01	?(	1.251E-01	2.95E+01	1.93E+01 G
			242.00	0.000E+00		2.745E-01	0.00E+00	7.43E+00 GA
BI-214	N	2.1224E-01					5.84E+05	
			609.31	2.122E-01	(	8.304E-02	1.83E+01	4.61E+01 G
			1120.29	0.000E+00	%	1.946E-01	3.69E+01	1.51E+01 G
			1764.49	1.036E+00	+	2.310E-01	1.47E+01	1.54E+01 G
AC-228	N	2.6731E-01					2.10E+03	
			911.16	2.607E-01	?(	1.242E-01	2.21E+01	2.90E+01 G
			968.97	0.000E+00	%	1.699E-01	5.56E+01	1.75E+01 G
			338.32	2.833E-01	(	1.823E-01	2.69E+01	1.20E+01 G
			93.35	0.000E+00	?	4.688E-01	0.00E+00	5.56E+00 XA
TH-234	N	4.1443E+00					1.63E+12	
			63.29	4.144E+00	(	6.176E-01	5.39E+00	3.81E+00 G
			92.59	2.809E+00	-	3.643E-01	5.86E+00	5.58E+00 G
PA-234M	N	1.0753E+01					1.63E+12	
			1001.00	1.075E+01	(	4.942E+00	2.55E+01	8.37E-01 G
			766.41	0.000E+00	&	8.257E+00	1.00E+03	2.94E-01 G
Ra-226		3.3344E+00					5.84E+05	
			185.99	3.334E+00	(	6.678E-01	9.43E+00	3.28E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	T 1.1868E-01					1.58E+05	
		59.54	1.187E-01	(	6.624E-02	1.77E+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	<	2.0590E-01		
NA-22	<	2.9969E-02		
K-40	#	2.3569E+00	1.0664E+01%	4.172E-01
Sc-46	<	2.8915E-02		

CR-51	<	1.2953E-01		
MN-54	<	2.5087E-02		
FE-59	<	5.0677E-02		
Co-56	<	2.8556E-02		
CO-57	<	1.7350E-02		
CO-58	<	2.6254E-02		
CO-60	<	3.2628E-02		
ZN-65	<	1.0221E-01		
NB-94	<	4.3872E-02		
ZR-95	<	4.1221E-02		
NB-95	<	3.4352E-02		
RU-103	<	2.0536E-02		
RH-106	<	2.2841E-01		
AG-108M	<	1.8813E-02		
AG-110M	<	5.9257E-02		
SN-113	<	2.7782E-02		
SB-124	<	2.3872E-02		
SB-125	<	5.7512E-02		
I-131	<	1.7492E-02		
BA-133	<	3.4716E-02		
CS-134	<	1.4736E-02		
CS-137	<	2.3150E-02		
CE-139	<	1.2360E-02		
Ba-140	<	7.5969E-02		
La-140	<	3.0107E-02		
CE-141	<	3.2553E-02		
CE-144	<	1.4334E-01		
PM-144	<	3.8057E-02		
EU-152	<	8.3017E-02		
EU-154	<	2.2222E-01		
EU-155	<	5.1440E-02		
HF-181	<	3.6421E-02		
Ta-182	<	4.8785E-02		
Hg-203	<	2.2749E-02		
TL-208		9.9757E-02	1.9785E+01%	3.949E-02
pm-146	<	6.7224E-02		
y-88	<	3.1548E-02		
PB-210		6.9244E+00	5.9207E+00%	8.547E-01
PB-212		1.5943E-01	1.1122E+01%	4.333E-02
PB-214	#	2.1072E-01	1.3891E+01%	6.633E-02
BI-207	<	2.8452E-02		
BI-212	<	4.7584E-01		
BI-214		2.1224E-01	1.8344E+01%	8.304E-02
BI-210M	<	2.4443E-02		
RA-224	<	4.9989E-01		
AC-228		2.6731E-01	1.7394E+01%	1.242E-01
TH-227	<	1.3360E-01		
TH-229	<	2.6644E-01		
TH-234		4.1443E+00	5.3880E+00%	6.176E-01

PA-231	<	7.8973E-01		
PA-233	<	3.4680E-02		
PA-234	<	9.2567E-02		
PA-234M		1.0753E+01	2.5476E+01%	4.942E+00
Ra-226		3.3344E+00	9.4267E+00%	6.678E-01
U-235	<	1.0205E-01		
AM-241	#	1.1868E-01	1.7698E+01%	6.624E-02
Np-237	<	1.4122E-01		

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.6 keV) 2.858E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 17_20190119001_BGLong
Description: Background Long PBC Count
Acquired: 1/19/2019 2:13:12 PM
Detector: Detector #17
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.32	2.18	2.23	2.33	2.42	2.46	PASS

Analyst: Joey Sausto Reviewer:

(Page 1 of 8)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det17\17_20190119001_BGLong.An1

Acquisition information
Start time: 1/19/2019 2:13:12 PM
Live time: 72000
Real time: 73790
Dead time: 2.43 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_QC.Clb
17_QC_83725-334_SOURCE H_042211

Energy Calibration
Created: 2/29/2012 10:33:23 AM
Zero offset: 0.108 keV
Gain: 0.250 keV/channel
Quadratic: -2.584E-08 keV/channel^2

Efficiency Calibration
Created: 5/1/2011 11:17:56 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.63keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

(Page 2 of 8)

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1174

***** 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
46.61	1259.	5.62	0.78	5.950E-02	46.54	4.250	6.928E+00	PB210
63.40	1227.	7.05	0.72	8.051E-02	63.29	3.810	5.566E+00	TH234
74.93	322.	18.53	0.91	9.493E-02				
84.62	300.	19.40	1.44	1.071E-01				
92.63	1627.	5.42	1.01	1.119E-01	92.59	5.584	3.617E+00	TH234
					93.35	5.561	3.629E+00	AC228
139.83	202.	26.25	0.55	1.105E-01				
143.65	252.	24.23	1.03	1.094E-01	143.79	10.960	2.921E-01	U235
185.54	958.	7.26	0.97	9.860E-02	185.72	54.000	2.501E-01	U235
					185.99	3.280	4.120E+00	Ra226
198.53	250.	23.19	0.88	9.565E-02				
238.51	348.	16.21	0.85	8.657E-02	238.63	43.300	1.292E-01	PB212
295.05	184.	25.46	1.18	7.373E-02	295.09	19.300	1.801E-01	PB214
338.30	134.	27.20	1.12	6.390E-02	338.32	12.010	2.425E-01	AC228
351.84	293.	15.77	0.95	6.082E-02	351.93	37.600	1.778E-01	PB214
510.92	2303.	4.33	2.52	4.377E-02	511.86	20.000	3.663E+00	RH106
583.36	191.	24.43	0.95	3.885E-02	583.02	84.500	8.069E-02	TL208
609.16	351.	13.49	1.18	3.711E-02	609.31	46.090	2.851E-01	BI214
					610.30	5.750	2.289E+00	RU103
911.30	126.	22.51	2.52	2.355E-02	911.16	29.000	2.552E-01	AC228
968.53	115.	28.51	0.80	2.254E-02	968.97	17.460	4.059E-01	AC228
1001.55	123.	26.36	1.27	2.198E-02	1001.00	0.837	9.274E+00	PA234M
1120.68	130.	25.74	1.19	1.989E-02	1120.29	15.100	6.011E-01	BI214
					1120.55	99.987	9.081E-02	Sc46
					1121.30	34.900	2.603E-01	Ta182
1460.87	317.	8.24	1.85	1.608E-02	1460.83	10.670	2.567E+00	K40
1697.03	82.	16.41	0.42	1.431E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.68	119.	12.51	1.21	1.381E-02	1764.49	15.400	7.773E-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	
299.12	74.93	1142.	322.	3.390E+03	18.53	0.913	-	s
337.87	84.62	1089.	300.	2.802E+03	19.40	1.438	-	s
558.60	139.83	870.	202.	1.829E+03	26.25	0.551	-	s
793.31	198.53	892.	250.	2.619E+03	23.19	0.881	-	s
2042.57	510.32	882.	2303.	5.262E+04	4.33	2.521	-	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	185.92	46.61	1125.	1259.	0.017	5.62	0.783
TH-234	253.05	63.40	1563.	1227.	0.017	7.05	0.720
TH-234	369.90	92.63	1601.	1627.	0.023	5.42	1.010s
U-235	573.89	143.65	1043.	252.	0.004	24.23	1.025s
U-235	742.10	185.72	1012.	858.	0.012	5.83	0.971D
PB-212	953.18	238.51	812.	348.	0.005	16.21	0.853
PB-214	1179.26	295.05	578.	184.	0.003	25.46	1.179
AC-228	1352.21	338.30	398.	134.	0.002	27.20	1.121
PB-214	1406.37	351.84	501.	293.	0.004	15.77	0.950
TL-208	2332.29	583.36	410.	191.	0.003	24.43	0.955s
BI-214	2435.49	609.16	420.	351.	0.005	13.49	1.177s
AC-228	3644.15	911.30	162.	126.	0.002	22.51	2.517s
AC-228	3873.13	968.53	192.	115.	0.002	28.51	0.802s
PA-234M	4005.24	1001.55	179.	123.	0.002	26.36	1.270s
BI-214	4481.95	1120.68	165.	130.	0.002	25.74	1.192s
K-40	5843.41	1460.87	63.	317.	0.004	8.24	1.850s
BI-214	7059.60	1764.68	22.	119.	0.002	12.51	1.211s

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	2.5667E+00					4.66E+11	
			1460.83	2.567E+00	@(	3.209E-01	8.24E+00	1.07E+01 G
TL-208	N	8.0693E-02					6.98E+02	
			583.02	8.069E-02	(	4.105E-02	2.44E+01	8.45E+01 G
			277.28	0.000E+00	%	2.193E-01	1.00E+03	6.31E+00 G
			860.56	0.000E+00	%	1.992E-01	6.16E+01	1.24E+01 G
PB-210	N	6.9278E+00					8.14E+03	
			46.54	6.928E+00	(	8.746E-01	5.62E+00	4.25E+00 G
PB-212	N	1.2917E-01					6.98E+02	
			238.63	1.292E-01	(	5.024E-02	1.62E+01	4.33E+01 G
			300.03	0.000E+00	%	4.042E-01	3.78E+01	3.28E+00 GA
PB-214	N	1.7858E-01					5.84E+05	
			351.93	1.778E-01	(	6.503E-02	1.58E+01	3.76E+01 G
			295.09	1.801E-01	(	1.120E-01	2.55E+01	1.93E+01 G
			242.00	0.000E+00	@	2.597E-01	0.00E+00	7.43E+00 GA
BI-214	N	2.8511E-01					5.84E+05	
			609.31	2.851E-01	*(	7.977E-02	1.35E+01	4.61E+01 G
			1120.29	6.011E-01	+	2.893E-01	2.57E+01	1.51E+01 G
			1764.49	7.773E-01	+	1.605E-01	1.25E+01	1.54E+01 G
AC-228	N	2.9761E-01					2.10E+03	
			911.16	2.552E-01	(	1.260E-01	2.25E+01	2.90E+01 G
			968.97	4.059E-01	(	2.375E-01	2.85E+01	1.75E+01 G
			338.32	2.425E-01	(	1.732E-01	2.72E+01	1.20E+01 G
			93.35	0.000E+00	?	5.263E-01	0.00E+00	5.56E+00 XA
TH-234	N	5.5657E+00					1.63E+12	
			63.29	5.566E+00	(	8.480E-01	7.05E+00	3.81E+00 G
			92.59	3.617E+00	-	4.205E-01	5.42E+00	5.58E+00 G
PA-234M	N	9.2743E+00					1.63E+12	
			1001.00	9.274E+00	(	4.914E+00	2.64E+01	8.37E-01 G
			766.41	0.000E+00	&	7.894E+00	6.25E+01	2.94E-01 G
U-235	N	2.9208E-01					2.57E+11	
			185.72	2.238E-01	}	3.938E-02	5.83E+00	5.40E+01 GA
			143.79	2.921E-01	*(	1.776E-01	2.42E+01	1.10E+01 G

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Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		205.33	0.000E+00 %		2.596E-01	5.31E+02	5.01E+00 G
		163.38	0.000E+00 %		2.438E-01	4.45E+01	5.08E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity DPS	Time of Count Uncertainty Counting	1 Sigma	MDA
BE-7	<	1.9463E-01			
NA-22	<	5.1357E-02			
K-40	#	2.5667E+00	8.2441E+00%		3.209E-01
Sc-46	<	3.9858E-02			
CR-51	<	1.3949E-01			

MN-54	<	2.3431E-02		
FE-59	<	5.4179E-02		
Co-56	<	2.5610E-02		
CO-57	<	1.9422E-02		
CO-58	<	3.7015E-02		
CO-60	<	3.0878E-02		
ZN-65	<	7.2099E-02		
NB-94	<	2.6751E-02		
ZR-95	<	4.2507E-02		
NB-95	<	3.5919E-02		
RU-103	<	1.8021E-02		
RH-106	<	1.2973E-01		
AG-108M	<	1.8202E-02		
AG-110M	<	3.5472E-02		
SN-113	<	2.4385E-02		
SB-124	<	3.5713E-02		
SB-125	<	5.4235E-02		
I-131	<	1.8574E-02		
BA-133	<	3.3368E-02		
CS-134	<	3.0207E-02		
CS-137	<	2.6832E-02		
CE-139	<	1.4643E-02		
Ba-140	<	7.4154E-02		
La-140	<	3.0552E-02		
CE-141	<	3.1256E-02		
CE-144	<	1.4059E-01		
PM-144	<	2.7744E-02		
EU-152	<	3.9932E-02		
EU-154	<	3.4385E-01		
EU-155	<	4.3255E-02		
HF-181	<	2.9943E-02		
Ta-182	<	1.1162E-01		
Hg-203	<	1.6349E-02		
TL-208		8.0693E-02	2.4429E+01%	4.105E-02
pm-146	<	6.6070E-02		
y-88	<	2.8862E-02		
PB-210		6.9278E+00	5.6195E+00%	8.746E-01
PB-212		1.2917E-01	1.6212E+01%	5.024E-02
PB-214		1.7858E-01	1.4973E+01%	6.503E-02
BI-207	<	3.6524E-02		
BI-212	<	3.2365E-01		
BI-214		2.8511E-01	1.3487E+01%	7.977E-02
BI-210M	<	2.5934E-02		
RA-224	<	5.2525E-01		
AC-228		2.9761E-01	1.5127E+01%	1.260E-01
TH-227	<	1.3744E-01		
TH-229	<	2.9416E-01		
TH-234		5.5657E+00	7.0482E+00%	8.480E-01
PA-231	<	5.8859E-01		

PA-233	<	3.7733E-02		
PA-234	<	5.0684E-02		
PA-234M	#	9.2743E+00	2.6362E+01%	4.914E+00
U-235	#	2.9208E-01	2.4231E+01%	1.776E-01
AM-241	<	7.2861E-02		
Np-237	<	1.4973E-01		

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 2.560E+01 DPS

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Run Logs

Gamma Spectroscopy Run Log

Detector: GV2

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/21/18 11:08		ZZZZZ		365000			
03/21/18 11:29		ZZZZZ		365000			
03/22/18 02:01		IC 160-365000/3		365000			JLW
05/04/18 10:31		ICV 160-365000/4		365000			JLW
01/19/19 14:10		ICB 160-411335/1		411335			RTM
02/20/19 00:29		CCV 160-415654/1		415654			
02/20/19 00:50		CCV 160-415654/2		415654			KLS
02/20/19 01:33		CCB 160-415654/3		415654			KLS
02/20/19 02:48	60	ZZZZZ		415654			
02/20/19 04:37	60	ZZZZZ		415654			
02/20/19 08:14	30	180-86110-4	JSF-BS-BG12-13.5/15.0-2 0190123	415654	412881	901.1	KLS
02/20/19 10:40	60	ZZZZZ		415654			
02/20/19 11:48	30	180-86110-16	JSF-BS-BG10-10.5/12.5-2 0190124	415654	412881	901.1	KLS
02/20/19 15:56	30	ZZZZZ		415654			
02/21/19 00:29		CCV 160-415891/1		415891			
02/21/19 00:50		CCV 160-415891/2		415891			KLS
02/21/19 01:18		CCB 160-415891/3		415891			KLS
02/21/19 01:55	30	180-86110-2	JSF-BS-BG12-5.0/10.0-2(190123	415891	412881	901.1	KLS

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
01/19/19 14:09		ICB 160-411329/1		411329			RTM
02/20/19 00:27		CCV 160-415651/1		415651			
02/20/19 00:49		CCV 160-415651/2		415651			KLS
02/20/19 01:35		CCB 160-415651/3		415651			KLS
02/20/19 02:46	30	ZZZZZ		415651			
02/20/19 04:38	30	ZZZZZ		415651			
02/20/19 07:19	30	ZZZZZ		415651			
02/20/19 08:13	30	180-86110-1	JSF-BS-BG12-0.8/2.8-20 90123	415651	412881	901.1	KLS
02/20/19 10:48		ZZZZZ		415651			
02/20/19 11:51	30	180-86110-17	JSF-BS-BG10-0.0/0.5-20 90124	415651	412881	901.1	KLS
02/20/19 15:53	30	ZZZZZ		415651			
02/21/19 00:30		CCV 160-415889/1		415889			
02/21/19 00:52		CCV 160-415889/2		415889			KLS
02/21/19 01:17		CCB 160-415889/3		415889			KLS
02/21/19 01:54	30	180-86110-9	JSF-BS-FD01-20190124	415889	412881	901.1	KLS
02/21/19 17:11	30	ZZZZZ		415889			
02/21/19 17:56	30	ZZZZZ		415889			

Detector: GV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/05/12 14:07		IC 160-12302/1		12302			JLW
03/26/12 06:37		IC 160-12306/1		12306			JLW

Gamma Spectroscopy Run Log

Detector: GV7 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 15:25		ICV 160-12302/2		12302			JLW
04/02/12 14:43		ICV 160-12306/2		12306			JLW
01/19/19 14:12		ICB 160-411330/1		411330			RTM
02/19/19 00:57		CCV 160-415565/1		415565			
02/19/19 01:19		CCV 160-415565/2		415565			CDR
02/19/19 02:07		CCB 160-415565/3		415565			CDR
02/19/19 03:12	120	ZZZZZ		415565			
02/19/19 05:19	120	ZZZZZ		415565			
02/19/19 08:14	30	ZZZZZ		415565			
02/19/19 08:53	30	ZZZZZ		415565			
02/19/19 09:29	120	MB 160-412878/1-A		415565	412878	901.1	CDR
02/19/19 11:49	120	LCS 160-412878/2-A		415565	412878	901.1	CDR
02/19/19 17:10	60	ZZZZZ		415565			
02/19/19 18:44	60	ZZZZZ		415565			
02/20/19 00:28		CCV 160-415652/1		415652			
02/20/19 00:50		CCV 160-415652/2		415652			KLS
02/20/19 01:33		CCB 160-415652/3		415652			KLS
02/20/19 02:47	30	ZZZZZ		415652			
02/20/19 04:36	30	ZZZZZ		415652			
02/20/19 07:16	30	ZZZZZ		415652			
02/20/19 08:11	30	180-86110-3	JSF-BS-BG12-10.75/12.7 5-20190123	415652	412881	901.1	KLS
02/20/19 09:37	30	180-86110-8	JSF-BS-BG11-5.5/8.5-20' 90124	415652	412881	901.1	KLS
02/20/19 10:46	30	180-86110-10	JSF-BS-BG11-11.3/13.3-2 0190124	415652	412881	901.1	KLS
02/20/19 11:35	30	ZZZZZ		415652			
02/20/19 13:40	10	ZZZZZ		415652			
02/20/19 15:56	30	ZZZZZ		415652			

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
01/19/19 14:16		ICB 160-411331/1		411331			RTM
02/20/19 00:29		CCV 160-415653/1		415653			
02/20/19 00:52		CCV 160-415653/2		415653			KLS
02/20/19 01:32		CCB 160-415653/3		415653			KLS
02/20/19 02:49	60	ZZZZZ		415653			
02/20/19 04:35	60	ZZZZZ		415653			
02/20/19 06:01	60	ZZZZZ		415653			
02/20/19 07:15	30	ZZZZZ		415653			
02/20/19 08:04		ZZZZZ		415653			
02/20/19 09:36	30	180-86110-7	JSF-BS-BG11-1.1/3.1-20' 90124	415653	412881	901.1	KLS
02/20/19 11:36	30	ZZZZZ		415653			
02/20/19 13:00	10	ZZZZZ		415653			
02/20/19 13:42	30	ZZZZZ		415653			
02/20/19 15:57	30	ZZZZZ		415653			
02/20/19 16:35	30	ZZZZZ		415653			
02/21/19 00:28		CCV 160-415892/1		415892			
02/21/19 00:50		CCV 160-415892/2		415892			KLS

Gamma Spectroscopy Run Log

Detector: GV8 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
02/21/19 01:19		CCB 160-415892/3		415892			KLS
02/21/19 01:56	30	180-86110-11	JSF-BS-BG11-0.0/0.5-20´ 90124	415892	412881	901.1	KLS
02/21/19 17:12	30	ZZZZZ		415892			
02/21/19 17:59	10	ZZZZZ		415892			
02/21/19 18:38	30	ZZZZZ		415892			
02/21/19 20:23	30	ZZZZZ		415892			

Detector: GV9

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/03/12 13:37		IC 160-12326/1		12326			JLW
06/14/12 10:54		ICV 160-12326/2		12326			JLW
01/19/19 14:07		ICB 160-411326/1		411326			RTM
02/20/19 00:26		CCB 160-415646/1		415646			KLS
02/20/19 01:31		CCV 160-415646/2		415646			
02/20/19 01:51		CCV 160-415646/3		415646			KLS
02/20/19 02:50	60	ZZZZZ		415646			
02/20/19 04:35	60	ZZZZZ		415646			
02/20/19 05:54	60	ZZZZZ		415646			
02/20/19 07:08	30	ZZZZZ		415646			
02/20/19 07:58	30	MB 160-412881/1-A		415646	412881	901.1	KLS
02/20/19 09:33	30	180-86110-1 DU	JSF-BS-BG12-0.8/2.8-20´ 90123 DU	415646	412881	901.1	KLS
02/20/19 10:47	30	180-86110-14	JSF-BS-BG10-1.4/3.4-20´ 90124	415646	412881	901.1	KLS
02/20/19 11:36	30	ZZZZZ		415646			
02/20/19 12:24	60	ZZZZZ		415646			
02/20/19 13:52	30	ZZZZZ		415646			
02/20/19 15:55	60	ZZZZZ		415646			

Detector: GV12

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/18/18 13:54		IC 160-364854/1		364854			JLW
04/24/18 09:26		ICV 160-364854/2		364854			JLW
01/19/19 14:08		ICB 160-411325/1		411325			RTM
02/20/19 00:27		CCB 160-415647/1		415647			KLS
02/20/19 01:30		CCV 160-415647/2		415647			
02/20/19 01:51		CCV 160-415647/3		415647			KLS
02/20/19 02:50	60	ZZZZZ		415647			
02/20/19 04:34	60	ZZZZZ		415647			
02/20/19 05:55	60	ZZZZZ		415647			
02/20/19 07:09	30	ZZZZZ		415647			
02/20/19 07:59	30	LCS 160-412881/2-A		415647	412881	901.1	KLS
02/20/19 09:34	30	180-86110-5	JSF-BS-BG12-0.0/0.5-20´ 90123	415647	412881	901.1	KLS
02/20/19 10:47	30	180-86110-15	JSF-BS-BG10-6.5/8.5-20´ 90124	415647	412881	901.1	KLS
02/20/19 11:37	30	ZZZZZ		415647			
02/20/19 15:57	30	ZZZZZ		415647			

Gamma Spectroscopy Run Log

Detector: GV14

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/06/12 23:06		IC 160-12355/1		12355			JLW
04/12/12 03:08		ICV 160-12355/2		12355			JLW
01/19/19 14:07		ICB 160-411322/1		411322			RTM
02/19/19 00:55		CCV 160-415542/1		415542			
02/19/19 01:18		CCV 160-415542/2		415542			KLS
02/19/19 02:02		CCB 160-415542/3		415542			KLS
02/19/19 03:07	120	ZZZZZ		415542			
02/19/19 05:12	120	ZZZZZ		415542			
02/19/19 07:32	120	ZZZZZ		415542			
02/19/19 09:39	120	180-86110-13	JSF-BS-FB02-20190124	415542	412878	901.1	KLS
02/19/19 11:43	120	ZZZZZ		415542			
02/19/19 15:41	60	ZZZZZ		415542			
02/19/19 16:49	60	ZZZZZ		415542			
02/19/19 18:44	60	ZZZZZ		415542			
02/19/19 21:51		ZZZZZ		415542			
02/19/19 21:51	60	ZZZZZ		415542			

Detector: GV16

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 15:43		IC 160-11759/1		11759			JLW
04/24/12 08:11		ICV 160-11759/2		11759			JLW
01/19/19 14:10		ICB 160-411402/1		411402			JLW
02/19/19 00:52		CCV 160-415543/1		415543			
02/19/19 01:14		CCV 160-415543/2		415543			KLS
02/19/19 02:03		CCB 160-415543/3		415543			KLS
02/19/19 03:06	120	ZZZZZ		415543			
02/19/19 05:16	120	ZZZZZ		415543			
02/19/19 07:33	120	ZZZZZ		415543			
02/19/19 09:41	120	180-86110-6 DU	JSF-BS-FB01-20190123 DU	415543	412878	901.1	KLS
02/19/19 11:45	120	ZZZZZ		415543			
02/19/19 15:42	60	ZZZZZ		415543			
02/19/19 16:50	120	ZZZZZ		415543			
02/19/19 18:59	120	ZZZZZ		415543			

Detector: GV17

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/05/12 14:23		IC 160-11760/1		11760			JLW
03/07/12 23:01		ICV 160-11760/2		11760			JLW
01/19/19 14:13		ICB 160-411324/1		411324			RTM
02/19/19 00:52		CCV 160-415544/1		415544			
02/19/19 01:16		CCV 160-415544/2		415544			KLS
02/19/19 02:04		CCB 160-415544/3		415544			KLS
02/19/19 03:05	120	ZZZZZ		415544			
02/19/19 05:20	120	ZZZZZ		415544			
02/19/19 07:35	120	180-86110-6	JSF-BS-FB01-20190123	415544	412878	901.1	KLS
02/19/19 09:40	120	180-86110-12	JSF-BS-EB01-20190124	415544	412878	901.1	KLS
02/19/19 11:47	120	ZZZZZ		415544			
02/19/19 15:43	60	ZZZZZ		415544			
02/19/19 16:52	120	ZZZZZ		415544			

Gamma Spectroscopy Run Log

Detector: GV17 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
02/19/19 19:01	120	ZZZZZ		415544			

Subcontract Data

Shipping and Receiving Documents

TVA Environmental Investigations

Tennessee Valley Authority

Chain-of-Custody / Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate

COOLER No:	1 of 5
COC No:	JSF_BS_20190124_1B
1 of 2 Pages	
Task Desc:	JSF_BS

Rev-1 DC 1/24/19

REV 2 CT 4/8/19

180-86110 Chain of Custody

Required Ship to Lab:

Lab Name	TestAmerica Nashville
Lab Address	29360 Foster Creighton Dr Nashville, TN 37204

Lab Manager Contact Information

Lab PM	Gail Lage
Phone/Fax	615-301-5741/615-726-3404
Lab Email	Gail.Lage@testamericainc.com

Required Project Information:

Site ID #:	JOHN SEVIER FOSSIL PLANT		
Project #:	175568225		
Site Address	606 Old Highway 70 S		
City	Rogersville	State, Zip:	TN 37857
Site PM Name:	Roy Quinn		
Phone/Fax:	423-751-3753		
Site PM Email:	roquinn@tva.gov		

Required Sampler Information

Sampler:	Andrew Stevens & Elizabeth Dibone		
Sampling Company:	Stantec		
Address	601 Grassmere Park		
City/State	Nashville/TN	Phone:	615-885-1144
Sampling Team Number:	1		
Send EDD/Hard Copy to:	tva-eddsvtvs.com		

CT 4/8/19 10.75

Analysis Turnaround Time

☐ CALENDAR DAYS ☐ WORKING DAYS

TAT if different from below _____

☐ 24 hours
☐ 2 Business Days
☐ 5 Business Days
✓ 10 Business Days (Standard) DC 1/29/19

CT 4/8/19

JSF-BS-BG12-10.75/12.75-20190123

~~10.25~~ 12.75 DC 1/29/19

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Depth Unit	Sample Depth: Select Unit	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Preserve Type	Analysis: BACKGROUNDSOIL_RAD	Analysis: BACKGROUNDSOIL_BLANKS_RAD
1	JSF-BS-BG12-0 8/2 8-20190123	BG12	0 8	2.8	S	G	N	1/23/2019	1119	2				X	
2	JSF-BS-BG12-5.0/10 0-20190123	BG12	5.0	10 0	S	G	N	1/23/2019	1205	2				X	
3	~~JSF-BS-BG12-10 25/12 75-20190123~~	BG12	~~10.3~~	~~12.8~~	S	G	N	1/23/2019	1232	2				X	
4	JSF-BS-BG12-13 5/15 0-20190123	BG12	13 5	15 0	S	G	N	1/23/2019	1244	2				X	
5	JSF-BS-BG12-0 0/0 5-20190123	BG12	0.0	0 5	S	G	N	1/23/2019	1247	2				X	
6	JSF-BS-FB01-20190123	BG12	NA	NA	W	G	FB	1/23/2019	1530	3					X
7	JSF-BS-BG11-1 1/3 1-20190124	BG11	1.1	3.1	S	G	N	1/24/2019	1116	2				X	
8	JSF-BS-BG11-5 5/8 5-20190124	BG11	5.5	8.5	S	G	N	1/24/2019	1136	2				X	
9	JSF-BS-FD01-20190124	NA	NA	NA	S	G	FD	1/24/2019	1121	2				X	
10	JSF-BS-BG11-11 3/13.3-20190124	BG11	11 3	13.3	S	G	N	1/24/2019	1202	2				X	
11	JSF-BS-BG11-0 0/0 5-20190124	BG11	0.0	0.5	S	G	N	1/24/2019	1247	2				X	
12	JSF-BS-EB01-20190124	BG11	NA	NA	W	G	EB	1/24/2019	1235	3					X
13	JSF-BS-FB02-20190124	BG10	NA	NA	W	G	FB	1/24/2019	1434	3					X

AS 1/24/19

DC 1/29/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1700		1/25/19	930

Sample Receipt Conditions

Temperature in °C	Sample on Ice?	Sample Intact?	Trip Blank?
Yes / No	Yes / No	Yes / No	Yes / No
Yes / No	Yes / No	Yes / No	Yes / No
Yes / No	Yes / No	Yes / No	Yes / No
Yes / No	Yes / No	Yes / No	Yes / No

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Truck	Andrew Stevens

Page 1 of 1

Form TVA 30082AA

Tennessee Valley Authority

COOLER No:	1 of 5
COC No:	JSF_BS_20190124_1B
2 of 2 Pages	
Task Desc:	JSF_BS

Rev-1 DC 1/29/19

Chain-of-Custody / Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate

Required Ship to Lab:		Required Project Information:		Required Sampler Information	
Lab Name:	TestAmerica Nashville	Site ID #:	JOHN SEVIER FOSSIL PLANT	Sampler:	Andrew Stevens & Elizabeth Dibone
Lab Address:	29360 Foster Creighton Dr	Project #:	175568225	Sampling Company:	Stantec
	Nashville, TN 37204	Site Address	605 Old Highway 70 S	Address	601 Grassmere Park
		City	Rogersville, State, Zip: TN 37857	City/Sta #	Nashville/TN, Phone: 615-855-1144
Lab Manager Contact Information		Site PM Name:	Roy Quinn		
Lab PM	Gail Lage	Phone/Fax:	423-751-3753	Sampling Team Number:	1
Phone/Fax:	615-301-5741/615-726-3404	Site PM Email:	[illegible]	Send EDD/Hard Copy to:	[illegible]
Lab Email:	Gail.Lage@testamericainc.com				

Analysis Turnaround Time
C CALENDAR DAYS W WORKING DAYS
TAT Deferred from Below
24 Hours
3 Business Days
5 Business Days
✓ 10 Business Days (Standard) DC 1/29/19

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Depth Unit	Sample Depth: Select Unit	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis: GR_BACKGROUNDSOIL_RAD	Analysis: NR_BACKGROUNDSOIL_BLANKS_RAD
1	JSF-BS-BG10-1.4/3.4-20190124	BG10	1.4	3.4	S	G	N	1/24/2019	1507	2			X	
2	JSF-BS-BG10-6.5/8.5-20190124	BG10	6.5	8.5	S	G	N	1/24/2019	1527	2			X	
3	JSF-BS-BG10-10.5/12.5-20190124	BG10	10.5	12.5	S	G	N	1/24/2019	1548	2			X	
4	JSF-BS-BG10-0.0/0.5-20190124	BG10	0.0	0.5	S	G	N	1/24/2019	1556	2			X	
5														
6														
7														
8														
9														
10														
11														
12														
13														

Filtered: N N — AS 1/24/19
Preserve: None HNO3 — MS 1/24/19
Analysis — AS 1/24/19 DC 1/29/19
AS 1/24/19
AS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	[illegible]	1/24/19	431

SHIPPING METHOD	SAMPLER NAME AND SIGNATURE
Fedex	Andrew Stevens

Sample Receipt Conditions: Temperature in °C; Sample on Ice?; Sample Intact?; Trip Blank?

Form TVA 30067A

Farr, Carole

From: Farr, Carole
Sent: Monday, April 8, 2019 9:37 AM
To: 'Jennifer Gable'; 'Amanda Cover'
Cc: Zvirbulis, Brigid; Kerr, Jim; Brooks, Rebekah; Carey, Kevin; 'Jacob Gruzalski'
Subject: FW: data base analytical sample result reporting
Attachments: jsf_bs_20190124_1a_1b_rev_1.pdf

Hi Jennifer,

After reviewing the field data and COC with the FTL for this project, it was determined that the Sample ID on the COC was incorrect. It should be JSF-BS-BG12-10.75/12.75-20190123. The change has been noted on the attached COC.

Thank you,
Carole

Carole Farr
Principal Geologist

Direct: 858 633-4266
Mobile: 619 762-0668
Fax: 619 296-6199
Carole.Farr@stantec.com

Stantec

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From: Jennifer Gable <jgable@envstd.com>
Sent: Tuesday, April 02, 2019 9:39 AM
To: Zvirbulis, Brigid <brigid.zvirbulis@stantec.com>; Amanda Cover <ACover@envstd.com>; Jacob Gruzalski <jgruzalski@envstd.com>
Cc: Sukkurwala, Gus <gus.sukkurwala@stantec.com>; Kerr, Jim <Jim.KerrJr@stantec.com>; Brooks, Rebekah <rebekah.brooks@stantec.com>
Subject: RE: data base analytical sample result reporting

Hi Brigid,

Please see my comments below, these are issues originating with field information that will require either COC revisions or field data revisions.

I also noted that for JSF background soils, there is an incorrect sample ID for field pH measurement.
Analytical sample ID is JSF-BS-BG12-10.**2**5/12.75-20190123, field data reported JSF-BS-BG12-10.**7**5/12.75-20190123. Please provide revised field data so we can get this corrected.

Thanks
Jen

Office: 859-422-3145
Mobile: 859-619-8010
kevin.carey@stantec.com

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From: Farr, Carole <Carole.Farr@stantec.com>
Sent: Friday, April 5, 2019 1:15 PM
To: Edmunds, Matthew <Matthew.Edmunds@stantec.com>; Carey, Kevin <Kevin.Carey@stantec.com>
Cc: Kerr, Jim <Jim.KerrJr@stantec.com>; Brooks, Rebekah <rebekah.brooks@stantec.com>; Zvirbulis, Brigid <brigid.zvirbulis@stantec.com>
Subject: JSF Sample ID issue 1/23/2019

Matt and Kevin,

We are trying to address an inconsistency in sample IDs associated with data collected on 1/23/2019. Note that this we need to do this because the TDEC Portal is going live soon, and various types of data are going to be reported there, not just lab data. Following is an excerpt from an email from EnvStds. I'm also trying to find the daily field log and boring log associated with this, as those may also need to be corrected. I haven't been able to find the daily field log on the KMP. I will set up a short call with you both on Monday to resolve this.

I also noted that for JSF background soils, there is an incorrect sample ID for field pH measurement.
ISSUE #1 - Analytical sample ID is JSF-BS-BG12-10.**2**5/12.75-20190123, field data reported JSF-BS-BG12-10.**7**5/12.75-20190123. Please provide revised field data so we can get this corrected.

Thanks,
Carole

Carole Farr PG
Principal Geologist

Direct: 858-633-4266
Mobile: 619-762-0668
Carole.Farr@stantec.com

Stantec

Farr, Carole

From: Farr, Carole
Sent: Monday, April 8, 2019 9:06 AM
To: Carey, Kevin; Edmunds, Matthew
Cc: Kerr, Jim; Brooks, Rebekah; Zvirbulis, Brigid
Subject: FW: JSF Sample ID issue 1/23/2019

Hi Kevin,

Per your email, the COC sample ID will need to be corrected. I will make the COC correction to match up with the other field forms you referenced in your email.

Thank you,
Carole

Carole Farr
Principal Geologist

Direct: 858 633-4266
Mobile: 619 762-0668
Fax: 619 296-6199
Carole.Farr@stantec.com

Stantec

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From: Carey, Kevin <Kevin.Carey@stantec.com>
Sent: Friday, April 5, 2019 10:44 AM
To: Farr, Carole <Carole.Farr@stantec.com>; Edmunds, Matthew <Matthew.Edmunds@stantec.com>
Cc: Kerr, Jim <Jim.KerrJr@stantec.com>; Brooks, Rebekah <rebekah.brooks@stantec.com>; Zvirbulis, Brigid <brigid.zvirbulis@stantec.com>; Stevens, Andrew <Andrew.Stevens@stantec.com>
Subject: RE: JSF Sample ID issue 1/23/2019

Attached are the Daily Field Activity Log, Soil pH Data Form, and COC from 1/23/2019.

The Daily Field Activity Log indicates a sample interval of 10.75'/12.75 three separate times, which I've highlighted.

The Soil pH Data Form also indicates an interval of 10.75'/12.75' (twice).

My guess is the interval of 10.25'/12.75' was inadvertently put on the COC. I can even understand where a hand-written "7" could be confused for a "2".

If this is the case and the interval is, in fact, 10.75/12.75', does the COC need to be modified accordingly, initialed, dated, and emailed to EnvStandards personnel? Or do we need to dig deeper for a rationale?

Hope this helps.

Kevin P. Carey, PG
Senior Geologist
3052 Beaumont Centre Circle
Lexington, Kentucky 40503

Jennifer N. Gable
Associate Principal Chemist
Environmental Standards, Inc.
(610) 935.5577 x 414

From: Zvirbulis, Brigid [mailto:brigid.zvirbulis@stantec.com]
Sent: Wednesday, March 27, 2019 6:27 PM
To: Amanda Cover <ACover@envstd.com>; Jennifer Gable <jgable@envstd.com>; Jacob Gruzalski <jgruzalski@envstd.com>
Cc: Sukkurwala, Gus <gus.sukkurwala@stantec.com>
Subject: data base analytical sample result reporting

All

It was shown to me today that there are some issues when we pull the data and Gus works his magic to create the tables we use for reporting. These are items that need to be updated/fixed before the items are uploaded into the system for reporting.

Currently there is a disconnect between the Sample IDs when a sample is also sent for ASH. We are showing 2 lines of sample results for the same sample because the Sample IDs were not entered the same way. For example as circled in the snipit, the ID for the Ash sample is BG03-**0.0**/0.5-20180822 but the ID for the other results is **0**/0.5-20180822. Not sure why one is 0 and the other 0.0 as they should be identical if they are coming off the COC. Somewhere in the process – possibly during samle Login, the 0.0 is being cut? We reviewed the COCs and the samples were reported consistent with the COC. Please provide a revised COC for samples submitted to TestAmerica to address this issue.

I also noted this issue for the following locations:

CUF BG-03
CUF BG-07

The 2nd issue is there are no depths for the duplicates. This needs to be populated as well.

We'll update these. I also noticed this for BRF and JSF

3rd, the units are not correct – they are showing as all capital letters MG/KG when they shouldn't be (mg/Kg)

4th – Gus is having to manually enter the Sample location because in the database the samples are listed as "Background Soil Sample Location 1" with out specifics. That is consistent with the field data we've received. You'll need to either use the sys_loc_code in table rather than loc_name, or start populating both fields with a consistent location code.

Can you please work with Gus/me/the lab to ensure that these corrections are made and the EDDs are updated accordingly. I'm not sure if some of this will need to be "fixed" during validation?

Thank you,
Brigid

Brigid Zvirbulis, PMP

PLEASE NOTE THAT I WILL BE ON VACATION FROM APRIL 1ST THROUGH APRIL 9TH .

Principal Project Manager, Principal Chemist

Direct: 248 522-8304
Mobile: 248 766-9525
brigid.zvirbulis@stantec.com

Stantec
27280 Haggerty Road Suite C-11
Farmington Hills MI 48331-3433

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TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	1	of	5
COC No:	JSF_BS_20190124_1B		
1 of 2 Pages			
Task Desc:	JSF_BS		

Chain-of-Custody / Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate

180-86110 Chain of Custody

Required Ship to Lab:		Required Project Information:		Required Sampler Information	
Lab Name:	TestAmerica Nashville	Site ID #:	JOHN SEVIER FOSSIL PLANT	Sampler:	Andrew Stevens & Elizabeth Dilbone
Lab Address:	29360 Foster Creighton Dr	Project #:	175568225	Sampling Company:	Stantec
	Nashville, TN 37204	Site Address	606 Old Highway 70 S	Address	601 Grassmere Park
		City	Rogersville State, Zip: TN, 37857	City/State	Nashville/TN Phone: 615-885-1144
Lab Manager Contact Information		Site PM Name:	Roy Quinn		
Lab PM:	Gail Lage	Phone/Fax:	423-751-3753	Sampling Team Number:	1
Phone/Fax:	615-301-5741/615-726-3404	Site PM Email:	jrquinn@tva.gov	Send EDD/Hard Copy to:	tva-ei@envstd.com
Lab Email:	Gail.Lage@testamericainc.com				

Analysis Turnaround Time

☐ CALENDAR DAYS ☒ WORKING DAYS

TAT if different from Below _____

☐ 24 Hours
☐ 3 Business Days
☒ 5 Business Days
☐ 10 Business Days (Standard)

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Depth Unit Start Depth	Sample Depth: Select Unit End Depth	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis: CUF_BACKGROUNDSOIL_RAD (Preserve: None)	Analysis: CUF_BACKGROUNDSOIL_BLANKS_RAD (Preserve: HNO3)
1	JSF-BS-BG12-0.8/2.8-20190123	BG12	0.8	2.8	S	G	N	1/23/2019	1119	2		☐	X	
2	JSF-BS-BG12-5.0/10.0-20190123	BG12	5.0	10.0	S	G	N	1/23/2019	1205	2		☐	X	
3	JSF-BS-BG12-10.25/12.75-20190123	BG12	10.3	12.8	S	G	N	1/23/2019	1232	2		☐	X	
4	JSF-BS-BG12-13.5/15.0-20190123	BG12	13.5	15.0	S	G	N	1/23/2019	1244	2		☐	X	
5	JSF-BS-BG12-0.0/0.5-20190123	BG12	0.0	0.5	S	G	N	1/23/2019	1247	2		☐	X	
6	JSF-BS-FB01-20190123	BG12	NA	NA	W	G	FB	1/23/2019	1530	3		☐		X
7	JSF-BS-BG11-1.1/3.1-20190124	BG11	1.1	3.1	S	G	N	1/24/2019	1116	2		☐	X	
8	JSF-BS-BG11-5.5/8.5-20190124	BG11	5.5	8.5	S	G	N	1/24/2019	1136	2		☐	X	
9	JSF-BS-FD01-20190124	NA	NA	NA	S	G	FD	1/24/2019	1121	2		☐	X	
10	JSF-BS-BG11-11.3/13.3-20190124	BG11	11.3	13.3	S	G	N	1/24/2019	1202	2		☐	X	
11	JSF-BS-BG11-0.0/0.5-20190124	BG11	0.0	0.5	S	G	N	1/24/2019	1247	2		☐	X	
12	JSF-BS-EB01-20190124	BG11	NA	NA	W	G	EB	1/24/2019	1235	3		☐		X
13	JSF-BS-FB02-20190124	BG10	NA	NA	W	G	FB	1/24/2019	1434	3		☐		X

AS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	TMSIII	1/25/19	930

Sample Receipt Conditions

Temperature in °C	Sample on Ice?	Sample Intact?	Trip Blank?
☐Yes ☐ No	☐Yes ☐ No	☐Yes ☐ No	☐Yes ☐ No
☐Yes ☐ No	☐Yes ☐ No	☐Yes ☐ No	☐Yes ☐ No
☐Yes ☐ No	☐Yes ☐ No	☐Yes ☐ No	☐Yes ☐ No
☐Yes ☐ No	☐Yes ☐ No	☐Yes ☐ No	☐Yes ☐ No

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Fedex	Andrew Stevens

Form TVA 3000EAA

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	1	of	5
COC No:	JSF_BS_20190124_1B		
2 of 2 Pages			
Task Desc:	JSF_BS		

Chain-of-Custody / Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate

Required Ship to Lab:		Required Project Information:		Required Sampler Information	
Lab Name:	TestAmerica Nashville	Site ID #:	JOHN SEVIER FOSSIL PLANT	Sampler:	Andrew Stevens & Elizabeth Dilbone
Lab Address:	29360 Foster Creighton Dr	Project #:	175568225	Sampling Company:	Stantec
	Nashville, TN 37204	Site Address	606 Old Highway 70 S	Address	601 Grassmere Park
		City	Rogersville State, Zip: TN, 37857	City/State	Nashville/TN Phone: 615-885-1144
Lab Manager Contact Information		Site PM Name:	Roy Quinn		
Lab PM:	Gail Lage	Phone/Fax:	423-751-3753	Sampling Team Number:	1
Phone/Fax:	615-301-5741/615-726-3404	Site PM Email:	irquinn@tva.gov	Send EDD/Hard Copy to:	tva-ei@envstd.com
Lab Email:	Gail.Lage@testamericainc.com				

Analysis Turnaround Time

☐ CALENDAR DAYS ☒ WORKING DAYS

TAT if different from Below _____

☐ 24 Hours
☐ 3 Business Days
☒ 5 Business Days
☐ 10 Business Days (Standard)

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Depth Unit Start Depth	Sample Depth: Select Unit End Depth	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Filtered N	Filtered N	Preserve None	Preserve HNO3	Analysis CUF_BACKGROUNDSOIL_RAD	Analysis CUF_BACKGROUNDSOIL_BLANKS_RAD
1	JSF-BS-BG10-1.4/3.4-20190124	BG10	1.4	3.4	S	G	N	1/24/2019	1507	2		☐					X	
2	JSF-BS-BG10-6.5/8.5-20190124	BG10	6.5	8.5	S	G	N	1/24/2019	1527	2		☐					X	
3	JSF-BS-BG10-10.5/12.5-20190124	BG10	10.5	12.5	S	G	N	1/24/2019	1548	2		☐					X	
4	JSF-BS-BG10-0.0/0.5-20190124	BG10	0.0	0.5	S	G	N	1/24/2019	1556	2		☐					X	
5												☐						
6												☐						
7												☐						
8												☐						
9												☐						
10												☐						
11												☐						
12												☐						
13												☐						

AS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	MPISR	1/24/19	930

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Fedex	Andrew Stevens

Sample Receipt Conditions

Temperature in °C	Sample on Ice?	Sample Intact?	Trip Blank?
☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☑ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

Form TVA 30067A

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	2	of	5
COC No:	JSF_BS_20190124_1B		
1 of 2 Pages			
Task Desc:	JSF_BS		

Chain-of-Custody / Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate

Required Ship to Lab:		Required Project Information:		Required Sampler Information	
Lab Name:	TestAmerica Nashville	Site ID #:	JOHN SEVIER FOSSIL PLANT	Sampler:	Andrew Stevens & Elizabeth Dibone
Lab Address:	29360 Foster Creighton Dr	Project #:	175568225	Sampling Company:	Stantec
	Nashville, TN 37204	Site Address	606 Old Highway 70 S	Address	601 Grassmere Park
		City	Rogersville State, Zip: TN, 37857	City/State	Nashville/TN Phone: 615-885-1144
Lab Manager Contact Information		Site PM Name:	Roy Quinn		
Lab PM:	Gail Lage	Phone/Fax:	423-751-3753	Sampling Team Number:	1
Phone/Fax:	615-301-5741/615-726-3404	Site PM Email:	rtquinn@tva.gov	Send EDD/Hard Copy to:	tva-ei@envstd.com
Lab Email:	Gail.Lage@testamericainc.com				

Analysis Turnaround Time

☐ CALENDAR DAYS ☒ WORKING DAYS

TAT if different from Below _____

☐ 24 Hours
☐ 3 Business Days
☒ 5 Business Days
☐ 10 Business Days (Standard)

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Start Depth (Depth Unit)	Sample Depth: End Depth (Select Unit)	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis: CUF_BACKGROUNDSOIL_RAD	Analysis: CUF_BACKGROUNDSOIL_BLANKS_RAD	Filtered N	Filtered N	Preserve None	Preserve HNO3
1	JSF-BS-BG12-0.8/2.8-20190123	BG12	0.8	2.8	S	G	N	1/23/2019	1119	2		☐	X					
2	JSF-BS-BG12-5.0/10.0-20190123	BG12	5.0	10.0	S	G	N	1/23/2019	1205	2		☐	X					
3	JSF-BS-BG12-10.25/12.75-20190123	BG12	10.3	12.8	S	G	N	1/23/2019	1232	2		☐	X					
4	JSF-BS-BG12-13.5/15.0-20190123	BG12	13.5	15.0	S	G	N	1/23/2019	1244	2		☐	X					
5	JSF-BS-BG12-0.0/0.5-20190123	BG12	0.0	0.5	S	G	N	1/23/2019	1247	2		☐	X					
6	JSF-BS-FB01-20190123	BG12	NA	NA	W	G	FB	1/23/2019	1530	3		☐		X				
7	JSF-BS-BG11-1.1/3.1-20190124	BG11	1.1	3.1	S	G	N	1/24/2019	1116	2		☐	X					
8	JSF-BS-BG11-5.5/8.5-20190124	BG11	5.5	8.5	S	G	N	1/24/2019	1136	2		☐	X					
9	JSF-BS-FD01-20190124	NA	NA	NA	S	G	FD	1/24/2019	1121	2		☐	X					
10	JSF-BS-BG11-11.3/13.3-20190124	BG11	11.3	13.3	S	G	N	1/24/2019	1202	2		☐	X					
11	JSF-BS-BG11-0.0/0.5-20190124	BG11	0.0	0.5	S	G	N	1/24/2019	1247	2		☐	X					
12	JSF-BS-EB01-20190124	BG11	NA	NA	W	G	EB	1/24/2019	1235	3		☐		X				
13	JSF-BS-FB02-20190124	BG10	NA	NA	W	G	FB	1/24/2019	1434	3		☐		X				

AS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	[illegible]	1/25/19	930

Sample Receipt Conditions:

Temperature in °C	Sample on Ice?	Sample Intact?	Trip Blank?
☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Fedex	Andrew Stevens

Form TVA 3600EAA

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	2	of	5
COC No:	JSF_BS_20190124_1B		
2 of 2 Pages			
Task Desc:	JSF_BS		

Chain-of-Custody / Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate

Required Ship to Lab:		Required Project Information:		Required Sampler Information	
Lab Name:	TestAmerica Nashville	Site ID #:	JOHN SEVIER FOSSIL PLANT	Sampler:	Andrew Stevens & Elizabeth Dilbone
Lab Address:	29360 Foster Creighton Dr	Project #:	175568225	Sampling Company:	Stantec
	Nashville, TN 37204	Site Address	606 Old Highway 70 S	Address	601 Grassmere Park
		City	Rogersville State, Zip: TN, 37857	City/State	Nashville/TN Phone: 615-885-1144
Lab Manager Contact Information		Site PM Name:	Roy Quinn		
Lab PM:	Gail Lage	Phone/Fax:	423-751-3753	Sampling Team Number:	1
Phone/Fax:	615-301-5741/615-726-3404	Site PM Email:	rquinn@tva.gov	Send EDD/Hard Copy to:	tva-ei@envstd.com
Lab Email:	Gail.Lage@testamericainc.com				

Analysis Turnaround Time

☐ CALENDAR DAYS ☒ WORKING DAYS

TAT if different from Below _____

- ☐ 24 Hours
- ☐ 3 Business Days
- ☒ 5 Business Days
- ☐ 10 Business Days (Standard)

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Start Depth (Depth Unit)	Sample Depth: End Depth (Select Unit)	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis: CUF_BACKGROUNDSOIL_RAD	Analysis: CUF_BACKGROUNDSOIL_BLANKS_RAD
1	JSF-BS-BG10-1.4/3.4-20190124	BG10	1.4	3.4	S	G	N	1/24/2019	1507	2		☐	X	
2	JSF-BS-BG10-6.5/8.5-20190124	BG10	6.5	8.5	S	G	N	1/24/2019	1527	2		☐	X	
3	JSF-BS-BG10-10.5/12.5-20190124	BG10	10.5	12.5	S	G	N	1/24/2019	1548	2		☐	X	
4	JSF-BS-BG10-0.0/0.5-20190124	BG10	0.0	0.5	S	G	N	1/24/2019	1556	2		☐	X	
5												☐		
6												☐		
7												☐		
8												☐		
9												☐		
10												☐		
11												☐		
12												☐		
13												☐		

Filtered: N N — AS 1/24/19

Preserve: None, HNO3 — AS 1/24/19

AS 1/24/19

AS 1/24/19

AS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	[illegible]	1/25/19	930

Sample Receipt Conditions

☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Temperature in °C	Sample on Ice?	Sample Intact?	Trip Blank?

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Fedex	Andrew Stevens

Form TVA 30067A

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	3 of 5
COC No:	JSF_BS_20190124_1B
1 of 2 Pages	
Task Desc:	JSF_BS

Chain-of-Custody / Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate

Required Ship to Lab:		Required Project Information:		Required Sampler Information	
Lab Name:	TestAmerica Nashville	Site ID #:	JOHN SEVIER FOSSIL PLANT	Sampler:	Andrew Stevens & Elizabeth Dilbone
Lab Address:	29360 Foster Creighton Dr	Project #:	175568225	Sampling Company:	Stantec
	Nashville, TN 37204	Site Address	606 Old Highway 70 S	Address	601 Grassmere Park
		City	Rogersville State, Zip: TN, 37857	City/State	Nashville/TN Phone: 615-885-1144
Lab Manager Contact Information		Site PM Name:	Roy Quinn		
Lab PM:	Gail Lage	Phone/Fax:	423-751-3753	Sampling Team Number:	1
Phone/Fax:	615-301-5741/615-726-3404	Site PM Email:	jrquinn@tva.gov	Send EDD/Hard Copy to:	tva-ei@envsta.com
Lab Email:	Gail.Lage@testamericainc.com				

Analysis Turnaround Time

☐ CALENDAR DAYS ☒ WORKING DAYS

TAT if different from Below _____

☐ 24 Hours
☐ 3 Business Days
☒ 5 Business Days
☐ 10 Business Days (Standard)

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Start Depth (Depth Unit)	Sample Depth: End Depth (Select Unit)	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis: CUF_BACKGROUNDSOIL_RAD	Analysis: CUF_BACKGROUNDSOIL_BLANKS_RAD	Preserve: None	Preserve: HNO3	Filtered: N	Filtered: N
1	JSF-BS-BG12-0.8/2.8-20190123	BG12	0.8	2.8	S	G	N	1/23/2019	1119	2		☐	X					
2	JSF-BS-BG12-5.0/10.0-20190123	BG12	5.0	10.0	S	G	N	1/23/2019	1205	2		☐	X					
3	JSF-BS-BG12-10.25/12.75-20190123	BG12	10.3	12.8	S	G	N	1/23/2019	1232	2		☐	X					
4	JSF-BS-BG12-13.5/15.0-20190123	BG12	13.5	15.0	S	G	N	1/23/2019	1244	2		☐	X					
5	JSF-BS-BG12-0.0/0.5-20190123	BG12	0.0	0.5	S	G	N	1/23/2019	1247	2		☐	X					
6	JSF-BS-FB01-20190123	BG12	NA	NA	W	G	FB	1/23/2019	1530	3		☐		X				
7	JSF-BS-BG11-1.1/3.1-20190124	BG11	1.1	3.1	S	G	N	1/24/2019	1116	2		☐	X					
8	JSF-BS-BG11-5.5/8.5-20190124	BG11	5.5	8.5	S	G	N	1/24/2019	1136	2		☐	X					
9	JSF-BS-FD01-20190124	NA	NA	NA	S	G	FD	1/24/2019	1121	2		☐	X					
10	JSF-BS-BG11-11.3/13.3-20190124	BG11	11.3	13.3	S	G	N	1/24/2019	1202	2		☐	X					
11	JSF-BS-BG11-0.0/0.5-20190124	BG11	0.0	0.5	S	G	N	1/24/2019	1247	2		☐	X					
12	JSF-BS-EB01-20190124	BG11	NA	NA	W	G	EB	1/24/2019	1235	3		☐		X				
13	JSF-BS-FB02-20190124	BG10	NA	NA	W	G	FB	1/24/2019	1434	3		☐		X				

AS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	[signature] TAPIST	1/25/19	0930

Sample Receipt Conditions:

Temperature in °C	Sample on Ice?	Sample Intact?	Trip Blank?
☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Fedex	Andrew Stevens

Form TVA 3009EA

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	3	of	5
COC No:	JSF_BS_20190124_1B		
2 of 2 Pages			
Task Desc:	JSF_BS		

Chain-of-Custody / Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate

Required Ship to Lab:		Required Project Information:		Required Sampler Information	
Lab Name:	TestAmerica Nashville	Site ID #:	JOHN SEVIER FOSSIL PLANT	Sampler:	Andrew Stevens & Elizabeth Dilbone
Lab Address:	29360 Foster Creighton Dr Nashville, TN 37204	Project #:	175568225	Sampling Company:	Stantec
		Site Address	606 Old Highway 70 S	Address	601 Grassmere Park
		City	Rogersville State, Zip: TN, 37857	City/State	Nashville/TN Phone: 615-885-1144
Lab Manager Contact Information		Site PM Name:	Roy Quinn		
Lab PM:	Gail Lage	Phone/Fax:	423-751-3753	Sampling Team Number:	1
Phone/Fax:	615-301-5741/615-726-3404	Site PM Email:	rrquinn@tva.gov	Send EDD/Hard Copy to:	tva-ei@envstd.com
Lab Email:	Gail.Lage@testamericainc.com				

Analysis Turnaround Time

☐ CALENDAR DAYS ☒ WORKING DAYS

TAT if different from Below _____

☐ 24 Hours
☐ 3 Business Days
☒ 5 Business Days
☐ 10 Business Days (Standard)

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Depth Unit / Start Depth	Sample Depth: Select Unit / End Depth	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Filtered: N	Filtered: N	Preserve: None	Preserve: HNO3	Analysis: CUF_BACKGROUNDSOIL_RAD	Analysis: CUF_BACKGROUNDSOIL_BLANKS_RAD
1	JSF-BS-BG10-1.4/3.4-20190124	BG10	1.4	3.4	S	G	N	1/24/2019	1507	2		☐					X	
2	JSF-BS-BG10-6.5/8.5-20190124	BG10	6.5	8.5	S	G	N	1/24/2019	1527	2		☐					X	
3	JSF-BS-BG10-10.5/12.5-20190124	BG10	10.5	12.5	S	G	N	1/24/2019	1548	2		☐					X	
4	JSF-BS-BG10-0.0/0.5-20190124	BG10	0.0	0.5	S	G	N	1/24/2019	1556	2		☐					X	
5												☐						
6												☐						
7												☐						
8												☐						
9												☐						
10												☐						
11												☐						
12												☐						
13												☐						

AS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	mpiss	1/24/19	5:10

Sample Receipt Conditions

☑Yes ☐ No	☑Yes ☐ No	☑Yes ☐ No	☐Yes ☑ No
☐Yes ☐ No	☐Yes ☐ No	☐Yes ☐ No	☐Yes ☐ No
☐Yes ☐ No	☐Yes ☐ No	☐Yes ☐ No	☐Yes ☐ No
☐Yes ☐ No	☐Yes ☐ No	☐Yes ☐ No	☐Yes ☐ No
Temperature in °C	Sample on Ice?	Sample Intact?	Trip Blank?

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Fedex	Andrew Stevens

Form TVA 30067A

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	4	of	5
COC No:	JSF_BS_20190124_1B		
1 of 2 Pages			
Task Desc:	JSF_BS		

Chain-of-Custody / Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate

Required Ship to Lab:		Required Project Information:		Required Sampler Information	
Lab Name:	TestAmerica Nashville	Site ID #:	JOHN SEVIER FOSSIL PLANT	Sampler:	Andrew Stevens & Elizabeth Dilbone
Lab Address:	29360 Foster Creighton Dr	Project #:	175568225	Sampling Company:	Stantec
	Nashville, TN 37204	Site Address	606 Old Highway 70 S	Address	601 Grassmere Park
		City	Rogersville, State, Zip: TN, 37857	City/State	Nashville/TN, Phone: 615-885-1144
Lab Manager Contact Information		Site PM Name:	Roy Quinn		
Lab PM:	Gail Lage	Phone/Fax:	423-751-3753	Sampling Team Number:	1
Phone/Fax:	615-301-5741/615-726-3404	Site PM Email:	jrquinn@tva.gov	Send EDD/Hard Copy to:	tva-ei@envstd.com
Lab Email:	Gail.Lage@testamericainc.com				

Analysis Turnaround Time

☐ CALENDAR DAYS ☑ WORKING DAYS

TAT if different from Below _____

☐ 24 Hours
☐ 3 Business Days
☑ 5 Business Days
☐ 10 Business Days (Standard)

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Start Depth (Depth Unit)	Sample Depth: End Depth (Select Unit)	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis: CUF_BACKGROUNDSOIL_RAD	Analysis: CUF_BACKGROUNDSOIL_BLANKS_RAD
1	JSF-BS-BG12-0.8/2.8-20190123	BG12	0.8	2.8	S	G	N	1/23/2019	1119	2		☐	X	
2	JSF-BS-BG12-5.0/10.0-20190123	BG12	5.0	10.0	S	G	N	1/23/2019	1205	2		☐	X	
3	JSF-BS-BG12-10.25/12.75-20190123	BG12	10.3	12.8	S	G	N	1/23/2019	1232	2		☐	X	
4	JSF-BS-BG12-13.5/15.0-20190123	BG12	13.5	15.0	S	G	N	1/23/2019	1244	2		☐	X	
5	JSF-BS-BG12-0.0/0.5-20190123	BG12	0.0	0.5	S	G	N	1/23/2019	1247	2		☐	X	
6	JSF-BS-FB01-20190123	BG12	NA	NA	W	G	FB	1/23/2019	1530	3		☐		X
7	JSF-BS-BG11-1.1/3.1-20190124	BG11	1.1	3.1	S	G	N	1/24/2019	1116	2		☐	X	
8	JSF-BS-BG11-5.5/8.5-20190124	BG11	5.5	8.5	S	G	N	1/24/2019	1136	2		☐	X	
9	JSF-BS-FD01-20190124	NA	NA	NA	S	G	FD	1/24/2019	1121	2		☐	X	
10	JSF-BS-BG11-11.3/13.3-20190124	BG11	11.3	13.3	S	G	N	1/24/2019	1202	2		☐	X	
11	JSF-BS-BG11-0.0/0.5-20190124	BG11	0.0	0.5	S	G	N	1/24/2019	1247	2		☐	X	
12	JSF-BS-EB01-20190124	BG11	NA	NA	W	G	EB	1/24/2019	1235	3		☐		X
13	JSF-BS-FB02-20190124	BG10	NA	NA	W	G	FB	1/24/2019	1434	3		☐		X

Filtered: N, N

Preserve: None, HNO3

AS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	[illegible]	1/25/19	930

Sample Receipt Conditions: ☐Yes ☐No

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Fedex	Andrew Stevens

Temperature in °C | Sample on Ice? | Sample Intact? | Trip Blank?

Form TVA 30[illegible]

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	4 of 5
COC No:	JSF_BS_20190124_1B
2 of 2 Pages	
Task Desc:	JSF_BS

Chain-of-Custody / Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate

Required Ship to Lab:		Required Project Information:		Required Sampler Information	
Lab Name:	TestAmerica Nashville	Site ID #:	JOHN SEVIER FOSSIL PLANT	Sampler:	Andrew Stevens & Elizabeth Dilbone
Lab Address:	29360 Foster Creighton Dr	Project #:	175568225	Sampling Company:	Stantec
	Nashville, TN 37204	Site Address	606 Old Highway 70 S	Address	601 Grassmere Park
		City	Rogersville State, Zip: TN, 37857	City/State	Nashville/TN Phone: 615-885-1144
Lab Manager Contact Information		Site PM Name:	Roy Quinn		
Lab PM:	Gail Lage	Phone/Fax:	423-751-3753	Sampling Team Number:	1
Phone/Fax:	615-301-5741/615-726-3404	Site PM Email:	jrquinn@tva.gov	Send EDD/Hard Copy to:	tva-ei@envstd.com
Lab Email:	Gail.Lage@testamericainc.com				

Analysis Turnaround Time

☐ CALENDAR DAYS ☒ WORKING DAYS

TAT if different from Below _____

☐ 24 Hours
☐ 3 Business Days
☒ 5 Business Days
☐ 10 Business Days (Standard)

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Start Depth (Depth Unit)	Sample Depth: End Depth (Select Unit)	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis: CUF_BACKGROUNDSOIL_RAD	Analysis: CUF_BACKGROUNDSOIL_BLANKS_RAD
1	JSF-BS-BG10-1.4/3.4-20190124	BG10	1.4	3.4	S	G	N	1/24/2019	1507	2		☐	X	
2	JSF-BS-BG10-6.5/8.5-20190124	BG10	6.5	8.5	S	G	N	1/24/2019	1527	2		☐	X	
3	JSF-BS-BG10-10.5/12.5-20190124	BG10	10.5	12.5	S	G	N	1/24/2019	1548	2		☐	X	
4	JSF-BS-BG10-0.0/0.5-20190124	BG10	0.0	0.5	S	G	N	1/24/2019	1556	2		☐	X	
5												☐		
6												☐		
7												☐		
8												☐		
9												☐		
10												☐		
11												☐		
12												☐		
13												☐		

Filtered: N N — AS 1/24/19

Preserve: None, HNO3 — MD 1/24/19

AS 1/24/19

AS 1/24/19

AS 1/24/19

AS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	JMB	1/26/19	930

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Fedex	Andrew Stevens

Sample Receipt Conditions

Temperature in °C	Sample on Ice?	Sample Intact?	Trip Blank?
☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No

Form TVA 30067A

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	5	of	5
COC No:	JSF_BS_20190124_1B		
1 of 2 Pages			
Task Desc:	JSF_BS		

Chain-of-Custody / Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate

Required Ship to Lab:		Required Project Information:		Required Sampler Information	
Lab Name:	TestAmerica Nashville	Site ID #:	JOHN SEVIER FOSSIL PLANT	Sampler:	Andrew Stevens & Elizabeth Dilbone
Lab Address:	29360 Foster Creighton Dr	Project #:	175568225	Sampling Company:	Stantec
	Nashville, TN 37204	Site Address	606 Old Highway 70 S	Address	601 Grassmere Park
		City	Rogersville State, Zip: TN, 37857	City/State	Nashville/TN Phone: 615-885-1144
Lab Manager Contact Information		Site PM Name:	Roy Quinn		
Lab PM:	Gail Lage	Phone/Fax:	423-751-3753	Sampling Team Number:	1
Phone/Fax:	615-301-5741/615-726-3404	Site PM Email:	jrquinn@tva.gov	Send EDD/Hard Copy to:	tva-ei@envstd.com
Lab Email:	Gail.Lage@testamericainc.com				

Analysis Turnaround Time

☐ CALENDAR DAYS ☒ WORKING DAYS

TAT if different from Below _____

☐ 24 Hours
☐ 3 Business Days
☒ 5 Business Days
☐ 10 Business Days (Standard)

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Start Depth	Sample Depth: End Depth	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis: CUF_BACKGROUNDSOIL_RAD	Analysis: CUF_BACKGROUNDSOIL_BLANKS_RAD	Filtered: N	Filtered: N	Preserve: None	Preserve: HNO3
1	JSF-BS-BG12-0.8/2.8-20190123	BG12	0.8	2.8	S	G	N	1/23/2019	1119	2		☐	X					
2	JSF-BS-BG12-5.0/10.0-20190123	BG12	5.0	10.0	S	G	N	1/23/2019	1205	2		☐	X					
3	JSF-BS-BG12-10.25/12.75-20190123	BG12	10.3	12.8	S	G	N	1/23/2019	1232	2		☐	X					
4	JSF-BS-BG12-13.5/15.0-20190123	BG12	13.5	15.0	S	G	N	1/23/2019	1244	2		☐	X					
5	JSF-BS-BG12-0.0/0.5-20190123	BG12	0.0	0.5	S	G	N	1/23/2019	1247	2		☐	X					
6	JSF-BS-FB01-20190123	BG12	NA	NA	W	G	FB	1/23/2019	1530	3		☐		X				
7	JSF-BS-BG11-1.1/3.1-20190124	BG11	1.1	3.1	S	G	N	1/24/2019	1116	2		☐	X					
8	JSF-BS-BG11-5.5/8.5-20190124	BG11	5.5	8.5	S	G	N	1/24/2019	1136	2		☐	X					
9	JSF-BS-FD01-20190124	NA	NA	NA	S	G	FD	1/24/2019	1121	2		☐	X					
10	JSF-BS-BG11-11.3/13.3-20190124	BG11	11.3	13.3	S	G	N	1/24/2019	1202	2		☐	X					
11	JSF-BS-BG11-0.0/0.5-20190124	BG11	0.0	0.5	S	G	N	1/24/2019	1247	2		☐	X					
12	JSF-BS-EB01-20190124	BG11	NA	NA	W	G	EB	1/24/2019	1235	3		☐		X				
13	JSF-BS-FB02-20190124	BG10	NA	NA	W	G	FB	1/24/2019	1434	3		☐		X				

AS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	MA	1/25/19	930

Sample Receipt Conditions:

Temperature in °C	Sample on Ice?	Sample Intact?	Trip Blank?
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Fedex	Andrew Stevens

Form TVA 38006AA

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	5 of 5
COC No:	JSF_BS_20190124_1B
2 of 2 Pages	
Task Desc:	JSF_BS

Chain-of-Custody / Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate

Required Ship to Lab:		Required Project Information:		Required Sampler Information	
Lab Name:	TestAmerica Nashville	Site ID #:	JOHN SEVIER FOSSIL PLANT	Sampler:	Andrew Stevens & Elizabeth Dilbone
Lab Address:	29360 Foster Creighton Dr	Project #:	175568225	Sampling Company:	Stantec
	Nashville, TN 37204	Site Address	606 Old Highway 70 S	Address	601 Grassmere Park
		City	Rogersville State, Zip: TN, 37857	City/State	Nashville/TN Phone: 615-885-1144
Lab Manager Contact Information		Site PM Name:	Roy Quinn		
Lab PM:	Gail Lage	Phone/Fax:	423-751-3753	Sampling Team Number:	1
Phone/Fax:	615-301-5741/615-726-3404	Site PM Email:	jrquinn@tva.gov	Send EDD/Hard Copy to:	tva-ei@envsld.com
Lab Email:	Gail.Lage@testamericainc.com				

Analysis Turnaround Time

☐ CALENDAR DAYS ☒ WORKING DAYS

TAT if different from Below _____

☐ 24 Hours
☐ 3 Business Days
☒ 5 Business Days
☐ 10 Business Days (Standard)

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Start Depth (Depth Unit)	Sample Depth: End Depth (Select Unit)	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis: CUF_BACKGROUNDSOIL_RAD	Analysis: CUF_BACKGROUNDSOIL_BLANKS_RAD
1	JSF-BS-BG10-1.4/3.4-20190124	BG10	1.4	3.4	S	G	N	1/24/2019	1507	2		☐	X	
2	JSF-BS-BG10-6.5/8.5-20190124	BG10	6.5	8.5	S	G	N	1/24/2019	1527	2		☐	X	
3	JSF-BS-BG10-10.5/12.5-20190124	BG10	10.5	12.5	S	G	N	1/24/2019	1548	2		☐	X	
4	JSF-BS-BG10-0.0/0.5-20190124	BG10	0.0	0.5	S	G	N	1/24/2019	1556	2		☐	X	
5												☐		
6												☐		
7												☐		
8												☐		
9												☐		
10												☐		
11												☐		
12												☐		
13												☐		

Filtered: N, N — AS 1/24/19

Preserve: None, HNO3 — AS 1/24/19

AS 1/24/19

AS 1/24/19

AS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	MCM	1/26/19	930

Sample Receipt Conditions

☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Temperature in °C	Sample on Ice?	Sample Intact?	Trip Blank?

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Fedex	Andrew Stevens

Form TVA 30067A

THE LEADER IN ENVIRONMENTAL TESTING

IF THIS SHIPMENT ... ATED (2 ...

SDR

FedEx Express

180-86110 Waybill

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ORIGIN ID:RNCA (615) 726-0177
SHIPPING
TEST AMERICA
2960 FOSTER CREIGHTON DR

NASHVILLE, TN 37204
UNITED STATES US

SHIP DATE: 25 JAN18
ACTWGT: 10.00 KG
CAD: 820425/CAFE321

BILL RECIPIENT

TO SAMPLE LOG IN
TESTAMERICA
301 ALPHA DRIVE
RIDC PARK
PITTSBURG PA 152382907

(412) 963- 7058
INV:
PO:
REF:
DEPT:

3 of 12

MPS# 0263 4820 8841 6076

Mstr# 4820 8841 6054

0201

SATURDAY 12:00
PRIORITY OVERNIGHT

XO AGCA

15238
PA-US PIT

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
531818

Custody Seal
DATE 11 25 2018
SIGNATURE

Uncorrected temp 20 °C
Thermometer ID 10
CF 0 Initials JB
PT-WI-SR-001 effective 11/8/18

fragile
HANDLE
WITH CARE

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ORIGIN ID:RNCA (615) 726-0177
SHIPPING
TEST AMERICA
2960 FOSTER CREIGHTON DR
NASHVILLE, TN 37204
UNITED STATES US

TO SAMPLE LOG IN
TESTAMERICA
301 ALPHA DRIVE
RIDC DPARK
PITTSBURG PA 152382907
(412) 963-7058
INV:
PO:

FedEx

6 of 12
MPS# 4820 8841 6102
Mstr# 4820 8841 6102
XO-AGCA

SATURDAY 12:00P
PRIORITY OVERNIGHT

Uncorrected temp 2.6 C
Thermometer ID 14
CF 0 Initials TS

PT WI-SR-001

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
685722

Custody Seal
DATE 1-15-15
SIGNATURE

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
685722

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ORIGIN ID:RNCA (315) 726-0177
SHIPPING
TEST AMERICA
2960 FOSTER CREIGHTON DR

NASHVILLE, TN 37204
UNITED STATES US

BILL RECIPIENT

TO SAMPLE LOG IN
TESTAMERICA
301 ALPHA DRIVE
RIDC DPARK
PITTSBURG PA 152382907
(412) 963-7058
INV:
PO:

7 of 12

MPS# 0263 4820 8841 6113

Mstr# 4820 8841 6054

XO ACCA

SATURDAY 12:00P
PRIORITY OVERNIGHT

Uncorrected Temp
Thermometer ID
CF
Initials

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
685721

Custo
DATE
SIGNATURE

TestAmerica
685721

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ORIGIN ID:RNCA (615) 726-0177
SHIPPING
TEST AMERICA
2960 FOSTER CREIGHTON DR

NASHVILLE, TN 37204
UNITED STATES US

BILL SENDER

TO SAMPLE LOG IN
TESTAMERICA
301 ALPHA DRIVE
RIDC DPARK
PITTSBURG PA 152362907
(412) 963-7058
INV:
PO:

FedEx Express

8 of 12

MPS# 0263 4820 8841 6124

Mstr# 4820 8841 6054

XO AGCA

SATURDAY 12:00P
PRIORITY OVERNIGHT

15238
PA-US PIT

Uncorrected temp 3.1 °C
Thermometer ID 10
CF 0 Initials B

PT-WI-SR-021 effective 11/9/12

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
685713

Custody Seal
DATE
SIGNATURE Cust Will 11-5-12

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
685713

Temperature Controlled
DELAYED IN TRANSIT
MAINTAINED (2° TO 8° C / 36° TO 47° F)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ORIGIN ID:RNCA (615) 726-0177
SHIPPING
TEST AMERICA
2960 FOSTER CREIGHTON DR
NASHVILLE, TN 37204
UNITED STATES US

SHIP DATE: 25JAN19
ACTWGT: 10.00 LB
CAD: 620425/CAFE32

BILL RECIPIENT

TO SAMPLE LOG IN
TESTAMERICA
301 ALPHA DRIVE
RIDC DPARK
PITTSBURG PA 152382907
(412) 963-7058
INV:
PO:

SATURDAY 12:00
PRIORITY OVERNI

9 of 12
MPS# 4820 8841 6135
0263
Mstr# 4820 8841 6064

15238
PIT
PA-US

XO AGCA

Uncorrected Temp 10
Thermometer ID
CF 0 Initials

685717

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
685717

ATURE

Tamper Evident Seal

TestAmerica Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone (412) 963-7058 Fax (412) 963-2468

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lage, Gail	Carrier Tracking No(s):	COC No: 180-353454.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: gail.lage@testamericainc.com	State of Origin: Tennessee	Page: Page 1 of 2
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 180-86110-1
Address: 13715 Rider Trail North, ,	Due Date Requested: 2/7/2019			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: JSF_BS_20190124_1B	Project #: 18019862			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	901.1_Ra/Fill_Geo_21 (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
JSF-BS-BG12-0.8/2.8-20190123 (180-86110-1)	1/23/19	11:19 Eastern		Solid			X	2	TVA
JSF-BS-BG12-5.0/10.0-20190123 (180-86110-2)	1/23/19	12:05 Eastern		Solid			X	2	TVA
JSF-BS-BG12-10.25/12.75-20190123 (180-86110-3)	1/23/19	12:32 Eastern		Solid			X	2	TVA
JSF-BS-BG12-13.5/15.0-20190123 (180-86110-4)	1/23/19	12:44 Eastern		Solid			X	2	TVA
JSF-BS-BG12-0.0/0.5-20190123 (180-86110-5)	1/23/19	12:47 Eastern		Solid			X	2	TVA
JSF-BS-FB01-20190123 (180-86110-6)	1/23/19	15:30 Eastern		Water			X	3	TVA
JSF-BS-BG11-1.1/3.1-20190124 (180-86110-7)	1/24/19	11:16 Eastern		Solid			X	2	TVA
JSF-BS-BG11-5.5/8.5-20190124 (180-86110-8)	1/24/19	11:36 Eastern		Solid			X	2	TVA
JSF-BS-FD01-20190124 (180-86110-9)	1/24/19	11:21 Eastern		Solid			X	2	TVA

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification
Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	1/28/19 1700	TAPitt	[signature]	1-29-19 0925	TA STL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Ver: 09/20/2016

TestAmerica Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone (412) 963-7058 Fax (412) 963-2468

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)
Client Contact: Shipping/Receiving
Company: TestAmerica Laboratories, Inc.
Address: 13715 Rider Trail North, ,
City: Earth City
State, Zip: MO, 63045
Phone: 314-298-8566(Tel) 314-298-8757(Fax)
Email:
Project Name: JSF_BS_20190124_1B
Site:

Sampler:
Phone:
Due Date Requested: 2/7/2019
TAT Requested (days):
PO #:
WO #:
Project #: 18019862
SSOW#:

Lab PM: Lage, Gail
E-Mail: gail.lage@testamericainc.com
Carrier Tracking No(s):
State of Origin: Tennessee
Accreditations Required (See note):

COC No: 180-353454.2
Page: Page 2 of 2
Job #: 180-86110-1

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Analysis Requested

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	901.1_Ra/Fill_Geo_21 (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
JSF-BS-BG11-11.3/13.3-20190124 (180-86110-10)	1/24/19	12:02 Eastern		Solid			X	2	TVA
JSF-BS-BG11-0.0/0.5-20190124 (180-86110-11)	1/24/19	12:47 Eastern		Solid			X	2	TVA
JSF-BS-EB01-20190124 (180-86110-12)	1/24/19	12:35 Eastern		Water			X	3	TVA
JSF-BS-FB02-20190124 (180-86110-13)	1/24/19	14:34 Eastern		Water			X	3	TVA
JSF-BS-BG10-1.4/3.4-20190124 (180-86110-14)	1/24/19	15:07 Eastern		Solid			X	2	TVA
JSF-BS-BG10-6.5/8.5-20190124 (180-86110-15)	1/24/19	15:27 Eastern		Solid			X	2	TVA
JSF-BS-BG10-10.5/12.5-20190124 (180-86110-16)	1/24/19	15:48 Eastern		Solid			X	2	TVA
JSF-BS-BG10-0.0/0.5-20190124 (180-86110-17)	1/24/19	15:56 Eastern		Solid			X	2	TVA

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. I

Possible Hazard Identification
Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2

Special Instructions/QC Requirements:

Empty Kit Relinquished by: Date: Time: Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	1/28/19 1700	TAPIT	[signature]	1-29-19 0925	TAST
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks:

Ver: 09/20/2016

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-86110-1

Login Number: 86110
List Number: 1
Creator: Kovitch, Christina M

List Source: Eurofins TestAmerica, Pittsburgh

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-86110-1

Login Number: 86110
List Number: 2
Creator: Hellm, Michael

List Source: Eurofins TestAmerica, St. Louis
List Creation: 01/29/19 02:57 PM

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.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	0.1, 0.8, 1.1, 1.2
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.	N/A	
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.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-86110-1

Login Number: 86110
List Number: 3
Creator: Hellm, Michael

List Source: Eurofins TestAmerica, St. Louis
List Creation: 01/29/19 03:41 PM

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	20.0
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.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	