Environment Testing
TestAmerica

ANALYTICAL REPORT

Job Number: 490-164491-1

Job Description: CUF_BS_20181206_1B

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, PA 19482-0810

Attention: Jennifer N. Gable

Approved for release.
Gail Lage
Senior Project Manager
4/22/2019 1:11 PM

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04/22/2019
Revision: 1

Table of Contents

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
490-164491-1

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

Receipt
The samples were received on 12/6/2018 6:10 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 4 coolers at receipt time were 1.8º C, 2.6º C, 4.2º C and 4.8º C.

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: CUF_BS_20181206_1B

Job ID: 490-164491-1

Client Sample ID: CUF-BS-FB13-20181206 — Lab Sample ID: 490-164491-1

No Detections.

Client Sample ID: CUF-BS-BG11-1.0/3.0-20181206 — Lab Sample ID: 490-164491-2

No Detections.

Client Sample ID: CUF-BS-BG11-6.5/8.5-20181206 — Lab Sample ID: 490-164491-3

No Detections.

Client Sample ID: CUF-BS-BG11-11.2/13.2-20181206 — Lab Sample ID: 490-164491-4

No Detections.

Client Sample ID: CUF-BS-BG11-0.0/0.5-20181206 — Lab Sample ID: 490-164491-5

No Detections.

Client Sample ID: CUF-BS-BG12-2.5/4.5-20181206 — Lab Sample ID: 490-164491-6

No Detections.

Client Sample ID: CUF-BS-BG12-6.5/8.5-20181206 — Lab Sample ID: 490-164491-7

No Detections.

Client Sample ID: CUF-BS-BG12-10.6/12.6-20181206 — Lab Sample ID: 490-164491-8

No Detections.

Client Sample ID: CUF-BS-BG12-0.0/0.5-20181206 — Lab Sample ID: 490-164491-9

No Detections.

Client Sample ID: CUF-BS-EB04-20181206 — Lab Sample ID: 490-164491-10

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: CUF-BS-FB13-20181206 Lab Sample ID: 490-164491-1

Date Collected: 12/06/18 08:40 **Matrix: Water**
Date Received: 12/06/18 18:10

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-11.5	U	14.9	14.9	50.0	32.9	pCi/L	12/13/18 01:29	01/03/19 01:56	1
Radium-228	5.35	U	8.94	8.96	50.0	28.5	pCi/L	12/13/18 01:29	01/03/19 01:56	1
Radium 226 and 228 (positive only)	5.35	U	8.94	8.96			pCi/L	12/13/18 01:29	01/03/19 01:56	1

Client Sample ID: CUF-BS-BG11-1.0/3.0-20181206 Lab Sample ID: 490-164491-2

Date Collected: 12/06/18 09:08 **Matrix: Solid**
Date Received: 12/06/18 18:10

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**1.15**		0.271	0.296	1.00	0.222	pCi/g	12/12/18 20:58	01/02/19 12:54	1
Radium-228	**1.61**		0.369	0.404		0.167	pCi/g	12/12/18 20:58	01/02/19 12:54	1
Radium 226 and 228 (positive only)	**2.76**		0.458	0.501			pCi/g	12/12/18 20:58	01/02/19 12:54	1

Client Sample ID: CUF-BS-BG11-6.5/8.5-20181206 Lab Sample ID: 490-164491-3

Date Collected: 12/06/18 09:11 **Matrix: Solid**
Date Received: 12/06/18 18:10

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**1.48**		0.293	0.331	1.00	0.228	pCi/g	12/12/18 20:58	01/02/19 12:55	1
Radium-228	**2.25**		0.435	0.492		0.155	pCi/g	12/12/18 20:58	01/02/19 12:55	1
Radium 226 and 228 (positive only)	**3.73**		0.524	0.593			pCi/g	12/12/18 20:58	01/02/19 12:55	1

Client Sample ID: CUF-BS-BG11-11.2/13.2-20181206 Lab Sample ID: 490-164491-4

Date Collected: 12/06/18 09:40 **Matrix: Solid**
Date Received: 12/06/18 18:10

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**1.02**		0.223	0.247	1.00	0.177	pCi/g	12/12/18 20:58	01/02/19 13:30	1
Radium-228	**1.09**		0.226	0.252		0.104	pCi/g	12/12/18 20:58	01/02/19 13:30	1
Radium 226 and 228 (positive only)	**2.11**		0.317	0.353			pCi/g	12/12/18 20:58	01/02/19 13:30	1

Client Sample ID: CUF-BS-BG11-0.0/0.5-20181206 Lab Sample ID: 490-164491-5

Date Collected: 12/06/18 09:32 **Matrix: Solid**
Date Received: 12/06/18 18:10

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.08		0.220	0.246	1.00	0.113	pCi/g	12/12/18 20:58	01/02/19 13:31	1
Radium-228	0.694		0.295	0.303		0.487	pCi/g	12/12/18 20:58	01/02/19 13:31	1
Radium 226 and 228 (positive only)	1.77		0.368	0.390			pCi/g	12/12/18 20:58	01/02/19 13:31	1

Client Sample ID: CUF-BS-BG12-2.5/4.5-20181206 Lab Sample ID: 490-164491-6

Date Collected: 12/06/18 11:00 **Matrix: Solid**
Date Received: 12/06/18 18:10

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.872		0.199	0.218	1.00	0.157	pCi/g	12/12/18 20:58	01/02/19 13:30	1
Radium-228	0.938		0.212	0.232		0.128	pCi/g	12/12/18 20:58	01/02/19 13:30	1
Radium 226 and 228 (positive only)	1.81		0.291	0.318			pCi/g	12/12/18 20:58	01/02/19 13:30	1

Client Sample ID: CUF-BS-BG12-6.5/8.5-20181206 Lab Sample ID: 490-164491-7

Date Collected: 12/06/18 11:10 **Matrix: Solid**
Date Received: 12/06/18 18:10

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.937		0.201	0.223	1.00	0.151	pCi/g	12/12/18 20:58	01/02/19 13:32	1
Radium-228	0.381	U	0.326	0.329		0.430	pCi/g	12/12/18 20:58	01/02/19 13:32	1
Radium 226 and 228 (positive only)	1.32		0.383	0.397			pCi/g	12/12/18 20:58	01/02/19 13:32	1

Client Sample ID: CUF-BS-BG12-10.6/12.6-20181206 Lab Sample ID: 490-164491-8

Date Collected: 12/06/18 11:25 **Matrix: Solid**
Date Received: 12/06/18 18:10

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.812		0.176	0.195	1.00	0.134	pCi/g	12/12/18 20:58	01/02/19 14:11	1
Radium-228	0.917		0.219	0.238		0.0965	pCi/g	12/12/18 20:58	01/02/19 14:11	1
Radium 226 and 228 (positive only)	1.73		0.281	0.308			pCi/g	12/12/18 20:58	01/02/19 14:11	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: CUF_BS_20181206_1B

Job ID: 490-164491-1

Client Sample ID: CUF-BS-BG12-0.0/0.5-20181206

Lab Sample ID: 490-164491-9

Date Collected: 12/06/18 11:37
Date Received: 12/06/18 18:10

Matrix: Solid

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**1.12**		0.210	0.239	1.00	0.134	pCi/g	12/12/18 20:58	01/02/19 14:12	1
Radium-228	**1.09**		0.238	0.263		0.242	pCi/g	12/12/18 20:58	01/02/19 14:12	1
Radium 226 and 228 (positive only)	**2.21**		0.317	0.355			pCi/g	12/12/18 20:58	01/02/19 14:12	1

Client Sample ID: CUF-BS-EB04-20181206

Lab Sample ID: 490-164491-10

Date Collected: 12/06/18 11:50
Date Received: 12/06/18 18:10

Matrix: Water

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	9.67	U	5.83	5.91	50.0	39.8	pCi/L	12/13/18 01:29	01/03/19 02:04	1
Radium-228	2.77	U	3.98	3.99	50.0	43.1	pCi/L	12/13/18 01:29	01/03/19 02:04	1
Radium 226 and 228 (positive only)	12.4	U	7.06	7.13			pCi/L	12/13/18 01:29	01/03/19 02:04	1

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

Lab Sample ID: MB 160-405451/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408603 — **Prep Batch: 405451**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.04275	U	0.0776	0.0777	1.00	0.260	pCi/g	12/12/18 20:58	01/02/19 12:53	1
Radium-228	-0.03762	U	0.131	0.131		0.165	pCi/g	12/12/18 20:58	01/02/19 12:53	1
Radium 226 and 228 (positive only)	0.0000	U	0.00000	0.00000			pCi/g	12/12/18 20:58	01/02/19 12:53	1

Lab Sample ID: LCS 160-405451/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408602 — **Prep Batch: 405451**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.7	99.70		11.7		1.13	pCi/g	103	87 - 116
Cesium-137	28.0	30.48		3.20		0.248	pCi/g	109	87 - 120
Cobalt-60	12.2	12.91		1.35		0.169	pCi/g	106	87 - 115

Lab Sample ID: 490-164491-8 DU — **Client Sample ID: CUF-BS-BG12-10.6/12.6-20181206**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408602 — **Prep Batch: 405451**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Radium-226	0.812		0.9066		0.232	1.00	0.232	pCi/g	0.22	1
Radium-228	0.917		1.132		0.325		0.209	pCi/g	0.38	1
Radium 226 and 228 (positive only)	1.73		2.039		0.399			pCi/g	0.44	

Lab Sample ID: MB 160-405454/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 408894 — **Prep Batch: 405454**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-6.406	U	21.1	21.2	50.0	36.0	pCi/L	12/13/18 01:29	01/03/19 02:00	1
Radium-228	10.52	U	19.1	19.2	50.0	22.9	pCi/L	12/13/18 01:29	01/03/19 02:00	1
Radium 226 and 228 (positive only)	10.52	U	19.1	19.2			pCi/L	12/13/18 01:29	01/03/19 02:00	1

Lab Sample ID: LCS 160-405454/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 408895 — **Prep Batch: 405454**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	136000	130900		15100		273	pCi/L	96	90 - 111
Cesium-137	45000	44560		4460		80.1	pCi/L	99	90 - 111
Cobalt-60	31100	30070		2970		43.0	pCi/L	97	89 - 110

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

Lab Sample ID: 490-164491-1 DU
Matrix: Water
Analysis Batch: 408895

Client Sample ID: CUF-BS-FB13-20181206
Prep Type: Total/NA
Prep Batch: 405454

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Radium-226	-11.5	U		-15.68	U	15.5	50.0	36.2	pCi/L			0.14	1
Radium-228	5.35	U		-1.962	U	4.03	50.0	35.1	pCi/L			0.56	1
Radium 226 and 228 (positive only)	5.35	U		0.0000	U	0.00000			pCi/L			0.16	

QC Association Summary

Client: Environmental Standards Inc.
Project/Site: CUF_BS_20181206_1B

Job ID: 490-164491-1

Rad

Prep Batch: 405451

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-164491-2	CUF-BS-BG11-1.0/3.0-20181206	Total/NA	Solid	Fill_Geo-21	
490-164491-3	CUF-BS-BG11-6.5/8.5-20181206	Total/NA	Solid	Fill_Geo-21	
490-164491-4	CUF-BS-BG11-11.2/13.2-20181206	Total/NA	Solid	Fill_Geo-21	
490-164491-5	CUF-BS-BG11-0.0/0.5-20181206	Total/NA	Solid	Fill_Geo-21	
490-164491-6	CUF-BS-BG12-2.5/4.5-20181206	Total/NA	Solid	Fill_Geo-21	
490-164491-7	CUF-BS-BG12-6.5/8.5-20181206	Total/NA	Solid	Fill_Geo-21	
490-164491-8	CUF-BS-BG12-10.6/12.6-20181206	Total/NA	Solid	Fill_Geo-21	
490-164491-9	CUF-BS-BG12-0.0/0.5-20181206	Total/NA	Solid	Fill_Geo-21	
MB 160-405451/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-405451/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
490-164491-8 DU	CUF-BS-BG12-10.6/12.6-20181206	Total/NA	Solid	Fill_Geo-21	

Prep Batch: 405454

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-164491-1	CUF-BS-FB13-20181206	Total/NA	Water	Fill_Geo-21	
490-164491-10	CUF-BS-EB04-20181206	Total/NA	Water	Fill_Geo-21	
MB 160-405454/1-A	Method Blank	Total/NA	Water	Fill_Geo-21	
LCS 160-405454/2-A	Lab Control Sample	Total/NA	Water	Fill_Geo-21	
490-164491-1 DU	CUF-BS-FB13-20181206	Total/NA	Water	Fill_Geo-21	

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: CUF_BS_20181206_1B

Job ID: 490-164491-1

Client Sample ID: CUF-BS-FB13-20181206 — Lab Sample ID: 490-164491-1

Date Collected: 12/06/18 08:40 — **Matrix: Water**
Date Received: 12/06/18 18:10

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	405454	12/13/18 01:29	MPT	TAL SL
Total/NA	Analysis	901.1		1			408896	01/03/19 01:56	CDR	TAL SL

Client Sample ID: CUF-BS-BG11-1.0/3.0-20181206 — Lab Sample ID: 490-164491-2

Date Collected: 12/06/18 09:08 — **Matrix: Solid**
Date Received: 12/06/18 18:10

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			291 g	1.0 g	405451	12/12/18 20:58	MPT	TAL SL
Total/NA	Analysis	901.1		1			408606	01/02/19 12:54	RTM	TAL SL

Client Sample ID: CUF-BS-BG11-6.5/8.5-20181206 — Lab Sample ID: 490-164491-3

Date Collected: 12/06/18 09:11 — **Matrix: Solid**
Date Received: 12/06/18 18:10

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			276.7 g	1.0 g	405451	12/12/18 20:58	MPT	TAL SL
Total/NA	Analysis	901.1		1			408607	01/02/19 12:55	RTM	TAL SL

Client Sample ID: CUF-BS-BG11-11.2/13.2-20181206 — Lab Sample ID: 490-164491-4

Date Collected: 12/06/18 09:40 — **Matrix: Solid**
Date Received: 12/06/18 18:10

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			331.8 g	1.0 g	405451	12/12/18 20:58	MPT	TAL SL
Total/NA	Analysis	901.1		1			408603	01/02/19 13:30	RTM	TAL SL

Client Sample ID: CUF-BS-BG11-0.0/0.5-20181206 — Lab Sample ID: 490-164491-5

Date Collected: 12/06/18 09:32 — **Matrix: Solid**
Date Received: 12/06/18 18:10

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			331.6 g	1.0 g	405451	12/12/18 20:58	MPT	TAL SL
Total/NA	Analysis	901.1		1			408602	01/02/19 13:31	RTM	TAL SL

Client Sample ID: CUF-BS-BG12-2.5/4.5-20181206 — Lab Sample ID: 490-164491-6

Date Collected: 12/06/18 11:00 — **Matrix: Solid**
Date Received: 12/06/18 18:10

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			353.7 g	1.0 g	405451	12/12/18 20:58	MPT	TAL SL
Total/NA	Analysis	901.1		1			408606	01/02/19 13:30	RTM	TAL SL

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: CUF_BS_20181206_1B

Job ID: 490-164491-1

Client Sample ID: CUF-BS-BG12-6.5/8.5-20181206 — Lab Sample ID: 490-164491-7

Date Collected: 12/06/18 11:10
Date Received: 12/06/18 18:10
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			342 g	1.0 g	405451	12/12/18 20:58	MPT	TAL SL
Total/NA	Analysis	901.1		1			408607	01/02/19 13:32	RTM	TAL SL

Client Sample ID: CUF-BS-BG12-10.6/12.6-20181206 — Lab Sample ID: 490-164491-8

Date Collected: 12/06/18 11:25
Date Received: 12/06/18 18:10
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			342.4 g	1.0 g	405451	12/12/18 20:58	MPT	TAL SL
Total/NA	Analysis	901.1		1			408603	01/02/19 14:11	RTM	TAL SL

Client Sample ID: CUF-BS-BG12-0.0/0.5-20181206 — Lab Sample ID: 490-164491-9

Date Collected: 12/06/18 11:37
Date Received: 12/06/18 18:10
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			362.4 g	1.0 g	405451	12/12/18 20:58	MPT	TAL SL
Total/NA	Analysis	901.1		1			408602	01/02/19 14:12	RTM	TAL SL

Client Sample ID: CUF-BS-EB04-20181206 — Lab Sample ID: 490-164491-10

Date Collected: 12/06/18 11:50
Date Received: 12/06/18 18:10
Matrix: Water

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	405454	12/13/18 01:29	MPT	TAL SL
Total/NA	Analysis	901.1		1			408900	01/03/19 02:04	RTM	TAL SL

Laboratory References:

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

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: CUF_BS_20181206_1B

Job ID: 490-164491-1

Laboratory: Eurofins TestAmerica, Nashville

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
A2LA	ISO/IEC 17025		0453.07	12-31-19
Alaska (UST)	State Program	10	UST-087	06-30-19
Arizona	State Program	9	AZ0473	05-05-19
Arkansas DEQ	State Program	6	88-0737	04-25-20
California	State Program	9	2938	06-30-19
Connecticut	State Program	1	PH-0220	12-31-19
Florida	NELAP	4	E87358	06-30-19
Georgia	State Program	4	NA: NELAP & A2LA	12-31-19
Illinois	NELAP	5	200010	12-09-19
Iowa	State Program	7	131	04-01-20
Kansas	NELAP	7	E-10229	10-31-19
Kentucky (UST)	State Program	4	19	06-30-19
Kentucky (WW)	State Program	4	90038	12-31-19
Louisiana	NELAP	6	30613	06-30-19
Maine	State Program	1	TN00032	11-03-19
Maryland	State Program	3	316	03-31-20
Massachusetts	State Program	1	M-TN032	06-30-19
Minnesota	NELAP	5	047-999-345	12-31-19
Mississippi	State Program	4	N/A	06-30-19
Montana (UST)	State Program	8	NA	02-17-19
Nevada	State Program	9	TN00032	07-31-19
New Hampshire	NELAP	1	2963	10-09-19
New Jersey	NELAP	2	TN965	06-30-19
New York	NELAP	2	11342	03-31-20
North Carolina (WW/SW)	State Program	4	387	12-31-19
North Dakota	State Program	8	R-146	06-30-19
Ohio VAP	State Program	5	CL0033	07-06-19
Oklahoma	State Program	6	9412	08-31-19
Oregon	NELAP	10	TN200001	04-26-19
Pennsylvania	NELAP	3	68-00585	07-31-19
Rhode Island	State Program	1	LAO00268	12-30-19
South Carolina	State Program	4	84009 (001)	02-28-19 *
Tennessee	State Program	4	2008	02-23-20
Texas	NELAP	6	T104704077	08-31-19
USDA	Federal		P330-13-00306	04-10-20
Utah	NELAP	8	TN00032	07-31-19
Virginia	NELAP	3	460152	06-14-19
Washington	State Program	10	C789	07-19-19
West Virginia DEP	State Program	3	219	02-28-19 *
Wisconsin	State Program	5	998020430	08-31-19
Wyoming (UST)	A2LA	8	453.07	12-31-19

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

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: CUF_BS_20181206_1B

Job ID: 490-164491-1

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 / DOE		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: CUF_BS_20181206_1B

Job ID: 490-164491-1

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: CUF_BS_20181206_1B

Job ID: 490-164491-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
490-164491-1	CUF-BS-FB13-20181206	Water	12/06/18 08:40	12/06/18 18:10
490-164491-2	CUF-BS-BG11-1.0/3.0-20181206	Solid	12/06/18 09:08	12/06/18 18:10
490-164491-3	CUF-BS-BG11-6.5/8.5-20181206	Solid	12/06/18 09:11	12/06/18 18:10
490-164491-4	CUF-BS-BG11-11.2/13.2-20181206	Solid	12/06/18 09:40	12/06/18 18:10
490-164491-5	CUF-BS-BG11-0.0/0.5-20181206	Solid	12/06/18 09:32	12/06/18 18:10
490-164491-6	CUF-BS-BG12-2.5/4.5-20181206	Solid	12/06/18 11:00	12/06/18 18:10
490-164491-7	CUF-BS-BG12-6.5/8.5-20181206	Solid	12/06/18 11:10	12/06/18 18:10
490-164491-8	CUF-BS-BG12-10.6/12.6-20181206	Solid	12/06/18 11:25	12/06/18 18:10
490-164491-9	CUF-BS-BG12-0.0/0.5-20181206	Solid	12/06/18 11:37	12/06/18 18:10
490-164491-10	CUF-BS-EB04-20181206	Water	12/06/18 11:50	12/06/18 18:10

REAGENT TRACEABILITY SUMMARY

Lab Name: Eurofins TestAmerica, St. Louis Job No.: 490-164491-1

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 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

REAGENT TRACEABILITY SUMMARY

Lab Name: Eurofins TestAmerica, St. Louis Job No.: 490-164491-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: Eurofins TestAmerica, St. Louis Job No.: 490-164491-1

SDG No.:

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

Reagent

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:

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

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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

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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

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

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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

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

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

83725-334
5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

(Certificate continued on reverse side)

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

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

This standard will expire one year after the reference date.

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

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

Reagent

Source E_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

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

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CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

83725-334
5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

(Certificate continued on reverse side)

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

This standard will expire one year after the reference date.

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

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

Reagent

Source H_00002

Eckert & Ziegler
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CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

83725-334
5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

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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

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

MQO

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: 405451

Fill Geometry, 21-Day In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 405451

Lab Id: MB 160-405451/1-A | Analyzed: 01/02/19 12:53 | 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	-0.04275	0.0776	0.0777	U	pCi/g	1.00	0.260	408603
Radium-228	-0.03762	0.131	0.131	U	pCi/g		0.165	408603
Radium 226 and 228 (positive only)	0.0000	0.00000	0.00000	U	pCi/g		0.260	408603

Lab Id: LCS 160-405451/2-A | Analyzed: 01/02/19 12:54 | 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	99.70	1.48	11.7		pCi/g		1.13	408602
Cesium-137	30.48	0.746	3.20		pCi/g		0.248	408602
Cobalt-60	12.91	0.404	1.35		pCi/g		0.169	408602

Lab Id: 490-164491-2 | Analyzed: 01/02/19 12:54 | Ts: 30 | Sigma: 2
Client ID: CUF-BS-BG11-1.0/3.0-20181206 | Detector: GV14 | Decay Corrected: No | Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	1.15	0.271	0.296		pCi/g	1.00	0.222	408606
Radium-228	1.61	0.369	0.404		pCi/g		0.167	408606
Radium 226 and 228 (positive only)	2.76	0.458	0.501		pCi/g		0.222	408606

Lab Id: 490-164491-3 | Analyzed: 01/02/19 12:55 | Ts: 30 | Sigma: 2
Client ID: CUF-BS-BG11-6.5/8.5-20181206 | Detector: GV16 | Decay Corrected: No | Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	1.48	0.293	0.331		pCi/g	1.00	0.228	408607
Radium-228	2.25	0.435	0.492		pCi/g		0.155	408607
Radium 226 and 228 (positive only)	3.73	0.524	0.593		pCi/g		0.228	408607

Lab Id: 490-164491-4 | Analyzed: 01/02/19 13:30 | Ts: 30 | Sigma: 2
Client ID: CUF-BS-BG11-11.2/13.2-20181206 | Detector: GV9 | Decay Corrected: No | Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	1.02	0.223	0.247		pCi/g	1.00	0.177	408603

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 405451

Lab Id: 490-164491-4 Analyzed: 01/02/19 13:30 Ts: 30 Sigma: 2
Client ID: CUF-BS-BG11-11.2/13.2-20181206 Detector: GV9 Decay Corrected: No Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-228	1.09	0.226	0.252		pCi/g		0.104	408603
Radium 226 and 228 (positive only)	2.11	0.317	0.353		pCi/g		0.177	408603

Lab Id: 490-164491-5 Analyzed: 01/02/19 13:31 Ts: 30 Sigma: 2
Client ID: CUF-BS-BG11-0.0/0.5-20181206 Detector: GV12 Decay Corrected: No Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	1.08	0.220	0.246		pCi/g	1.00	0.113	408602
Radium-228	0.694	0.295	0.303		pCi/g		0.487	408602
Radium 226 and 228 (positive only)	1.77	0.368	0.390		pCi/g		0.487	408602

Lab Id: 490-164491-6 Analyzed: 01/02/19 13:30 Ts: 30 Sigma: 2
Client ID: CUF-BS-BG12-2.5/4.5-20181206 Detector: GV14 Decay Corrected: No Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.872	0.199	0.218		pCi/g	1.00	0.157	408606
Radium-228	0.938	0.212	0.232		pCi/g		0.128	408606
Radium 226 and 228 (positive only)	1.81	0.291	0.318		pCi/g		0.157	408606

Lab Id: 490-164491-7 Analyzed: 01/02/19 13:32 Ts: 30 Sigma: 2
Client ID: CUF-BS-BG12-6.5/8.5-20181206 Detector: GV16 Decay Corrected: No Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.937	0.201	0.223		pCi/g	1.00	0.151	408607
Radium-228	0.381	0.326	0.329	U	pCi/g		0.430	408607
Radium 226 and 228 (positive only)	1.32	0.383	0.397		pCi/g		0.430	408607

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 405451

Lab Id: 490-164491-8 Analyzed: 01/02/19 14:11 Ts: 30 Sigma: 2
Client ID: CUF-BS-BG12-10.6/12.6-20181206 Detector: GV9 Decay Corrected: No Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.812	0.176	0.195		pCi/g	1.00	0.134	408603
Radium-228	0.917	0.219	0.238		pCi/g		0.0965	408603
Radium 226 and 228 (positive only)	1.73	0.281	0.308		pCi/g		0.134	408603

Lab Id: 490-164491-8 DU Analyzed: 01/02/19 14:53 Ts: 30 Sigma: 2
Client ID: CUF-BS-BG12-10.6/12.6-20181206 Detector: GV12 Decay Corrected: No Ingrowth:

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.9066	0.213	0.232		pCi/g	1.00	0.232	408602
Radium-228	1.132	0.305	0.325		pCi/g		0.209	408602
Radium 226 and 228 (positive only)	2.039	0.372	0.399		pCi/g		0.232	408602

Lab Id: 490-164491-9 Analyzed: 01/02/19 14:12 Ts: 30 Sigma: 2
Client ID: CUF-BS-BG12-0.0/0.5-20181206 Detector: GV12 Decay Corrected: No Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	1.12	0.210	0.239		pCi/g	1.00	0.134	408602
Radium-228	1.09	0.238	0.263		pCi/g		0.242	408602
Radium 226 and 228 (positive only)	2.21	0.317	0.355		pCi/g		0.242	408602

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 405451

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 160-405451/1-A	Radium-226			-0.04275	U	pCi/g							-1.10059987
MB 160-405451/1-A	Radium-228			-0.03762	U	pCi/g							-.57532851
MB 160-405451/1-A	Radium 226 and 228 (positive only)			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 160-405451/2-A	Americium-241		96.7	99.70		pCi/g	103	87 - 116					.4864974911
LCS 160-405451/2-A	Cesium-137		28.0	30.48		pCi/g	109	87 - 120					1.5127942967
LCS 160-405451/2-A	Cobalt-60		12.2	12.91		pCi/g	106	87 - 115					.9683587436

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
490-164491-8	Radium-226	0.812		0.9066		pCi/g			11	0.22	0.63	1	.62675903
490-164491-8	Radium-228	0.917		1.132		pCi/g			21	0.38	1.07	1	1.06662466
490-164491-8	Radium 226 and 228 (positive only)	1.73		2.039		pCi/g			16	0.44	1.23		

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: Eurofins TestAmerica, St. Loui Job No.: 490-164491-1

SDG No.:

Batch Number: 405451 Batch Start Date: 12/12/18 20:58 Batch Analyst: Tucker, Michael P

Batch Method: Fill_Geo-21 Batch End Date: 12/12/18 22:24

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-405451/1		Fill_Geo-21, 901.1				291.18 g	12/12/18	1/2/19	Tuna Can
LCS 160-405451/2		Fill_Geo-21, 901.1				341.9 g	12/12/18	1/2/19	Tuna Can
490-164491-A-2	CUF-BS-BG11-1.0/ 3.0-20181206	Fill_Geo-21, 901.1	T	46.8 g	337.8 g	291 g	12/12/18 22:24	1/2/19	Tuna Can
490-164491-A-3	CUF-BS-BG11-6.5/ 8.5-20181206	Fill_Geo-21, 901.1	T	46.5 g	323.2 g	276.7 g	12/12/18 22:24	1/2/19	Tuna Can
490-164491-A-4	CUF-BS-BG11-11.2 /13.2-20181206	Fill_Geo-21, 901.1	T	46.7 g	378.5 g	331.8 g	12/12/18 22:24	1/2/19	Tuna Can
490-164491-A-5	CUF-BS-BG11-0.0/ 0.5-20181206	Fill_Geo-21, 901.1	T	46.8 g	378.4 g	331.6 g	12/12/18 22:24	1/2/19	Tuna Can
490-164491-A-6	CUF-BS-BG12-2.5/ 4.5-20181206	Fill_Geo-21, 901.1	T	46.3 g	400.0 g	353.7 g	12/12/18 22:24	1/2/19	Tuna Can
490-164491-A-7	CUF-BS-BG12-6.5/ 8.5-20181206	Fill_Geo-21, 901.1	T	46.7 g	388.7 g	342 g	12/12/18 22:24	1/2/19	Tuna Can
490-164491-A-8	CUF-BS-BG12-10.6 /12.6-20181206	Fill_Geo-21, 901.1	T	46.3 g	388.7 g	342.4 g	12/12/18 22:24	1/2/19	Tuna Can
490-164491-A-8 DU	CUF-BS-BG12-10.6 /12.6-20181206	Fill_Geo-21, 901.1	T	46.3 g	388.7 g	342.4 g	12/12/18 22:24	1/2/19	Tuna Can
490-164491-A-9	CUF-BS-BG12-0.0/ 0.5-20181206	Fill_Geo-21, 901.1	T	46.8 g	409.2 g	362.4 g	12/12/18 22:24	1/2/19	Tuna Can

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00008					
MB 160-405451/1		Fill_Geo-21, 901.1							
LCS 160-405451/2		Fill_Geo-21, 901.1		# g					
490-164491-A-2	CUF-BS-BG11-1.0/ 3.0-20181206	Fill_Geo-21, 901.1	T						
490-164491-A-3	CUF-BS-BG11-6.5/ 8.5-20181206	Fill_Geo-21, 901.1	T						
490-164491-A-4	CUF-BS-BG11-11.2 /13.2-20181206	Fill_Geo-21, 901.1	T						
490-164491-A-5	CUF-BS-BG11-0.0/ 0.5-20181206	Fill_Geo-21, 901.1	T						
490-164491-A-6	CUF-BS-BG12-2.5/ 4.5-20181206	Fill_Geo-21, 901.1	T						
490-164491-A-7	CUF-BS-BG12-6.5/ 8.5-20181206	Fill_Geo-21, 901.1	T						

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

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: Eurofins TestAmerica, St. Loui Job No.: 490-164491-1

SDG No.:

Batch Number: 405451 Batch Start Date: 12/12/18 20:58 Batch Analyst: Tucker, Michael P

Batch Method: Fill_Geo-21 Batch End Date: 12/12/18 22:24

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00008					
490-164491-A-8	CUF-BS-BG12-10.6 /12.6-20181206	Fill_Geo-21, 901.1	T						
490-164491-A-8 DU	CUF-BS-BG12-10.6 /12.6-20181206	Fill_Geo-21, 901.1	T						
490-164491-A-9	CUF-BS-BG12-0.0/ 0.5-20181206	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_20190006

Sample Description: 405451_Gamma_MB 160-405451~1-A
Detector: Detector # 9
Batch ID: 405451
Work Order Number: Gamma
Lot Number: MB 160-405451~1-A

Decay to Time: 1/2/2019 12:53 Live Time: 1800 sec
Acquisition Time: 1/2/2019 12:53:36 Real Time: 1802 sec
Analysis Time: 1/2/2019 13:23 Dead Time: 0.12 %
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_2018-12-22_1357.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	1.111E+00	107.7	1.196E+00	1.198E+00	4.195E+00
NA-22	3.575E-01	37.8	1.351E-01	1.363E-01	3.764E-01
K-40	5.074E-01	447.0	2.268E+00	2.268E+00	8.509E+00
Sc-46	-2.312E-01	128.5	2.971E-01	2.973E-01	1.032E+00
CR-51	9.576E-01	190.8	1.827E+00	1.828E+00	6.346E+00
MN-54	-1.368E-01	88.8	1.214E-01	1.217E-01	7.763E-01
FE-59	-2.677E-02	1584.3	4.241E-01	4.241E-01	1.082E+00
Co-56	9.391E-02	50.6	4.748E-02	4.773E-02	7.690E-01
CO-57	2.237E-02	536.5	1.200E-01	1.200E-01	4.249E-01
CO-58	-2.520E-01	116.9	2.947E-01	2.950E-01	1.016E+00
CO-60	-7.229E-02	213.7	1.545E-01	1.545E-01	7.655E-01
ZN-65	-1.439E-01	606.3	8.722E-01	8.722E-01	3.095E+00
NB-94	-2.551E-01	116.8	2.979E-01	2.981E-01	1.023E+00
ZR-95	5.568E-01	34.0	1.891E-01	1.912E-01	4.597E-01
NB-95	-1.145E-02	1596.9	1.829E-01	1.829E-01	6.921E-01
RU-103	1.650E-02	1417.1	2.338E-01	2.338E-01	6.054E-01
RH-106	1.969E+00	101.0	1.989E+00	1.991E+00	1.259E+01
AG-108M	1.216E-01	132.9	1.616E-01	1.617E-01	4.178E-01
AG-110M	0.000E+00	1.#INF	7.451E-02	7.451E-02	1.125E+00
SN-113	2.662E-01	160.5	4.272E-01	4.274E-01	1.462E+00
SB-124	2.181E-01	158.4	3.454E-01	3.456E-01	1.186E+00
SB-125	7.434E-01	91.3	6.790E-01	6.801E-01	1.666E+00
I-131	2.526E-01	98.4	2.487E-01	2.490E-01	4.594E-01
Gd-153	2.571E-01	123.6	3.178E-01	3.182E-01	1.278E+00
Ga-68	-1.265E+01	119.0	1.506E+01	1.508E+01	3.376E+01
Tc-99m	0.000E+00	1.#INF	6.168E-02	6.168E-02	6.768E-01
BA-133	3.207E-01	108.0	3.464E-01	3.468E-01	1.122E+00
CS-134	2.471E-01	97.2	2.401E-01	2.405E-01	9.279E-01
CS-137	-1.678E-01	216.8	3.638E-01	3.639E-01	1.269E+00
CE-139	1.575E-01	102.7	1.618E-01	1.625E-01	5.481E-01
Ba-140	6.567E-01	72.2	4.740E-01	4.752E-01	1.364E+00
La-140	-1.040E-02	120.3	1.251E-02	1.252E-02	9.183E-01
CE-141	-3.148E-01	144.6	4.552E-01	4.554E-01	1.536E+00

CE-144	0.000E+00	1.#INF	1.365E-01	1.365E-01	5.190E+00
PM-144	6.445E-01	29.2	1.879E-01	1.909E-01	4.847E-01
EU-152	6.879E-01	74.1	5.096E-01	5.109E-01	1.143E+00
EU-154	1.698E+00	23.6	4.003E-01	4.101E-01	8.150E-01
EU-155	7.620E-02	814.9	6.209E-01	6.209E-01	2.167E+00
HF-181	1.465E-01	125.1	1.833E-01	1.835E-01	6.446E-01
Ta-182	3.863E-01	40.8	1.577E-01	1.589E-01	4.600E+00
Hg-203	1.215E-01	93.1	1.131E-01	1.133E-01	3.898E-01
TL-208	1.486E-02	280.5	4.168E-02	4.169E-02	5.928E-01
PM-146	4.337E-01	33.3	1.446E-01	1.463E-01	7.025E-01
Y-88	3.227E-02	301.1	9.716E-02	9.717E-02	5.109E-01
Cd-113m	4.865E+02	423.1	2.058E+03	2.059E+03	7.398E+03
Cd-109	-2.768E-07	1684262328.4	4.662E+00	4.662E+00	1.615E+01
Cf-251	-8.382E-01	101.4	8.501E-01	8.533E-01	2.222E+00
Cf-249	-3.809E-01	109.1	4.156E-01	4.160E-01	1.406E+00
Sn-126	-1.433E+00	124.1	1.779E+00	1.780E+00	6.057E+00
PB-210	-3.044E+00	201.4	6.130E+00	6.133E+00	2.115E+01
PB-212	3.151E-01	124.8	3.932E-01	3.937E-01	1.343E+00
PB-214	-8.795E-01	64.9	5.708E-01	5.727E-01	1.843E+00
BI-207	1.060E-01	426.8	4.524E-01	4.525E-01	1.087E+00
BI-212	-5.953E+00	79.1	4.708E+00	4.718E+00	1.576E+01
U-235	-1.206E+00	136.6	1.647E+00	1.648E+00	5.576E+00
BI-214	-4.606E-01	90.7	4.178E-01	4.185E-01	2.802E+00
BI-210M	2.011E-01	106.9	2.150E-01	2.154E-01	7.423E-01
AC-228	-4.053E-01	173.7	7.041E-01	7.044E-01	1.774E+00
TH-227	7.756E-01	116.0	8.996E-01	9.008E-01	5.697E+00
TH-229	3.209E+00	73.5	2.360E+00	2.374E+00	6.289E+00
TH-234	1.986E+00	97.6	1.938E+00	1.941E+00	6.139E+00
PA-231	4.862E+00	132.2	6.430E+00	6.436E+00	3.004E+01
PA-233	6.241E-01	124.1	7.745E-01	7.752E-01	2.083E+00
PA-234	-4.734E-01	190.4	9.012E-01	9.016E-01	3.078E+00
PA-234M	-2.869E+00	814.6	2.337E+01	2.337E+01	1.148E+02
AM-241	3.639E-01	116.6	4.242E-01	4.247E-01	1.451E+00
Np-237	7.471E-01	168.4	1.258E+00	1.259E+00	4.292E+00
Ir-192	1.951E-01	100.3	1.955E-01	1.959E-01	9.118E-01
Cs-136	-3.246E-01	112.8	3.661E-01	3.665E-01	1.250E+00
Np-239	-3.372E-01	188.3	6.350E-01	6.353E-01	2.176E+00
Nd-147	-1.070E+00	165.1	1.767E+00	1.768E+00	4.436E+00
TL-210	7.177E-02	164.8	1.183E-01	1.183E-01	8.431E-01
Kr-85	0.000E+00	1.#INF	1.184E+01	1.184E+01	2.644E+02
Total	5.130E+02				

Analyst: Joey Sausto

Sample description
405451_Gamma_MB 160-405451~1-A

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20190006.An1

Acquisition information
Start time: 1/2/2019 12:53:36 PM
Live time: 1800
Real time: 1802
Dead time: 0.12 %
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	1/2/2019 12:53:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2018-12-22_1357.PBC 12/22/2018 1:57:02 PM
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	4.	278.39	1.00	2.900E-02	50.14	8.000	PBC<MDA	TH227
59.54	9.	116.60	1.01	3.659E-02	59.54	35.900	PBC<MDA	AM241
63.29	8.	129.14	1.01	3.921E-02	63.29	3.810	PBC<MDA	TH234
80.99	3.	298.14	1.03	4.830E-02	80.99	34.060	PBC<MDA	BA133
86.49	9.	168.43	1.04	5.008E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	3.187E-01	EU155
					86.94	9.040	1.080E+00	Sn126
92.59	6.	146.34	1.04	5.156E-02	92.59	5.584	PBC<MDA	TH234
93.35	6.	156.75	1.04	5.171E-02	93.35	5.561	PBC<MDA	AC228
97.50	6.	165.97	1.05	5.240E-02	97.50	30.000	PBC<MDA	Gd153
99.50	6.	174.96	1.05	5.266E-02	99.50	15.000	PBC<MDA	Np239
103.20	6.	183.22	1.05	5.303E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	2.763E-01	Np239
103.70	6.	191.56	1.05	5.307E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	2.764E-01	Np239
105.31	2.	814.89	1.05	5.318E-02	105.31	21.200	PBC<MDA	EU155
121.78	10.	93.43	1.07	5.305E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.204E-01	CO57
122.06	2.	536.49	1.07	5.303E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.237E-02	CO57
123.10	2.	382.53	1.07	5.296E-02	123.10	40.790	PBC<MDA	EU154
162.66	7.	95.91	1.11	4.690E-02	162.66	6.220	PBC<MDA	Ba140
165.85	11.	102.73	1.11	4.736E-02	165.85	79.900	PBC<MDA	CE139

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
193.51	8.	105.24	1.14	4.287E-02	193.51	4.400	PBC<MDA	TH229
210.85	10.	102.76	1.15	4.052E-02	210.85	2.990	PBC<MDA	TH229
235.97	9.	115.98	1.18	3.760E-02	235.97	12.300	PBC<MDA	TH227
238.63	9.	124.80	1.18	3.732E-02	238.63	43.300	PBC<MDA	PB212
242.00	2.	615.96	1.18	3.697E-02	242.00	7.430	PBC<MDA	PB214
263.70	2.	423.09	1.20	3.489E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	6.	106.94	1.20	3.470E-02	265.83	50.000	PBC<MDA	BI210M
277.28	2.	305.57	1.21	3.372E-02	277.28	6.310	PBC<MDA	TL208
279.20	6.	93.10	1.22	3.356E-02	279.20	81.460	PBC<MDA	Hg203
284.30	8.	98.45	1.22	3.315E-02	284.30	6.140	PBC<MDA	I131
295.09	2.	580.23	1.23	3.232E-02	295.09	19.300	PBC<MDA	PB214
296.00	7.	164.78	1.23	3.225E-02	296.00	79.000	PBC<MDA	TL210
300.03	7.	172.24	1.24	3.195E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	5.257E+00	PA231
					300.18	6.200	2.086E+00	PA233
300.07	7.	179.88	1.24	3.195E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	5.257E+00	PA231
					300.18	6.200	2.086E+00	PA233
300.18	7.	187.21	1.24	3.194E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	5.257E+00	PA231
					300.18	6.200	2.086E+00	PA233
302.65	7.	193.91	1.24	3.176E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	7.113E-01	BA133
302.85	4.	378.89	1.24	3.175E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	3.738E-01	BA133
308.44	7.	155.00	1.24	3.135E-02	308.44	31.750	PBC<MDA	Ir192
312.01	8.	162.99	1.25	3.110E-02	312.01	36.000	PBC<MDA	PA233
316.49	8.	170.43	1.25	3.080E-02	316.49	87.040	PBC<MDA	Ir192
320.08	5.	190.80	1.25	3.056E-02	320.08	9.940	PBC<MDA	CR51
356.00	10.	108.00	1.29	2.837E-02	356.00	62.050	PBC<MDA	BA133
364.48	4.	176.78	1.29	2.791E-02	364.48	81.700	PBC<MDA	I131
391.69	8.	160.45	1.32	2.653E-02	391.69	64.000	PBC<MDA	SN113
433.94	5.	132.88	1.35	2.466E-02	433.94	90.480	PBC<MDA	AG108M
453.88	3.	268.31	1.37	2.388E-02	453.88	65.000	PBC<MDA	PM146
463.37	5.	95.05	1.38	2.352E-02	463.37	10.470	PBC<MDA	SB125
468.06	3.	193.36	1.38	2.335E-02	468.06	51.750	PBC<MDA	Ir192
477.60	5.	107.68	1.39	2.301E-02	477.60	10.520	PBC<MDA	BE7
482.00	5.	125.10	1.40	2.286E-02	482.00	80.500	PBC<MDA	HF181
487.02	5.	138.18	1.40	2.269E-02	487.02	45.500	PBC<MDA	La140
511.86	67.	14.55	2.67	2.188E-02	511.86	20.000	8.505E+00	RH106
537.26	4.	107.88	1.44	2.112E-02	537.26	24.390	PBC<MDA	Ba140
569.32	6.	97.18	1.47	2.024E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.009E+00	PA234
					569.70	97.740	1.686E-01	BI207
600.50	9.	123.54	1.50	1.946E-02	600.50	17.860	PBC<MDA	SB125
602.73	7.	158.36	1.50	1.940E-02	602.73	98.260	PBC<MDA	SB124
609.31	-7.	90.71	1.50	1.925E-02	609.31	46.090	PBC<MDA	BI214
635.89	4.	91.34	1.53	1.864E-02	635.89	11.310	PBC<MDA	SB125

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
696.54	20.	29.15	1.58	1.741E-02	696.54	99.000	6.445E-01	PM144
735.72	9.	33.33	1.61	1.671E-02	735.72	22.500	1.330E+00	PM146
747.16	5.	109.07	1.62	1.651E-02	747.16	34.000	PBC<MDA	PM146
756.73	9.	33.95	1.62	1.635E-02	756.73	54.460	5.568E-01	ZR95
778.92	1.	501.66	1.64	1.600E-02	778.92	12.940	PBC<MDA	EU152
795.87	2.	308.22	1.66	1.574E-02	795.87	85.530	PBC<MDA	CS134
801.95	1.	640.31	1.66	1.565E-02	801.95	8.690	PBC<MDA	CS134
860.56	1.	721.66	1.71	1.482E-02	860.56	12.420	PBC<MDA	TL208
873.23	8.	95.30	1.72	1.465E-02	873.23	12.270	PBC<MDA	EU154
880.53	16.	25.00	1.72	1.456E-02	880.53	6.000	1.017E+01	PA234
898.04	2.	301.08	1.74	1.434E-02	898.04	93.700	PBC<MDA	Y88
964.11	6.	74.08	1.79	1.357E-02	964.11	14.605	PBC<MDA	EU152
996.33	18.	23.57	1.81	1.323E-02	996.33	10.600	7.132E+00	EU154
1037.84	1.	410.10	1.84	1.281E-02	1037.84	14.130	PBC<MDA	Co56
1050.36	5.	101.01	1.85	1.269E-02	1050.36	1.560	PBC<MDA	RH106
1063.66	2.	426.78	1.86	1.257E-02	1063.66	74.500	PBC<MDA	BI207
1120.29	-2.	368.35	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1189.05	6.	40.82	1.95	1.150E-02	1189.05	16.200	PBC<MDA	Ta182
1221.41	1.	812.99	1.97	1.126E-02	1221.41	27.000	PBC<MDA	Ta182
1238.28	5.	50.56	1.98	1.114E-02	1238.28	66.070	PBC<MDA	Co56
1274.53	7.	37.80	2.01	1.088E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.015E+00	EU154
1460.83	1.	446.96	2.13	9.749E-03	1460.83	10.670	PBC<MDA	K40

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.	-6.	-0.003	201.38	0.998s
TH-227	200.20	50.14	60.	4.	0.002	278.39	1.001s
AM-241	237.77	59.54	46.	9.	0.005	116.60	1.010s
TH-234	252.77	63.29	55.	8.	0.005	129.14	1.014s
Sn-126	256.74	64.28	72.	-10.	-0.006	124.09	1.015s
BA-133	323.56	80.99	22.	3.	0.002	298.14	1.031
Np-237	345.55	86.49	106.	9.	0.005	168.43	1.036s
Sn-126	347.35	86.94	128.	-10.	-0.005	170.95	1.037s
Sn-126	349.87	87.57	120.	-9.	-0.005	166.51	1.037s
TH-234	369.94	92.59	39.	6.	0.003	146.34	1.042s
AC-228	372.98	93.35	45.	6.	0.003	156.75	1.043s
Gd-153	389.58	97.50	52.	6.	0.004	165.97	1.047s
Np-239	397.58	99.50	58.	6.	0.004	174.96	1.049
Gd-153	412.37	103.20	64.	6.	0.004	183.22	1.052s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-239	414.37	103.70	71.	6.	0.004	191.56	1.053s
EU-155	420.82	105.31	78.	2.	0.001	814.89	1.054s
Np-239	424.09	106.13	92.	-7.	-0.004	188.29	1.055s
EU-152	486.67	121.78	37.	10.	0.005	93.43	1.070
CO-57	487.80	122.06	47.	2.	0.001	536.49	1.070s
EU-154	491.95	123.10	39.	2.	0.001	382.53	1.071s
PA-234	524.72	131.29	112.	-8.	-0.004	190.39	1.079s
HF-181	531.64	133.02	120.	0.	0.000	1000.00	1.081s
CE-144	533.69	133.54	120.	0.	0.000	1000.00	1.081s
HF-181	544.74	136.30	120.	0.	0.000	1000.00	1.084s
CO-57	545.43	136.47	120.	0.	0.000	1000.00	1.084s
Tc-99m	561.57	140.51	120.	0.	0.000	1000.00	1.088
U-235	574.67	143.79	128.	-12.	-0.007	136.55	1.091s
CE-141	581.29	145.44	189.	-14.	-0.008	144.60	1.092s
Ba-140	650.15	162.66	20.	7.	0.004	95.91	1.108s
U-235	653.03	163.38	83.	-17.	-0.009	75.03	1.109s
CE-139	662.92	165.85	55.	11.	0.006	102.73	1.111s
Cf-251	705.90	176.60	37.	-12.	-0.006	101.42	1.122s
U-235	742.37	185.72	33.	-4.	-0.002	273.29	1.130s
TH-229	773.52	193.51	16.	8.	0.004	105.24	1.137s
U-235	820.80	205.33	32.	-9.	-0.005	122.60	1.148
TH-229	842.87	210.85	24.	10.	0.005	102.76	1.153
Cf-251	907.45	227.00	48.	-14.	-0.008	100.05	1.168s
TH-227	943.33	235.97	52.	9.	0.005	115.98	1.176s
PB-212	953.97	238.63	61.	9.	0.005	124.80	1.179s
PB-214	967.43	242.00	71.	2.	0.001	615.96	1.182
EU-152	978.21	244.69	90.	-11.	-0.006	126.94	1.185s
TH-227	1024.39	256.24	24.	0.	0.000	1000.00	1.195s
Cd-113m	1054.23	263.70	29.	2.	0.001	423.09	1.202s
BI-210M	1062.75	265.83	19.	6.	0.003	106.94	1.204s
TL-208	1108.55	277.28	21.	2.	0.001	305.57	1.215s
Hg-203	1116.22	279.20	12.	6.	0.003	93.10	1.216s
I-131	1136.61	284.30	16.	8.	0.005	98.45	1.221s
PB-214	1179.77	295.09	69.	2.	0.001	580.23	1.231s
TL-210	1183.41	296.00	71.	7.	0.004	164.78	1.231s
PB-212	1199.52	300.03	78.	7.	0.004	172.24	1.235s
PA-231	1199.68	300.07	86.	7.	0.004	179.88	1.235s
PA-233	1200.12	300.18	93.	7.	0.004	187.21	1.235s
PA-231	1210.00	302.65	101.	7.	0.004	193.91	1.237s
BA-133	1210.81	302.85	108.	4.	0.002	378.89	1.238s
Ir-192	1233.16	308.44	64.	7.	0.004	155.00	1.243s
PA-233	1247.44	312.01	71.	8.	0.004	162.99	1.246s
Ir-192	1265.35	316.49	78.	8.	0.004	170.43	1.250s
CR-51	1279.73	320.08	47.	5.	0.003	190.80	1.253s
La-140	1314.43	328.76	96.	-12.	-0.006	86.96	1.261s
Cf-249	1333.15	333.44	106.	-4.	-0.002	344.53	1.265s
AC-228	1352.66	338.32	110.	0.	0.000	1000.00	1.270s
Cs-136	1361.66	340.57	110.	0.	0.000	1000.00	1.272s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	1376.53	344.29	110.	0.	0.000	1000.00	1.275s
HF-181	1382.70	345.83	124.	-12.	-0.007	137.02	1.276s
PB-214	1407.11	351.93	50.	-17.	-0.009	64.91	1.282
BA-133	1423.37	356.00	50.	10.	0.005	108.00	1.285s
I-131	1457.31	364.48	12.	4.	0.002	176.78	1.293s
BA-133	1534.73	383.84	69.	-12.	-0.007	101.53	1.310
Cf-249	1551.17	387.95	81.	-12.	-0.007	109.11	1.314s
SN-113	1566.12	391.69	81.	8.	0.005	160.45	1.317s
AG-108M	1735.10	433.94	9.	5.	0.003	132.88	1.354s
PM-146	1814.87	453.88	13.	3.	0.002	268.31	1.372s
SB-125	1852.82	463.37	8.	5.	0.003	95.05	1.380s
Ir-192	1871.59	468.06	12.	3.	0.002	193.36	1.384s
BE-7	1909.73	477.60	11.	5.	0.003	107.68	1.392s
HF-181	1927.34	482.00	16.	5.	0.003	125.10	1.396s
La-140	1947.43	487.02	20.	5.	0.003	138.18	1.400s
RH-106	2046.81	511.86	14.	67.	0.037	14.55	2.672s
Kr-85	2055.27	513.98	81.	0.	0.000	1000.00	1.424s
Nd-147	2123.35	531.00	17.	-5.	-0.003	165.12	1.438s
Ba-140	2148.39	537.26	5.	4.	0.002	107.88	1.444s
CS-134	2252.30	563.24	0.	0.	0.000	1000.00	1.466s
CS-134	2276.64	569.32	14.	6.	0.003	97.18	1.471s
PA-234	2277.24	569.47	20.	0.	0.000	1000.00	1.471s
TL-208	2331.45	583.02	11.	-2.	-0.001	306.65	1.482s
SB-125	2401.36	600.50	58.	9.	0.005	123.54	1.497
SB-124	2410.29	602.73	67.	7.	0.004	158.36	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	90.71	1.505s
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	6.	4.	0.002	91.34	1.526s
I-131	2547.28	636.97	16.	-6.	-0.003	122.45	1.527s
AG-110M	2630.43	657.76	38.	-13.	-0.007	54.59	1.544s
CS-137	2646.03	661.66	49.	-5.	-0.003	216.78	1.548s
PM-144	2785.58	696.54	7.	20.	0.011	29.15	1.576s
NB-94	2809.93	702.63	37.	-8.	-0.004	116.77	1.581s
SB-124	2890.57	722.79	31.	-6.	-0.004	131.16	1.598s
AG-108M	2891.17	722.94	38.	0.	0.000	1000.00	1.598s
EU-154	2892.86	723.36	38.	0.	0.000	1000.00	1.598s
ZR-95	2896.22	724.20	38.	0.	0.000	1000.00	1.599s
BI-212	2908.11	727.17	51.	-14.	-0.008	79.08	1.601s
PM-146	2942.31	735.72	0.	9.	0.005	33.33	1.608s
PM-146	2988.08	747.16	5.	5.	0.003	109.07	1.617s
ZR-95	3026.36	756.73	0.	9.	0.005	33.95	1.625s
AG-110M	3055.23	763.94	10.	-1.	-0.001	351.78	1.631s
PA-234M	3065.10	766.41	15.	-1.	0.000	830.66	1.633s
EU-152	3115.14	778.92	5.	1.	0.001	501.66	1.643s
BI-212	3141.15	785.42	20.	-7.	-0.004	101.73	1.648s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	3182.96	795.87	18.	2.	0.001	308.22	1.656s
TL-210	3197.88	799.60	20.	0.	0.000	1000.00	1.659s
CS-134	3207.29	801.95	20.	1.	0.001	640.31	1.661s
CO-58	3242.59	810.78	30.	-7.	-0.004	116.93	1.668s
La-140	3262.58	815.77	37.	0.	0.000	1000.00	1.672s
Cs-136	3273.50	818.50	47.	-9.	-0.005	112.77	1.674s
MN-54	3338.91	834.85	16.	-4.	-0.002	88.76	1.687s
Co-56	3386.61	846.77	15.	-4.	-0.002	218.66	1.696s
TL-208	3441.80	860.56	5.	1.	0.000	721.66	1.707s
NB-94	3483.94	871.10	25.	-11.	-0.006	69.48	1.715s
EU-154	3492.47	873.23	25.	8.	0.004	95.30	1.717s
PA-234	3521.68	880.53	0.	16.	0.009	25.00	1.722s
PA-234	3532.53	883.24	16.	0.	0.000	1000.00	1.724s
AG-110M	3538.30	884.68	16.	0.	0.000	1000.00	1.725s
Sc-46	3556.69	889.28	27.	-6.	-0.003	128.48	1.729s
Y-88	3591.74	898.04	5.	2.	0.001	301.08	1.736s
AC-228	3643.88	911.07	5.	-3.	-0.002	173.74	1.746s
AG-110M	3749.60	937.49	20.	-12.	-0.007	86.87	1.766s
PA-234	3783.72	946.02	20.	-12.	-0.007	84.69	1.772s
EU-152	3856.11	964.11	7.	6.	0.003	74.08	1.786s
AC-228	3875.56	968.97	32.	-11.	-0.006	80.44	1.790s
EU-154	3985.03	996.33	0.	18.	0.010	23.57	1.810s
PA-234M	4003.71	1001.00	19.	-1.	0.000	814.64	1.814s
EU-154	4018.82	1004.77	18.	0.	0.000	1000.00	1.816s
Co-56	4151.13	1037.84	6.	1.	0.001	410.10	1.841s
Cs-136	4192.07	1048.07	11.	-3.	-0.001	183.71	1.848s
RH-106	4201.23	1050.36	10.	5.	0.003	101.01	1.850s
BI-207	4254.46	1063.66	11.	2.	0.001	426.78	1.860s
Ga-68	4309.44	1077.40	16.	-8.	-0.004	119.02	1.870s
EU-152	4448.20	1112.07	34.	-11.	-0.006	78.07	1.895s
ZN-65	4462.09	1115.55	45.	-2.	-0.001	606.28	1.897s
BI-214	4481.06	1120.29	49.	-2.	-0.001	368.35	1.901s
Sc-46	4482.12	1120.55	47.	0.	0.000	1000.00	1.901s
CO-60	4692.96	1173.24	11.	-2.	-0.001	432.15	1.938s
Ta-182	4756.25	1189.05	0.	6.	0.003	40.82	1.949s
Ta-182	4885.75	1221.41	6.	1.	0.000	812.99	1.972s
Co-56	4953.27	1238.28	1.	5.	0.003	50.56	1.984s
NA-22	5098.35	1274.53	0.	7.	0.004	37.80	2.008s
EU-154	5098.39	1274.54	7.	0.	0.000	1000.00	2.008s
FE-59	5166.65	1291.60	11.	-9.	-0.005	90.70	2.020s
TL-210	5252.32	1313.00	0.	0.	0.000	1000.00	2.034s
CO-60	5330.37	1332.50	6.	-1.	-0.001	213.70	2.047s
AG-110M	5537.69	1384.30	11.	-3.	-0.002	243.10	2.082s
K-40	5844.03	1460.83	8.	1.	0.001	446.96	2.131s
La-140	6385.95	1596.21	6.	-2.	-0.001	197.06	2.215s
BI-214	7059.65	1764.49	14.	-6.	-0.003	89.84	2.314s
Co-56	7087.11	1771.35	2.	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	1.1108E+00				5.31E+01	
			477.60	1.111E+00	?(	4.195E+00 1.08E+02	1.05E+01 G
NA-22	C	3.5754E-01				9.50E+02	
			1274.53	3.575E-01	?(	3.764E-01 3.78E+01	9.99E+01 G
K-40	N	5.0739E-01				4.66E+11	
			1460.83	5.074E-01	?(P	8.509E+00 4.47E+02	1.07E+01 G
Sc-46	F	-2.3122E-01				8.38E+01	
			889.28	-2.312E-01	?(	1.032E+00 1.28E+02	1.00E+02 G
			1120.55	0.000E+00	+	1.597E+00 1.00E+03	1.00E+02 G
CR-51	F	9.5759E-01				2.77E+01	
			320.08	9.576E-01	?(P	6.346E+00 1.91E+02	9.94E+00 G
MN-54	C	-1.3683E-01				3.12E+02	
			834.85	-1.368E-01	&(P	7.763E-01 8.88E+01	1.00E+02 G
FE-59	F	-2.6771E-02				4.45E+01	
			1099.25	-2.677E-02	%(	1.082E+00 1.58E+03	5.65E+01 G
			1291.60	-1.115E+00	+	2.197E+00 9.07E+01	4.32E+01 G
Co-56	C	9.3911E-02				7.73E+01	
			846.77	-1.482E-01	?(	7.690E-01 2.19E+02	9.99E+01 G
			1238.28	3.930E-01	?(P	5.564E-01 5.06E+01	6.61E+01 G
			1037.84	4.077E-01	?(P	4.238E+00 4.10E+02	1.41E+01 G
			1771.35	0.000E+00	-	4.238E+00 1.00E+03	1.55E+01 A
CO-57	C	2.2371E-02				2.72E+02	
			122.06	2.237E-02	?(	4.249E-01 5.36E+02	8.56E+01 G
			136.47	0.000E+00	-	5.430E+00 1.00E+03	1.07E+01 G
CO-58	C	-2.5202E-01				7.09E+01	
			810.78	-2.520E-01	?(	1.016E+00 1.17E+02	9.95E+01 G
CO-60	F	-7.2295E-02				1.93E+03	
			1332.50	-7.229E-02	?(P	7.655E-01 2.14E+02	1.00E+02 G
			1173.24	-8.838E-02	+ P	8.637E-01 4.32E+02	9.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F	-1.4385E-01					2.44E+02	
			1115.55	-1.439E-01	?(	3.095E+00	6.06E+02	5.06E+01 G
NB-94	I	-2.5507E-01					7.41E+06	
			702.63	-2.551E-01	?(	1.023E+00	1.17E+02	9.79E+01 G
			871.10	-4.293E-01	+	9.911E-01	6.95E+01	9.99E+01 G
ZR-95	I	5.5683E-01					6.40E+01	
			756.73	5.568E-01	?(P	4.597E-01	3.40E+01	5.45E+01 G
			724.20	0.000E+00	-	2.330E+00	1.00E+03	4.42E+01 G
NB-95	I	-1.1451E-02					6.40E+01	
			765.79	-1.145E-02	%(	6.921E-01	1.60E+03	9.98E+01 G
RU-103	I	1.6496E-02					3.93E+01	
			497.05	1.650E-02	%(P	6.054E-01	1.42E+03	9.09E+01 G
			610.30	0.000E+00	-	2.151E+01	1.00E+03	5.75E+00 GA
RH-106	I	1.9691E+00					3.74E+02	
			621.92	1.476E-01	%(	1.259E+01	2.43E+03	9.93E+00 G
			1050.36	1.356E+01	?(	4.791E+01	1.01E+02	1.56E+00 G
			511.86	8.505E+00	?	2.557E+00	1.45E+01	2.00E+01 GA
AG-108M	C	1.2161E-01					1.53E+05	
			433.94	1.216E-01	?(P	4.178E-01	1.33E+02	9.05E+01 G
			722.94	0.000E+00	-	1.131E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	-	1.383E+00	1.00E+03	8.98E+01 G
SN-113	F	2.6624E-01					1.15E+02	
			391.69	2.662E-01	?(	1.462E+00	1.60E+02	6.40E+01 G
SB-124	F	2.1812E-01					6.02E+01	
			602.73	2.181E-01	?(	1.186E+00	1.58E+02	9.83E+01 G
			1690.98	-3.245E-02	% P	9.906E-01	1.81E+03	4.78E+01 G
			722.79	-1.922E+00	+	8.739E+00	1.31E+02	1.08E+01 G
SB-125	I	7.4336E-01					1.01E+03	
			427.88	5.023E-02	%(	1.666E+00	1.28E+03	2.96E+01 G
			600.50	1.441E+00	&(	6.083E+00	1.24E+02	1.79E+01 G
			635.89	1.142E+00	?(	3.636E+00	9.13E+01	1.13E+01 G
			463.37	1.082E+00	?(	3.585E+00	9.51E+01	1.05E+01 G
I-131	I	2.5259E-01					8.02E+00	
			364.48	9.746E-02	?(	4.594E-01	1.77E+02	8.17E+01 G
			284.30	2.317E+00	?(	5.827E+00	9.84E+01	6.14E+00 G
			636.97	-2.302E+00	+ P	8.770E+00	1.22E+02	7.17E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Gd-153	F	2.5708E-01					2.42E+02	
			97.50	2.227E-01	?(	1.278E+00	1.66E+02	3.00E+01 G
			103.20	3.044E-01	&(	1.924E+00	1.83E+02	2.18E+01 G
Ga-68	C	-1.2652E+01					4.71E-02	
			1077.40	-1.265E+01	?(	3.376E+01	1.19E+02	3.30E+00 G
BA-133	F	3.2072E-01					3.85E+03	
			356.00	3.050E-01	?(	1.122E+00	1.08E+02	6.20E+01 G
			302.85	3.738E-01	?(	4.884E+00	3.79E+02	1.83E+01 G
			383.84	-2.783E+00	+	9.554E+00	1.02E+02	8.94E+00 GA
			80.99	1.013E-01	&	8.296E-01	2.98E+02	3.41E+01 GA
CS-134	I	2.4709E-01					7.54E+02	
			795.87	8.255E-02	?(	9.279E-01	3.08E+02	8.55E+01 G
			604.71	0.000E+00	-	1.258E+00	1.00E+03	9.76E+01 G
			569.32	1.071E+00	&(	3.595E+00	9.72E+01	1.54E+01 G
			801.95	4.086E-01	?(	9.623E+00	6.40E+02	8.69E+00 G
			563.24	0.000E+00	-	2.404E+00	1.00E+03	8.35E+00 G
CS-137	I	-1.6783E-01					1.10E+04	
			661.66	-1.678E-01	&(	1.269E+00	2.17E+02	8.52E+01 G
CE-139	F	1.5748E-01					1.38E+02	
			165.85	1.575E-01	?(P	5.481E-01	1.03E+02	7.99E+01 G
Ba-140	I	6.5670E-01					1.28E+01	
			537.26	4.804E-01	&(P	1.364E+00	1.08E+02	2.44E+01 G
			162.66	1.348E+00	&(	4.435E+00	9.59E+01	6.22E+00 G
			304.85	-1.563E-06	%	2.132E+01	3.92E+08	4.29E+00 G
La-140	I	-1.0396E-02					1.28E+01	
			1596.21	-1.403E-01	?(P	9.183E-01	1.97E+02	9.54E+01 G
			487.02	2.620E-01	?(	1.273E+00	1.38E+02	4.55E+01 G
			328.76	-1.061E+00	+ P	4.411E+00	8.70E+01	2.03E+01 G
			815.77	0.000E+00	+	4.799E+00	1.00E+03	2.33E+01 G
CE-141	I	-3.1478E-01					3.25E+01	
			145.44	-3.148E-01	?(	1.536E+00	1.45E+02	4.82E+01 G
PM-144	C	6.4455E-01					3.63E+02	
			696.54	6.445E-01	&(	4.847E-01	2.92E+01	9.90E+01 G
			618.06	0.000E+00	-	1.260E+00	1.00E+03	9.91E+01 G
EU-152	F	6.8790E-01					4.94E+03	
			121.78	3.605E-01	&(	1.143E+00	9.34E+01	2.86E+01 G
			344.29	0.000E+00	&	3.723E+00	1.00E+03	2.65E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1112.07	-3.831E+00	+	1.003E+01	7.81E+01	1.36E+01 G
			778.92	2.684E-01	?(	3.524E+00	5.02E+02	1.29E+01 G
			964.11	1.700E+00	?(P	4.210E+00	7.41E+01	1.46E+01 G
			244.69	-2.176E+00	+	9.379E+00	1.27E+02	7.58E+00 G
			1408.00	-4.128E-02	% P	1.941E+00	1.92E+03	2.10E+01 GA
EU-154	I	1.6982E+00					3.14E+03	
			123.10	6.001E-02	?(	8.150E-01	3.83E+02	4.08E+01 G
			1274.54	0.000E+00	-	2.182E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	5.083E+00	1.00E+03	2.02E+01 G
			873.23	2.450E+00	?(P	7.966E+00	9.53E+01	1.23E+01 G
			1004.77	0.000E+00	-	5.277E+00	1.00E+03	1.80E+01 G
			996.33	7.132E+00	?(	2.920E+00	2.36E+01	1.06E+01 G
EU-155	I	7.6198E-02					1.81E+03	
			105.31	7.620E-02	?(P	2.167E+00	8.15E+02	2.12E+01 G
			86.54	6.396E-03	%	1.902E+00	8.56E+03	3.07E+01 G
HF-181	F	1.4652E-01					4.24E+01	
			482.00	1.465E-01	?(	6.446E-01	1.25E+02	8.05E+01 G
			133.02	0.000E+00	-	1.328E+00	1.00E+03	4.33E+01 G
			345.83	-1.495E+00	+	6.938E+00	1.37E+02	1.51E+01 G
			136.30	0.000E+00	-	9.909E+00	1.00E+03	5.85E+00 G
Ta-182	F	3.8627E-01					1.14E+02	
			1121.30	-6.604E-02	&(	4.600E+00	1.95E+03	3.49E+01 G
			1221.41	1.295E-01	?(P	2.631E+00	8.13E+02	2.70E+01 G
			1189.05	1.789E+00	?(	2.197E+00	4.08E+01	1.62E+01 G
Hg-203	F	1.2148E-01					4.66E+01	
			279.20	1.215E-01	?(	3.898E-01	9.31E+01	8.15E+01 G
TL-208	N	1.4860E-02					6.98E+02	
			583.02	-5.521E-02	?(P	5.928E-01	3.07E+02	8.45E+01 G
			277.28	5.657E-01	?(	6.261E+00	3.06E+02	6.31E+00 G
			860.56	2.117E-01	?(P	4.055E+00	7.22E+02	1.24E+01 G
PM-146	C	4.3374E-01					2.02E+03	
			453.88	1.012E-01	?(P	7.025E-01	2.68E+02	6.50E+01 G
			747.16	4.763E-01	?(P	1.347E+00	1.09E+02	3.40E+01 G
			735.72	1.330E+00	?(	1.089E+00	3.33E+01	2.25E+01 G
Y-88	F	3.2269E-02					1.07E+02	
			1836.06	-4.173E-03	%(P	5.109E-01	8.61E+03	9.92E+01 G
			898.04	7.085E-02	?(P	5.550E-01	3.01E+02	9.37E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cd-113m		4.8651E+02					5.33E+03	
			263.70	4.865E+02	?(	7.398E+03	4.23E+02	6.00E-03 K
Cd-109	F	-2.7678E-07					4.53E+02	
			88.04	-2.768E-07	%(	1.615E+01	1.68E+09	3.79E+00 G
Cf-251	T	-8.3819E-01					3.28E+05	
			176.60	-8.382E-01	?(	2.222E+00	1.01E+02	1.70E+01 G
			227.00	-3.215E+00	+	7.998E+00	1.00E+02	6.30E+00 GA
Cf-249	T	-3.8087E-01					1.28E+05	
			387.95	-3.809E-01	?(	1.406E+00	1.09E+02	6.60E+01 G
			333.44	-5.141E-01	&	6.106E+00	3.45E+02	1.55E+01 G
Sn-126		-1.4335E+00					3.65E+07	
			87.57	-2.784E-01	+	1.578E+00	1.67E+02	3.75E+01 GA
			64.28	-1.433E+00	?(	6.057E+00	1.24E+02	9.70E+00 G
			86.94	-1.167E+00	+	6.785E+00	1.71E+02	9.04E+00 GA
PB-210	N	-3.0439E+00					8.14E+03	
			46.54	-3.044E+00	?(	2.115E+01	2.01E+02	4.25E+00 G
PB-212	N	3.1505E-01					6.98E+02	
			238.63	3.151E-01	&(	1.343E+00	1.25E+02	4.33E+01 G
			300.03	3.942E+00	?	2.330E+01	1.72E+02	3.28E+00 GA
PB-214	N	-8.7946E-01					5.84E+05	
			351.93	-8.795E-01	(P	1.843E+00	6.49E+01	3.76E+01 G
			295.09	1.827E-01	+ P	3.686E+00	5.80E+02	1.93E+01 G
			242.00	3.945E-01	+ P	8.492E+00	6.16E+02	7.43E+00 GA
BI-207	C	1.0601E-01					1.18E+04	
			1063.66	1.060E-01	?(P	1.087E+00	4.27E+02	7.45E+01 G
			569.70	-1.405E-02	&	6.690E-01	1.29E+03	9.77E+01 G
BI-212	N	-5.9533E+00					6.98E+02	
			727.17	-5.953E+00	?(	1.576E+01	7.91E+01	7.55E+00 G
			785.42	-1.820E+01	+	6.382E+01	1.02E+02	1.28E+00 GA
U-235	N	-1.2060E+00					2.57E+11	
			143.79	-1.206E+00	(	5.576E+00	1.37E+02	1.10E+01 G
			205.33	-2.423E+00	& P	7.819E+00	1.23E+02	5.01E+00 G
			163.38	-3.975E+00	+ P	1.058E+01	7.50E+01	5.08E+00 G
			185.72	-9.347E-02	+	6.889E-01	2.73E+02	5.40E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-214	N	-4.6055E-01					5.84E+05	
			609.31	-4.606E-01	?(P	2.802E+00	9.07E+01	4.61E+01 G
			1120.29	-6.584E-01	+ P	1.079E+01	3.68E+02	1.51E+01 G
			1764.49	-2.481E+00	+ P	8.634E+00	8.98E+01	1.54E+01 G
BI-210M	T	2.0108E-01					1.10E+09	
			265.83	2.011E-01	?(P	7.423E-01	1.07E+02	5.00E+01 G
			304.90	2.395E-07	%	3.267E+00	3.92E+08	2.80E+01 G
AC-228	N	-4.0526E-01					2.10E+03	
			911.07	-4.053E-01	?(	1.774E+00	1.74E+02	2.90E+01 G
			968.97	-2.538E+00	+	6.863E+00	8.04E+01	1.75E+01 G
			338.32	0.000E+00	&	8.116E+00	1.00E+03	1.20E+01 G
			93.35	1.213E+00	?	6.582E+00	1.57E+02	5.56E+00 XA
TH-227	N	7.7561E-01					7.95E+03	
			256.24	0.000E+00	?(	5.697E+00	1.00E+03	7.00E+00 G
			235.97	1.098E+00	?(	4.349E+00	1.16E+02	1.23E+01 G
			50.14	9.579E-01	?(	9.293E+00	2.78E+02	8.00E+00 G
TH-229	N	3.2086E+00					2.68E+06	
			193.51	2.329E+00	?(	6.289E+00	1.05E+02	4.40E+00 G
			210.85	4.503E+00	&(	1.171E+01	1.03E+02	2.99E+00 G
TH-234	N	1.9861E+00					1.63E+12	
			92.59	1.211E+00	?(	6.139E+00	1.46E+02	5.58E+00 G
			63.29	3.123E+00	?(	1.381E+01	1.29E+02	3.81E+00 G
PA-231	N	4.8624E+00					1.20E+07	
			302.65	4.525E+00	?(	3.004E+01	1.94E+02	2.88E+00 G
			300.07	5.257E+00	?(	3.242E+01	1.80E+02	2.46E+00 G
PA-233	C	6.2405E-01					7.82E+08	
			312.01	3.722E-01	?(	2.083E+00	1.63E+02	3.60E+01 G
			300.18	2.086E+00	?(	1.338E+01	1.87E+02	6.20E+00 G
PA-234	N	-4.7336E-01					1.63E+12	
			131.29	-4.734E-01	(	3.078E+00	1.90E+02	1.80E+01 G
			946.02	-3.711E+00	+	7.089E+00	8.47E+01	1.34E+01 G
			569.47	0.000E+00	&	7.885E+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	1.017E+01	?	4.687E+00	2.50E+01	6.00E+00 GA
PA-234M	N	-2.8691E+00					1.63E+12	
			1001.00	-2.869E+00	?(P	1.148E+02	8.15E+02	8.37E-01 G
			766.41	-7.778E+00	+	2.422E+02	8.31E+02	2.94E-01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AM-241   T   3.6385E-01                                      1.58E+05
                           59.54 3.639E-01  (  1.451E+00 1.17E+02 3.59E+01 G

Np-237   F   7.4708E-01                                      2.14E+06
                           86.49 7.471E-01 ?(  4.292E+00 1.68E+02 1.31E+01 G

Ir-192   F   1.9505E-01                                      7.40E+01
                          316.49 1.560E-01 ?(  9.118E-01 1.70E+02 8.70E+01 G
                          468.06 1.242E-01 ?(  8.759E-01 1.93E+02 5.18E+01 G
                          308.44 4.176E-01 ?(  2.224E+00 1.55E+02 3.18E+01 G

Cs-136   F  -3.2463E-01                                      1.30E+01
                          818.50-3.246E-01 ?(  1.250E+00 1.13E+02 1.00E+02 G
                         1048.07-1.457E-01 +   9.795E-01 1.84E+02 8.00E+01 G
                          340.57 0.000E+00 &   2.088E+00 1.00E+03 4.69E+01 G

Np-239   T  -3.3723E-01                                      2.36E+00
                          103.70 2.764E-01 ?   1.825E+00 1.92E+02 2.40E+01 X
                          106.13-3.372E-01 &(  2.176E+00 1.88E+02 2.27E+01 G
                           99.50 4.441E-01 ?   2.684E+00 1.75E+02 1.50E+01 X

Nd-147      -1.0699E+00                                      1.11E+01
                          531.00-1.070E+00 ?(  4.436E+00 1.65E+02 1.30E+01 G
                           91.10-3.653E-08 %   2.131E+00 1.68E+09 2.83E+01 G

TL-210   N   7.1767E-02                                      5.84E+05
                          799.60 0.000E+00 ?(  8.431E-01 1.00E+03 9.90E+01 G
                          296.00 1.617E-01 ?(  9.148E-01 1.65E+02 7.90E+01 G
                         1313.00 0.000E+00 -   1.835E+00 1.00E+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	
PB-210	46.54	70.	-6.	-0.003	201.38	-3.044E+00	
TH-227	50.14	60.	4.	0.002	278.39	9.579E-01	
AM-241	59.54	46.	9.	0.005	116.60	3.639E-01	
TH-234	63.29	55.	8.	0.005	129.14	3.123E+00	
Sn-126	64.28	72.	-10.	-0.006	124.09	-1.433E+00	
BA-133	80.99	22.	3.	0.002	298.14	1.013E-01	
Np-237	86.49	106.	9.	0.005	168.43	7.471E-01	
Sn-126	86.94	128.	-10.	-0.005	170.95	-1.167E+00	
Sn-126	87.57	120.	-9.	-0.005	166.51	-2.784E-01	
TH-234	92.59	39.	6.	0.003	146.34	1.211E+00	
AC-228	93.35	45.	6.	0.003	156.75	1.213E+00	
Gd-153	97.50	52.	6.	0.004	165.97	2.227E-01	
Np-239	99.50	58.	6.	0.004	174.96	4.441E-01	
Gd-153	103.20	64.	6.	0.004	183.22	3.044E-01	
Np-239	103.70	71.	6.	0.004	191.56	2.764E-01	
EU-155	105.31	78.	2.	0.001	814.89	7.620E-02	P
Np-239	106.13	92.	-7.	-0.004	188.29	-3.372E-01	
EU-152	121.78	37.	10.	0.005	93.43	3.605E-01	
CO-57	122.06	47.	2.	0.001	536.49	2.237E-02	
PA-234	131.29	112.	-8.	-0.004	190.39	-4.734E-01	
U-235	143.79	128.	-12.	-0.007	136.55	-1.206E+00	
CE-141	145.44	189.	-14.	-0.008	144.60	-3.148E-01	
Ba-140	162.66	20.	7.	0.004	95.91	1.348E+00	
U-235	163.38	83.	-17.	-0.009	75.03	-3.975E+00	P
CE-139	165.85	55.	11.	0.006	102.73	1.575E-01	P
Cf-251	176.60	37.	-12.	-0.006	101.42	-8.382E-01	
U-235	185.72	33.	-4.	-0.002	273.29	-9.347E-02	
TH-229	193.51	16.	8.	0.004	105.24	2.329E+00	
U-235	205.33	32.	-9.	-0.005	122.60	-2.423E+00	P
TH-229	210.85	24.	10.	0.005	102.76	4.503E+00	
Cf-251	227.00	48.	-14.	-0.008	100.05	-3.215E+00	
TH-227	235.97	52.	9.	0.005	115.98	1.098E+00	
PB-212	238.63	61.	9.	0.005	124.80	3.151E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	242.00	71.	2.	0.001	615.96	3.945E-01	P
EU-152	244.69	90.	-11.	-0.006	126.94	-2.176E+00	
Cd-113m	263.70	29.	2.	0.001	423.09	4.865E+02	
BI-210M	265.83	19.	6.	0.003	106.94	2.011E-01	P
TL-208	277.28	21.	2.	0.001	305.57	5.657E-01	
Hg-203	279.20	12.	6.	0.003	93.10	1.215E-01	
I-131	284.30	16.	8.	0.005	98.45	2.317E+00	
PB-214	295.09	69.	2.	0.001	580.23	1.827E-01	P
TL-210	296.00	71.	7.	0.004	164.78	1.617E-01	
PB-212	300.03	78.	7.	0.004	172.24	3.942E+00	
PA-231	300.07	86.	7.	0.004	179.88	5.257E+00	
PA-233	300.18	93.	7.	0.004	187.21	2.086E+00	
PA-231	302.65	101.	7.	0.004	193.91	4.525E+00	
BA-133	302.85	108.	4.	0.002	378.89	3.738E-01	
Ir-192	308.44	64.	7.	0.004	155.00	4.176E-01	
PA-233	312.01	71.	8.	0.004	162.99	3.722E-01	
Ir-192	316.49	78.	8.	0.004	170.43	1.560E-01	
CR-51	320.08	47.	5.	0.003	190.80	9.576E-01	P
La-140	328.76	96.	-12.	-0.006	86.96	-1.061E+00	P
Cf-249	333.44	106.	-4.	-0.002	344.53	-5.141E-01	
HF-181	345.83	124.	-12.	-0.007	137.02	-1.495E+00	
PB-214	351.93	50.	-17.	-0.009	64.91	-8.795E-01	P
BA-133	356.00	50.	10.	0.005	108.00	3.050E-01	
I-131	364.48	12.	4.	0.002	176.78	9.746E-02	
BA-133	383.84	69.	-12.	-0.007	101.53	-2.783E+00	
Cf-249	387.95	81.	-12.	-0.007	109.11	-3.809E-01	
SN-113	391.69	81.	8.	0.005	160.45	2.662E-01	
AG-108M	433.94	9.	5.	0.003	132.88	1.216E-01	P
PM-146	453.88	13.	3.	0.002	268.31	1.012E-01	P
SB-125	463.37	8.	5.	0.003	95.05	1.082E+00	
Ir-192	468.06	12.	3.	0.002	193.36	1.242E-01	
BE-7	477.60	11.	5.	0.003	107.68	1.111E+00	
HF-181	482.00	16.	5.	0.003	125.10	1.465E-01	
La-140	487.02	20.	5.	0.003	138.18	2.620E-01	
RH-106	511.86	14.	67.	0.037	14.55	8.505E+00	
Nd-147	531.00	17.	-5.	-0.003	165.12	-1.070E+00	
Ba-140	537.26	5.	4.	0.002	107.88	4.804E-01	P
CS-134	569.32	14.	6.	0.003	97.18	1.071E+00	
TL-208	583.02	11.	-2.	-0.001	306.65	-5.521E-02	P
SB-125	600.50	58.	9.	0.005	123.54	1.441E+00	
SB-124	602.73	67.	7.	0.004	158.36	2.181E-01	
BI-214	609.31	81.	-7.	-0.004	90.71	-4.606E-01	P
SB-125	635.89	6.	4.	0.002	91.34	1.142E+00	
I-131	636.97	16.	-6.	-0.003	122.45	-2.302E+00	P
AG-110M	657.76	38.	-13.	-0.007	54.59	-4.073E-01	P
CS-137	661.66	49.	-5.	-0.003	216.78	-1.678E-01	
NB-94	702.63	37.	-8.	-0.004	116.77	-2.551E-01	
SB-124	722.79	31.	-6.	-0.004	131.16	-1.922E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
BI-212	727.17	51.	-14.	-0.008	79.08	-5.953E+00		
PM-146	735.72	0.	9.	0.005	33.33	1.330E+00		
PM-146	747.16	5.	5.	0.003	109.07	4.763E-01		P
AG-110M	763.94	10.	-1.	-0.001	351.78	-2.048E-01		
PA-234M	766.41	15.	-1.	0.000	830.66	-7.778E+00		
EU-152	778.92	5.	1.	0.001	501.66	2.684E-01		
BI-212	785.42	20.	-7.	-0.004	101.73	-1.820E+01		
CS-134	795.87	18.	2.	0.001	308.22	8.255E-02		
CS-134	801.95	20.	1.	0.001	640.31	4.086E-01		
CO-58	810.78	30.	-7.	-0.004	116.93	-2.520E-01		
Cs-136	818.50	47.	-9.	-0.005	112.77	-3.246E-01		
MN-54	834.85	16.	-4.	-0.002	88.76	-1.368E-01		P
Co-56	846.77	15.	-4.	-0.002	218.66	-1.482E-01		
TL-208	860.56	5.	1.	0.000	721.66	2.117E-01		P
NB-94	871.10	25.	-11.	-0.006	69.48	-4.293E-01		
PA-234	880.53	0.	16.	0.009	25.00	1.017E+01		
Sc-46	889.28	27.	-6.	-0.003	128.48	-2.312E-01		
Y-88	898.04	5.	2.	0.001	301.08	7.085E-02		P
AC-228	911.07	5.	-3.	-0.002	173.74	-4.053E-01		
AG-110M	937.49	20.	-12.	-0.007	86.87	-1.399E+00		
PA-234	946.02	20.	-12.	-0.007	84.69	-3.711E+00		
EU-152	964.11	7.	6.	0.003	74.08	1.700E+00		P
AC-228	968.97	32.	-11.	-0.006	80.44	-2.538E+00		
PA-234M	1001.00	19.	-1.	0.000	814.64	-2.869E+00		P
Co-56	1037.84	6.	1.	0.001	410.10	4.077E-01		P
Cs-136	1048.07	11.	-3.	-0.001	183.71	-1.457E-01		
RH-106	1050.36	10.	5.	0.003	101.01	1.356E+01		
BI-207	1063.66	11.	2.	0.001	426.78	1.060E-01		P
Ga-68	1077.40	16.	-8.	-0.004	119.02	-1.265E+01		
EU-152	1112.07	34.	-11.	-0.006	78.07	-3.831E+00		
ZN-65	1115.55	45.	-2.	-0.001	606.28	-1.439E-01		
BI-214	1120.29	49.	-2.	-0.001	368.35	-6.584E-01		P
CO-60	1173.24	11.	-2.	-0.001	432.15	-8.838E-02		P
Ta-182	1189.05	0.	6.	0.003	40.82	1.789E+00		
Ta-182	1221.41	6.	1.	0.000	812.99	1.295E-01		P
Co-56	1238.28	1.	5.	0.003	50.56	3.930E-01		P
NA-22	1274.53	0.	7.	0.004	37.80	3.575E-01		
FE-59	1291.60	11.	-9.	-0.005	90.70	-1.115E+00		
CO-60	1332.50	6.	-1.	-0.001	213.70	-7.229E-02		P
AG-110M	1384.30	11.	-3.	-0.002	243.10	-7.487E-01		
K-40	1460.83	8.	1.	0.001	446.96	5.074E-01		P
La-140	1596.21	6.	-2.	-0.001	197.06	-1.403E-01		P
BI-214	1764.49	14.	-6.	-0.003	89.84	-2.481E+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	1.1108E+00	1.1108E+00	1.077E+02%	4.20E+00
NA-22	#A	3.5754E-01	3.5754E-01	3.780E+01%	3.76E-01
K-40	#A	5.0739E-01	5.0739E-01	4.470E+02%	8.51E+00
Sc-46	#A	-2.3122E-01	-2.3122E-01	1.285E+02%	1.03E+00
CR-51	#A	9.5758E-01	9.5759E-01	1.908E+02%	6.35E+00
MN-54	#A	-1.3683E-01	-1.3683E-01	8.876E+01%	7.76E-01
FE-59	#A	-2.6770E-02	-2.6771E-02	1.584E+03%	1.08E+00
Co-56	#A	9.3911E-02	9.3911E-02	5.056E+01%	7.69E-01
CO-57	#A	2.2371E-02	2.2371E-02	5.365E+02%	4.25E-01
CO-58	#A	-2.5202E-01	-2.5202E-01	1.169E+02%	1.02E+00
CO-60	#A	-7.2295E-02	-7.2295E-02	2.137E+02%	7.66E-01
ZN-65	#A	-1.4385E-01	-1.4385E-01	6.063E+02%	3.09E+00
NB-94	#A	-2.5507E-01	-2.5507E-01	1.168E+02%	1.02E+00
ZR-95	#	5.5683E-01	5.5683E-01	3.395E+01%	4.60E-01
NB-95	#A	-1.1451E-02	-1.1451E-02	1.597E+03%	6.92E-01
RU-103	#A	1.6496E-02	1.6496E-02	1.417E+03%	6.05E-01
RH-106	#A	1.9691E+00	1.9691E+00	1.010E+02%	1.26E+01
AG-108M	#A	1.2161E-01	1.2161E-01	1.329E+02%	4.18E-01
AG-110M	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.12E+00
SN-113	#A	2.6624E-01	2.6624E-01	1.605E+02%	1.46E+00
SB-124	#A	2.1812E-01	2.1812E-01	1.584E+02%	1.19E+00
SB-125	#A	7.4336E-01	7.4336E-01	9.134E+01%	1.67E+00
I-131	#A	2.5258E-01	2.5259E-01	9.845E+01%	4.59E-01
Gd-153	#A	2.5708E-01	2.5708E-01	1.236E+02%	1.28E+00
Ga-68	#A	-1.2575E+01	-1.2652E+01	1.190E+02%	3.38E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.77E-01
BA-133	#A	3.2072E-01	3.2072E-01	1.080E+02%	1.12E+00
CS-134	#A	2.4709E-01	2.4709E-01	9.718E+01%	9.28E-01
CS-137	#A	-1.6783E-01	-1.6783E-01	2.168E+02%	1.27E+00
CE-139	#A	1.5748E-01	1.5748E-01	1.027E+02%	5.48E-01
Ba-140	#A	6.5669E-01	6.5670E-01	7.218E+01%	1.36E+00
La-140	#A	-1.0396E-02	-1.0396E-02	1.203E+02%	9.18E-01
CE-141	#A	-3.1478E-01	-3.1478E-01	1.446E+02%	1.54E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.19E+00
PM-144	#	6.4454E-01	6.4455E-01	2.915E+01%	4.85E-01
EU-152	#A	6.8790E-01	6.8790E-01	7.408E+01%	1.14E+00
EU-154	#C	1.6982E+00	1.6982E+00	2.357E+01%	8.15E-01
EU-155	#A	7.6198E-02	7.6198E-02	8.149E+02%	2.17E+00
HF-181	#A	1.4652E-01	1.4652E-01	1.251E+02%	6.45E-01
Ta-182	#A	3.8627E-01	3.8627E-01	4.082E+01%	4.60E+00
Hg-203	#A	1.2147E-01	1.2148E-01	9.310E+01%	3.90E-01
TL-208	#A	1.4860E-02	1.4860E-02	2.805E+02%	5.93E-01
PM-146	#A	4.3374E-01	4.3374E-01	3.333E+01%	7.02E-01

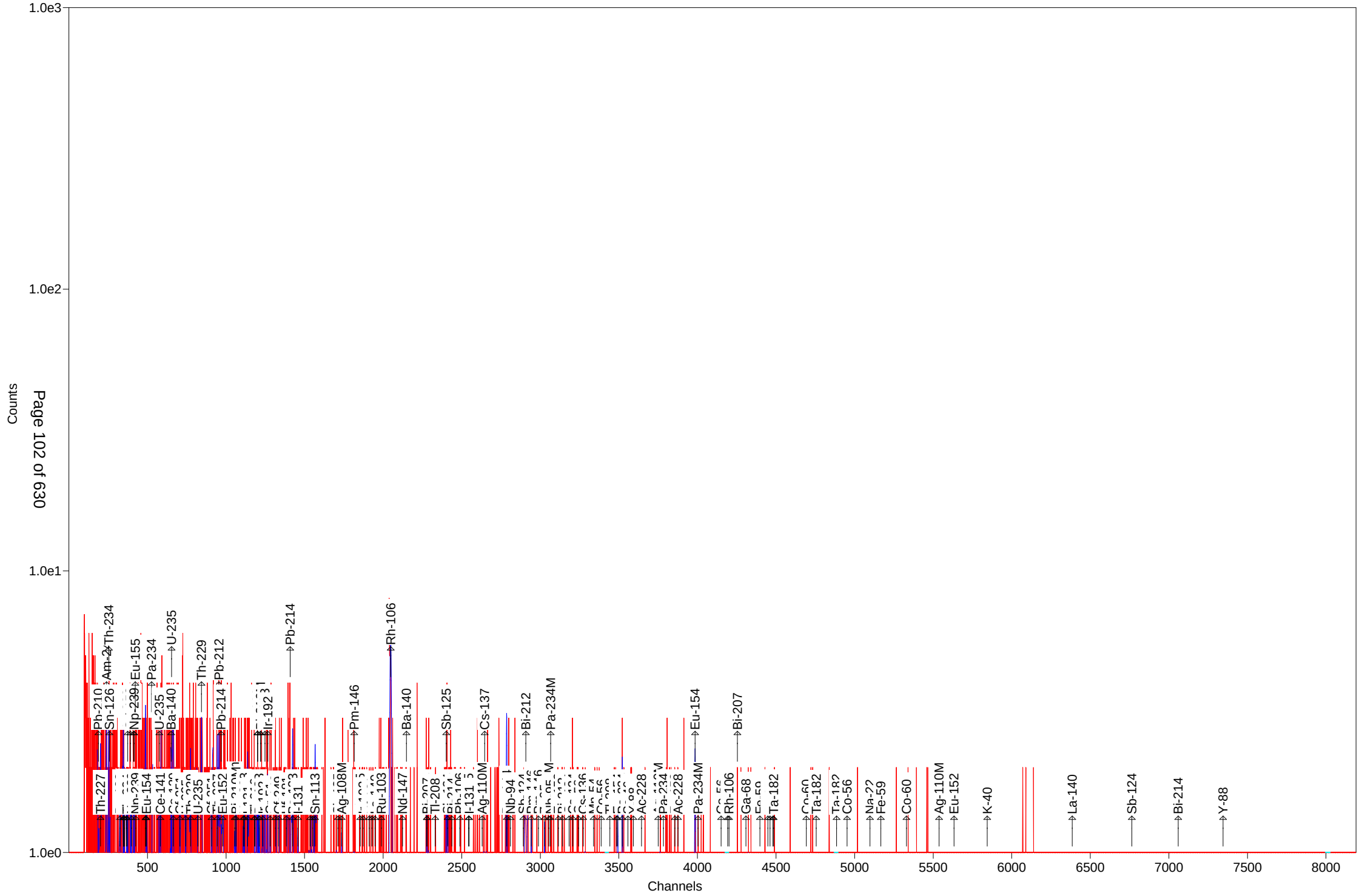
Y-88	#A	3.2269E-02	3.2269E-02	3.011E+02%	5.11E-01
Cd-113m	#A	4.8651E+02	4.8651E+02	4.231E+02%	7.40E+03
Cd-109	#A	-2.7678E-07	-2.7678E-07	1.684E+09%	1.61E+01
Cf-251	#A	-8.3819E-01	-8.3819E-01	1.014E+02%	2.22E+00
Cf-249	#A	-3.8087E-01	-3.8087E-01	1.091E+02%	1.41E+00
Sn-126	#A	-1.4335E+00	-1.4335E+00	1.241E+02%	6.06E+00
PB-210	#A	-3.0439E+00	-3.0439E+00	2.014E+02%	2.12E+01
PB-212	#A	3.1505E-01	3.1505E-01	1.248E+02%	1.34E+00
PB-214	#A	-8.7946E-01	-8.7946E-01	6.491E+01%	1.84E+00
BI-207	#A	1.0601E-01	1.0601E-01	4.268E+02%	1.09E+00
BI-212	#A	-5.9533E+00	-5.9533E+00	7.908E+01%	1.58E+01
U-235	#A	-1.2060E+00	-1.2060E+00	1.366E+02%	5.58E+00
BI-214	#A	-4.6055E-01	-4.6055E-01	9.071E+01%	2.80E+00
BI-210M	#A	2.0108E-01	2.0108E-01	1.069E+02%	7.42E-01
AC-228	#A	-4.0526E-01	-4.0526E-01	1.737E+02%	1.77E+00
TH-227	#A	7.7561E-01	7.7561E-01	1.160E+02%	5.70E+00
TH-229	#A	3.2086E+00	3.2086E+00	7.354E+01%	6.29E+00
TH-234	#A	1.9861E+00	1.9861E+00	9.758E+01%	6.14E+00
PA-231	#A	4.8624E+00	4.8624E+00	1.322E+02%	3.00E+01
PA-233	#A	6.2405E-01	6.2405E-01	1.241E+02%	2.08E+00
PA-234	#A	-4.7336E-01	-4.7336E-01	1.904E+02%	3.08E+00
PA-234M	#A	-2.8691E+00	-2.8691E+00	8.146E+02%	1.15E+02
AM-241	#A	3.6385E-01	3.6385E-01	1.166E+02%	1.45E+00
Np-237	#A	7.4708E-01	7.4708E-01	1.684E+02%	4.29E+00
Ir-192	#A	1.9505E-01	1.9505E-01	1.003E+02%	9.12E-01
Cs-136	#A	-3.2462E-01	-3.2463E-01	1.128E+02%	1.25E+00
Np-239	#A	-3.3718E-01	-3.3723E-01	1.883E+02%	2.18E+00
Nd-147	#A	-1.0698E+00	-1.0699E+00	1.651E+02%	4.44E+00
TL-210	#A	7.1767E-02	7.1767E-02	1.648E+02%	8.43E-01
Kr-85	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.64E+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

405451_Gamma_MB 160-405451~1-A. 9_Gamma_20190006.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20190006

Sample Description: 405451_Gamma_LCS 160-405451~2-A
Detector: Detector #12
Batch ID: 405451
Work Order Number: Gamma
Lot Number: LCS 160-405451~2-A

Decay to Time: 1/2/2019 12:54 Live Time: 1800 sec
Acquisition Time: 1/2/2019 12:54:42 Real Time: 1806 sec
Analysis Time: 1/2/2019 13:24 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_2018-12-22_1532.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	-1.574E+01	103.2	1.624E+01	1.626E+01	5.388E+01
NA-22	-6.322E-01	97.5	6.164E-01	6.172E-01	2.099E+00
K-40	5.125E+00	151.2	7.748E+00	7.752E+00	1.646E+01
Sc-46	1.650E+00	91.1	1.504E+00	1.506E+00	5.004E+00
CR-51	1.005E+01	165.7	1.665E+01	1.666E+01	5.530E+01
MN-54	-1.628E+00	96.5	1.572E+00	1.574E+00	3.533E+00
FE-59	-1.816E+00	197.1	3.578E+00	3.579E+00	7.578E+00
Co-56	1.053E+00	86.7	9.129E-01	9.145E-01	3.006E+00
CO-57	-4.647E-01	150.3	6.984E-01	6.988E-01	2.329E+00
CO-58	-1.658E+00	80.6	1.337E+00	1.339E+00	4.437E+00
CO-60	1.634E+02	1.6	2.555E+00	8.528E+00	2.142E+00
ZN-65	0.000E+00	1.#INF	1.150E+00	1.150E+00	1.078E+01
NB-94	-4.635E-01	240.2	1.113E+00	1.114E+00	2.550E+00
ZR-95	-2.345E-01	911.4	2.137E+00	2.137E+00	4.922E+00
NB-95	4.598E-01	209.1	9.613E-01	9.616E-01	3.260E+00
RU-103	1.547E-01	837.9	1.296E+00	1.296E+00	3.185E+00
RH-106	-7.596E+00	245.7	1.866E+01	1.867E+01	6.235E+01
AG-108M	6.792E-01	80.6	5.474E-01	5.485E-01	3.690E+00
AG-110M	0.000E+00	1.#INF	9.784E-01	9.784E-01	7.192E+00
SN-113	-2.140E+00	108.1	2.315E+00	2.317E+00	7.681E+00
SB-124	-1.434E-01	75.5	1.083E-01	1.085E-01	5.942E+00
SB-125	4.162E+00	33.6	1.398E+00	1.414E+00	1.120E+01
I-131	3.059E-01	453.4	1.387E+00	1.387E+00	3.384E+00
Gd-153	-2.627E+00	145.0	3.809E+00	3.812E+00	1.263E+01
Ga-68	-1.902E+01	327.9	6.236E+01	6.237E+01	1.331E+02
Tc-99m	-9.074E-01	158.5	1.438E+00	1.439E+00	4.768E+00
BA-133	7.066E-01	261.1	1.845E+00	1.846E+00	6.172E+00
CS-134	1.219E+00	113.2	1.380E+00	1.381E+00	4.619E+00
CS-137	3.856E+02	1.2	4.721E+00	2.024E+01	3.143E+00
CE-139	-9.561E-01	100.5	9.613E-01	9.625E-01	3.189E+00
Ba-140	1.528E+00	322.4	4.926E+00	4.926E+00	1.160E+01
La-140	1.034E+00	128.3	1.327E+00	1.328E+00	1.243E+00
CE-141	1.619E+00	159.0	2.575E+00	2.576E+00	8.539E+00

CE-144	0.000E+00	1.#INF	3.533E+00	3.533E+00	3.610E+01
PM-144	2.870E+00	30.9	8.856E-01	8.976E-01	1.899E+00
EU-152	3.802E+00	109.9	4.178E+00	4.182E+00	8.334E+00
EU-154	3.570E+00	78.5	2.802E+00	2.808E+00	5.159E+00
EU-155	5.099E+00	63.6	3.245E+00	3.257E+00	8.135E+00
HF-181	-6.005E-01	75.6	4.538E-01	4.548E-01	7.226E+00
Ta-182	-4.201E+00	117.9	4.951E+00	4.956E+00	1.655E+01
Hg-203	-1.256E+00	86.9	1.091E+00	1.093E+00	3.618E+00
TL-208	9.516E-01	197.6	1.881E+00	1.881E+00	3.341E+00
PM-146	3.344E-01	134.1	4.485E-01	4.489E-01	5.272E+00
Y-88	-6.046E-01	152.3	9.207E-01	9.213E-01	1.883E+00
Cd-113m	-1.595E+04	91.8	1.464E+04	1.467E+04	4.856E+04
Cd-109	2.234E+01	126.8	2.833E+01	2.835E+01	9.391E+01
Cf-251	-1.121E+00	409.6	4.593E+00	4.593E+00	1.168E+01
Cf-249	-1.363E+00	142.7	1.945E+00	1.947E+00	6.479E+00
Sn-126	8.833E+00	76.3	6.737E+00	6.755E+00	2.000E+01
PB-210	1.105E+04	1.0	1.080E+02	6.983E+02	2.014E+02
PB-212	5.663E+00	26.7	1.511E+00	1.539E+00	3.964E+00
PB-214	-4.047E+00	58.4	2.362E+00	2.371E+00	9.519E+00
BI-207	-2.578E+00	107.5	2.770E+00	2.773E+00	5.823E+00
BI-212	-1.684E+01	85.6	1.442E+01	1.445E+01	4.800E+01
U-235	-3.540E+00	159.7	5.652E+00	5.655E+00	3.839E+01
BI-214	5.773E+00	20.4	1.178E+00	1.215E+00	1.282E+01
BI-210M	1.794E+00	89.3	1.601E+00	1.604E+00	5.313E+00
AC-228	8.236E+00	59.6	4.912E+00	4.930E+00	1.248E+01
TH-227	-1.395E+01	98.1	1.369E+01	1.370E+01	3.452E+01
TH-229	-5.897E+00	340.3	2.007E+01	2.007E+01	5.093E+01
TH-234	6.807E+00	280.1	1.907E+01	1.907E+01	6.339E+01
PA-231	2.008E+01	291.0	5.842E+01	5.843E+01	1.943E+02
PA-233	0.000E+00	1.#INF	1.778E+00	1.778E+00	1.598E+01
PA-234	-4.317E+00	119.7	5.167E+00	5.172E+00	1.714E+01
PA-234M	1.515E+02	111.6	1.690E+02	1.692E+02	5.655E+02
AM-241	1.261E+03	0.7	9.361E+00	7.402E+01	1.426E+01
Np-237	-6.491E+00	132.8	8.622E+00	8.629E+00	2.858E+01
Ir-192	1.518E+00	87.6	1.331E+00	1.333E+00	6.647E+00
Cs-136	1.115E+00	85.5	9.537E-01	9.558E-01	4.823E+00
Np-239	3.348E+00	135.6	4.539E+00	4.543E+00	1.505E+01
Nd-147	-5.494E+00	189.2	1.039E+01	1.040E+01	2.432E+01
TL-210	0.000E+00	1.#INF	3.104E-01	3.104E-01	4.153E+00
Kr-85	-5.031E+01	553.3	2.783E+02	2.784E+02	9.374E+02
Total	1.314E+04				

Analyst: Joey Sausto

Sample description
405451_Gamma_LCS 160-405451~2-A

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20190006.An1

Acquisition information
Start time: 1/2/2019 12:54:42 PM
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	1/2/2019 12:54:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2018-12-22_1532.PBC 12/22/2018 3:32:10 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 28 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0508

***** 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
28.10	15.	100.52	0.73	4.114E-03				
36.58	259.	21.07	0.77	1.052E-02				
46.65	15259.	0.98	0.85	1.809E-02	46.54	4.250	1.105E+04	PB210
49.57	56.	144.29	0.85	2.134E-02	50.14	8.000	1.771E+01	TH227
59.60	23022.	0.85	0.87	2.820E-02	59.54	35.900	1.265E+03	AM241
63.79	46.	76.27	0.80	3.015E-02	64.28	9.700	PBC<MDA	Sn126
77.27	125.	33.05	0.41	3.389E-02				
87.63	127.	30.45	0.84	3.576E-02	86.94	9.040	2.183E+01	Sn126
					87.57	37.500	5.249E+00	Sn126
					88.04	3.790	5.184E+01	Cd109
91.10	32.	213.60	0.90	3.621E-02	91.10	28.300	PBC<MDA	Nd147
92.82	151.	28.23	1.08	3.640E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	4.147E+01	AC228
103.70	51.	137.40	0.91	3.720E-02	103.70	24.000	PBC<MDA	Np239
105.31	72.	63.64	2.54	3.726E-02	105.31	21.200	PBC<MDA	EU155
					106.13	22.700	4.759E+00	Np239
106.13	51.	135.58	0.91	3.729E-02	106.13	22.700	PBC<MDA	Np239
123.10	47.	89.99	0.93	3.721E-02	123.10	40.790	PBC<MDA	EU154
145.44	50.	159.02	0.95	3.586E-02	145.44	48.200	PBC<MDA	CE141
153.02	49.	54.91	0.71	3.522E-02				
163.70	14.	347.49	0.97	3.428E-02	163.38	5.080	PBC<MDA	U235
185.92	30.	165.82	0.99	3.215E-02	185.72	54.000	PBC<MDA	U235
235.97	43.	129.07	1.04	2.764E-02	235.97	12.300	PBC<MDA	TH227
238.53	121.	26.67	0.85	2.744E-02	238.63	43.300	5.663E+00	PB212
242.00	43.	130.13	1.05	2.716E-02	242.00	7.430	PBC<MDA	PB214
265.83	41.	89.26	1.07	2.539E-02	265.83	50.000	PBC<MDA	BI210M
302.65	24.	290.95	1.11	2.306E-02	302.65	2.880	PBC<MDA	PA231

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					302.85	18.330	3.157E+00	BA133
308.95	17.	411.05	1.11	2.273E-02	308.44	31.750	PBC<MDA	Ir192
315.87	26.	263.44	1.12	2.229E-02	316.49	87.040	PBC<MDA	Ir192
320.08	40.	165.74	1.13	2.210E-02	320.08	9.940	PBC<MDA	CR51
328.76	12.	325.65	1.13	2.165E-02	328.76	20.300	PBC<MDA	La140
345.83	41.	108.90	1.15	2.083E-02	345.83	15.070	PBC<MDA	HF181
356.00	16.	261.14	1.16	2.037E-02	356.00	62.050	PBC<MDA	BA133
364.48	9.	453.38	1.17	2.001E-02	364.48	81.700	PBC<MDA	I131
468.06	45.	87.63	1.27	1.653E-02	468.06	51.750	PBC<MDA	Ir192
487.02	37.	128.25	1.29	1.604E-02	487.02	45.500	PBC<MDA	La140
497.24	4.	837.90	1.30	1.580E-02	497.05	90.900	PBC<MDA	RU103
511.92	121.	25.89	2.56	1.546E-02	511.86	20.000	2.175E+01	RH106
537.26	10.	322.36	1.34	1.491E-02	537.26	24.390	PBC<MDA	Ba140
583.02	15.	197.61	1.38	1.403E-02	583.02	84.500	PBC<MDA	TL208
609.48	33.	130.97	1.41	1.358E-02	609.31	46.090	PBC<MDA	BI214
610.47	6.	691.87	1.41	1.357E-02	610.30	5.750	PBC<MDA	RU103
635.89	53.	33.59	1.43	1.317E-02	635.89	11.310	PBC<MDA	SB125
661.67	7563.	1.22	1.49	1.279E-02	661.66	85.210	3.856E+02	CS137
696.54	63.	30.86	1.49	1.232E-02	696.54	99.000	2.870E+00	PM144
722.79	25.	75.53	1.51	1.199E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.286E+00	AG108M
					723.36	20.220	5.778E+00	EU154
722.94	25.	80.60	1.51	1.199E-02	722.79	10.810	1.080E+01	SB124
					722.94	90.840	1.286E+00	AG108M
					723.36	20.220	5.779E+00	EU154
723.36	3.	721.49	1.51	1.199E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.484E-01	AG108M
					723.36	20.220	6.672E-01	EU154
747.16	17.	134.12	1.53	1.171E-02	747.16	34.000	PBC<MDA	PM146
765.79	10.	209.07	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.561E+02	PA234M
785.42	7.	372.19	1.57	1.129E-02	785.42	1.280	PBC<MDA	BI212
795.87	21.	113.19	1.58	1.119E-02	795.87	85.530	PBC<MDA	CS134
818.50	4.	649.30	1.60	1.096E-02	818.50	100.000	PBC<MDA	Cs136
846.77	20.	131.97	1.63	1.070E-02	846.77	99.935	PBC<MDA	Co56
860.56	6.	493.29	1.64	1.057E-02	860.56	12.420	PBC<MDA	TL208
889.28	31.	91.15	1.66	1.033E-02	889.28	99.984	PBC<MDA	Sc46
913.17	32.	95.10	1.68	1.015E-02	911.07	29.000	PBC<MDA	AC228
945.06	49.	47.99	0.70	9.881E-03	946.02	13.400	2.058E+01	PA234
964.11	28.	109.87	1.73	9.739E-03	964.11	14.605	PBC<MDA	EU152
968.97	36.	71.98	1.74	9.703E-03	968.97	17.460	PBC<MDA	AC228
997.77	17.	45.17	0.69	9.498E-03	996.33	10.600	9.463E+00	EU154
1001.00	22.	111.57	1.76	9.476E-03	1001.00	0.837	PBC<MDA	PA234M
1048.07	29.	85.54	1.81	9.162E-03	1048.07	80.000	PBC<MDA	Cs136
1173.28	2488.	2.21	1.94	8.426E-03	1173.24	99.900	1.642E+02	CO60
1238.28	10.	112.44	1.97	8.090E-03	1238.28	66.070	PBC<MDA	Co56
1332.55	2236.	2.21	2.09	7.647E-03	1332.50	99.980	1.625E+02	CO60
1408.00	7.	88.42	2.12	7.324E-03	1408.00	21.005	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.83	7.	151.19	2.16	7.112E-03	1460.83	10.670	PBC<MDA	K40
1596.21	1.	600.00	2.27	6.616E-03	1596.21	95.400	PBC<MDA	La140
1765.69	24.	20.41	2.40	6.075E-03	1764.49	15.400	1.425E+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
112.09	28.10	98.	15.	3.646E+03	100.52	0.732	- c
145.98	36.58	906.	259.	2.461E+04	21.07	0.773	-
198.17	49.53	2925.	74.	3.483E+03	103.54	0.854	- c
308.64	77.27	557.	125.	3.681E+03	33.05	0.409	- s
611.43	153.02	257.	49.	1.401E+03	54.91	0.706	- s
3779.37	945.06	112.	49.	4.959E+03	47.99	0.704	- sM
3990.30	997.77	20.	17.	1.807E+03	45.17	0.687	- 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	3491.	15259.	8.477	0.98	0.851D
TH-227	200.18	50.14	26665.	-127.	-0.071	181.88	0.855s
AM-241	237.74	59.54	3040.	22960.	12.755	0.74	0.865D
TH-234	252.74	63.29	30633.	-125.	-0.069	119.58	0.868
Sn-126	254.76	63.79	484.	46.	0.026	76.27	0.803
BA-133	323.50	80.99	1978.	-56.	-0.031	113.87	0.887
Np-237	345.49	86.49	2591.	-54.	-0.030	132.83	0.892s
Sn-126	349.81	87.57	2377.	52.	0.029	67.13	0.893D
Cd-109	351.68	88.04	2368.	55.	0.030	126.80	0.894A
Nd-147	363.92	91.10	2322.	32.	0.018	213.60	0.897s
TH-234	369.87	92.59	2416.	25.	0.014	280.10	0.898
AC-228	372.91	93.35	2325.	53.	0.029	130.05	0.899
Gd-153	389.50	97.50	2842.	-52.	-0.029	145.00	0.903s
Np-239	397.50	99.50	2790.	-52.	-0.029	143.39	0.905
Gd-153	412.29	103.20	2802.	-53.	-0.029	143.09	0.909s
Np-239	414.29	103.70	2416.	51.	0.028	137.40	0.909s
EU-155	420.74	105.31	588.	72.	0.040	63.64	2.537s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-239	424.00	106.13	2365.	51.	0.028	135.58	0.912s
CO-57	487.69	122.06	790.	-27.	-0.015	150.28	0.928s
EU-154	491.84	123.10	880.	47.	0.026	89.99	0.929s
PA-234	524.60	131.29	1875.	-52.	-0.029	119.69	0.938s
HF-181	531.51	133.02	3116.	-39.	-0.022	202.26	0.939s
CE-144	533.57	133.54	3155.	0.	0.000	1000.00	0.940
HF-181	544.61	136.30	3155.	0.	0.000	1000.00	0.943s
CO-57	545.30	136.47	3226.	-51.	-0.028	157.92	0.943s
Tc-99m	561.44	140.51	3277.	-51.	-0.028	158.48	0.947
U-235	574.53	143.79	3352.	-51.	-0.029	159.68	0.950s
CE-141	581.15	145.44	3183.	50.	0.028	159.02	0.952s
Ba-140	649.99	162.66	1148.	-43.	-0.024	113.33	0.969s
U-235	652.87	163.38	1176.	14.	0.008	347.49	0.970s
CE-139	662.76	165.85	1085.	-47.	-0.026	100.54	0.973s
Cf-251	705.72	176.60	612.	-11.	-0.006	409.56	0.983s
U-235	742.18	185.72	703.	30.	0.017	165.82	0.992
TH-229	773.32	193.51	708.	-15.	-0.008	340.33	1.000s
U-235	820.59	205.33	781.	-51.	-0.029	102.80	1.012
TH-229	842.65	210.85	737.	-11.	-0.006	462.70	1.018s
Cf-251	907.22	227.00	733.	-51.	-0.028	100.71	1.034
TH-227	943.09	235.97	1488.	43.	0.024	129.07	1.043s
PB-212	953.32	238.53	310.	121.	0.067	26.67	0.854
PB-214	967.18	242.00	1531.	43.	0.024	130.13	1.049s
EU-152	977.96	244.69	1641.	-10.	-0.006	552.90	1.051s
TH-227	1024.13	256.24	565.	-46.	-0.025	98.10	1.063s
Cd-113m	1053.96	263.70	793.	-44.	-0.024	91.75	1.070
BI-210M	1062.48	265.83	649.	41.	0.023	89.26	1.072
TL-208	1108.27	277.28	709.	-30.	-0.017	125.49	1.084s
Hg-203	1115.93	279.20	745.	-45.	-0.025	86.85	1.086s
I-131	1136.32	284.30	462.	-18.	-0.010	224.64	1.091s
PB-214	1179.47	295.09	2471.	-21.	-0.012	153.23	1.101s
TL-210	1183.11	296.00	2450.	0.	0.000	1000.00	1.102s
PB-212	1199.22	300.03	2450.	0.	0.000	1000.00	1.106
PA-231	1199.38	300.07	2450.	0.	0.000	1000.00	1.106
PA-233	1199.82	300.18	2450.	0.	0.000	1000.00	1.107
PA-231	1209.70	302.65	2426.	24.	0.013	290.95	1.109s
BA-133	1210.50	302.85	2450.	0.	0.000	1000.00	1.109s
Ba-140	1218.49	304.85	2450.	0.	0.000	1000.00	1.111
BI-210M	1218.68	304.90	2450.	0.	0.000	1000.00	1.111
Ir-192	1232.85	308.44	2433.	17.	0.009	411.05	1.115s
PA-233	1247.13	312.01	2450.	0.	0.000	1000.00	1.118s
Ir-192	1265.04	316.49	2424.	26.	0.015	263.44	1.123s
CR-51	1279.41	320.08	2147.	40.	0.022	165.74	1.126s
La-140	1314.10	328.76	696.	12.	0.006	325.65	1.135s
AC-228	1352.33	338.32	1045.	-32.	-0.018	143.95	1.144
Cs-136	1361.32	340.57	1077.	0.	0.000	1000.00	1.146s
EU-152	1376.18	344.29	1077.	0.	0.000	1000.00	1.150s
HF-181	1382.35	345.83	986.	41.	0.023	108.90	1.151s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	1406.76	351.93	775.	-56.	-0.031	58.37	1.158s
BA-133	1423.02	356.00	873.	16.	0.009	261.14	1.162
I-131	1456.95	364.48	432.	9.	0.005	453.38	1.170
BA-133	1534.35	383.84	912.	-44.	-0.025	97.98	1.189s
Cf-249	1550.79	387.95	956.	-31.	-0.017	142.71	1.193s
SN-113	1565.74	391.69	1251.	-47.	-0.026	108.15	1.196s
SB-125	1710.45	427.88	488.	-17.	-0.009	255.57	1.232s
PM-146	1814.45	453.88	476.	-14.	-0.008	306.28	1.257s
SB-125	1852.39	463.37	504.	-11.	-0.006	400.72	1.266s
Ir-192	1871.16	468.06	756.	45.	0.025	87.63	1.271
BE-7	1909.29	477.60	1230.	-49.	-0.027	103.20	1.280
HF-181	1926.90	482.00	1278.	-49.	-0.027	104.83	1.284s
La-140	1946.98	487.02	1120.	37.	0.021	128.25	1.289s
RU-103	1987.11	497.05	292.	4.	0.002	837.90	1.298s
RH-106	2046.35	511.86	430.	121.	0.067	25.89	2.563s
Kr-85	2054.81	513.98	548.	-6.	-0.003	553.27	1.315
Nd-147	2122.88	531.00	316.	-19.	-0.011	189.16	1.331s
Ba-140	2147.92	537.26	247.	10.	0.006	322.36	1.337s
CS-134	2251.82	563.24	238.	-22.	-0.012	142.68	1.362
CS-134	2276.15	569.32	186.	-20.	-0.011	97.50	1.367s
PA-234	2276.75	569.47	232.	-16.	-0.009	135.50	1.368s
BI-207	2277.68	569.70	265.	-9.	-0.005	253.39	1.368s
TL-208	2330.96	583.02	217.	15.	0.009	197.61	1.381s
SB-125	2400.87	600.50	951.	-33.	-0.018	134.96	1.397s
SB-124	2409.79	602.73	918.	-33.	-0.018	132.47	1.399
CS-134	2417.71	604.71	889.	-33.	-0.018	128.80	1.401s
BI-214	2436.11	609.31	925.	33.	0.018	130.97	1.405
RU-103	2440.06	610.30	892.	6.	0.003	691.87	1.406s
AG-108M	2455.99	614.28	886.	0.	0.000	1000.00	1.410s
PM-144	2471.12	618.06	858.	-14.	-0.007	307.96	1.414s
RH-106	2486.54	621.92	987.	-18.	-0.010	245.71	1.417
SB-125	2542.43	635.89	132.	53.	0.029	33.59	1.430s
I-131	2546.77	636.97	187.	-8.	-0.005	234.84	1.432s
AG-110M	2629.92	657.76	7946.	-36.	-0.020	353.78	1.451s
CS-137	2645.55	661.67	160.	7563.	4.202	1.22	1.490
PM-144	2785.05	696.54	70.	63.	0.035	30.86	1.487
NB-94	2809.41	702.63	126.	-10.	-0.006	240.21	1.493s
SB-124	2890.04	722.79	169.	25.	0.014	75.53	1.512s
AG-108M	2890.65	722.94	194.	25.	0.014	80.60	1.512s
EU-154	2892.34	723.36	219.	3.	0.002	721.49	1.512s
ZR-95	2895.69	724.20	222.	0.	0.000	1000.00	1.513
BI-212	2907.58	727.17	260.	-27.	-0.015	85.64	1.516s
PM-146	2941.78	735.72	131.	-15.	-0.008	167.38	1.524s
PM-146	2987.55	747.16	107.	17.	0.009	134.12	1.535s
ZR-95	3025.83	756.73	131.	-3.	-0.001	911.38	1.543s
AG-110M	3054.69	763.94	192.	-6.	-0.004	304.41	1.550s
NB-95	3062.08	765.79	192.	10.	0.005	209.07	1.552s
PA-234M	3064.57	766.41	237.	-33.	-0.018	68.61	1.552s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	3140.62	785.42	135.	7.	0.004	372.19	1.570
CS-134	3182.43	795.87	272.	21.	0.012	113.19	1.579
TL-210	3197.35	799.60	293.	0.	0.000	1000.00	1.583s
CS-134	3206.76	801.95	330.	-26.	-0.015	100.13	1.585s
CO-58	3242.06	810.78	332.	-33.	-0.018	80.60	1.593s
La-140	3262.05	815.77	365.	-17.	-0.009	163.41	1.598s
Cs-136	3272.97	818.50	394.	4.	0.002	649.30	1.600s
MN-54	3338.38	834.85	201.	-32.	-0.018	96.54	1.615s
Co-56	3386.08	846.77	140.	20.	0.011	131.97	1.626s
TL-208	3441.27	860.56	180.	6.	0.003	493.29	1.638s
NB-94	3483.41	871.10	260.	-25.	-0.014	94.56	1.648s
EU-154	3491.95	873.23	304.	-14.	-0.008	180.31	1.650s
PA-234	3521.16	880.53	407.	-7.	-0.004	409.33	1.657s
PA-234	3532.00	883.24	414.	0.	0.000	1000.00	1.659s
AG-110M	3537.78	884.68	414.	0.	0.000	1000.00	1.660s
Sc-46	3556.17	889.28	375.	31.	0.017	91.15	1.664
Y-88	3591.22	898.04	235.	-38.	-0.021	90.16	1.672s
AC-228	3643.36	911.07	185.	32.	0.018	95.10	1.684s
AG-110M	3749.09	937.49	285.	-45.	-0.025	84.09	1.708s
PA-234	3783.21	946.02	331.	-41.	-0.023	64.81	1.716s
EU-152	3855.60	964.11	190.	28.	0.016	109.87	1.732
AC-228	3875.05	968.97	322.	36.	0.020	71.98	1.736
EU-154	3984.54	996.33	251.	29.	0.016	78.49	1.761s
PA-234M	4003.22	1001.00	280.	22.	0.012	111.57	1.765s
EU-154	4018.33	1004.77	352.	-32.	-0.018	84.86	1.768s
Co-56	4150.66	1037.84	229.	-41.	-0.023	85.40	1.798s
Cs-136	4191.60	1048.07	117.	29.	0.016	85.54	1.807s
RH-106	4200.76	1050.36	255.	-36.	-0.020	64.66	1.809
BI-207	4253.99	1063.66	213.	-31.	-0.017	107.45	1.820s
Ga-68	4308.98	1077.40	155.	-9.	-0.005	327.94	1.833s
FE-59	4396.44	1099.25	197.	-16.	-0.009	197.05	1.852s
EU-152	4447.76	1112.07	308.	-11.	-0.006	227.64	1.863s
ZN-65	4461.66	1115.55	319.	0.	0.000	1000.00	1.866s
BI-214	4480.63	1120.29	319.	0.	0.000	1000.00	1.870
Sc-46	4481.68	1120.55	319.	0.	0.000	1000.00	1.870s
Ta-182	4484.69	1121.30	356.	-23.	-0.013	117.87	1.871s
CO-60	4692.74	1173.28	72.	2488.	1.383	2.21	1.942
Ta-182	4755.86	1189.05	48.	-9.	-0.005	178.12	1.930s
Ta-182	4885.39	1221.41	57.	-16.	-0.009	115.48	1.957s
Co-56	4952.92	1238.28	23.	10.	0.006	112.44	1.972s
NA-22	5098.03	1274.53	34.	-9.	-0.005	97.50	2.003s
EU-154	5098.08	1274.54	43.	0.	0.000	1000.00	2.003s
FE-59	5166.35	1291.60	34.	-8.	-0.004	174.55	2.017s
TL-210	5252.04	1313.00	34.	-5.	-0.003	277.13	2.036s
CO-60	5330.32	1332.55	33.	2236.	1.242	2.21	2.086
EU-152	5632.39	1408.00	6.	7.	0.004	88.42	2.115s
K-40	5843.92	1460.83	18.	7.	0.004	151.19	2.159
La-140	6386.02	1596.21	6.	1.	0.001	600.00	2.269s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-124	6765.58	1690.98	13.	-4.	-0.002	246.63	2.345s
BI-214	7060.00	1764.49	0.	24.	0.013	20.41	2.403s
Co-56	7087.48	1771.35	35.	-8.	-0.005	105.37	2.408s
Y-88	7346.69	1836.06	13.	-6.	-0.004	152.27	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	-1.5738E+01				5.31E+01	
			477.60	-1.574E+01	&(	5.388E+01 1.03E+02 1.05E+01	G
NA-22	C	-6.3218E-01				9.50E+02	
			1274.53	-6.322E-01	?(	2.099E+00 9.75E+01 9.99E+01	G
K-40	N	5.1246E+00				4.66E+11	
			1460.83	5.125E+00	(	1.646E+01 1.51E+02 1.07E+01	G
Sc-46	F	1.6502E+00				8.38E+01	
			889.28	1.650E+00	(	5.004E+00 9.11E+01 1.00E+02	G
			1120.55	0.000E+00	-	5.476E+00 1.00E+03 1.00E+02	G
CR-51	F	1.0046E+01				2.77E+01	
			320.08	1.005E+01	&(	5.530E+01 1.66E+02 9.94E+00	G
MN-54	C	-1.6281E+00				3.12E+02	
			834.85	-1.628E+00	&(	3.533E+00 9.65E+01 1.00E+02	G
FE-59	F	-1.8156E+00				4.45E+01	
			1099.25	-1.816E+00	?(	7.578E+00 1.97E+02 5.65E+01	G
			1291.60	-1.313E+00	+	4.906E+00 1.75E+02 4.32E+01	G
Co-56	C	1.0531E+00				7.73E+01	
			846.77	1.039E+00	?(	3.006E+00 1.32E+02 9.99E+01	G
			1238.28	1.074E+00	?(	2.588E+00 1.12E+02 6.61E+01	G
			1037.84	-1.747E+01	+	3.122E+01 8.54E+01 1.41E+01	G
			1771.35	-4.970E+00	+	1.791E+01 1.05E+02 1.55E+01	A
CO-57	C	-4.6474E-01				2.72E+02	
			122.06	-4.647E-01	?(	2.329E+00 1.50E+02 8.56E+01	G
			136.47	-7.274E+00	&	3.809E+01 1.58E+02 1.07E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-58	C	-1.6583E+00					7.09E+01	
			810.78	-1.658E+00	&(	4.437E+00	8.06E+01	9.95E+01 G
CO-60	F	1.6335E+02					1.93E+03	
			1332.50	1.625E+02	(	2.142E+00	2.21E+00	1.00E+02 G
			1173.24	1.642E+02	(	2.779E+00	2.21E+00	9.99E+01 G
NB-94	I	-4.6352E-01					7.41E+06	
			702.63	-4.635E-01	&(	2.550E+00	2.40E+02	9.79E+01 G
			871.10	-1.309E+00	+	4.128E+00	9.46E+01	9.99E+01 G
ZR-95	I	-2.3446E-01					6.40E+01	
			756.73	-2.345E-01	?(	4.922E+00	9.11E+02	5.45E+01 G
			724.20	0.000E+00	+	7.579E+00	1.00E+03	4.42E+01 G
NB-95	I	4.5978E-01					6.40E+01	
			765.79	4.598E-01	?(	3.260E+00	2.09E+02	9.98E+01 G
RU-103	I	1.5472E-01					3.93E+01	
			497.05	1.547E-01	?(	3.185E+00	8.38E+02	9.09E+01 G
			610.30	4.355E+00	?	1.010E+02	6.92E+02	5.75E+00 GA
RH-106	I	-7.5955E+00					3.74E+02	
			621.92	-7.596E+00	&(	6.235E+01	2.46E+02	9.93E+00 G
			1050.36	-1.407E+02	+	3.002E+02	6.47E+01	1.56E+00 G
			511.86	2.175E+01	?	1.785E+01	2.59E+01	2.00E+01 GA
AG-108M	C	6.7917E-01					1.53E+05	
			433.94	7.014E-02	&(	3.690E+00	2.15E+03	9.05E+01 G
			722.94	1.286E+00	?(	3.447E+00	8.06E+01	9.08E+01 G
			614.28	0.000E+00	&	6.476E+00	1.00E+03	8.98E+01 G
SN-113	F	-2.1402E+00					1.15E+02	
			391.69	-2.140E+00	?(	7.681E+00	1.08E+02	6.40E+01 G
SB-124	F	-1.4338E-01					6.02E+01	
			602.73	-1.347E+00	?(	5.942E+00	1.32E+02	9.83E+01 G
			1690.98	-6.763E-01	+	3.559E+00	2.47E+02	4.78E+01 G
			722.79	1.080E+01	?(	2.709E+01	7.55E+01	1.08E+01 G
SB-125	I	4.1624E+00					1.01E+03	
			427.88	-1.803E+00	&(	1.120E+01	2.56E+02	2.96E+01 G
			600.50	-7.382E+00	+	3.317E+01	1.35E+02	1.79E+01 G
			635.89	1.977E+01	(	2.099E+01	3.36E+01	1.13E+01 G
			463.37	-3.504E+00	+	3.419E+01	4.01E+02	1.05E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	I	3.0589E-01					8.02E+00	
			364.48	3.059E-01	?(	3.384E+00	4.53E+02	8.17E+01 G
			284.30	-6.740E+00	+	3.852E+01	2.25E+02	6.14E+00 G
			636.97	-4.911E+00	&	3.918E+01	2.35E+02	7.17E+00 G
Gd-153	F	-2.6268E+00					2.42E+02	
			97.50	-2.627E+00	?(	1.263E+01	1.45E+02	3.00E+01 G
			103.20	-3.603E+00	+	1.710E+01	1.43E+02	2.18E+01 G
Ga-68	C	-1.9016E+01					4.71E-02	
			1077.40	-1.902E+01	?(	1.331E+02	3.28E+02	3.30E+00 G
Tc-99m	I	-9.0741E-01					2.51E-01	
			140.51	-9.074E-01	?(	4.768E+00	1.58E+02	8.93E+01 G
BA-133	F	7.0663E-01					3.85E+03	
			356.00	7.066E-01	?(	6.172E+00	2.61E+02	6.20E+01 G
			302.85	0.000E+00	-	3.069E+01	1.00E+03	1.83E+01 G
			383.84	-1.426E+01	+	4.635E+01	9.80E+01	8.94E+00 GA
			80.99	-2.617E+00	+	9.880E+00	1.14E+02	3.41E+01 GA
CS-134	I	1.2192E+00					7.54E+02	
			795.87	1.219E+00	?(	4.619E+00	1.13E+02	8.55E+01 G
			604.71	-1.376E+00	&	5.901E+00	1.29E+02	9.76E+01 G
			569.32	-5.143E+00	+	1.678E+01	9.75E+01	1.54E+01 G
			801.95	-1.504E+01	&	5.021E+01	1.00E+02	8.69E+00 G
			563.24	-1.032E+01	+	3.451E+01	1.43E+02	8.35E+00 G
CS-137	I	3.8556E+02					1.10E+04	
			661.66	3.856E+02	(	3.143E+00	1.22E+00	8.52E+01 G
CE-139	F	-9.5611E-01					1.38E+02	
			165.85	-9.561E-01	?(	3.189E+00	1.01E+02	7.99E+01 G
Ba-140	I	1.5280E+00					1.28E+01	
			537.26	1.528E+00	&(	1.160E+01	3.22E+02	2.44E+01 G
			162.66	-1.109E+01	&	4.175E+01	1.13E+02	6.22E+00 G
			304.85	0.000E+00	-	1.318E+02	1.00E+03	4.29E+00 G
La-140	I	1.0345E+00					1.28E+01	
			1596.21	8.802E-02	?(	1.243E+00	6.00E+02	9.54E+01 G
			487.02	2.832E+00	?(	1.208E+01	1.28E+02	4.55E+01 G
			328.76	1.454E+00	?(	1.588E+01	3.26E+02	2.03E+01 G
			815.77	-3.633E+00	+	1.993E+01	1.63E+02	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	1.6193E+00					3.25E+01	
			145.44	1.619E+00	&(	8.539E+00	1.59E+02	4.82E+01 G
PM-144	C	2.8696E+00					3.63E+02	
			696.54	2.870E+00	&(	1.899E+00	3.09E+01	9.90E+01 G
			618.06	-5.630E-01	-	5.804E+00	3.08E+02	9.91E+01 G
EU-152	F	3.8024E+00					4.94E+03	
			121.78	1.566E-01	%(	8.334E+00	1.59E+03	2.86E+01 G
			344.29	0.000E+00	-	1.561E+01	1.00E+03	2.65E+01 G
			1112.07	-5.107E+00	+	3.923E+01	2.28E+02	1.36E+01 G
			778.92	-3.778E-01	&	2.186E+01	2.51E+03	1.29E+01 G
			964.11	1.094E+01	&(	2.615E+01	1.10E+02	1.46E+01 G
			244.69	-2.823E+00	+	5.208E+01	5.53E+02	7.58E+00 G
			1408.00	2.658E+00	?	5.101E+00	8.84E+01	2.10E+01 GA
EU-154	I	3.5698E+00					3.14E+03	
			123.10	1.729E+00	?(	5.159E+00	9.00E+01	4.08E+01 G
			1274.54	0.000E+00	-	6.637E+00	1.00E+03	3.52E+01 G
			723.36	6.672E-01	?(	1.643E+01	7.21E+02	2.02E+01 G
			873.23	-5.986E+00	+	3.634E+01	1.80E+02	1.23E+01 G
			1004.77	-1.043E+01	+	2.941E+01	8.49E+01	1.80E+01 G
			996.33	1.619E+01	?(	4.219E+01	7.85E+01	1.06E+01 G
EU-155	I	5.0991E+00					1.81E+03	
			105.31	5.099E+00	*(	8.135E+00	6.36E+01	2.12E+01 G
			86.54	0.000E+00	}	1.204E+01	3.56E+03	3.07E+01 G
HF-181	F	-6.0046E-01					4.24E+01	
			482.00	-2.078E+00	(	7.226E+00	1.05E+02	8.05E+01 G
			133.02	-1.368E+00	+	9.182E+00	2.02E+02	4.33E+01 G
			345.83	7.292E+00	&(	2.638E+01	1.09E+02	1.51E+01 G
			136.30	0.000E+00	&	6.877E+01	1.00E+03	5.85E+00 G
Ta-182	F	-4.2005E+00					1.14E+02	
			1121.30	-4.201E+00	&(	1.655E+01	1.18E+02	3.49E+01 G
			1221.41	-3.943E+00	+	9.512E+00	1.15E+02	2.70E+01 G
			1189.05	-3.700E+00	+	1.439E+01	1.78E+02	1.62E+01 G
Hg-203	F	-1.2565E+00					4.66E+01	
			279.20	-1.256E+00	?(	3.618E+00	8.69E+01	8.15E+01 G
TL-208	N	9.5164E-01					6.98E+02	
			583.02	7.184E-01	(	3.341E+00	1.98E+02	8.45E+01 G
			277.28	-1.085E+01	+	4.536E+01	1.25E+02	6.31E+00 G
			860.56	2.538E+00	&(	2.759E+01	4.93E+02	1.24E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PM-146	C	3.3444E-01					2.02E+03	
			453.88	-7.071E-01	?(	5.272E+00	3.06E+02	6.50E+01 G
			747.16	2.326E+00	(	7.115E+00	1.34E+02	3.40E+01 G
			735.72	-3.058E+00	+	1.167E+01	1.67E+02	2.25E+01 G
Y-88	F	-6.0464E-01					1.07E+02	
			1836.06	-6.046E-01	?(	1.883E+00	1.52E+02	9.92E+01 G
			898.04	-2.197E+00	+	4.288E+00	9.02E+01	9.37E+01 G
Cd-113m		-1.5955E+04					5.33E+03	
			263.70	-1.595E+04	&(	4.856E+04	9.18E+01	6.00E-03 K
Cd-109	F	2.2339E+01					4.53E+02	
							Derived Ave Activity	
			88.04	2.234E+01	}(	9.391E+01	1.27E+02	3.79E+00 G
Cf-251	T	-1.1215E+00					3.28E+05	
			176.60	-1.121E+00	&(	1.168E+01	4.10E+02	1.70E+01 G
			227.00	-1.578E+01	+	4.005E+01	1.01E+02	6.30E+00 GA
Cf-249	T	-1.3632E+00					1.28E+05	
			387.95	-1.363E+00	?(	6.479E+00	1.43E+02	6.60E+01 G
			333.44	2.508E-01	%	2.194E+01	2.60E+03	1.55E+01 G
Sn-126		8.8328E+00					3.65E+07	
			87.57	2.168E+00	}	9.528E+00	6.71E+01	3.75E+01 GA
			64.28	8.833E+00	(	2.000E+01	7.63E+01	9.70E+00 G
			86.94	0.000E+00	}	4.033E+01	3.61E+03	9.04E+00 GA
PB-210	N	1.1050E+04					8.14E+03	
			46.54	1.105E+04	(P	2.014E+02	9.77E-01	4.25E+00 G
PB-212	N	5.6632E+00					6.98E+02	
			238.63	5.663E+00	(P	3.964E+00	2.67E+01	4.33E+01 G
			300.03	0.000E+00	-	1.703E+02	1.00E+03	3.28E+00 GA
PB-214	N	-4.0469E+00					5.84E+05	
			351.93	-4.047E+00	(P	9.519E+00	5.84E+01	3.76E+01 G
			295.09	-2.600E+00	+ P	2.871E+01	1.53E+02	1.93E+01 G
			242.00	1.179E+01	+	5.093E+01	1.30E+02	7.43E+00 GA
BI-207	C	-2.5781E+00					1.18E+04	
			1063.66	-2.578E+00	&(	5.823E+00	1.07E+02	7.45E+01 G
			569.70	-3.650E-01	+	3.130E+00	2.53E+02	9.77E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-212	N	-1.6842E+01					6.98E+02	
			727.17	-1.684E+01	(	4.800E+01	8.56E+01	7.55E+00 G
			785.42	2.562E+01	?	2.187E+02	3.72E+02	1.28E+00 GA
U-235	N	-3.5398E+00					2.57E+11	
			143.79	-7.250E+00	?(	3.839E+01	1.60E+02	1.10E+01 G
			205.33	-1.879E+01	+	4.866E+01	1.03E+02	5.01E+00 G
			163.38	4.466E+00	?(	5.185E+01	3.47E+02	5.08E+00 G
			185.72	9.587E-01	+ P	4.040E+00	1.66E+02	5.40E+01 GA
BI-214	N	5.7734E+00					5.84E+05	
			609.31	2.941E+00	?(	1.282E+01	1.31E+02	4.61E+01 G
			1120.29	0.000E+00	-	3.625E+01	1.00E+03	1.51E+01 G
			1764.49	1.425E+01	?(	4.376E+00	2.04E+01	1.54E+01 G
BI-210M	T	1.7938E+00					1.10E+09	
			265.83	1.794E+00	?(	5.313E+00	8.93E+01	5.00E+01 G
			304.90	0.000E+00	-	2.020E+01	1.00E+03	2.80E+01 G
AC-228	N	8.2363E+00					2.10E+03	
			911.07	6.042E+00	&(	1.248E+01	9.51E+01	2.90E+01 G
			968.97	1.188E+01	(	2.831E+01	7.20E+01	1.75E+01 G
			338.32	-6.988E+00	-	3.349E+01	1.44E+02	1.20E+01 G
			93.35	1.445E+01	?	6.232E+01	1.30E+02	5.56E+00 XA
TH-227	N	-1.3950E+01					7.95E+03	
			256.24	-1.395E+01	&(	3.452E+01	9.81E+01	7.00E+00 G
			235.97	6.955E+00	&	2.981E+01	1.29E+02	1.23E+01 G
			50.14	-4.025E+01	&	2.418E+02	1.82E+02	8.00E+00 G
TH-229	N	-5.8970E+00					2.68E+06	
			193.51	-5.897E+00	&(	5.093E+01	3.40E+02	4.40E+00 G
			210.85	-6.860E+00	+	8.058E+01	4.63E+02	2.99E+00 G
TH-234	N	6.8071E+00					1.63E+12	
			92.59	6.807E+00	?(P	6.339E+01	2.80E+02	5.58E+00 G
			63.29	-6.115E+01	& P	4.007E+02	1.20E+02	3.81E+00 G
PA-231	N	2.0080E+01					1.20E+07	
			302.65	2.008E+01	?(	1.943E+02	2.91E+02	2.88E+00 G
			300.07	0.000E+00	-	2.271E+02	1.00E+03	2.46E+00 G
PA-234	N	-4.3169E+00					1.63E+12	
			131.29	-4.317E+00	&(	1.714E+01	1.20E+02	1.80E+01 G
			946.02	-1.718E+01	&	3.674E+01	6.48E+01	1.34E+01 G
			569.47	-7.671E+00	+	3.496E+01	1.35E+02	8.20E+00 G
			883.24	0.000E+00	+	5.439E+01	1.00E+03	9.60E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          880.53-6.232E+00 &   8.611E+01 4.09E+02 6.00E+00 GA

PA-234M  N   1.5151E+02                                     1.63E+12
                         1001.00 1.515E+02 &(  5.655E+02 1.12E+02 8.37E-01 G
                          766.41-5.397E+02 +   1.225E+03 6.86E+01 2.94E-01 G

AM-241   T   1.2612E+03                                     1.58E+05
                           59.54 1.261E+03  (  1.426E+01 7.42E-01 3.59E+01 G

Np-237   F  -6.4905E+00                                     2.14E+06
                           86.49-6.491E+00 ?(  2.858E+01 1.33E+02 1.31E+01 G

Ir-192   F   1.5184E+00                                     7.40E+01
                          316.49 7.589E-01 &(  6.647E+00 2.63E+02 8.70E+01 G
                          468.06 2.925E+00  (  8.498E+00 8.76E+01 5.18E+01 G
                          308.44 1.309E+00 ?(  1.790E+01 4.11E+02 3.18E+01 G

Cs-136   F   1.1149E+00                                     1.30E+01
                          818.50 2.196E-01  (  4.823E+00 6.49E+02 1.00E+02 G
                         1048.07 2.234E+00 ?(  4.031E+00 8.55E+01 8.00E+01 G
                          340.57 0.000E+00 -   8.748E+00 1.00E+03 4.69E+01 G

Np-239   T   3.3478E+00                                     2.36E+00
                          103.70 3.165E+00 &   1.442E+01 1.37E+02 2.40E+01 X
                          106.13 3.348E+00 &(  1.505E+01 1.36E+02 2.27E+01 G
                           99.50-5.244E+00 +   2.494E+01 1.43E+02 1.50E+01 X

Nd-147      -5.4941E+00                                     1.11E+01
                          531.00-5.494E+00 ?(  2.432E+01 1.89E+02 1.30E+01 G
                           91.10 1.736E+00 +   1.232E+01 2.14E+02 2.83E+01 G

Kr-85    I  -5.0308E+01                                     3.92E+03
                          513.98-5.031E+01 &(  9.374E+02 5.53E+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.
   % - Peak 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	26665.	-127.	-0.071	181.88	-4.025E+01
BA-133	80.99	1978.	-56.	-0.031	113.87	-2.617E+00
Np-237	86.49	2591.	-54.	-0.030	132.83	-6.491E+00
Nd-147	91.10	2322.	32.	0.018	213.60	1.736E+00
Gd-153	97.50	2842.	-52.	-0.029	145.00	-2.627E+00
Np-239	99.50	2790.	-52.	-0.029	143.39	-5.244E+00
Gd-153	103.20	2802.	-53.	-0.029	143.09	-3.603E+00
Np-239	103.70	2416.	51.	0.028	137.40	3.165E+00
Np-239	106.13	2365.	51.	0.028	135.58	3.348E+00
CO-57	122.06	790.	-27.	-0.015	150.28	-4.647E-01
EU-154	123.10	880.	47.	0.026	89.99	1.729E+00
PA-234	131.29	1875.	-52.	-0.029	119.69	-4.317E+00
HF-181	133.02	3116.	-39.	-0.022	202.26	-1.368E+00
CO-57	136.47	3226.	-51.	-0.028	157.92	-7.274E+00
Tc-99m	140.51	3277.	-51.	-0.028	158.48	-9.074E-01
CE-141	145.44	3183.	50.	0.028	159.02	1.619E+00
Ba-140	162.66	1148.	-43.	-0.024	113.33	-1.109E+01
CE-139	165.85	1085.	-47.	-0.026	100.54	-9.561E-01
Cf-251	176.60	612.	-11.	-0.006	409.56	-1.121E+00
TH-229	193.51	708.	-15.	-0.008	340.33	-5.897E+00
TH-229	210.85	737.	-11.	-0.006	462.70	-6.860E+00
Cf-251	227.00	733.	-51.	-0.028	100.71	-1.578E+01
TH-227	235.97	1488.	43.	0.024	129.07	6.955E+00
PB-214	242.00	1531.	43.	0.024	130.13	1.179E+01
EU-152	244.69	1641.	-10.	-0.006	552.90	-2.823E+00
TH-227	256.24	565.	-46.	-0.025	98.10	-1.395E+01
Cd-113m	263.70	793.	-44.	-0.024	91.75	-1.595E+04
BI-210M	265.83	649.	41.	0.023	89.26	1.794E+00
TL-208	277.28	709.	-30.	-0.017	125.49	-1.085E+01
Hg-203	279.20	745.	-45.	-0.025	86.85	-1.256E+00
I-131	284.30	462.	-18.	-0.010	224.64	-6.740E+00

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	295.09	2471.	-21.	-0.012	153.23	-2.600E+00	P
CR-51	320.08	2147.	40.	0.022	165.74	1.005E+01	
La-140	328.76	696.	12.	0.006	325.65	1.454E+00	
HF-181	345.83	986.	41.	0.023	108.90	7.292E+00	
PB-214	351.93	775.	-56.	-0.031	58.37	-4.047E+00	P
BA-133	356.00	873.	16.	0.009	261.14	7.066E-01	
I-131	364.48	432.	9.	0.005	453.38	3.059E-01	
BA-133	383.84	912.	-44.	-0.025	97.98	-1.426E+01	
Cf-249	387.95	956.	-31.	-0.017	142.71	-1.363E+00	
SN-113	391.69	1251.	-47.	-0.026	108.15	-2.140E+00	
SB-125	427.88	488.	-17.	-0.009	255.57	-1.803E+00	
PM-146	453.88	476.	-14.	-0.008	306.28	-7.071E-01	
SB-125	463.37	504.	-11.	-0.006	400.72	-3.504E+00	
BE-7	477.60	1230.	-49.	-0.027	103.20	-1.574E+01	
HF-181	482.00	1278.	-49.	-0.027	104.83	-2.078E+00	
La-140	487.02	1120.	37.	0.021	128.25	2.832E+00	
Kr-85	513.98	548.	-6.	-0.003	553.27	-5.031E+01	
Nd-147	531.00	316.	-19.	-0.011	189.16	-5.494E+00	
Ba-140	537.26	247.	10.	0.006	322.36	1.528E+00	
CS-134	563.24	238.	-22.	-0.012	142.68	-1.032E+01	
CS-134	569.32	186.	-20.	-0.011	97.50	-5.143E+00	
PA-234	569.47	232.	-16.	-0.009	135.50	-7.671E+00	
BI-207	569.70	265.	-9.	-0.005	253.39	-3.650E-01	
TL-208	583.02	217.	15.	0.009	197.61	7.184E-01	
SB-125	600.50	951.	-33.	-0.018	134.96	-7.382E+00	
SB-124	602.73	918.	-33.	-0.018	132.47	-1.347E+00	
CS-134	604.71	889.	-33.	-0.018	128.80	-1.376E+00	
SB-125	635.89	132.	53.	0.029	33.59	1.977E+01	
I-131	636.97	187.	-8.	-0.005	234.84	-4.911E+00	
AG-110M	657.76	7946.	-36.	-0.020	353.78	-1.630E+00	
NB-94	702.63	126.	-10.	-0.006	240.21	-4.635E-01	
SB-124	722.79	169.	25.	0.014	75.53	1.080E+01	
AG-108M	722.94	194.	25.	0.014	80.60	1.286E+00	
EU-154	723.36	219.	3.	0.002	721.49	6.672E-01	
BI-212	727.17	260.	-27.	-0.015	85.64	-1.684E+01	
PM-146	735.72	131.	-15.	-0.008	167.38	-3.058E+00	
PM-146	747.16	107.	17.	0.009	134.12	2.326E+00	
ZR-95	756.73	131.	-3.	-0.001	911.38	-2.345E-01	
AG-110M	763.94	192.	-6.	-0.004	304.41	-1.407E+00	
NB-95	765.79	192.	10.	0.005	209.07	4.598E-01	
PA-234M	766.41	237.	-33.	-0.018	68.61	-5.397E+02	
BI-212	785.42	135.	7.	0.004	372.19	2.562E+01	
CS-134	795.87	272.	21.	0.012	113.19	1.219E+00	
CS-134	801.95	330.	-26.	-0.015	100.13	-1.504E+01	
CO-58	810.78	332.	-33.	-0.018	80.60	-1.658E+00	
La-140	815.77	365.	-17.	-0.009	163.41	-3.633E+00	
Cs-136	818.50	394.	4.	0.002	649.30	2.196E-01	
MN-54	834.85	201.	-32.	-0.018	96.54	-1.628E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Co-56	846.77	140.	20.	0.011	131.97	1.039E+00	
TL-208	860.56	180.	6.	0.003	493.29	2.538E+00	
NB-94	871.10	260.	-25.	-0.014	94.56	-1.309E+00	
EU-154	873.23	304.	-14.	-0.008	180.31	-5.986E+00	
PA-234	880.53	407.	-7.	-0.004	409.33	-6.232E+00	
Sc-46	889.28	375.	31.	0.017	91.15	1.650E+00	
Y-88	898.04	235.	-38.	-0.021	90.16	-2.197E+00	
AG-110M	937.49	285.	-45.	-0.025	84.09	-7.296E+00	
PA-234	946.02	331.	-41.	-0.023	64.81	-1.718E+01	
EU-152	964.11	190.	28.	0.016	109.87	1.094E+01	
EU-154	996.33	251.	29.	0.016	78.49	1.619E+01	
PA-234M	1001.00	280.	22.	0.012	111.57	1.515E+02	
EU-154	1004.77	352.	-32.	-0.018	84.86	-1.043E+01	
Co-56	1037.84	229.	-41.	-0.023	85.40	-1.747E+01	
Cs-136	1048.07	117.	29.	0.016	85.54	2.234E+00	
BI-207	1063.66	213.	-31.	-0.017	107.45	-2.578E+00	
Ga-68	1077.40	155.	-9.	-0.005	327.94	-1.902E+01	
FE-59	1099.25	197.	-16.	-0.009	197.05	-1.816E+00	
EU-152	1112.07	308.	-11.	-0.006	227.64	-5.107E+00	
Ta-182	1121.30	356.	-23.	-0.013	117.87	-4.201E+00	
Ta-182	1189.05	48.	-9.	-0.005	178.12	-3.700E+00	
Ta-182	1221.41	57.	-16.	-0.009	115.48	-3.943E+00	
Co-56	1238.28	23.	10.	0.006	112.44	1.074E+00	
NA-22	1274.53	34.	-9.	-0.005	97.50	-6.322E-01	
FE-59	1291.60	34.	-8.	-0.004	174.55	-1.313E+00	
TL-210	1313.00	34.	-5.	-0.003	277.13	-1.710E+00	
EU-152	1408.00	6.	7.	0.004	88.42	2.658E+00	
La-140	1596.21	6.	1.	0.001	600.00	8.802E-02	
SB-124	1690.98	13.	-4.	-0.002	246.63	-6.763E-01	
Co-56	1771.35	35.	-8.	-0.005	105.37	-4.970E+00	
Y-88	1836.06	13.	-6.	-0.004	152.27	-6.046E-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	-1.5738E+01	-1.5738E+01	1.032E+02%	5.39E+01
NA-22	#A	-6.3218E-01	-6.3218E-01	9.750E+01%	2.10E+00
K-40	A	5.1246E+00	5.1246E+00	1.512E+02%	1.65E+01
Sc-46	#A	1.6502E+00	1.6502E+00	9.115E+01%	5.00E+00
CR-51	#A	1.0046E+01	1.0046E+01	1.657E+02%	5.53E+01
MN-54	#A	-1.6281E+00	-1.6281E+00	9.654E+01%	3.53E+00
FE-59	#A	-1.8156E+00	-1.8156E+00	1.971E+02%	7.58E+00
Co-56	#A	1.0531E+00	1.0531E+00	8.669E+01%	3.01E+00
CO-57	#A	-4.6474E-01	-4.6474E-01	1.503E+02%	2.33E+00

CO-58	#A	-1.6583E+00	-1.6583E+00	8.060E+01%	4.44E+00
CO-60		1.6335E+02	1.6335E+02	1.564E+00%	2.14E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.08E+01
NB-94	#A	-4.6352E-01	-4.6352E-01	2.402E+02%	2.55E+00
ZR-95	#A	-2.3446E-01	-2.3446E-01	9.114E+02%	4.92E+00
NB-95	#A	4.5977E-01	4.5978E-01	2.091E+02%	3.26E+00
RU-103	#A	1.5472E-01	1.5472E-01	8.379E+02%	3.18E+00
RH-106	#A	-7.5955E+00	-7.5955E+00	2.457E+02%	6.23E+01
AG-108M	#A	6.7917E-01	6.7917E-01	8.060E+01%	3.69E+00
AG-110M	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.19E+00
SN-113	#A	-2.1402E+00	-2.1402E+00	1.081E+02%	7.68E+00
SB-124	#A	-1.4338E-01	-1.4338E-01	7.553E+01%	5.94E+00
SB-125	#A	4.1624E+00	4.1624E+00	3.359E+01%	1.12E+01
I-131	#A	3.0588E-01	3.0589E-01	4.534E+02%	3.38E+00
Gd-153	#A	-2.6268E+00	-2.6268E+00	1.450E+02%	1.26E+01
Ga-68	#A	-1.8881E+01	-1.9016E+01	3.279E+02%	1.33E+02
Tc-99m	#A	-9.0619E-01	-9.0741E-01	1.585E+02%	4.77E+00
BA-133	#A	7.0663E-01	7.0663E-01	2.611E+02%	6.17E+00
CS-134	#A	1.2192E+00	1.2192E+00	1.132E+02%	4.62E+00
CS-137		3.8556E+02	3.8556E+02	1.224E+00%	3.14E+00
CE-139	#A	-9.5610E-01	-9.5611E-01	1.005E+02%	3.19E+00
Ba-140	#A	1.5279E+00	1.5280E+00	3.224E+02%	1.16E+01
La-140	#A	1.0345E+00	1.0345E+00	1.283E+02%	1.24E+00
CE-141	#A	1.6193E+00	1.6193E+00	1.590E+02%	8.54E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.61E+01
PM-144	#	2.8696E+00	2.8696E+00	3.086E+01%	1.90E+00
EU-152	#A	3.8024E+00	3.8024E+00	1.099E+02%	8.33E+00
EU-154	#A	3.5698E+00	3.5698E+00	7.849E+01%	5.16E+00
EU-155	#A	5.0991E+00	5.0991E+00	6.364E+01%	8.13E+00
HF-181	#A	-6.0046E-01	-6.0046E-01	7.558E+01%	7.23E+00
Ta-182	#A	-4.2005E+00	-4.2005E+00	1.179E+02%	1.66E+01
Hg-203	#A	-1.2565E+00	-1.2565E+00	8.685E+01%	3.62E+00
TL-208	#A	9.5164E-01	9.5164E-01	1.976E+02%	3.34E+00
PM-146	#A	3.3444E-01	3.3444E-01	1.341E+02%	5.27E+00
Y-88	#A	-6.0463E-01	-6.0464E-01	1.523E+02%	1.88E+00
Cd-113m	#A	-1.5955E+04	-1.5955E+04	9.175E+01%	4.86E+04
Cd-109	#A	2.2339E+01	2.2339E+01	1.268E+02%	9.39E+01
Cf-251	#A	-1.1215E+00	-1.1215E+00	4.096E+02%	1.17E+01
Cf-249	#A	-1.3632E+00	-1.3632E+00	1.427E+02%	6.48E+00
Sn-126	A	8.8328E+00	8.8328E+00	7.627E+01%	2.00E+01
PB-210		1.1050E+04	1.1050E+04	9.774E-01%	2.01E+02
PB-212		5.6632E+00	5.6632E+00	2.667E+01%	3.96E+00
PB-214	#A	-4.0469E+00	-4.0469E+00	5.837E+01%	9.52E+00
BI-207	#A	-2.5781E+00	-2.5781E+00	1.075E+02%	5.82E+00
BI-212	#A	-1.6842E+01	-1.6842E+01	8.564E+01%	4.80E+01
U-235	#A	-3.5398E+00	-3.5398E+00	1.597E+02%	3.84E+01
BI-214	#A	5.7734E+00	5.7734E+00	2.041E+01%	1.28E+01
BI-210M	#A	1.7938E+00	1.7938E+00	8.926E+01%	5.31E+00
AC-228	A	8.2363E+00	8.2363E+00	5.964E+01%	1.25E+01

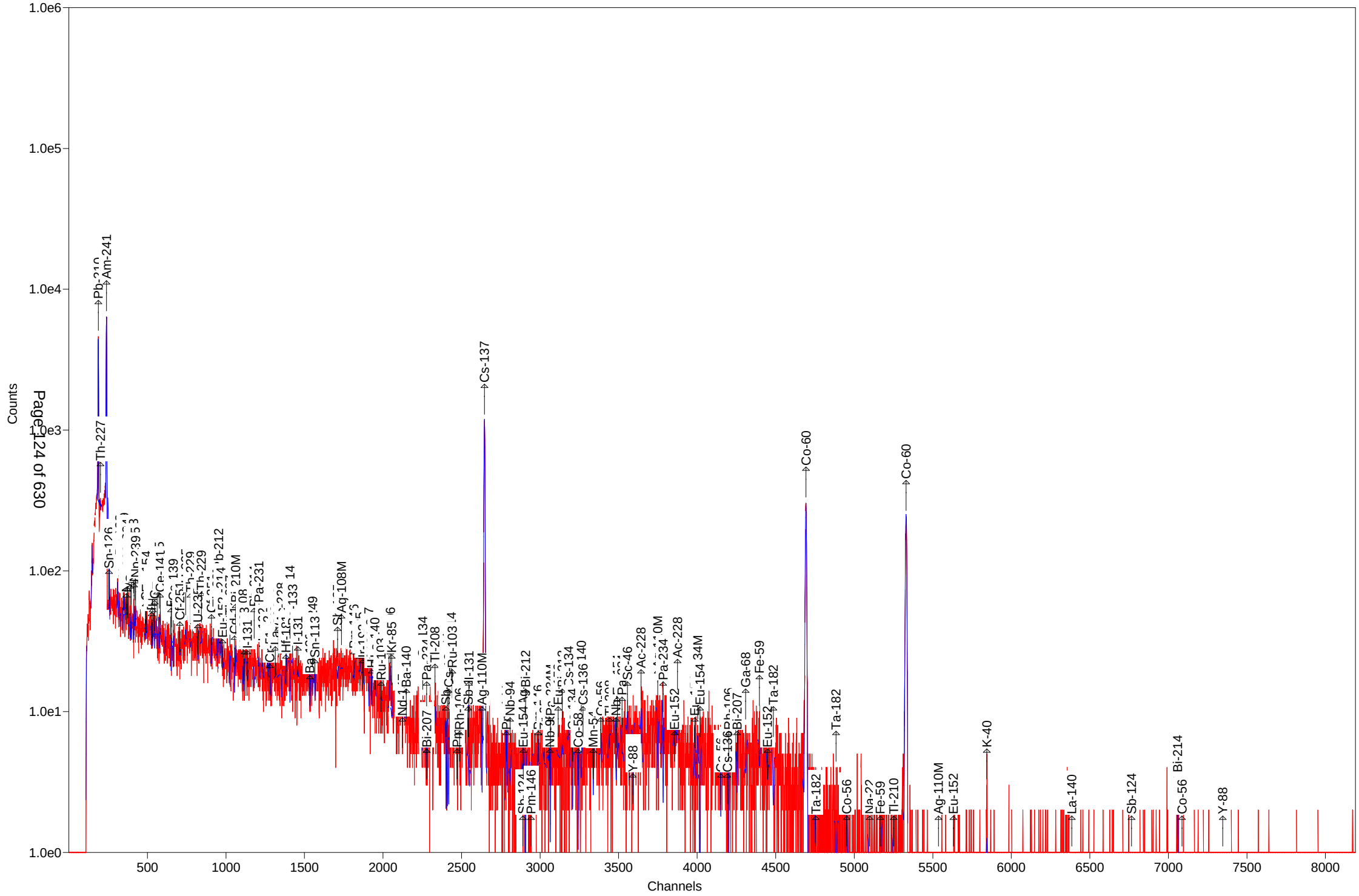
TH-227 #A	-1.3950E+01	-1.3950E+01	9.810E+01%		3.45E+01
TH-229 #A	-5.8970E+00	-5.8970E+00	3.403E+02%		5.09E+01
TH-234 #A	6.8071E+00	6.8071E+00	2.801E+02%		6.34E+01
PA-231 #A	2.0080E+01	2.0080E+01	2.910E+02%		1.94E+02
PA-233 #A	0.0000E+00	0.0000E+00	7.071E+02%		1.60E+01
PA-234 #A	-4.3169E+00	-4.3169E+00	1.197E+02%		1.71E+01
PA-234M#A	1.5151E+02	1.5151E+02	1.116E+02%		5.66E+02
AM-241	1.2612E+03	1.2612E+03	7.422E-01%		1.43E+01
Np-237 #A	-6.4905E+00	-6.4905E+00	1.328E+02%		2.86E+01
Ir-192 A	1.5184E+00	1.5184E+00	8.763E+01%		6.65E+00
Cs-136 #A	1.1149E+00	1.1149E+00	8.554E+01%		4.82E+00
Np-239 #A	3.3473E+00	3.3478E+00	1.356E+02%		1.51E+01
Nd-147 #A	-5.4939E+00	-5.4941E+00	1.892E+02%		2.43E+01
TL-210 #A	0.0000E+00	0.0000E+00	7.071E+02%		4.15E+00
Kr-85 #A	-5.0308E+01	-5.0308E+01	5.533E+02%		9.37E+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) 1.288E+04 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 1.2879258E+04 Bq/Sample

405451_Gamma_LCS 160-405451~2-A. 12_Gamma_20190006.spc.



Test America St. Louis Spectrum ID: 14_Gamma_20190006

Sample Description: 405451_Gamma_490-164491-A-2-A
Detector: Detector #14
Batch ID: 405451
Work Order Number: Gamma
Lot Number: 490-164491-A-2-A

Decay to Time: 1/2/2019 12:54 Live Time: 1800 sec
Acquisition Time: 1/2/2019 12:54:22 Real Time: 1801 sec
Analysis Time: 1/2/2019 13:25 Dead Time: 0.05 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 14_Soil_TunaCan.Clb
Efficiency Cal Desc: 14_TunaCan_90099_042312
Efficiency Cal Date: 4/23/2012 11:29
Energy Cal Date: 2/28/2012 10:48
Library: Client_Long_Rev15.lib
Bkgd Correction File: 14_2018-12-22_1356.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	-3.584E+00	97.2	3.483E+00	3.487E+00	1.178E+01
NA-22	-1.444E-01	291.5	4.209E-01	4.210E-01	1.541E+00
K-40	5.963E+01	17.0	1.013E+01	1.058E+01	1.791E+01
Sc-46	1.460E-01	211.2	3.084E-01	3.085E-01	1.510E+00
CR-51	9.977E-01	269.2	2.686E+00	2.687E+00	9.352E+00
MN-54	1.213E-01	282.4	3.427E-01	3.427E-01	8.764E-01
FE-59	9.175E-01	69.9	6.416E-01	6.432E-01	1.973E+00
Co-56	3.381E-01	95.0	3.211E-01	3.216E-01	1.180E+00
CO-57	0.000E+00	1.#INF	5.929E-02	5.929E-02	8.398E-01
CO-58	-2.326E-01	146.5	3.408E-01	3.410E-01	1.588E+00
CO-60	0.000E+00	1.#INF	7.486E-02	7.486E-02	5.517E-01
ZN-65	-1.559E+00	22.1	3.454E-01	3.541E-01	4.480E+00
NB-94	3.351E-01	37.1	1.243E-01	1.255E-01	8.943E-01
ZR-95	-6.797E-01	83.8	5.698E-01	5.709E-01	2.120E+00
NB-95	4.331E-01	113.0	4.893E-01	4.898E-01	1.670E+00
RU-103	-4.073E-01	105.1	4.281E-01	4.286E-01	1.076E+00
RH-106	3.421E+00	98.9	3.384E+00	3.389E+00	1.154E+01
AG-108M	2.203E-02	78.2	1.722E-02	1.726E-02	9.848E-01
AG-110M	0.000E+00	1.#INF	3.123E-01	3.123E-01	2.047E+00
SN-113	4.386E-01	132.0	5.789E-01	5.793E-01	1.970E+00
SB-124	-2.622E-01	115.6	3.031E-01	3.034E-01	2.916E+00
SB-125	2.280E-01	66.4	1.513E-01	1.517E-01	3.262E+00
I-131	5.603E-01	43.8	2.455E-01	2.472E-01	5.858E-01
Gd-153	1.066E-01	732.7	7.807E-01	7.808E-01	2.678E+00
Ga-68	6.659E+00	173.7	1.157E+01	1.157E+01	2.914E+01
Tc-99m	-2.768E-01	117.0	3.237E-01	3.241E-01	1.086E+00
BA-133	-3.143E-01	169.6	5.329E-01	5.331E-01	3.046E+00
CS-134	6.466E-01	82.4	5.327E-01	5.338E-01	1.493E+00
CS-137	4.440E-01	106.4	4.723E-01	4.729E-01	1.611E+00
CE-139	2.608E-01	119.9	3.128E-01	3.138E-01	1.055E+00
Ba-140	3.640E-01	361.4	1.316E+00	1.316E+00	3.497E+00
La-140	-8.201E-01	112.5	9.226E-01	9.236E-01	1.998E+00
CE-141	4.448E-01	136.4	6.066E-01	6.070E-01	2.040E+00

CE-144	1.805E+00	133.6	2.413E+00	2.414E+00	8.122E+00
PM-144	-6.381E-01	92.8	5.922E-01	5.931E-01	1.417E+00
EU-152	1.050E+00	105.2	1.104E+00	1.105E+00	2.442E+00
EU-154	1.424E-01	76.7	1.093E-01	1.095E-01	1.992E+00
EU-155	8.328E-01	119.5	9.953E-01	9.963E-01	3.357E+00
HF-181	1.873E-01	139.2	2.607E-01	2.609E-01	1.674E+00
Ta-182	1.892E+00	93.6	1.770E+00	1.772E+00	5.999E+00
Hg-203	-3.599E-01	109.1	3.926E-01	3.932E-01	1.325E+00
TL-208	4.150E+00	11.9	4.934E-01	5.384E-01	6.902E-01
PM-146	5.592E-01	36.4	2.038E-01	2.058E-01	1.401E+00
Y-88	-2.955E-01	205.5	6.071E-01	6.074E-01	1.391E+00
Cd-113m	2.502E+03	129.8	3.249E+03	3.253E+03	1.119E+04
Cd-109	0.000E+00	1.#INF	1.189E+01	1.189E+01	3.978E+01
Cf-251	1.180E-01	1245.5	1.470E+00	1.470E+00	4.080E+00
Cf-249	4.498E-01	123.7	5.564E-01	5.569E-01	1.890E+00
Sn-126	3.000E+00	116.0	3.479E+00	3.482E+00	1.168E+01
PB-210	1.328E+01	80.8	1.074E+01	1.076E+01	3.092E+01
PB-212	9.582E+00	8.6	8.286E-01	1.035E+00	1.814E+00
PB-214	9.534E+00	10.6	1.008E+00	1.123E+00	1.714E+00
BI-207	4.902E-01	42.5	2.083E-01	2.097E-01	6.151E-01
BI-212	1.669E+00	326.5	5.449E+00	5.450E+00	1.929E+01
U-235	-2.185E+00	94.2	2.058E+00	2.061E+00	9.062E+00
BI-214	9.542E+00	11.8	1.129E+00	1.233E+00	1.850E+00
BI-210M	-5.020E-01	101.4	5.088E-01	5.097E-01	1.720E+00
AC-228	1.338E+01	11.5	1.535E+00	1.680E+00	1.393E+00
TH-227	3.613E+00	47.1	1.703E+00	1.717E+00	1.169E+01
TH-229	-6.383E+00	106.7	6.808E+00	6.827E+00	1.837E+01
TH-234	1.069E+01	34.6	3.703E+00	3.751E+00	1.450E+01
PA-231	1.031E+01	123.0	1.268E+01	1.270E+01	5.787E+01
PA-233	-8.183E-02	126.0	1.031E-01	1.032E-01	5.262E+00
PA-234	3.708E-01	128.2	4.754E-01	4.758E-01	6.525E+00
PA-234M	2.804E+01	90.9	2.548E+01	2.552E+01	2.231E+02
AM-241	4.544E-01	224.6	1.020E+00	1.021E+00	2.931E+00
Np-237	1.976E+00	159.2	3.146E+00	3.148E+00	1.054E+01
Ir-192	3.119E-01	114.5	3.571E-01	3.576E-01	9.814E-01
Cs-136	-7.200E-01	94.2	6.783E-01	6.795E-01	1.566E+00
Np-239	7.973E-01	119.8	9.549E-01	9.561E-01	3.220E+00
Nd-147	-4.192E+00	95.4	3.999E+00	4.006E+00	9.910E+00
TL-210	1.518E-01	172.1	2.613E-01	2.614E-01	1.385E+00
Kr-85	6.762E+01	146.8	9.926E+01	9.933E+01	3.397E+02
Total	2.775E+03				

Analyst: Joey Sausto

Sample description
405451_Gamma_490-164491-A-2-A

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20190006.An1

Acquisition information
Start time: 1/2/2019 12:54:22 PM
Live time: 1800
Real time: 1801
Dead time: 0.05 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_TunaCan.Clb
14_TunaCan_90099_042312

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 4/23/2012 11:29:47 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.02 %
Log(Eff): 2.101260E-01 + (-5.951973E-01*Log(E)) + (-1.605331E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -2.391492E+01 + (8.828985E+00*Log(E)) + (-9.371496E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_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	1/2/2019 12:54:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2018-12-22_1356.PBC 12/22/2018 1:56:07 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 20 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.2837

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	22.	80.82	0.75	2.171E-02	46.54	4.250	PBC<MDA	PB210
50.14	30.	47.14	0.75	2.439E-02	50.14	8.000	PBC<MDA	TH227
59.54	9.	224.57	0.76	3.065E-02	59.54	35.900	PBC<MDA	AM241
63.23	29.	49.15	0.77	3.281E-02	63.29	3.810	PBC<MDA	TH234
64.23	17.	115.95	0.77	3.334E-02	64.28	9.700	PBC<MDA	Sn126
74.79	105.	16.70	0.78	3.812E-02				
77.13	161.	11.29	0.78	3.897E-02				
80.99	7.	272.55	0.78	4.020E-02	80.99	34.060	PBC<MDA	BA133
86.34	19.	159.20	0.79	4.163E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	8.431E-01	EU155
87.42	54.	25.94	0.79	4.186E-02	87.57	37.500	1.910E+00	Sn126
91.10	9.	335.28	0.79	4.255E-02	91.10	28.300	PBC<MDA	Nd147
92.41	39.	48.82	0.80	4.279E-02	92.59	5.584	PBC<MDA	TH234
93.17	19.	168.95	0.80	4.291E-02	93.35	5.561	PBC<MDA	AC228
97.16	2.	732.67	0.80	4.345E-02	97.50	30.000	PBC<MDA	Gd153
99.50	16.	109.38	0.80	4.365E-02	99.50	15.000	PBC<MDA	Np239
103.70	14.	124.97	0.81	4.395E-02	103.70	24.000	PBC<MDA	Np239
105.31	14.	119.51	0.81	4.403E-02	105.31	21.200	PBC<MDA	EU155
106.13	14.	119.76	0.81	4.406E-02	106.13	22.700	PBC<MDA	Np239
121.78	8.	201.56	0.83	4.380E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.186E-01	CO57
133.54	15.	133.64	0.84	4.277E-02	133.54	11.090	PBC<MDA	CE144

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
145.44	16.	136.38	0.85	4.125E-02	145.44	48.200	PBC<MDA	CE141
165.85	15.	119.94	0.87	3.872E-02	165.85	79.900	PBC<MDA	CE139
185.72	30.	65.60	0.89	3.553E-02	185.72	54.000	PBC<MDA	U235
205.33	7.	231.84	0.91	3.290E-02	205.33	5.010	PBC<MDA	U235
227.00	6.	215.21	0.93	3.046E-02	227.00	6.300	PBC<MDA	Cf251
238.20	232.	9.90	1.00	2.935E-02	238.63	43.300	9.801E+00	PB212
241.65	16.	183.22	0.95	2.900E-02	242.00	7.430	PBC<MDA	PB214
244.69	14.	198.25	0.95	2.875E-02	244.69	7.580	PBC<MDA	EU152
263.70	7.	129.84	0.97	2.714E-02	263.70	0.006	PBC<MDA	Cd113m
277.28	27.	34.91	1.11	2.610E-02	277.28	6.310	9.137E+00	TL208
284.30	2.	624.50	0.99	2.560E-02	284.30	6.140	PBC<MDA	I131
295.10	9.	235.49	1.00	2.487E-02	295.09	19.300	PBC<MDA	PB214
296.00	12.	172.14	1.00	2.481E-02	296.00	79.000	PBC<MDA	TL210
299.38	12.	170.91	1.01	2.455E-02	300.03	3.280	PBC<MDA	PB212
300.07	12.	169.34	1.01	2.455E-02	300.07	2.460	PBC<MDA	PA231
					300.18	6.200	4.422E+00	PA233
300.18	12.	174.11	1.01	2.454E-02	300.07	2.460	PBC<MDA	PA231
					300.18	6.200	4.423E+00	PA233
302.65	12.	178.36	1.01	2.438E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.510E+00	BA133
302.85	3.	646.22	1.01	2.437E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	4.236E-01	BA133
316.49	5.	195.46	1.02	2.355E-02	316.49	87.040	PBC<MDA	Ir192
320.08	4.	269.22	1.03	2.334E-02	320.08	9.940	PBC<MDA	CR51
337.73	11.	126.73	1.04	2.235E-02	338.32	12.010	PBC<MDA	AC228
340.57	12.	121.15	1.05	2.224E-02	340.57	46.900	PBC<MDA	Cs136
344.29	11.	140.01	1.05	2.205E-02	344.29	26.500	PBC<MDA	EU152
345.83	12.	139.19	1.05	2.197E-02	345.83	15.070	PBC<MDA	HF181
351.41	146.	9.95	0.95	2.170E-02	351.93	37.600	9.534E+00	PB214
364.48	17.	43.82	1.07	2.109E-02	364.48	81.700	PBC<MDA	I131
383.84	10.	125.65	1.09	2.025E-02	383.84	8.940	PBC<MDA	BA133
387.95	11.	123.69	1.09	2.008E-02	387.95	66.000	PBC<MDA	Cf249
391.69	10.	131.97	1.09	1.993E-02	391.69	64.000	PBC<MDA	SN113
463.37	11.	107.13	1.16	1.745E-02	463.37	10.470	PBC<MDA	SB125
468.06	10.	119.38	1.17	1.731E-02	468.06	51.750	PBC<MDA	Ir192
511.86	45.	21.91	2.46	1.612E-02	511.86	20.000	7.812E+00	RH106
513.98	8.	146.79	1.21	1.607E-02	513.98	0.430	PBC<MDA	Kr85
537.26	2.	361.41	1.23	1.551E-02	537.26	24.390	PBC<MDA	Ba140
563.24	9.	96.63	1.25	1.494E-02	563.24	8.350	PBC<MDA	CS134
569.32	5.	134.16	1.26	1.481E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.287E+00	PA234
					569.70	97.740	1.920E-01	BI207
569.47	2.	338.64	1.26	1.481E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	9.912E-01	PA234
					569.70	97.740	8.318E-02	BI207
582.75	95.	11.29	0.95	1.454E-02	583.02	84.500	4.150E+00	TL208
608.96	111.	10.89	1.45	1.404E-02	609.31	46.090	8.994E+00	BI214
621.92	8.	98.93	1.31	1.380E-02	621.92	9.930	PBC<MDA	RH106

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
635.89	4.	138.12	1.32	1.356E-02	635.89	11.310	PBC<MDA	SB125
636.97	1.	640.31	1.32	1.354E-02	636.97	7.170	PBC<MDA	I131
661.66	9.	106.37	1.34	1.313E-02	661.66	85.210	PBC<MDA	CS137
702.63	6.	137.14	1.38	1.251E-02	702.63	97.900	PBC<MDA	NB94
722.79	4.	142.62	1.40	1.223E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.983E-01	AG108M
					723.36	20.220	8.911E-01	EU154
722.94	7.	95.26	1.40	1.223E-02	722.79	10.810	2.886E+00	SB124
					722.94	90.840	3.434E-01	AG108M
					723.36	20.220	1.544E+00	EU154
723.36	7.	109.46	1.40	1.222E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.435E-01	AG108M
					723.36	20.220	1.544E+00	EU154
724.20	7.	121.98	1.40	1.221E-02	724.20	44.150	PBC<MDA	ZR95
727.17	3.	326.46	1.40	1.217E-02	727.17	7.550	PBC<MDA	BI212
735.72	8.	36.45	1.41	1.206E-02	735.72	22.500	1.611E+00	PM146
747.16	6.	106.88	1.42	1.191E-02	747.16	34.000	PBC<MDA	PM146
765.79	9.	112.97	1.43	1.167E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.471E+02	PA234M
766.41	7.	90.87	1.43	1.167E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.142E+02	PA234M
795.87	4.	183.71	1.46	1.131E-02	795.87	85.530	PBC<MDA	CS134
834.85	2.	282.44	1.49	1.088E-02	834.85	99.980	PBC<MDA	MN54
860.69	7.	102.79	1.51	1.062E-02	860.56	12.420	PBC<MDA	TL208
871.10	8.	37.10	1.52	1.052E-02	871.10	99.890	4.111E-01	NB94
880.53	8.	92.31	1.53	1.042E-02	880.53	6.000	PBC<MDA	PA234
883.24	1.	657.60	1.53	1.040E-02	883.24	9.600	PBC<MDA	PA234
910.96	66.	12.31	1.68	1.014E-02	911.07	29.000	1.247E+01	AC228
946.02	5.	128.21	1.58	9.832E-03	946.02	13.400	PBC<MDA	PA234
968.87	45.	19.36	1.60	9.642E-03	968.97	17.460	1.489E+01	AC228
1063.66	6.	42.49	1.67	8.934E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	3.	173.74	1.69	8.841E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	7.	106.27	1.70	8.697E-03	1099.25	56.500	PBC<MDA	FE59
1120.55	5.	211.24	1.72	8.561E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	3.278E-01	Sc46
					1121.30	34.900	9.396E-01	Ta182
1120.64	11.	105.39	1.72	8.562E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1121.30	10.	93.57	1.72	8.556E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	6.599E-01	Sc46
					1121.30	34.900	1.892E+00	Ta182
1238.28	8.	94.99	1.80	7.886E-03	1238.28	66.070	PBC<MDA	Co56
1291.60	6.	90.93	1.84	7.616E-03	1291.60	43.200	PBC<MDA	FE59
1460.44	79.	16.99	1.96	6.879E-03	1460.83	10.670	5.963E+01	K40
1764.25	18.	25.71	2.14	5.878E-03	1764.49	15.400	1.118E+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
298.55	74.80	102.	105.	2.760E+03	16.70	0.777	- sD
307.92	77.14	83.	161.	4.119E+03	11.29	0.780	- 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	185.58	46.54	109.	22.	0.012	80.82	0.750s
TH-227	199.98	50.14	60.	30.	0.017	47.14	0.751s
AM-241	237.55	59.54	141.	9.	0.005	224.57	0.761s
TH-234	252.55	63.29	87.	29.	0.016	49.15	0.765D
Sn-126	256.52	64.28	196.	17.	0.010	115.95	0.766
BA-133	323.33	80.99	126.	7.	0.004	272.55	0.784
Np-237	345.33	86.49	467.	19.	0.011	159.20	0.789s
EU-155	345.54	86.54	262.	-20.	-0.011	114.72	0.790s
Sn-126	347.13	86.94	242.	-17.	-0.009	131.16	0.790D
Sn-126	349.65	87.57	86.	54.	0.030	25.94	0.790D
Cd-109	351.53	88.04	569.	0.	0.000	170.02	0.791A
Nd-147	363.77	91.10	500.	9.	0.005	335.28	0.794s
TH-234	369.72	92.59	164.	39.	0.022	48.82	0.796D
AC-228	372.76	93.35	515.	19.	0.011	168.95	0.797s
Gd-153	389.36	97.50	166.	2.	0.001	732.67	0.801s
Np-239	397.36	99.50	141.	16.	0.009	109.38	0.803s
Gd-153	412.15	103.20	221.	-18.	-0.010	122.41	0.807s
Np-239	414.15	103.70	147.	14.	0.008	124.97	0.807s
EU-155	420.60	105.31	133.	14.	0.008	119.51	0.809s
Np-239	423.87	106.13	141.	14.	0.008	119.76	0.810s
EU-152	486.45	121.78	126.	8.	0.004	201.56	0.826s
CO-57	487.58	122.06	134.	0.	0.000	1000.00	0.826s
EU-154	491.73	123.10	173.	-18.	-0.010	107.47	0.828s
PA-234	524.50	131.29	358.	-21.	-0.011	132.14	0.836s
HF-181	531.42	133.02	379.	-21.	-0.011	135.53	0.838s
CE-144	533.47	133.54	204.	15.	0.009	133.64	0.838s
HF-181	544.52	136.30	279.	-18.	-0.010	133.18	0.841s
CO-57	545.21	136.47	297.	-6.	-0.003	437.91	0.841s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Tc-99m	561.35	140.51	215.	-18.	-0.010	116.97	0.845s
U-235	574.45	143.79	235.	-18.	-0.010	94.18	0.849s
CE-141	581.07	145.44	228.	16.	0.009	136.38	0.850s
Ba-140	649.93	162.66	168.	-16.	-0.009	117.50	0.868
U-235	652.81	163.38	184.	-2.	-0.001	945.73	0.869s
CE-139	662.70	165.85	144.	15.	0.008	119.94	0.871s
U-235	742.15	185.72	116.	30.	0.017	65.60	0.892s
TH-229	773.30	193.51	103.	-17.	-0.010	106.66	0.899s
U-235	820.58	205.33	73.	7.	0.004	231.84	0.912s
TH-229	842.65	210.85	112.	-18.	-0.010	112.15	0.917s
Cf-251	907.23	227.00	57.	6.	0.004	215.21	0.933s
TH-227	943.11	235.97	496.	-16.	-0.009	193.96	0.942s
PB-212	953.75	238.63	69.	219.	0.122	8.65	0.945D
PB-214	967.21	242.00	448.	16.	0.009	183.22	0.948s
EU-152	977.99	244.69	401.	14.	0.008	198.25	0.951s
TH-227	1024.17	256.24	67.	-7.	-0.004	268.49	0.962s
Cd-113m	1054.01	263.70	42.	7.	0.004	129.84	0.970
BI-210M	1062.53	265.83	70.	-12.	-0.007	101.37	0.972s
TL-208	1108.33	277.28	18.	27.	0.015	34.91	1.109
Hg-203	1115.99	279.20	105.	-14.	-0.008	109.10	0.985s
I-131	1136.39	284.30	44.	2.	0.001	624.50	0.990s
PB-214	1179.54	295.09	201.	9.	0.005	235.49	1.001s
TL-210	1183.18	296.00	210.	12.	0.007	172.14	1.002
PB-212	1199.30	300.03	193.	12.	0.006	170.91	1.006s
PA-231	1199.46	300.07	204.	12.	0.007	169.34	1.006s
PA-233	1199.90	300.18	216.	12.	0.007	174.11	1.006s
PA-231	1209.78	302.65	228.	12.	0.007	178.36	1.008s
BA-133	1210.59	302.85	241.	3.	0.002	646.22	1.009s
Ba-140	1218.57	304.85	244.	0.	0.000	1000.00	1.011s
BI-210M	1218.76	304.90	244.	0.	0.000	1000.00	1.011s
Ir-192	1232.94	308.44	244.	0.	0.000	1000.00	1.014s
PA-233	1247.22	312.01	284.	-13.	-0.007	182.07	1.018s
Ir-192	1265.13	316.49	52.	5.	0.003	195.46	1.022s
CR-51	1279.51	320.08	61.	4.	0.002	269.22	1.026s
La-140	1314.21	328.76	66.	-11.	-0.006	141.42	1.034
Cf-249	1332.92	333.44	51.	-8.	-0.005	164.54	1.039s
AC-228	1352.44	338.32	99.	11.	0.006	126.73	1.043s
Cs-136	1361.44	340.57	101.	12.	0.007	121.15	1.045s
EU-152	1376.30	344.29	114.	11.	0.006	140.01	1.049s
HF-181	1382.47	345.83	123.	12.	0.006	139.19	1.050
PB-214	1404.80	351.41	23.	140.	0.078	10.58	0.955
BA-133	1423.15	356.00	228.	-13.	-0.007	169.57	1.060s
I-131	1457.08	364.48	11.	17.	0.009	43.82	1.069s
BA-133	1534.50	383.84	73.	10.	0.006	125.65	1.087s
Cf-249	1550.94	387.95	83.	11.	0.006	123.69	1.091s
SN-113	1565.90	391.69	83.	10.	0.006	131.97	1.095s
SB-125	1710.63	427.88	40.	-13.	-0.007	95.37	1.129s
AG-108M	1734.87	433.94	33.	-9.	-0.005	123.98	1.135

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	1852.59	463.37	59.	11.	0.006	107.13	1.163s
Ir-192	1871.36	468.06	60.	10.	0.005	119.38	1.167s
BE-7	1909.50	477.60	57.	-12.	-0.006	97.17	1.176
HF-181	1927.10	482.00	68.	-3.	-0.002	342.37	1.180s
La-140	1947.19	487.02	36.	-9.	-0.005	134.72	1.185s
RU-103	1987.33	497.05	32.	-11.	-0.006	105.10	1.194s
RH-106	2046.57	511.86	27.	45.	0.025	21.91	2.458s
Kr-85	2055.03	513.98	72.	8.	0.005	146.79	1.210s
Nd-147	2123.11	531.00	52.	-15.	-0.009	95.39	1.225s
Ba-140	2148.15	537.26	21.	2.	0.001	361.41	1.231s
CS-134	2252.06	563.24	16.	9.	0.005	96.63	1.255s
CS-134	2276.40	569.32	20.	5.	0.003	134.16	1.260
PA-234	2276.99	569.47	26.	2.	0.001	338.64	1.261
BI-207	2277.92	569.70	38.	-8.	-0.004	121.11	1.261
TL-208	2330.13	582.75	7.	92.	0.051	11.89	0.950s
SB-125	2401.12	600.50	240.	-12.	-0.007	90.40	1.289s
SB-124	2410.04	602.73	227.	-12.	-0.007	182.01	1.291s
CS-134	2417.96	604.71	216.	-10.	-0.005	218.49	1.292s
BI-214	2434.97	608.96	16.	105.	0.058	11.83	1.453
PM-144	2471.37	618.06	28.	-2.	-0.001	303.32	1.304s
RH-106	2486.79	621.92	31.	8.	0.005	98.93	1.308s
SB-125	2542.69	635.89	14.	4.	0.002	138.12	1.320s
I-131	2547.03	636.97	20.	1.	0.001	640.31	1.321s
AG-110M	2630.18	657.76	47.	-12.	-0.007	83.42	1.339s
CS-137	2645.77	661.66	41.	9.	0.005	106.37	1.343s
PM-144	2785.32	696.54	39.	-14.	-0.008	92.82	1.374s
NB-94	2809.67	702.63	13.	6.	0.003	137.14	1.379s
SB-124	2890.31	722.79	14.	4.	0.002	142.62	1.396s
AG-108M	2890.91	722.94	18.	7.	0.004	95.26	1.397s
EU-154	2892.60	723.36	25.	7.	0.004	109.46	1.397s
ZR-95	2895.96	724.20	32.	7.	0.004	121.98	1.398s
BI-212	2907.84	727.17	39.	3.	0.002	326.46	1.400
PM-146	2942.05	735.72	0.	8.	0.004	36.45	1.408s
PM-146	2987.81	747.16	9.	6.	0.003	106.88	1.417s
ZR-95	3026.09	756.73	22.	-8.	-0.004	83.83	1.426s
AG-110M	3054.96	763.94	44.	-14.	-0.008	71.76	1.432s
NB-95	3062.34	765.79	48.	9.	0.005	112.97	1.433s
PA-234M	3064.83	766.41	17.	7.	0.004	90.87	1.434s
EU-152	3114.87	778.92	31.	-14.	-0.008	48.54	1.444s
BI-212	3140.88	785.42	13.	-1.	-0.001	631.62	1.450s
CS-134	3182.68	795.87	25.	4.	0.002	183.71	1.459s
TL-210	3197.61	799.60	29.	0.	0.000	1000.00	1.462s
CS-134	3207.01	801.95	55.	-12.	-0.007	88.75	1.464s
CO-58	3242.31	810.77	39.	-5.	-0.003	146.51	1.471s
Cs-136	3273.22	818.50	37.	-14.	-0.008	94.21	1.478s
MN-54	3338.63	834.85	10.	2.	0.001	282.44	1.492s
TL-208	3441.51	860.56	10.	7.	0.004	102.79	1.513s
NB-94	3483.65	871.10	0.	8.	0.004	37.10	1.522s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	3492.19	873.23	14.	-5.	-0.003	114.89	1.523s
PA-234	3521.39	880.53	20.	8.	0.004	92.31	1.529s
PA-234	3532.24	883.24	28.	1.	0.001	657.60	1.531s
AG-110M	3538.01	884.68	29.	0.	0.000	1000.00	1.533s
Y-88	3591.45	898.04	14.	-2.	-0.001	128.73	1.543s
AC-228	3643.15	910.96	0.	66.	0.037	12.31	1.681
AG-110M	3749.30	937.49	28.	-12.	-0.007	97.89	1.576s
PA-234	3783.42	946.02	10.	5.	0.003	128.21	1.582s
EU-152	3855.80	964.11	54.	-7.	-0.004	93.18	1.597s
AC-228	3875.25	968.97	16.	45.	0.025	19.36	1.601s
EU-154	3984.71	996.33	30.	-8.	-0.004	110.35	1.622s
EU-154	4018.51	1004.77	20.	-6.	-0.003	168.87	1.629s
Co-56	4150.81	1037.84	10.	-4.	-0.002	212.81	1.655s
Cs-136	4191.74	1048.07	15.	-3.	-0.002	191.49	1.663s
RH-106	4200.91	1050.36	29.	-6.	-0.003	133.33	1.665s
BI-207	4254.12	1063.66	0.	6.	0.003	42.49	1.675s
Ga-68	4309.10	1077.40	5.	3.	0.002	173.74	1.685s
FE-59	4396.54	1099.25	10.	7.	0.004	106.27	1.702s
EU-152	4447.85	1112.07	60.	-12.	-0.007	96.22	1.712s
ZN-65	4461.74	1115.55	48.	-12.	-0.007	22.15	1.714s
BI-214	4480.72	1120.29	67.	11.	0.006	105.39	1.718s
Sc-46	4481.77	1120.55	54.	5.	0.003	211.24	1.718s
Ta-182	4484.77	1121.30	40.	10.	0.006	93.57	1.719s
CO-60	4692.60	1173.24	10.	-4.	-0.002	282.70	1.757s
Ta-182	4755.88	1189.05	10.	0.	0.000	1000.00	1.769s
Ta-182	4885.38	1221.41	21.	-8.	-0.005	130.66	1.792s
Co-56	4952.89	1238.28	11.	8.	0.005	94.99	1.805s
NA-22	5097.96	1274.53	16.	-2.	-0.001	291.55	1.831s
EU-154	5098.00	1274.54	18.	0.	0.000	1000.00	1.831s
FE-59	5166.25	1291.60	5.	6.	0.004	90.93	1.843s
TL-210	5251.92	1313.00	16.	-8.	-0.004	119.02	1.858s
CO-60	5329.96	1332.50	0.	0.	0.000	1000.00	1.871s
K-40	5843.58	1460.83	20.	79.	0.044	16.99	1.958
La-140	6385.44	1596.21	17.	-9.	-0.005	112.49	2.044s
SB-124	6764.81	1690.98	6.	-2.	-0.001	343.80	2.102s
BI-214	7059.07	1764.49	2.	18.	0.010	25.71	2.145s
Co-56	7086.53	1771.35	20.	0.	0.000	1000.00	2.149s
Y-88	7345.59	1836.06	6.	-3.	-0.002	205.48	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  -3.5839E+00                                     5.31E+01
                          477.60-3.584E+00 &(  1.178E+01 9.72E+01 1.05E+01 G

NA-22    C  -1.4438E-01                                     9.50E+02
                         1274.53-1.444E-01 ?(  1.541E+00 2.92E+02 9.99E+01 G

K-40     N   5.9627E+01                                     4.66E+11
                         1460.83 5.963E+01 ?(P 1.791E+01 1.70E+01 1.07E+01 G

Sc-46    F   1.4599E-01                                     8.38E+01
                          889.28-3.582E-02 %(  1.510E+00 1.16E+03 1.00E+02 G
                         1120.55 3.278E-01 ?(  2.406E+00 2.11E+02 1.00E+02 G

CR-51    F   9.9770E-01                                     2.77E+01
                          320.08 9.977E-01 ?(  9.352E+00 2.69E+02 9.94E+00 G

MN-54    C   1.2132E-01                                     3.12E+02
                          834.85 1.213E-01 ?(P 8.764E-01 2.82E+02 1.00E+02 G

FE-59    F   9.1745E-01                                     4.45E+01
                         1099.25 7.915E-01 ?(  1.973E+00 1.06E+02 5.65E+01 G
                         1291.60 1.082E+00 ?(  2.275E+00 9.09E+01 4.32E+01 G

Co-56    C   3.3808E-01                                     7.73E+01
                          846.77-3.444E-02 %(  1.180E+00 1.38E+03 9.99E+01 G
                         1238.28 9.016E-01 ?(P 1.944E+00 9.50E+01 6.61E+01 G
                         1037.84-1.785E+00 + P 7.568E+00 2.13E+02 1.41E+01 G
                         1771.35 0.000E+00 -   1.442E+01 1.00E+03 1.55E+01  A

CO-58    C  -2.3259E-01                                     7.09E+01
                          810.78-2.326E-01 ?(P 1.588E+00 1.47E+02 9.95E+01 G

ZN-65    F  -1.5592E+00                                     2.44E+02
                         1115.55-1.559E+00 ?(P 4.480E+00 2.21E+01 5.06E+01 G

NB-94    I   3.3506E-01                                     7.41E+06
                          702.63 2.575E-01 ?(P 8.943E-01 1.37E+02 9.79E+01 G
                          871.10 4.111E-01 ?(P 3.898E-01 3.71E+01 9.99E+01 G

ZR-95    I  -6.7970E-01                                     6.40E+01
                          756.73-6.797E-01 ?(P 2.120E+00 8.38E+01 5.45E+01 G
                          724.20 7.082E-01 +   2.983E+00 1.22E+02 4.42E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-95	I	4.3309E-01					6.40E+01	
			765.79	4.331E-01	?(	1.670E+00	1.13E+02	9.98E+01 G
RU-103	I	-4.0733E-01					3.93E+01	
			497.05	-4.073E-01	?(	1.076E+00	1.05E+02	9.09E+01 G
			610.30	5.261E-06	%	4.799E+01	2.66E+08	5.75E+00 GA
RH-106	I	3.4208E+00					3.74E+02	
			621.92	3.421E+00	?(P	1.154E+01	9.89E+01	9.93E+00 G
			1050.36	-2.367E+01	+	1.097E+02	1.33E+02	1.56E+00 G
			511.86	7.812E+00	?	4.613E+00	2.19E+01	2.00E+01 GA
AG-108M	C	2.2030E-02					1.53E+05	
			433.94	-3.007E-01	?(	9.848E-01	1.24E+02	9.05E+01 G
			722.94	3.434E-01	&(	1.123E+00	9.53E+01	9.08E+01 G
			614.28	-3.384E-07	&	3.087E+00	2.66E+08	8.98E+01 G
SN-113	F	4.3864E-01					1.15E+02	
			391.69	4.386E-01	?(	1.970E+00	1.32E+02	6.40E+01 G
SB-124	F	-2.6216E-01					6.02E+01	
			602.73	-4.743E-01	&(	2.916E+00	1.82E+02	9.83E+01 G
			1690.98	-3.181E-01	+	2.634E+00	3.44E+02	4.78E+01 G
			722.79	1.666E+00	&(	8.466E+00	1.43E+02	1.08E+01 G
SB-125	I	2.2795E-01					1.01E+03	
			427.88	-1.315E+00	?(	3.262E+00	9.54E+01	2.96E+01 G
			600.50	-2.655E+00	+ P	1.640E+01	9.04E+01	1.79E+01 G
			635.89	1.484E+00	?(P	7.277E+00	1.38E+02	1.13E+01 G
			463.37	3.233E+00	&(P	1.175E+01	1.07E+02	1.05E+01 G
I-131	I	5.6032E-01					8.02E+00	
			364.48	5.482E-01	?(	5.858E-01	4.38E+01	8.17E+01 G
			284.30	7.069E-01	&(	1.188E+01	6.24E+02	6.14E+00 G
			636.97	5.723E-01	&(	1.348E+01	6.40E+02	7.17E+00 G
Gd-153	F	1.0656E-01					2.42E+02	
			97.50	1.066E-01	?(	2.678E+00	7.33E+02	3.00E+01 G
			103.20	-1.016E+00	+	4.177E+00	1.22E+02	2.18E+01 G
Ga-68	C	6.6588E+00					4.71E-02	
			1077.40	6.659E+00	?(	2.914E+01	1.74E+02	3.30E+00 G
Tc-99m	I	-2.7675E-01					2.51E-01	
			140.51	-2.768E-01	?(	1.086E+00	1.17E+02	8.93E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BA-133	F	-3.1427E-01					3.85E+03	
			356.00	-5.323E-01	?(	3.046E+00	1.70E+02	6.20E+01 G
			302.85	4.236E-01	?(	9.326E+00	6.46E+02	1.83E+01 G
			383.84	3.047E+00	* P	1.303E+01	1.26E+02	8.94E+00 GA
			80.99	2.840E-01	?	2.232E+00	2.73E+02	3.41E+01 GA
CS-134	I	6.4660E-01					7.54E+02	
			795.87	2.296E-01	?(	1.493E+00	1.84E+02	8.55E+01 G
			604.71	-3.874E-01	+	2.868E+00	2.18E+02	9.76E+01 G
			569.32	1.219E+00	?(	5.743E+00	1.34E+02	1.54E+01 G
			801.95	-7.089E+00	+	2.119E+01	8.88E+01	8.69E+00 G
			563.24	3.863E+00	&(P	9.521E+00	9.66E+01	8.35E+00 G
CS-137	I	4.4405E-01					1.10E+04	
			661.66	4.440E-01	?(P	1.611E+00	1.06E+02	8.52E+01 G
CE-139	F	2.6084E-01					1.38E+02	
			165.85	2.608E-01	?(	1.055E+00	1.20E+02	7.99E+01 G
Ba-140	I	3.6400E-01					1.28E+01	
			537.26	3.640E-01	?(P	3.497E+00	3.61E+02	2.44E+01 G
			162.66	-3.701E+00	&	1.463E+01	1.18E+02	6.22E+00 G
			304.85	0.000E+00	&	4.033E+01	1.00E+03	4.29E+00 G
La-140	I	-8.2013E-01					1.28E+01	
			1596.21	-8.201E-01	?(	1.998E+00	1.12E+02	9.54E+01 G
			487.02	-6.551E-01	+	2.232E+00	1.35E+02	4.55E+01 G
			328.76	-1.317E+00	&	4.857E+00	1.41E+02	2.03E+01 G
			815.77	-6.639E-02	& P	7.105E+00	2.22E+03	2.33E+01 G
CE-141	I	4.4479E-01					3.25E+01	
			145.44	4.448E-01	?(	2.040E+00	1.36E+02	4.82E+01 G
CE-144	I	1.8053E+00					2.85E+02	
			133.54	1.805E+00	?(	8.122E+00	1.34E+02	1.11E+01 G
PM-144	C	-6.3805E-01					3.63E+02	
			696.54	-6.381E-01	?(	1.417E+00	9.28E+01	9.90E+01 G
			618.06	-1.010E-01	+	1.097E+00	3.03E+02	9.91E+01 G
EU-152	F	1.0498E+00					4.94E+03	
			121.78	3.550E-01	&(	2.442E+00	2.02E+02	2.86E+01 G
			344.29	1.049E+00	?(P	4.982E+00	1.40E+02	2.65E+01 G
			1112.07	-5.628E+00	+	1.830E+01	9.62E+01	1.36E+01 G
			778.92	-5.121E+00	+ P	1.065E+01	4.85E+01	1.29E+01 G
			964.11	-2.934E+00	+ P	1.458E+01	9.32E+01	1.46E+01 G
			244.69	3.673E+00	?(	2.447E+01	1.98E+02	7.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1408.00	-1.748E-01	% P	5.075E+00	1.72E+03	2.10E+01 GA
EU-154	I	1.4244E-01					3.14E+03	
			123.10	-5.524E-01	(	1.992E+00	1.07E+02	4.08E+01 G
			1274.54	0.000E+00	+	4.609E+00	1.00E+03	3.52E+01 G
			723.36	1.544E+00	?(	5.829E+00	1.09E+02	2.02E+01 G
			873.23	-2.157E+00	+	8.692E+00	1.15E+02	1.23E+01 G
			1004.77	-1.977E+00	+	7.761E+00	1.69E+02	1.80E+01 G
			996.33	-4.171E+00	+	1.582E+01	1.10E+02	1.06E+01 G
EU-155	I	8.3281E-01					1.81E+03	
			105.31	8.328E-01	*(P	3.357E+00	1.20E+02	2.12E+01 G
			86.54	-8.846E-01	&	3.399E+00	1.15E+02	3.07E+01 G
HF-181	F	1.8732E-01					4.24E+01	
			482.00	-1.403E-01	?(	1.674E+00	3.42E+02	8.05E+01 G
			133.02	-6.167E-01	+	2.799E+00	1.36E+02	4.33E+01 G
			345.83	1.937E+00	(	9.139E+00	1.39E+02	1.51E+01 G
			136.30	-4.032E+00	+	1.802E+01	1.33E+02	5.85E+00 G
Ta-182	F	1.8915E+00					1.14E+02	
			1121.30	1.892E+00	?(	5.999E+00	9.36E+01	3.49E+01 G
			1221.41	-2.150E+00	-	6.252E+00	1.31E+02	2.70E+01 G
			1189.05	0.000E+00	&	7.338E+00	1.00E+03	1.62E+01 G
Hg-203	F	-3.5988E-01					4.66E+01	
			279.20	-3.599E-01	&(	1.325E+00	1.09E+02	8.15E+01 G
TL-208	N	4.1504E+00					6.98E+02	
			583.02	4.150E+00	*(P	6.902E-01	1.19E+01	8.45E+01 G
			277.28	9.137E+00	+ P	7.568E+00	3.49E+01	6.31E+00 G
			860.56	2.900E+00	- P	7.314E+00	1.03E+02	1.24E+01 G
PM-146	C	5.5916E-01					2.02E+03	
			453.88	4.818E-02	&(	1.401E+00	1.11E+03	6.50E+01 G
			747.16	8.396E-01	?(P	2.278E+00	1.07E+02	3.40E+01 G
			735.72	1.611E+00	?(P	1.509E+00	3.64E+01	2.25E+01 G
Y-88	F	-2.9547E-01					1.07E+02	
			1836.06	-2.955E-01	?(	1.391E+00	2.05E+02	9.92E+01 G
			898.04	-1.362E-01	+ P	1.177E+00	1.29E+02	9.37E+01 G
Cd-113m		2.5023E+03					5.33E+03	
			263.70	2.502E+03	?(	1.119E+04	1.30E+02	6.00E-03 K
Cf-251	T	1.1803E-01					3.28E+05	
			176.60	1.180E-01	&(	4.080E+00	1.25E+03	1.70E+01 G
			227.00	1.833E+00	*	1.094E+01	2.15E+02	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	4.4981E-01					1.28E+05	
			387.95	4.498E-01	?(	1.890E+00	1.24E+02	6.60E+01 G
			333.44	-1.320E+00	+	5.719E+00	1.65E+02	1.55E+01 G
Sn-126		3.0001E+00					3.65E+07	
			87.57	1.910E+00	}	1.627E+00	2.59E+01	3.75E+01 GA
			64.28	3.000E+00	&(	1.168E+01	1.16E+02	9.70E+00 G
			86.94	-2.514E+00	+	1.108E+01	1.31E+02	9.04E+00 GA
PB-210	N	1.3284E+01					8.14E+03	
			46.54	1.328E+01	(P	3.092E+01	8.08E+01	4.25E+00 G
PB-212	N	9.5817E+00					6.98E+02	
			238.63	9.582E+00	(P	1.814E+00	8.65E+00	4.33E+01 G
			300.03	8.044E+00	& P	4.649E+01	1.71E+02	3.28E+00 GA
PB-214	N	9.5336E+00					5.84E+05	
			351.93	9.534E+00	(P	1.714E+00	1.06E+01	3.76E+01 G
			295.09	9.969E-01	- P	7.960E+00	2.35E+02	1.93E+01 G
			242.00	4.249E+00	-	2.612E+01	1.83E+02	7.43E+00 GA
BI-207	C	4.9020E-01					1.18E+04	
			1063.66	4.902E-01	?(P	6.151E-01	4.25E+01	7.45E+01 G
			569.70	-2.879E-01	&	1.200E+00	1.21E+02	9.77E+01 G
BI-212	N	1.6692E+00					6.98E+02	
			727.17	1.669E+00	(	1.929E+01	3.26E+02	7.55E+00 G
			785.42	-4.020E+00	+ P	7.420E+01	6.32E+02	1.28E+00 GA
U-235	N	-2.1855E+00					2.57E+11	
			143.79	-2.185E+00	(P	9.062E+00	9.42E+01	1.10E+01 G
			205.33	2.247E+00	+	1.436E+01	2.32E+02	5.01E+00 G
			163.38	-5.791E-01	&	1.877E+01	9.46E+02	5.08E+00 G
			185.72	8.661E-01	+ P	1.532E+00	6.56E+01	5.40E+01 GA
BI-214	N	9.5423E+00					5.84E+05	
			609.31	8.994E+00	(P	1.850E+00	1.18E+01	4.61E+01 G
			1120.29	4.914E+00	- P	1.754E+01	1.05E+02	1.51E+01 G
			1764.49	1.118E+01	?(P	5.478E+00	2.57E+01	1.54E+01 G
BI-210M	T	-5.0199E-01					1.10E+09	
			265.83	-5.020E-01	?(	1.720E+00	1.01E+02	5.00E+01 G
			304.90	0.000E+00	&	6.179E+00	1.00E+03	2.80E+01 G
AC-228	N	1.3381E+01					2.10E+03	
			911.07	1.247E+01	(	1.393E+00	1.23E+01	2.90E+01 G
			968.97	1.489E+01	?(P	6.957E+00	1.94E+01	1.75E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			338.32	2.366E+00	& P	1.016E+01	1.27E+02	1.20E+01 G
			93.35	4.463E+00	-	2.525E+01	1.69E+02	5.56E+00 XA
TH-227	N	3.6129E+00					7.95E+03	
			256.24	-2.020E+00	?(P	1.169E+01	2.68E+02	7.00E+00 G
			235.97	-2.501E+00	&	1.627E+01	1.94E+02	1.23E+01 G
			50.14	8.542E+00	(	1.105E+01	4.71E+01	8.00E+00 G
TH-229	N	-6.3831E+00					2.68E+06	
			193.51	-6.383E+00	&(	1.837E+01	1.07E+02	4.40E+00 G
			210.85	-1.013E+01	+ P	2.993E+01	1.12E+02	2.99E+00 G
TH-234	N	1.0691E+01					1.63E+12	
			92.59	9.163E+00	(P	1.450E+01	4.88E+01	5.58E+00 G
			63.29	1.293E+01	(P	2.048E+01	4.91E+01	3.81E+00 G
PA-231	N	1.0314E+01					1.20E+07	
			302.65	9.606E+00	?(	5.787E+01	1.78E+02	2.88E+00 G
			300.07	1.114E+01	&(	6.376E+01	1.69E+02	2.46E+00 G
PA-233	C	-8.1827E-02					7.82E+08	
			312.01	-8.577E-01	?(	5.262E+00	1.82E+02	3.60E+01 G
			300.18	4.423E+00	&(	2.602E+01	1.74E+02	6.20E+00 G
PA-234	N	3.7082E-01					1.63E+12	
			131.29	-1.474E+00	?(	6.525E+00	1.32E+02	1.80E+01 G
			946.02	2.278E+00	?(P	7.230E+00	1.28E+02	1.34E+01 G
			569.47	9.912E-01	&(	1.207E+01	3.39E+02	8.20E+00 G
			883.24	6.382E-01	?(	1.520E+01	6.58E+02	9.60E+00 G
			880.53	6.680E+00	?	2.107E+01	9.23E+01	6.00E+00 GA
PA-234M	N	2.8045E+01					1.63E+12	
			1001.00	-2.224E+00	&(P	2.231E+02	2.79E+03	8.37E-01 G
			766.41	1.142E+02	?(	3.551E+02	9.09E+01	2.94E-01 G
AM-241	T	4.5439E-01					1.58E+05	
			59.54	4.544E-01	?(	2.931E+00	2.25E+02	3.59E+01 G
Np-237	F	1.9764E+00					2.14E+06	
			86.49	1.976E+00	?(	1.054E+01	1.59E+02	1.31E+01 G
Ir-192	F	3.1188E-01					7.40E+01	
			316.49	1.446E-01	&(	9.814E-01	1.95E+02	8.70E+01 G
			468.06	5.933E-01	?(	2.415E+00	1.19E+02	5.18E+01 G
			308.44	0.000E+00	&	5.499E+00	1.00E+03	3.18E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Cs-136   F  -7.1996E-01                                      1.30E+01
                         818.50-7.200E-01 ?(  1.566E+00 9.42E+01 1.00E+02 G
                        1048.07-2.304E-01 +   1.594E+00 1.91E+02 8.00E+01 G
                         340.57 6.420E-01 +   2.634E+00 1.21E+02 4.69E+01 G

Np-239   T   7.9734E-01                                      2.36E+00
                         103.70 7.390E-01 &   3.115E+00 1.25E+02 2.40E+01 X
                         106.13 7.973E-01 &(  3.220E+00 1.20E+02 2.27E+01 G
                          99.50 1.340E+00 &   4.929E+00 1.09E+02 1.50E+01 X

Nd-147      -4.1917E+00                                      1.11E+01
                         531.00-4.192E+00 ?(  9.910E+00 9.54E+01 1.30E+01 G
                          91.10 4.370E-01 +   4.931E+00 3.35E+02 2.83E+01 G

TL-210   N   1.5179E-01                                      5.84E+05
                         799.60 0.000E+00 ?(  1.385E+00 1.00E+03 9.90E+01 G
                         296.00 3.419E-01 &(  1.989E+00 1.72E+02 7.90E+01 G
                        1313.00-2.817E+00 +   7.517E+00 1.19E+02 2.10E+01 GA

Kr-85    I   6.7619E+01                                      3.92E+03
                         513.98 6.762E+01 ?(  3.397E+02 1.47E+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
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M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
A - Not in Average
C - Coincidence Peak

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	109.	22.	0.012	80.82	1.328E+01	P
TH-227	50.14	60.	30.	0.017	47.14	8.542E+00	
AM-241	59.54	141.	9.	0.005	224.57	4.544E-01	
BA-133	80.99	126.	7.	0.004	272.55	2.840E-01	
EU-155	86.54	262.	-20.	-0.011	114.72	-8.846E-01	
Nd-147	91.10	500.	9.	0.005	335.28	4.370E-01	
Np-239	99.50	141.	16.	0.009	109.38	1.340E+00	
Np-239	103.70	147.	14.	0.008	124.97	7.390E-01	
EU-155	105.31	133.	14.	0.008	119.51	8.328E-01	P
Np-239	106.13	141.	14.	0.008	119.76	7.973E-01	
EU-152	121.78	126.	8.	0.004	201.56	3.550E-01	
EU-154	123.10	173.	-18.	-0.010	107.47	-5.524E-01	
PA-234	131.29	358.	-21.	-0.011	132.14	-1.474E+00	
HF-181	133.02	379.	-21.	-0.011	135.53	-6.167E-01	
CE-144	133.54	204.	15.	0.009	133.64	1.805E+00	
HF-181	136.30	279.	-18.	-0.010	133.18	-4.032E+00	
CO-57	136.47	297.	-6.	-0.003	437.91	-6.856E-01	
Tc-99m	140.51	215.	-18.	-0.010	116.97	-2.768E-01	
U-235	143.79	235.	-18.	-0.010	94.18	-2.185E+00	P
CE-141	145.44	228.	16.	0.009	136.38	4.448E-01	
Ba-140	162.66	168.	-16.	-0.009	117.50	-3.701E+00	
U-235	163.38	184.	-2.	-0.001	945.73	-5.791E-01	
CE-139	165.85	144.	15.	0.008	119.94	2.608E-01	
U-235	185.72	116.	30.	0.017	65.60	8.661E-01	P
TH-229	193.51	103.	-17.	-0.010	106.66	-6.383E+00	
U-235	205.33	73.	7.	0.004	231.84	2.247E+00	
TH-229	210.85	112.	-18.	-0.010	112.15	-1.013E+01	P
Cf-251	227.00	57.	6.	0.004	215.21	1.833E+00	
TH-227	235.97	496.	-16.	-0.009	193.96	-2.501E+00	
EU-152	244.69	401.	14.	0.008	198.25	3.673E+00	
TH-227	256.24	67.	-7.	-0.004	268.49	-2.020E+00	P
Cd-113m	263.70	42.	7.	0.004	129.84	2.502E+03	
BI-210M	265.83	70.	-12.	-0.007	101.37	-5.020E-01	
Hg-203	279.20	105.	-14.	-0.008	109.10	-3.599E-01	
I-131	284.30	44.	2.	0.001	624.50	7.069E-01	
TL-210	296.00	210.	12.	0.007	172.14	3.419E-01	
PA-231	300.07	204.	12.	0.007	169.34	1.114E+01	
PA-233	300.18	216.	12.	0.007	174.11	4.423E+00	
PA-231	302.65	228.	12.	0.007	178.36	9.606E+00	
BA-133	302.85	241.	3.	0.002	646.22	4.236E-01	
PA-233	312.01	284.	-13.	-0.007	182.07	-8.577E-01	
Ir-192	316.49	52.	5.	0.003	195.46	1.446E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CR-51	320.08	61.	4.	0.002	269.22	9.977E-01		
La-140	328.76	66.	-11.	-0.006	141.42	-1.317E+00		
Cf-249	333.44	51.	-8.	-0.005	164.54	-1.320E+00		
Cs-136	340.57	101.	12.	0.007	121.15	6.420E-01		
EU-152	344.29	114.	11.	0.006	140.01	1.049E+00		P
HF-181	345.83	123.	12.	0.006	139.19	1.937E+00		
BA-133	356.00	228.	-13.	-0.007	169.57	-5.323E-01		
I-131	364.48	11.	17.	0.009	43.82	5.482E-01		
BA-133	383.84	73.	10.	0.006	125.65	3.047E+00		P
Cf-249	387.95	83.	11.	0.006	123.69	4.498E-01		
SN-113	391.69	83.	10.	0.006	131.97	4.386E-01		
SB-125	427.88	40.	-13.	-0.007	95.37	-1.315E+00		
AG-108M	433.94	33.	-9.	-0.005	123.98	-3.007E-01		
SB-125	463.37	59.	11.	0.006	107.13	3.233E+00		P
Ir-192	468.06	60.	10.	0.005	119.38	5.933E-01		
BE-7	477.60	57.	-12.	-0.006	97.17	-3.584E+00		
HF-181	482.00	68.	-3.	-0.002	342.37	-1.403E-01		
La-140	487.02	36.	-9.	-0.005	134.72	-6.551E-01		
RU-103	497.05	32.	-11.	-0.006	105.10	-4.073E-01		
RH-106	511.86	27.	45.	0.025	21.91	7.812E+00		
Kr-85	513.98	72.	8.	0.005	146.79	6.762E+01		
Nd-147	531.00	52.	-15.	-0.009	95.39	-4.192E+00		
Ba-140	537.26	21.	2.	0.001	361.41	3.640E-01		P
CS-134	563.24	16.	9.	0.005	96.63	3.863E+00		P
CS-134	569.32	20.	5.	0.003	134.16	1.219E+00		
PA-234	569.47	26.	2.	0.001	338.64	9.912E-01		
BI-207	569.70	38.	-8.	-0.004	121.11	-2.879E-01		
SB-125	600.50	240.	-12.	-0.007	90.40	-2.655E+00		P
SB-124	602.73	227.	-12.	-0.007	182.01	-4.743E-01		
CS-134	604.71	216.	-10.	-0.005	218.49	-3.874E-01		
PM-144	618.06	28.	-2.	-0.001	303.32	-1.010E-01		
RH-106	621.92	31.	8.	0.005	98.93	3.421E+00		P
SB-125	635.89	14.	4.	0.002	138.12	1.484E+00		P
I-131	636.97	20.	1.	0.001	640.31	5.723E-01		
AG-110M	657.76	47.	-12.	-0.007	83.42	-5.482E-01		
CS-137	661.66	41.	9.	0.005	106.37	4.440E-01		P
PM-144	696.54	39.	-14.	-0.008	92.82	-6.381E-01		
NB-94	702.63	13.	6.	0.003	137.14	2.575E-01		P
SB-124	722.79	14.	4.	0.002	142.62	1.666E+00		
AG-108M	722.94	18.	7.	0.004	95.26	3.434E-01		
EU-154	723.36	25.	7.	0.004	109.46	1.544E+00		
ZR-95	724.20	32.	7.	0.004	121.98	7.082E-01		
BI-212	727.17	39.	3.	0.002	326.46	1.669E+00		
PM-146	735.72	0.	8.	0.004	36.45	1.611E+00		P
PM-146	747.16	9.	6.	0.003	106.88	8.396E-01		P
ZR-95	756.73	22.	-8.	-0.004	83.83	-6.797E-01		P
AG-110M	763.94	44.	-14.	-0.008	71.76	-3.002E+00		
NB-95	765.79	48.	9.	0.005	112.97	4.331E-01		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PA-234M	766.41	17.	7.	0.004	90.87	1.142E+02		
EU-152	778.92	31.	-14.	-0.008	48.54	-5.121E+00		P
BI-212	785.42	13.	-1.	-0.001	631.62	-4.020E+00		P
CS-134	795.87	25.	4.	0.002	183.71	2.296E-01		
CS-134	801.95	55.	-12.	-0.007	88.75	-7.089E+00		
CO-58	810.77	39.	-5.	-0.003	146.51	-2.326E-01		P
Cs-136	818.50	37.	-14.	-0.008	94.21	-7.200E-01		
MN-54	834.85	10.	2.	0.001	282.44	1.213E-01		P
NB-94	871.10	0.	8.	0.004	37.10	4.111E-01		P
EU-154	873.23	14.	-5.	-0.003	114.89	-2.157E+00		
PA-234	880.53	20.	8.	0.004	92.31	6.680E+00		
PA-234	883.24	28.	1.	0.001	657.60	6.382E-01		
Y-88	898.04	14.	-2.	-0.001	128.73	-1.362E-01		P
AG-110M	937.49	28.	-12.	-0.007	97.89	-1.959E+00		
PA-234	946.02	10.	5.	0.003	128.21	2.278E+00		P
EU-152	964.11	54.	-7.	-0.004	93.18	-2.934E+00		P
EU-154	996.33	30.	-8.	-0.004	110.35	-4.171E+00		
EU-154	1004.77	20.	-6.	-0.003	168.87	-1.977E+00		
Co-56	1037.84	10.	-4.	-0.002	212.81	-1.785E+00		P
Cs-136	1048.07	15.	-3.	-0.002	191.49	-2.304E-01		
RH-106	1050.36	29.	-6.	-0.003	133.33	-2.367E+01		
BI-207	1063.66	0.	6.	0.003	42.49	4.902E-01		P
Ga-68	1077.40	5.	3.	0.002	173.74	6.659E+00		
FE-59	1099.25	10.	7.	0.004	106.27	7.915E-01		
EU-152	1112.07	60.	-12.	-0.007	96.22	-5.628E+00		
ZN-65	1115.55	48.	-12.	-0.007	22.15	-1.559E+00		P
Sc-46	1120.55	54.	5.	0.003	211.24	3.278E-01		
Ta-182	1121.30	40.	10.	0.006	93.57	1.892E+00		
CO-60	1173.24	10.	-4.	-0.002	282.70	-2.883E-01		P
Ta-182	1221.41	21.	-8.	-0.005	130.66	-2.150E+00		
Co-56	1238.28	11.	8.	0.005	94.99	9.016E-01		P
NA-22	1274.53	16.	-2.	-0.001	291.55	-1.444E-01		
FE-59	1291.60	5.	6.	0.004	90.93	1.082E+00		
TL-210	1313.00	16.	-8.	-0.004	119.02	-2.817E+00		
La-140	1596.21	17.	-9.	-0.005	112.49	-8.201E-01		
SB-124	1690.98	6.	-2.	-0.001	343.80	-3.181E-01		
Y-88	1836.06	6.	-3.	-0.002	205.48	-2.955E-01		

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-3.5839E+00	-3.5839E+00	9.717E+01%	1.18E+01
NA-22	#A	-1.4438E-01	-1.4438E-01	2.915E+02%	1.54E+00
K-40	#	5.9627E+01	5.9627E+01	1.699E+01%	1.79E+01
Sc-46	#A	1.4599E-01	1.4599E-01	2.112E+02%	1.51E+00
CR-51	#A	9.9770E-01	9.9770E-01	2.692E+02%	9.35E+00
MN-54	#A	1.2132E-01	1.2132E-01	2.824E+02%	8.76E-01
FE-59	#A	9.1745E-01	9.1745E-01	6.993E+01%	1.97E+00
Co-56	#A	3.3808E-01	3.3808E-01	9.499E+01%	1.18E+00
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.40E-01
CO-58	#A	-2.3259E-01	-2.3259E-01	1.465E+02%	1.59E+00
CO-60	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.52E-01
ZN-65	#A	-1.5592E+00	-1.5592E+00	2.215E+01%	4.48E+00
NB-94	#A	3.3506E-01	3.3506E-01	3.710E+01%	8.94E-01
ZR-95	#A	-6.7969E-01	-6.7970E-01	8.383E+01%	2.12E+00
NB-95	#A	4.3309E-01	4.3309E-01	1.130E+02%	1.67E+00
RU-103	#A	-4.0733E-01	-4.0733E-01	1.051E+02%	1.08E+00
RH-106	#A	3.4208E+00	3.4208E+00	9.893E+01%	1.15E+01
AG-108M	#A	2.2030E-02	2.2030E-02	7.818E+01%	9.85E-01
AG-110M	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.05E+00
SN-113	#A	4.3864E-01	4.3864E-01	1.320E+02%	1.97E+00
SB-124	#A	-2.6216E-01	-2.6216E-01	1.156E+02%	2.92E+00
SB-125	#A	2.2795E-01	2.2795E-01	6.637E+01%	3.26E+00
I-131	#A	5.6031E-01	5.6032E-01	4.382E+01%	5.86E-01
Gd-153	#A	1.0656E-01	1.0656E-01	7.327E+02%	2.68E+00
Ga-68	#A	6.6338E+00	6.6588E+00	1.737E+02%	2.91E+01
Tc-99m	#A	-2.7656E-01	-2.7675E-01	1.170E+02%	1.09E+00
BA-133	#A	-3.1427E-01	-3.1427E-01	1.696E+02%	3.05E+00
CS-134	#A	6.4660E-01	6.4660E-01	8.239E+01%	1.49E+00
CS-137	#A	4.4405E-01	4.4405E-01	1.064E+02%	1.61E+00
CE-139	#A	2.6084E-01	2.6084E-01	1.199E+02%	1.05E+00
Ba-140	#A	3.6400E-01	3.6400E-01	3.614E+02%	3.50E+00
La-140	#A	-8.2012E-01	-8.2013E-01	1.125E+02%	2.00E+00
CE-141	#A	4.4479E-01	4.4479E-01	1.364E+02%	2.04E+00
CE-144	#A	1.8053E+00	1.8053E+00	1.336E+02%	8.12E+00
PM-144	#A	-6.3805E-01	-6.3805E-01	9.282E+01%	1.42E+00
EU-152	#A	1.0498E+00	1.0498E+00	1.052E+02%	2.44E+00
EU-154	#A	1.4244E-01	1.4244E-01	7.670E+01%	1.99E+00
EU-155	#A	8.3281E-01	8.3281E-01	1.195E+02%	3.36E+00
HF-181	#A	1.8732E-01	1.8732E-01	1.392E+02%	1.67E+00
Ta-182	#A	1.8915E+00	1.8915E+00	9.357E+01%	6.00E+00
Hg-203	#A	-3.5988E-01	-3.5988E-01	1.091E+02%	1.32E+00
TL-208		4.1504E+00	4.1504E+00	1.189E+01%	6.90E-01
PM-146	#A	5.5916E-01	5.5916E-01	3.645E+01%	1.40E+00

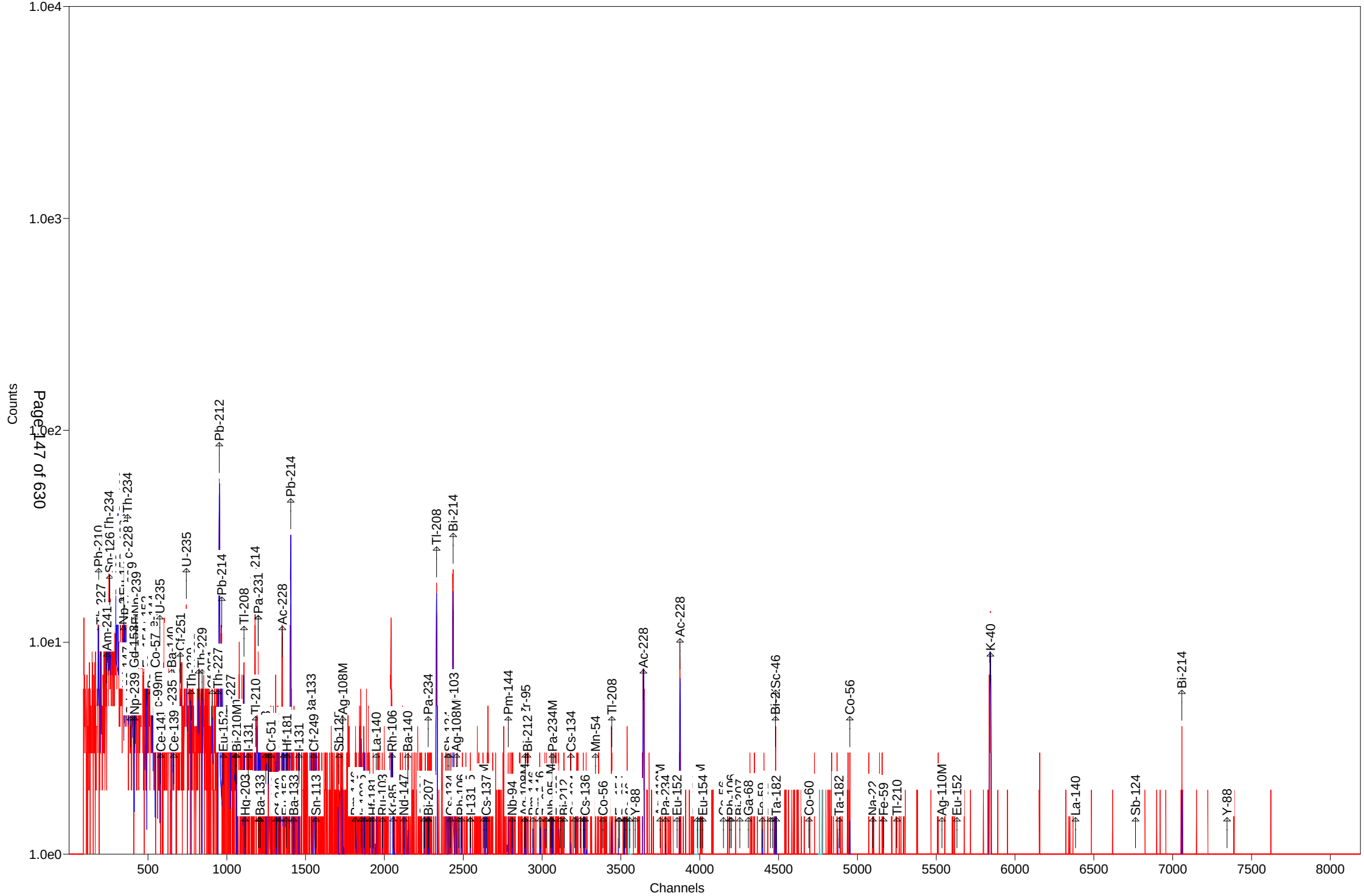
Y-88	#A	-2.9547E-01	-2.9547E-01	2.055E+02%	1.39E+00
Cd-113m	#A	2.5023E+03	2.5023E+03	1.298E+02%	1.12E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.98E+01
Cf-251	#A	1.1803E-01	1.1803E-01	1.245E+03%	4.08E+00
Cf-249	#A	4.4981E-01	4.4981E-01	1.237E+02%	1.89E+00
Sn-126	A	3.0001E+00	3.0001E+00	1.160E+02%	1.17E+01
PB-210	#A	1.3284E+01	1.3284E+01	8.082E+01%	3.09E+01
PB-212		9.5817E+00	9.5817E+00	8.647E+00%	1.81E+00
PB-214		9.5336E+00	9.5336E+00	1.058E+01%	1.71E+00
BI-207	#A	4.9020E-01	4.9020E-01	4.249E+01%	6.15E-01
BI-212	#A	1.6692E+00	1.6692E+00	3.265E+02%	1.93E+01
U-235	#A	-2.1855E+00	-2.1855E+00	9.418E+01%	9.06E+00
BI-214		9.5423E+00	9.5423E+00	1.183E+01%	1.85E+00
BI-210M	#A	-5.0199E-01	-5.0199E-01	1.014E+02%	1.72E+00
AC-228		1.3381E+01	1.3381E+01	1.147E+01%	1.39E+00
TH-227	#A	3.6129E+00	3.6129E+00	4.714E+01%	1.17E+01
TH-229	#A	-6.3831E+00	-6.3831E+00	1.067E+02%	1.84E+01
TH-234	#A	1.0691E+01	1.0691E+01	3.464E+01%	1.45E+01
PA-231	#A	1.0314E+01	1.0314E+01	1.230E+02%	5.79E+01
PA-233	#A	-8.1827E-02	-8.1827E-02	1.260E+02%	5.26E+00
PA-234	#A	3.7082E-01	3.7082E-01	1.282E+02%	6.52E+00
PA-234M	#A	2.8045E+01	2.8045E+01	9.087E+01%	2.23E+02
AM-241	#A	4.5439E-01	4.5439E-01	2.246E+02%	2.93E+00
Np-237	#A	1.9764E+00	1.9764E+00	1.592E+02%	1.05E+01
Ir-192	#A	3.1188E-01	3.1188E-01	1.145E+02%	9.81E-01
Cs-136	#A	-7.1995E-01	-7.1996E-01	9.421E+01%	1.57E+00
Np-239	#A	7.9728E-01	7.9734E-01	1.198E+02%	3.22E+00
Nd-147	#A	-4.1917E+00	-4.1917E+00	9.539E+01%	9.91E+00
TL-210	#A	1.5179E-01	1.5179E-01	1.721E+02%	1.38E+00
Kr-85	#A	6.7619E+01	6.7619E+01	1.468E+02%	3.40E+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) 1.165E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.5 keV) 1.1650680E+02 Bq/Sample

405451_Gamma_490-164491-A-2-A. 14_Gamma_20190006.spc.



Test America St. Louis Spectrum ID: 16_Gamma_20190006

Sample Description: 405451_Gamma_490-164491-A-3-A
Detector: Detector #16
Batch ID: 405451
Work Order Number: Gamma
Lot Number: 490-164491-A-3-A

Decay to Time: 1/2/2019 12:54 Live Time: 1800 sec
Acquisition Time: 1/2/2019 12:55:20 Real Time: 1803 sec
Analysis Time: 1/2/2019 13:26 Dead Time: 0.15 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 16_Soil_TunaCan.Clb
Efficiency Cal Desc: 16_TunaCan_90099_071012
Efficiency Cal Date: 7/13/2012 09:47
Energy Cal Date: 2/28/2012 09:35
Library: Client_Long_Rev15.lib
Bkgd Correction File: 16_2018-12-22_1359.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.111E+00	103.4	3.218E+00	3.222E+00	1.090E+01
NA-22	-8.358E-01	60.6	5.065E-01	5.082E-01	1.660E+00
K-40	1.027E+02	8.2	8.405E+00	9.912E+00	1.057E+01
Sc-46	3.326E-01	81.7	2.719E-01	2.724E-01	2.102E+00
CR-51	0.000E+00	1.#INF	5.249E-01	5.249E-01	2.158E+01
MN-54	-4.776E-02	774.3	3.698E-01	3.698E-01	1.303E+00
FE-59	7.281E-01	122.5	8.916E-01	8.924E-01	2.007E+00
Co-56	-9.089E-01	41.7	3.790E-01	3.819E-01	1.696E+00
CO-57	4.881E-01	86.2	4.206E-01	4.214E-01	7.835E-01
CO-58	4.181E-01	82.7	3.457E-01	3.463E-01	1.166E+00
CO-60	-4.480E-01	174.2	7.803E-01	7.806E-01	1.681E+00
ZN-65	-9.278E-01	144.9	1.345E+00	1.345E+00	4.595E+00
NB-94	2.935E-01	161.8	4.748E-01	4.751E-01	1.628E+00
ZR-95	-3.138E-01	199.4	6.259E-01	6.261E-01	2.016E+00
NB-95	0.000E+00	1.#INF	8.074E-02	8.074E-02	1.426E+00
RU-103	1.801E-01	234.1	4.217E-01	4.218E-01	1.042E+00
RH-106	3.053E+00	96.8	2.956E+00	2.961E+00	7.034E+00
AG-108M	2.151E-01	168.0	3.613E-01	3.615E-01	8.842E-01
AG-110M	3.465E-01	78.6	2.723E-01	2.729E-01	2.866E+00
SN-113	0.000E+00	1.#INF	2.932E-01	2.932E-01	1.748E+00
SB-124	5.562E-01	132.8	7.385E-01	7.391E-01	2.609E+00
SB-125	7.851E-01	89.7	7.043E-01	7.055E-01	3.097E+00
I-131	3.149E-01	121.9	3.837E-01	3.841E-01	9.625E-01
Gd-153	0.000E+00	1.#INF	4.945E-01	4.946E-01	6.663E+00
Ga-68	8.041E+00	177.9	1.431E+01	1.431E+01	3.327E+01
Tc-99m	-3.308E-01	155.4	5.143E-01	5.146E-01	1.718E+00
BA-133	-5.767E-01	147.0	8.477E-01	8.482E-01	2.852E+00
CS-134	3.430E-01	38.5	1.321E-01	1.333E-01	2.254E+00
CS-137	3.364E-01	119.7	4.026E-01	4.030E-01	1.382E+00
CE-139	8.087E-02	406.0	3.284E-01	3.285E-01	1.121E+00
Ba-140	1.241E+00	92.8	1.151E+00	1.153E+00	2.812E+00
La-140	4.957E-01	94.2	4.667E-01	4.675E-01	1.061E+00
CE-141	-6.428E-01	146.8	9.433E-01	9.438E-01	3.149E+00

CE-144	2.113E+00	154.8	3.272E+00	3.273E+00	1.096E+01
PM-144	-3.667E-01	127.1	4.661E-01	4.665E-01	1.589E+00
EU-152	-9.450E-01	98.5	9.306E-01	9.320E-01	3.108E+00
EU-154	9.986E-01	66.5	6.639E-01	6.660E-01	1.758E+00
EU-155	-1.025E-01	1187.8	1.218E+00	1.218E+00	9.320E+00
HF-181	5.730E-01	85.5	4.901E-01	4.909E-01	1.547E+00
Ta-182	2.226E+00	48.0	1.068E+00	1.074E+00	4.857E+00
Hg-203	-3.715E-01	97.4	3.619E-01	3.626E-01	1.216E+00
TL-208	3.833E+00	13.9	5.316E-01	5.676E-01	9.655E-01
PM-146	4.419E-01	118.4	5.232E-01	5.237E-01	1.197E+00
Y-88	1.302E-01	100.1	1.303E-01	1.305E-01	5.796E-01
Cd-113m	-6.222E+03	87.7	5.457E+03	5.472E+03	1.823E+04
Cd-109	0.000E+00	1.#INF	1.635E+01	1.635E+01	5.445E+01
Cf-251	-1.900E+00	97.8	1.857E+00	1.865E+00	4.743E+00
Cf-249	6.731E-01	110.6	7.446E-01	7.454E-01	1.605E+00
Sn-126	2.866E+00	168.0	4.815E+00	4.818E+00	1.614E+01
PB-210	1.343E+01	63.2	8.491E+00	8.527E+00	2.777E+01
PB-212	9.958E+00	8.1	8.030E-01	1.029E+00	1.737E+00
PB-214	9.342E+00	10.5	9.803E-01	1.094E+00	1.762E+00
BI-207	3.606E-01	88.7	3.199E-01	3.204E-01	1.476E+00
BI-212	4.964E+00	103.6	5.143E+00	5.150E+00	1.750E+01
U-235	-1.475E-01	90.1	1.329E-01	1.331E-01	1.347E+01
BI-214	1.111E+01	9.9	1.102E+00	1.244E+00	1.719E+00
BI-210M	-2.003E-01	321.8	6.446E-01	6.447E-01	2.206E+00
AC-228	1.692E+01	9.7	1.636E+00	1.849E+00	1.165E+00
TH-227	4.153E+00	106.8	4.435E+00	4.443E+00	1.097E+01
TH-229	3.969E+00	95.4	3.788E+00	3.801E+00	1.746E+01
TH-234	1.089E+01	40.0	4.353E+00	4.395E+00	1.547E+01
PA-231	-1.215E+01	179.8	2.186E+01	2.187E+01	7.329E+01
PA-233	0.000E+00	1.#INF	2.012E-01	2.012E-01	5.849E+00
PA-234	1.620E+00	90.0	1.458E+00	1.461E+00	6.427E+00
PA-234M	-8.140E+00	426.4	3.471E+01	3.471E+01	2.229E+02
AM-241	8.953E-01	158.1	1.415E+00	1.416E+00	4.736E+00
Np-237	0.000E+00	1.#INF	4.720E+00	4.720E+00	1.573E+01
Ir-192	1.885E-01	101.0	1.904E-01	1.907E-01	2.444E+00
Cs-136	4.436E-01	61.1	2.711E-01	2.723E-01	1.438E+00
Np-239	1.164E+00	220.6	2.567E+00	2.568E+00	8.561E+00
Nd-147	1.025E+00	224.5	2.301E+00	2.302E+00	5.772E+00
TL-210	5.847E-01	88.6	5.179E-01	5.190E-01	1.740E+00
Kr-85	0.000E+00	1.#INF	4.525E+01	4.525E+01	4.067E+02
Total	2.289E+02				

Analyst: Joey Sausto

Sample description
405451_Gamma_490-164491-A-3-A

Spectrum Filename: C:\User\SPC\Det16\16_Gamma_20190006.An1

Acquisition information
Start time: 1/2/2019 12:55:20 PM
Live time: 1800
Real time: 1803
Dead time: 0.15 %
Detector ID: 16

Detector system
Ge16 SN/11012217

Calibration
Filename: 16_Soil_TunaCan.Clb
16_TunaCan_90099_071012

Energy Calibration
Created: 2/28/2012 9:35:31 AM
Zero offset: 0.050 keV
Gain: 0.250 keV/channel
Quadratic: -2.285E-08 keV/channel^2

Efficiency Calibration
Created: 7/13/2012 9:47:24 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.01 %
Log(Eff): 1.477416E-02 + (-5.514266E-01*Log(E)) + (-1.443482E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.17 %
Log(Eff): -2.408438E+01 + (8.948554E+00*Log(E)) + (-9.513599E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_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	1/2/2019 12:54:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	16_2018-12-22_1359.PBC 12/22/2018 1:59:52 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 20 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1750

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.33	24.	63.20	0.96	2.352E-02	46.54	4.250	PBC<MDA	PB210
59.54	19.	158.07	0.97	3.327E-02	59.54	35.900	PBC<MDA	AM241
63.22	38.	52.50	0.97	3.561E-02	63.29	3.810	PBC<MDA	TH234
64.21	18.	168.00	0.98	3.619E-02	64.28	9.700	PBC<MDA	Sn126
74.80	106.	17.96	0.99	4.138E-02				
77.13	171.	12.30	0.99	4.229E-02				
87.18	82.	25.35	0.86	4.531E-02	86.49	13.100	7.703E+00	Np237
					86.54	30.700	3.286E+00	EU155
					86.94	9.040	1.114E+01	Sn126
					87.57	37.500	2.676E+00	Sn126
					88.04	3.790	2.642E+01	Cd109
92.65	37.	60.26	1.00	4.638E-02	92.59	5.584	PBC<MDA	TH234
106.13	23.	220.65	1.01	4.769E-02	106.13	22.700	PBC<MDA	Np239
121.78	21.	87.46	1.03	4.721E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.864E-01	CO57
					123.10	40.790	6.021E-01	EU154
122.06	20.	86.18	1.03	4.729E-02	121.78	28.580	8.149E-01	EU152
					122.06	85.600	2.722E-01	CO57
					123.10	40.790	5.722E-01	EU154
131.29	18.	156.61	1.04	4.639E-02	131.29	18.000	PBC<MDA	PA234
133.02	19.	151.52	1.04	4.618E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	2.112E+00	CE144

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
133.54	19.	154.81	1.04	4.612E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	2.113E+00	CE144
136.30	20.	157.71	1.04	4.576E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.218E+00	CO57
136.47	20.	160.93	1.04	4.573E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.218E+00	CO57
165.85	5.	406.05	1.07	4.156E-02	165.85	79.900	PBC<MDA	CE139
185.72	79.	26.11	1.09	3.839E-02	185.72	54.000	2.117E+00	U235
205.33	17.	96.32	1.11	3.577E-02	205.33	5.010	PBC<MDA	U235
210.85	20.	95.43	1.11	3.511E-02	210.85	2.990	PBC<MDA	TH229
238.37	294.	6.73	1.43	3.219E-02	238.63	43.300	1.118E+01	PB212
241.81	55.	22.41	1.14	3.185E-02	242.00	7.430	1.288E+01	PB214
256.19	16.	106.80	1.15	3.058E-02	256.24	7.000	PBC<MDA	TH227
276.84	1.	877.10	1.17	2.890E-02	277.28	6.310	PBC<MDA	TL208
294.94	118.	17.23	0.61	2.766E-02	295.09	19.300	1.224E+01	PB214
					296.00	79.000	2.996E+00	TL210
299.93	23.	40.06	1.30	2.732E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.874E+01	PA231
					300.18	6.200	PBC<MDA	PA233
328.76	16.	156.59	1.22	2.559E-02	328.76	20.300	PBC<MDA	La140
333.44	16.	158.36	1.22	2.533E-02	333.44	15.510	PBC<MDA	Cf249
338.10	71.	17.76	1.29	2.506E-02	338.32	12.010	1.310E+01	AC228
340.57	16.	161.43	1.23	2.494E-02	340.57	46.900	PBC<MDA	Cs136
351.69	154.	10.49	1.48	2.436E-02	351.93	37.600	9.342E+00	PB214
364.48	11.	121.85	1.25	2.375E-02	364.48	81.700	PBC<MDA	I131
383.84	11.	106.53	1.27	2.288E-02	383.84	8.940	PBC<MDA	BA133
387.95	8.	154.52	1.27	2.271E-02	387.95	66.000	PBC<MDA	Cf249
433.94	7.	168.00	1.31	2.093E-02	433.94	90.480	PBC<MDA	AG108M
453.88	2.	678.97	1.33	2.026E-02	453.88	65.000	PBC<MDA	PM146
463.37	10.	89.71	1.34	1.996E-02	463.37	10.470	PBC<MDA	SB125
468.06	9.	100.99	1.34	1.981E-02	468.06	51.750	PBC<MDA	Ir192
477.60	12.	103.42	1.35	1.952E-02	477.60	10.520	PBC<MDA	BE7
482.00	9.	134.22	1.35	1.939E-02	482.00	80.500	PBC<MDA	HF181
487.02	7.	142.53	1.36	1.925E-02	487.02	45.500	PBC<MDA	La140
497.05	6.	234.09	1.37	1.896E-02	497.05	90.900	PBC<MDA	RU103
511.86	65.	22.77	2.63	1.856E-02	511.86	20.000	9.728E+00	RH106
531.00	4.	224.47	1.40	1.807E-02	531.00	13.000	PBC<MDA	Nd147
537.26	10.	92.78	1.40	1.791E-02	537.26	24.390	PBC<MDA	Ba140
563.24	19.	38.51	1.43	1.730E-02	563.24	8.350	7.434E+00	CS134
569.70	6.	131.53	1.43	1.716E-02	569.32	15.380	1.359E+00	CS134
					569.47	8.200	2.549E+00	PA234
					569.70	97.740	PBC<MDA	BI207
582.96	101.	13.87	1.49	1.687E-02	583.02	84.500	3.920E+00	TL208
600.50	10.	217.13	1.46	1.651E-02	600.50	17.860	PBC<MDA	SB125
602.73	10.	221.03	1.46	1.646E-02	602.73	98.260	PBC<MDA	SB124
604.71	5.	485.81	1.46	1.642E-02	604.71	97.620	PBC<MDA	CS134
609.01	150.	9.92	2.08	1.633E-02	609.31	46.090	1.111E+01	BI214
621.92	9.	96.84	1.48	1.609E-02	621.92	9.930	PBC<MDA	RH106

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
657.76	12.	78.59	1.51	1.543E-02	657.76	94.640	PBC<MDA	AG110M
661.66	8.	119.68	1.51	1.537E-02	661.66	85.210	PBC<MDA	CS137
702.63	8.	161.76	1.55	1.470E-02	702.63	97.900	PBC<MDA	NB94
722.79	7.	147.19	1.57	1.439E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.904E-01	AG108M
					723.36	20.220	1.305E+00	EU154
722.96	1.	885.94	1.57	1.439E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.958E-02	AG108M
					723.36	20.220	2.228E-01	EU154
727.17	10.	103.62	1.57	1.433E-02	727.17	7.550	PBC<MDA	BI212
735.72	7.	118.42	1.58	1.421E-02	735.72	22.500	PBC<MDA	PM146
747.16	5.	177.22	1.59	1.404E-02	747.16	34.000	PBC<MDA	PM146
763.94	6.	164.58	1.60	1.381E-02	763.94	22.280	PBC<MDA	AG110M
799.60	14.	88.58	1.63	1.335E-02	799.60	98.960	PBC<MDA	TL210
801.95	11.	84.08	1.64	1.332E-02	801.95	8.690	PBC<MDA	CS134
810.78	10.	82.68	1.64	1.322E-02	810.78	99.460	PBC<MDA	CO58
815.77	5.	195.81	1.65	1.316E-02	815.77	23.280	PBC<MDA	La140
818.50	2.	479.58	1.65	1.312E-02	818.50	100.000	PBC<MDA	Cs136
858.97	9.	99.89	1.69	1.264E-02	860.56	12.420	PBC<MDA	TL208
898.04	6.	100.10	1.72	1.225E-02	898.04	93.700	PBC<MDA	Y88
911.20	107.	9.67	2.00	1.211E-02	911.07	29.000	1.692E+01	AC228
946.02	6.	89.99	1.76	1.178E-02	946.02	13.400	PBC<MDA	PA234
967.07	14.	86.09	1.78	1.157E-02	968.97	17.460	PBC<MDA	AC228
1001.00	-1.	426.39	1.81	1.129E-02	1001.00	0.837	PBC<MDA	PA234M
1004.50	6.	114.25	1.81	1.126E-02	1004.77	18.010	PBC<MDA	EU154
1048.07	11.	61.11	1.84	1.091E-02	1048.07	80.000	PBC<MDA	Cs136
1063.66	8.	119.02	1.86	1.079E-02	1063.66	74.500	PBC<MDA	BI207
1077.40	4.	177.92	1.87	1.068E-02	1077.40	3.300	PBC<MDA	Ga68
1099.25	8.	122.45	1.89	1.052E-02	1099.25	56.500	PBC<MDA	FE59
1119.30	10.	124.40	1.91	1.037E-02	1120.29	15.100	PBC<MDA	BI214
1120.55	13.	81.75	1.91	1.037E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.036E+00	Ta182
1121.30	11.	81.92	1.91	1.037E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.764E+00	Ta182
1173.24	3.	220.18	1.95	1.002E-02	1173.24	99.900	PBC<MDA	CO60
1221.41	13.	50.03	1.99	9.717E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	10.	87.15	2.00	9.617E-03	1238.28	66.070	PBC<MDA	Co56
1273.71	6.	138.11	2.03	9.409E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.087E+00	EU154
1313.00	4.	221.56	2.07	9.199E-03	1313.00	21.000	PBC<MDA	TL210
1460.44	167.	8.18	1.29	8.482E-03	1460.83	10.670	1.027E+02	K40
1596.21	3.	242.22	2.29	7.928E-03	1596.21	95.400	PBC<MDA	La140
1763.62	34.	19.47	2.43	7.342E-03	1764.49	15.400	1.653E+01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.86	74.81	127.	108.	2.618E+03	17.64	0.985	- sD
308.19	77.14	130.	177.	4.192E+03	11.81	0.988	- D

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

This section based on library: Client_Long_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	185.86	46.54	103.	24.	0.013	63.20	0.959D
TH-227	200.26	50.14	280.	-9.	-0.005	251.54	0.963s
AM-241	237.83	59.54	452.	19.	0.011	158.07	0.971s
TH-234	252.82	63.29	174.	38.	0.021	52.50	0.975D
Sn-126	256.79	64.28	454.	18.	0.010	168.00	0.976s
BA-133	323.60	80.99	882.	-31.	-0.017	67.90	0.991s
Np-237	345.59	86.49	1249.	0.	0.000	188.94	0.996A
EU-155	345.80	86.54	1363.	-29.	-0.016	182.50	0.996s
Sn-126	349.91	87.57	1197.	47.	0.026	37.90	0.997D
Cd-109	351.79	88.04	1274.	0.	0.000	176.24	0.998A
Nd-147	364.02	91.10	1177.	-29.	-0.016	169.06	1.001s
TH-234	369.98	92.59	222.	37.	0.020	60.26	1.002D
AC-228	373.02	93.35	1266.	-13.	-0.007	388.60	1.003s
Gd-153	389.61	97.50	1279.	0.	0.000	1000.00	1.007s
Np-239	397.61	99.50	1279.	0.	0.000	1000.00	1.008
Gd-153	412.40	103.20	1279.	0.	0.000	1000.00	1.012s
Np-239	414.40	103.70	1279.	0.	0.000	1000.00	1.012s
Np-239	424.11	106.13	1239.	23.	0.013	220.65	1.014s
EU-152	486.69	121.78	245.	-23.	-0.013	98.48	1.029s
CO-57	487.81	122.06	136.	20.	0.011	86.18	1.029s
EU-154	491.96	123.10	156.	21.	0.012	87.46	1.030s
PA-234	524.73	131.29	406.	18.	0.010	156.61	1.038
HF-181	531.64	133.02	424.	19.	0.011	151.52	1.039s
CE-144	533.70	133.54	444.	19.	0.011	154.81	1.040s
HF-181	544.74	136.30	463.	20.	0.011	157.71	1.042s
CO-57	545.43	136.47	483.	20.	0.011	160.93	1.042s
Tc-99m	561.57	140.51	643.	-23.	-0.013	155.45	1.046s
U-235	574.67	143.79	620.	-23.	-0.013	152.23	1.049s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CE-141	581.29	145.44	648.	-25.	-0.014	146.75	1.050s
Ba-140	650.14	162.66	216.	-5.	-0.003	471.74	1.066s
U-235	653.01	163.38	218.	0.	0.000	1000.00	1.067s
CE-139	662.90	165.85	190.	5.	0.003	406.05	1.069s
Cf-251	705.88	176.60	139.	-23.	-0.013	97.76	1.079s
U-235	742.34	185.72	99.	79.	0.044	26.11	1.087
TH-229	773.49	193.51	110.	-2.	-0.001	983.62	1.094s
U-235	820.76	205.33	73.	17.	0.010	96.32	1.105s
TH-229	842.82	210.85	103.	20.	0.011	95.43	1.110s
Cf-251	907.40	227.00	106.	-7.	-0.004	265.65	1.125s
TH-227	943.27	235.97	607.	-21.	-0.012	168.63	1.133s
PB-212	953.91	238.63	77.	250.	0.139	8.06	1.136D
PB-214	967.37	242.00	48.	55.	0.030	22.41	1.139D
EU-152	978.14	244.69	587.	-22.	-0.012	159.17	1.141s
TH-227	1024.32	256.24	72.	16.	0.009	106.80	1.152
Cd-113m	1054.15	263.70	146.	-20.	-0.011	87.72	1.158s
BI-210M	1062.67	265.83	147.	-5.	-0.003	321.84	1.160
TL-208	1108.46	277.28	65.	1.	0.001	877.10	1.171s
Hg-203	1116.13	279.20	109.	-16.	-0.009	97.43	1.173s
I-131	1136.52	284.30	76.	-7.	-0.004	158.79	1.177s
PB-214	1179.06	294.94	58.	118.	0.065	17.23	0.612s
TL-210	1183.31	296.00	516.	-17.	-0.009	190.27	1.188s
PB-212	1199.01	299.93	21.	23.	0.013	40.06	1.302
PA-231	1199.58	300.07	499.	-17.	-0.009	186.56	1.192
PA-233	1200.02	300.18	482.	-17.	-0.009	183.39	1.192
PA-231	1209.90	302.65	465.	-17.	-0.010	179.83	1.194
BA-133	1210.70	302.85	448.	-6.	-0.003	540.08	1.194s
Ba-140	1218.69	304.85	442.	0.	0.000	1000.00	1.196s
BI-210M	1218.88	304.90	442.	0.	0.000	1000.00	1.196s
Ir-192	1233.05	308.44	442.	0.	0.000	1000.00	1.199s
PA-233	1247.34	312.01	442.	0.	0.000	1000.00	1.202s
Ir-192	1265.24	316.49	442.	0.	0.000	1000.00	1.206
CR-51	1279.62	320.08	442.	0.	0.000	1000.00	1.210s
La-140	1314.31	328.76	293.	16.	0.009	156.59	1.217s
Cf-249	1333.02	333.44	308.	16.	0.009	158.36	1.222s
AC-228	1351.64	338.10	24.	71.	0.039	17.76	1.294s
Cs-136	1361.54	340.57	324.	16.	0.009	161.43	1.228
HF-181	1382.56	345.83	69.	-13.	-0.007	131.33	1.233s
PB-214	1406.01	351.69	32.	154.	0.086	10.49	1.477
BA-133	1423.24	356.00	254.	-16.	-0.009	146.98	1.242s
I-131	1457.16	364.48	44.	11.	0.006	121.85	1.250
BA-133	1534.57	383.84	65.	11.	0.006	106.53	1.267s
Cf-249	1551.01	387.95	76.	8.	0.005	154.52	1.271s
SN-113	1565.96	391.69	84.	0.	0.000	1000.00	1.274s
SB-125	1710.67	427.88	48.	-7.	-0.004	177.29	1.307s
AG-108M	1734.91	433.94	35.	7.	0.004	168.00	1.312s
PM-146	1814.67	453.88	30.	2.	0.001	678.97	1.330s
SB-125	1852.61	463.37	38.	10.	0.006	89.71	1.338s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ir-192	1871.38	468.06	40.	9.	0.005	100.99	1.342s
BE-7	1909.51	477.60	65.	12.	0.006	103.42	1.351s
HF-181	1927.12	482.00	77.	9.	0.005	134.22	1.355s
La-140	1947.21	487.02	42.	7.	0.004	142.53	1.359s
RU-103	1987.33	497.05	40.	6.	0.003	234.09	1.368s
RH-106	2046.57	511.86	77.	65.	0.036	22.77	2.631s
Kr-85	2055.03	513.98	142.	0.	0.000	1000.00	1.383s
Nd-147	2123.10	531.00	22.	4.	0.002	224.47	1.398s
Ba-140	2148.14	537.26	17.	10.	0.005	92.78	1.404s
CS-134	2252.03	563.24	9.	19.	0.011	38.51	1.427s
CS-134	2276.36	569.32	30.	-6.	-0.004	129.24	1.432s
BI-207	2277.89	569.70	33.	6.	0.004	131.53	1.432s
TL-208	2330.92	582.96	22.	101.	0.056	13.87	1.487
SB-125	2401.07	600.50	238.	10.	0.006	217.13	1.460s
SB-124	2409.99	602.73	247.	10.	0.006	221.03	1.462s
CS-134	2417.91	604.71	257.	5.	0.003	485.81	1.463s
BI-214	2435.11	609.01	20.	150.	0.084	9.92	2.083s
RU-103	2440.26	610.30	262.	0.	0.000	1000.00	1.468s
AG-108M	2456.19	614.28	262.	0.	0.000	1000.00	1.472s
RH-106	2486.73	621.92	14.	9.	0.005	96.84	1.479s
SB-125	2542.62	635.89	33.	-1.	-0.001	818.54	1.491s
I-131	2546.96	636.97	60.	-17.	-0.010	67.94	1.492s
AG-110M	2630.10	657.76	37.	12.	0.007	78.59	1.510s
CS-137	2645.69	661.66	41.	8.	0.004	119.68	1.513s
PM-144	2785.22	696.54	71.	-10.	-0.005	127.12	1.544s
NB-94	2809.57	702.63	72.	8.	0.004	161.76	1.549s
SB-124	2890.19	722.79	47.	7.	0.004	147.19	1.567s
AG-108M	2890.80	722.94	54.	0.	0.000	1000.00	1.567s
EU-154	2892.49	723.36	53.	1.	0.001	885.94	1.567s
ZR-95	2895.84	724.20	48.	-1.	-0.001	984.89	1.568s
BI-212	2907.73	727.17	45.	10.	0.005	103.62	1.570s
PM-146	2941.93	735.72	15.	7.	0.004	118.42	1.578s
PM-146	2987.69	747.16	19.	5.	0.003	177.22	1.588s
ZR-95	3025.97	756.73	28.	-4.	-0.002	199.44	1.596s
AG-110M	3054.82	763.94	43.	6.	0.003	164.58	1.602s
NB-95	3062.21	765.79	49.	0.	0.000	1000.00	1.604s
PA-234M	3064.70	766.41	63.	-14.	-0.008	85.38	1.605s
EU-152	3114.73	778.92	33.	-8.	-0.004	162.22	1.615s
BI-212	3140.74	785.42	42.	-9.	-0.005	93.45	1.621s
CS-134	3182.54	795.87	88.	-18.	-0.010	77.84	1.630s
TL-210	3197.46	799.60	69.	14.	0.008	88.58	1.633s
CS-134	3206.86	801.95	40.	11.	0.006	84.08	1.635s
CO-58	3242.16	810.78	28.	10.	0.005	82.68	1.643s
La-140	3262.14	815.77	38.	5.	0.003	195.81	1.647s
Cs-136	3273.06	818.50	45.	2.	0.001	479.58	1.649s
MN-54	3338.46	834.85	35.	-1.	-0.001	774.34	1.663s
Co-56	3386.15	846.77	61.	-21.	-0.012	41.70	1.674s
TL-208	3441.33	860.56	16.	9.	0.005	99.89	1.685s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
NB-94	3483.47	871.10	45.	-18.	-0.010	86.76	1.695s
EU-154	3492.00	873.23	76.	-8.	-0.004	161.75	1.696
PA-234	3521.21	880.53	64.	-15.	-0.008	82.32	1.703s
PA-234	3532.05	883.24	79.	-9.	-0.005	135.85	1.705s
AG-110M	3537.82	884.68	88.	0.	0.000	1000.00	1.706s
Y-88	3591.26	898.04	5.	6.	0.003	100.10	1.718
AC-228	3643.90	911.20	0.	107.	0.059	9.67	2.000s
AG-110M	3749.09	937.49	35.	-16.	-0.009	85.05	1.751s
PA-234	3783.21	946.02	5.	6.	0.003	89.99	1.759s
EU-152	3855.58	964.11	96.	-23.	-0.013	63.44	1.774s
AC-228	3875.02	968.97	64.	14.	0.008	86.09	1.778s
EU-154	3984.48	996.33	48.	-12.	-0.007	47.03	1.801s
PA-234M	4003.15	1001.00	57.	-1.	-0.001	426.39	1.805s
EU-154	4018.27	1004.77	23.	6.	0.003	114.25	1.808s
Co-56	4150.56	1037.84	27.	-1.	-0.001	415.21	1.836s
Cs-136	4191.49	1048.07	18.	11.	0.006	61.11	1.845s
RH-106	4200.65	1050.36	39.	-3.	-0.002	289.78	1.847s
BI-207	4253.86	1063.66	16.	8.	0.004	119.02	1.858s
Ga-68	4308.84	1077.40	11.	4.	0.002	177.92	1.870s
FE-59	4396.27	1099.25	16.	8.	0.004	122.45	1.888s
EU-152	4447.58	1112.07	90.	-13.	-0.007	105.25	1.899s
ZN-65	4461.46	1115.55	77.	-9.	-0.005	144.92	1.901s
BI-214	4480.43	1120.29	69.	10.	0.005	124.40	1.906s
Sc-46	4481.49	1120.55	52.	13.	0.007	81.75	1.906s
Ta-182	4484.49	1121.30	39.	11.	0.006	81.92	1.906s
CO-60	4692.30	1173.24	6.	3.	0.001	220.18	1.950s
Ta-182	4885.06	1221.41	6.	13.	0.007	50.03	1.990s
Co-56	4952.57	1238.28	11.	10.	0.005	87.15	2.004s
NA-22	5097.62	1274.53	30.	-14.	-0.008	60.59	2.034s
EU-154	5097.66	1274.54	37.	6.	0.004	138.11	2.034s
TL-210	5251.57	1313.00	11.	4.	0.002	221.56	2.066
CO-60	5329.61	1332.50	28.	-7.	-0.004	174.19	2.081s
AG-110M	5536.89	1384.30	12.	-2.	-0.001	424.26	2.124s
EU-152	5631.75	1408.00	12.	-1.	-0.001	842.61	2.143s
K-40	5841.61	1460.44	10.	167.	0.093	8.18	1.291s
La-140	6385.02	1596.21	6.	3.	0.001	242.22	2.294s
SB-124	6764.37	1690.98	0.	0.	0.000	1000.00	2.369s
BI-214	7058.61	1764.49	4.	34.	0.019	19.47	2.427s
Co-56	7086.08	1771.35	49.	-6.	-0.003	174.40	2.433s

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   3.1113E+00                                        5.31E+01
                           477.60 3.111E+00 ?(  1.090E+01 1.03E+02 1.05E+01 G

NA-22    C  -8.3584E-01                                        9.50E+02
                          1274.53-8.358E-01 ?(  1.660E+00 6.06E+01 9.99E+01 G

K-40     N   1.0270E+02                                        4.66E+11
                          1460.83 1.027E+02  (P 1.057E+01 8.18E+00 1.07E+01 G

Sc-46    F   3.3258E-01                                        8.38E+01
                           889.28-4.504E-02 %(  2.102E+00 1.34E+03 1.00E+02 G
                          1120.55 7.102E-01 ?(  1.947E+00 8.17E+01 1.00E+02 G

MN-54    C  -4.7762E-02                                        3.12E+02
                           834.85-4.776E-02 &(P 1.303E+00 7.74E+02 1.00E+02 G

FE-59    F   7.2815E-01                                        4.45E+01
                          1099.25 7.281E-01 ?(P 2.007E+00 1.22E+02 5.65E+01 G
                          1291.60 6.844E-02 % P 2.556E+00 1.60E+03 4.32E+01 G

Co-56    C  -9.0890E-01                                        7.73E+01
                           846.77-9.089E-01 ?(P 1.696E+00 4.17E+01 9.99E+01 G
                          1238.28 8.538E-01 + P 1.614E+00 8.72E+01 6.61E+01 G
                          1037.84-5.225E-01 + P 9.708E+00 4.15E+02 1.41E+01 G
                          1771.35-2.860E+00 +   1.729E+01 1.74E+02 1.55E+01  A

CO-57    C   4.8808E-01                                        2.72E+02
                           122.06 2.722E-01  (  7.835E-01 8.62E+01 8.56E+01 G
                           136.47 2.218E+00 ?(  1.195E+01 1.61E+02 1.07E+01 G

CO-58    C   4.1808E-01                                        7.09E+01
                           810.78 4.181E-01 ?(  1.166E+00 8.27E+01 9.95E+01 G

CO-60    F  -4.4796E-01                                        1.93E+03
                          1332.50-4.480E-01 ?(  1.681E+00 1.74E+02 1.00E+02 G
                          1173.24 1.498E-01 + P 7.999E-01 2.20E+02 9.99E+01 G

ZN-65    F  -9.2777E-01                                        2.44E+02
                          1115.55-9.278E-01 ?(  4.595E+00 1.45E+02 5.06E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	I	2.9354E-01					7.41E+06	
			702.63	2.935E-01	?(P	1.628E+00	1.62E+02	9.79E+01 G
			871.10	-7.847E-01	+	1.508E+00	8.68E+01	9.99E+01 G
ZR-95	I	-3.1383E-01					6.40E+01	
			756.73	-3.138E-01	?(P	2.016E+00	1.99E+02	5.45E+01 G
			724.20	-8.754E-02	&	3.064E+00	9.85E+02	4.42E+01 G
RU-103	I	1.8013E-01					3.93E+01	
			497.05	1.801E-01	?(P	1.042E+00	2.34E+02	9.09E+01 G
			610.30	0.000E+00	-	4.628E+01	1.00E+03	5.75E+00 GA
RH-106	I	3.0528E+00					3.74E+02	
			621.92	3.053E+00	*(P	7.034E+00	9.68E+01	9.93E+00 G
			1050.36	-1.018E+01	+	1.042E+02	2.90E+02	1.56E+00 G
			511.86	9.728E+00	?	6.526E+00	2.28E+01	2.00E+01 GA
AG-108M	C	2.1508E-01					1.53E+05	
			433.94	2.151E-01	?(	8.842E-01	1.68E+02	9.05E+01 G
			722.94	0.000E+00	-	1.570E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	&	2.976E+00	1.00E+03	8.98E+01 G
AG-110M	F	3.4653E-01					2.50E+02	
			884.68	0.000E+00	?(	2.866E+00	1.00E+03	7.27E+01 G
			657.76	4.464E-01	?(	1.176E+00	7.86E+01	9.46E+01 G
			937.49	-2.182E+00	+	4.129E+00	8.50E+01	3.44E+01 G
			1384.30	-5.177E-01	+	4.880E+00	4.24E+02	2.43E+01 G
			763.94	1.053E+00	?(	6.015E+00	1.65E+02	2.23E+01 G
SB-124	F	5.5621E-01					6.02E+01	
			602.73	3.490E-01	?(	2.609E+00	2.21E+02	9.83E+01 G
			1690.98	0.000E+00	-	1.130E+00	1.00E+03	4.78E+01 G
			722.79	2.440E+00	?(	1.239E+01	1.47E+02	1.08E+01 G
SB-125	I	7.8511E-01					1.01E+03	
			427.88	-5.954E-01	?(P	3.097E+00	1.77E+02	2.96E+01 G
			600.50	1.912E+00	?(	1.405E+01	2.17E+02	1.79E+01 G
			635.89	-3.104E-01	+	9.150E+00	8.19E+02	1.13E+01 G
			463.37	2.765E+00	?(	8.391E+00	8.97E+01	1.05E+01 G
I-131	I	3.1492E-01					8.02E+00	
			364.48	3.149E-01	?(	9.625E-01	1.22E+02	8.17E+01 G
			284.30	-2.307E+00	+ P	1.383E+01	1.59E+02	6.14E+00 G
			636.97	-8.432E+00	+	1.898E+01	6.79E+01	7.17E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ga-68	C 8.0407E+00					4.71E-02	
		1077.40	8.041E+00	?(	3.327E+01	1.78E+02	3.30E+00 G
Tc-99m	I -3.3084E-01					2.51E-01	
		140.51	-3.308E-01	?(	1.718E+00	1.55E+02	8.93E+01 G
BA-133	F -5.7673E-01					3.85E+03	
		356.00	-5.767E-01	?(	2.852E+00	1.47E+02	6.20E+01 G
		302.85	-6.206E-01	+	1.131E+01	5.40E+02	1.83E+01 G
		383.84	3.026E+00	? P	1.091E+01	1.07E+02	8.94E+00 GA
		80.99	-1.157E+00	+ P	5.277E+00	6.79E+01	3.41E+01 GA
CS-134	I 3.4302E-01					7.54E+02	
		795.87	-8.687E-01	?(	2.254E+00	7.78E+01	8.55E+01 G
		604.71	1.626E-01	+	2.684E+00	4.86E+02	9.76E+01 G
		569.32	-1.333E+00	+	5.970E+00	1.29E+02	1.54E+01 G
		801.95	5.455E+00	?(	1.544E+01	8.41E+01	8.69E+00 G
		563.24	7.434E+00	&(	6.317E+00	3.85E+01	8.35E+00 G
CS-137	I 3.3644E-01					1.10E+04	
		661.66	3.364E-01	?(	1.382E+00	1.20E+02	8.52E+01 G
CE-139	F 8.0871E-02					1.38E+02	
		165.85	8.087E-02	?(	1.121E+00	4.06E+02	7.99E+01 G
Ba-140	I 1.2410E+00					1.28E+01	
		537.26	1.241E+00	?(	2.812E+00	9.28E+01	2.44E+01 G
		162.66	-1.017E+00	- P	1.537E+01	4.72E+02	6.22E+00 G
		304.85	0.000E+00	-	4.827E+01	1.00E+03	4.29E+00 G
La-140	I 4.9569E-01					1.28E+01	
		1596.21	1.959E-01	?(	1.061E+00	2.42E+02	9.54E+01 G
		487.02	4.239E-01	?(	2.088E+00	1.43E+02	4.55E+01 G
		328.76	1.676E+00	?(P	8.820E+00	1.57E+02	2.03E+01 G
		815.77	8.358E-01	&(	5.729E+00	1.96E+02	2.33E+01 G
CE-141	I -6.4276E-01					3.25E+01	
		145.44	-6.428E-01	(	3.149E+00	1.47E+02	4.82E+01 G
CE-144	I 2.1134E+00					2.85E+02	
		133.54	2.113E+00	(	1.096E+01	1.55E+02	1.11E+01 G
PM-144	C -3.6666E-01					3.63E+02	
		696.54	-3.667E-01	&(	1.589E+00	1.27E+02	9.90E+01 G
		618.06	-2.985E-02	% P	2.715E+00	1.74E+03	9.91E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-152	F	-9.4504E-01					4.94E+03	
			121.78	-9.450E-01	(	3.108E+00	9.85E+01	2.86E+01 G
			344.29	5.463E-02	%	7.512E+00	4.05E+03	2.65E+01 G
			1112.07	-5.156E+00	&	1.832E+01	1.05E+02	1.36E+01 G
			778.92	-2.417E+00	+	9.252E+00	1.62E+02	1.29E+01 G
			964.11	-7.561E+00	+	1.582E+01	6.34E+01	1.46E+01 G
			244.69	-5.039E+00	+	2.682E+01	1.59E+02	7.58E+00 G
			1408.00	-3.032E-01	&	5.716E+00	8.43E+02	2.10E+01 GA
EU-154	I	9.9861E-01					3.14E+03	
			123.10	6.021E-01	&(	1.758E+00	8.75E+01	4.08E+01 G
			1274.54	1.087E+00	?(	5.199E+00	1.38E+02	3.52E+01 G
			723.36	2.228E-01	-	6.987E+00	8.86E+02	2.02E+01 G
			873.23	-2.833E+00	+	1.571E+01	1.62E+02	1.23E+01 G
			1004.77	1.723E+00	?(	6.822E+00	1.14E+02	1.80E+01 G
			996.33	-5.539E+00	+ P	1.619E+01	4.70E+01	1.06E+01 G
EU-155	I	-1.0252E-01					1.81E+03	
			105.31	-1.025E-01	%(P	9.320E+00	1.19E+03	2.12E+01 G
			86.54	-1.153E+00	+	7.003E+00	1.83E+02	3.07E+01 G
HF-181	F	5.7295E-01					4.24E+01	
			482.00	3.380E-01	?(	1.547E+00	1.34E+02	8.05E+01 G
			133.02	5.403E-01	&(	2.742E+00	1.52E+02	4.33E+01 G
			345.83	-1.890E+00	+	6.174E+00	1.31E+02	1.51E+01 G
			136.30	4.048E+00	?(	2.138E+01	1.58E+02	5.85E+00 G
Ta-182	F	2.2258E+00					1.14E+02	
			1121.30	1.764E+00	?(	4.857E+00	8.19E+01	3.49E+01 G
			1221.41	2.823E+00	?(	2.923E+00	5.00E+01	2.70E+01 G
			1189.05	-2.306E-01	%	8.610E+00	1.68E+03	1.62E+01 G
Hg-203	F	-3.7148E-01					4.66E+01	
			279.20	-3.715E-01	?(	1.216E+00	9.74E+01	8.15E+01 G
TL-208	N	3.8326E+00					6.98E+02	
			583.02	3.920E+00	(P	9.655E-01	1.39E+01	8.45E+01 G
			277.28	3.975E-01	- P	1.224E+01	8.77E+02	6.31E+00 G
			860.56	3.238E+00	&(P	7.523E+00	9.99E+01	1.24E+01 G
PM-146	C	4.4186E-01					2.02E+03	
			453.88	7.031E-02	&(	1.197E+00	6.79E+02	6.50E+01 G
			747.16	6.205E-01	?(	2.658E+00	1.77E+02	3.40E+01 G
			735.72	1.245E+00	?(P	3.591E+00	1.18E+02	2.25E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Y-88	F	1.3019E-01					1.07E+02	
			1836.06	-4.059E-04	%(P	5.796E-01	1.27E+05	9.92E+01 G
			898.04	2.685E-01	&(P	6.568E-01	1.00E+02	9.37E+01 G
Cd-113m		-6.2217E+03					5.33E+03	
			263.70	-6.222E+03	(	1.823E+04	8.77E+01	6.00E-03 K
Cf-251	T	-1.8996E+00					3.28E+05	
			176.60	-1.900E+00	?(	4.743E+00	9.78E+01	1.70E+01 G
			227.00	-1.941E+00	+	1.343E+01	2.66E+02	6.30E+00 GA
Cf-249	T	6.7311E-01					1.28E+05	
			387.95	3.033E-01	?(	1.605E+00	1.55E+02	6.60E+01 G
			333.44	2.247E+00	?(	1.196E+01	1.58E+02	1.55E+01 G
Sn-126		2.8661E+00					3.65E+07	
			87.57	1.529E+00	}	5.351E+00	3.79E+01	3.75E+01 GA
			64.28	2.866E+00	&(	1.614E+01	1.68E+02	9.70E+00 G
			86.94	0.000E+00	}	2.321E+01	1.87E+03	9.04E+00 GA
PB-210	N	1.3435E+01					8.14E+03	
			46.54	1.343E+01	(P	2.777E+01	6.32E+01	4.25E+00 G
PB-212	N	9.9579E+00					6.98E+02	
			238.63	9.958E+00	(P	1.737E+00	8.06E+00	4.33E+01 G
			300.03	1.405E+01	+ P	1.503E+01	4.01E+01	3.28E+00 GA
PB-214	N	9.3422E+00					5.84E+05	
			351.93	9.342E+00	(P	1.762E+00	1.05E+01	3.76E+01 G
			295.09	1.224E+01	+ P	3.992E+00	1.72E+01	1.93E+01 G
			242.00	1.288E+01	+	8.227E+00	2.24E+01	7.43E+00 GA
BI-207	C	3.6064E-01					1.18E+04	
			1063.66	5.531E-01	?(	1.476E+00	1.19E+02	7.45E+01 G
			569.70	2.139E-01	?(P	9.704E-01	1.32E+02	9.77E+01 G
BI-212	N	4.9637E+00					6.98E+02	
			727.17	4.964E+00	?(	1.750E+01	1.04E+02	7.55E+00 G
			785.42	-2.944E+01	+ P	1.058E+02	9.34E+01	1.28E+00 GA
U-235	N	-1.4752E-01					2.57E+11	
			143.79	-2.649E+00	?(	1.347E+01	1.52E+02	1.10E+01 G
			205.33	5.326E+00	?(	1.321E+01	9.63E+01	5.01E+00 G
			163.38	0.000E+00	+	1.897E+01	1.00E+03	5.08E+00 G
			185.72	2.117E+00		1.315E+00	2.61E+01	5.40E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-214	N	1.1108E+01					5.84E+05	
			609.31	1.111E+01	*(P	1.719E+00	9.92E+00	4.61E+01 G
			1120.29	3.486E+00	& P	1.473E+01	1.24E+02	1.51E+01 G
			1764.49	1.653E+01	+ P	6.114E+00	1.95E+01	1.54E+01 G
BI-210M	T	-2.0029E-01					1.10E+09	
			265.83	-2.003E-01	?(	2.206E+00	3.22E+02	5.00E+01 G
			304.90	0.000E+00	+	7.397E+00	1.00E+03	2.80E+01 G
AC-228	N	1.6920E+01					2.10E+03	
			911.07	1.692E+01	@(	1.165E+00	9.67E+00	2.90E+01 G
			968.97	3.803E+00	&	1.099E+01	8.61E+01	1.75E+01 G
			338.32	1.310E+01	-	4.714E+00	1.78E+01	1.20E+01 G
			93.35	-2.789E+00	-	3.620E+01	3.89E+02	5.56E+00 XA
TH-227	N	4.1529E+00					7.95E+03	
			256.24	4.153E+00	?(	1.097E+01	1.07E+02	7.00E+00 G
			235.97	-2.903E+00	-	1.637E+01	1.69E+02	1.23E+01 G
			50.14	-2.494E+00	-	2.121E+01	2.52E+02	8.00E+00 G
TH-229	N	3.9694E+00					2.68E+06	
			193.51	-6.771E-01	?(	1.746E+01	9.84E+02	4.40E+00 G
			210.85	1.081E+01	*(	2.642E+01	9.54E+01	2.99E+00 G
TH-234	N	1.0893E+01					1.63E+12	
			92.59	7.843E+00	(P	1.547E+01	6.03E+01	5.58E+00 G
			63.29	1.536E+01	(P	2.629E+01	5.25E+01	3.81E+00 G
PA-231	N	-1.2154E+01					1.20E+07	
			302.65	-1.215E+01	?(	7.329E+01	1.80E+02	2.88E+00 G
			300.07	-1.412E+01	+	8.828E+01	1.87E+02	2.46E+00 G
PA-234	N	1.6203E+00					1.63E+12	
			131.29	1.224E+00	?(	6.427E+00	1.57E+02	1.80E+01 G
			946.02	2.152E+00	?(	4.622E+00	9.00E+01	1.34E+01 G
			569.47	-6.579E-02	%	1.238E+01	5.22E+03	8.20E+00 G
			883.24	-4.433E+00	+	2.054E+01	1.36E+02	9.60E+00 G
			880.53	-1.080E+01	+	2.979E+01	8.23E+01	6.00E+00 GA
PA-234M	N	-8.1404E+00					1.63E+12	
			1001.00	-8.140E+00	&(P	2.229E+02	4.26E+02	8.37E-01 G
			766.41	-1.897E+02	+	5.436E+02	8.54E+01	2.94E-01 G
AM-241	T	8.9527E-01					1.58E+05	
			59.54	8.953E-01	?(P	4.736E+00	1.58E+02	3.59E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ir-192 F	1.8852E-01					7.40E+01	
		316.49	0.000E+00	(	2.444E+00	1.00E+03	8.70E+01 G
		468.06	5.056E-01	?(	1.738E+00	1.01E+02	5.18E+01 G
		308.44	0.000E+00	-	6.577E+00	1.00E+03	3.18E+01 G
Cs-136 F	4.4358E-01					1.30E+01	
		818.50	8.467E-02	?(	1.438E+00	4.80E+02	1.00E+02 G
		1048.07	7.076E-01	?(	1.414E+00	6.11E+01	8.00E+01 G
		340.57	7.585E-01	?(	4.115E+00	1.61E+02	4.69E+01 G
Np-239 T	1.1636E+00					2.36E+00	
		103.70	0.000E+00	-	8.242E+00	1.00E+03	2.40E+01 X
		106.13	1.164E+00	(	8.561E+00	2.21E+02	2.27E+01 G
		99.50	0.000E+00	&	1.327E+01	1.00E+03	1.50E+01 X
Nd-147	1.0250E+00					1.11E+01	
		531.00	1.025E+00	?(	5.772E+00	2.24E+02	1.30E+01 G
		91.10	-1.229E+00	+	6.921E+00	1.69E+02	2.83E+01 G
TL-210 N	5.8465E-01					5.84E+05	
		799.60	5.847E-01	?(	1.740E+00	8.86E+01	9.90E+01 G
		296.00	-4.339E-01	-	2.767E+00	1.90E+02	7.90E+01 G
		1313.00	1.054E+00	?	5.291E+00	2.22E+02	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
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

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	59.54	452.	19.	0.011	158.07	8.953E-01	P
BA-133	80.99	882.	-31.	-0.017	67.90	-1.157E+00	P
EU-155	86.54	1363.	-29.	-0.016	182.50	-1.153E+00	
Nd-147	91.10	1177.	-29.	-0.016	169.06	-1.229E+00	
Np-239	106.13	1239.	23.	0.013	220.65	1.164E+00	
EU-152	121.78	245.	-23.	-0.013	98.48	-9.450E-01	
CO-57	122.06	136.	20.	0.011	86.18	2.722E-01	
PA-234	131.29	406.	18.	0.010	156.61	1.224E+00	
HF-181	133.02	424.	19.	0.011	151.52	5.403E-01	
CE-144	133.54	444.	19.	0.011	154.81	2.113E+00	
HF-181	136.30	463.	20.	0.011	157.71	4.048E+00	
CO-57	136.47	483.	20.	0.011	160.93	2.218E+00	
Tc-99m	140.51	643.	-23.	-0.013	155.45	-3.308E-01	
U-235	143.79	620.	-23.	-0.013	152.23	-2.649E+00	
CE-141	145.44	648.	-25.	-0.014	146.75	-6.428E-01	
Ba-140	162.66	216.	-5.	-0.003	471.74	-1.017E+00	P
CE-139	165.85	190.	5.	0.003	406.05	8.087E-02	
Cf-251	176.60	139.	-23.	-0.013	97.76	-1.900E+00	
U-235	185.72	99.	79.	0.044	26.11	2.117E+00	
TH-229	193.51	110.	-2.	-0.001	983.62	-6.771E-01	
U-235	205.33	73.	17.	0.010	96.32	5.326E+00	
TH-229	210.85	103.	20.	0.011	95.43	1.081E+01	
Cf-251	227.00	106.	-7.	-0.004	265.65	-1.941E+00	
EU-152	244.69	587.	-22.	-0.012	159.17	-5.039E+00	
Cd-113m	263.70	146.	-20.	-0.011	87.72	-6.222E+03	
BI-210M	265.83	147.	-5.	-0.003	321.84	-2.003E-01	
Hg-203	279.20	109.	-16.	-0.009	97.43	-3.715E-01	
I-131	284.30	76.	-7.	-0.004	158.79	-2.307E+00	P
TL-210	296.00	516.	-17.	-0.009	190.27	-4.339E-01	
PA-231	300.07	499.	-17.	-0.009	186.56	-1.412E+01	
PA-233	300.18	482.	-17.	-0.009	183.39	-5.602E+00	
PA-231	302.65	465.	-17.	-0.010	179.83	-1.215E+01	
BA-133	302.85	448.	-6.	-0.003	540.08	-6.206E-01	
La-140	328.76	293.	16.	0.009	156.59	1.676E+00	P
Cf-249	333.44	308.	16.	0.009	158.36	2.247E+00	
Cs-136	340.57	324.	16.	0.009	161.43	7.585E-01	
HF-181	345.83	69.	-13.	-0.007	131.33	-1.890E+00	
BA-133	356.00	254.	-16.	-0.009	146.98	-5.767E-01	
I-131	364.48	44.	11.	0.006	121.85	3.149E-01	
BA-133	383.84	65.	11.	0.006	106.53	3.026E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-249	387.95	76.	8.	0.005	154.52	3.033E-01	
SB-125	427.88	48.	-7.	-0.004	177.29	-5.954E-01	P
AG-108M	433.94	35.	7.	0.004	168.00	2.151E-01	
PM-146	453.88	30.	2.	0.001	678.97	7.031E-02	
SB-125	463.37	38.	10.	0.006	89.71	2.765E+00	
Ir-192	468.06	40.	9.	0.005	100.99	5.056E-01	
BE-7	477.60	65.	12.	0.006	103.42	3.111E+00	
HF-181	482.00	77.	9.	0.005	134.22	3.380E-01	
La-140	487.02	42.	7.	0.004	142.53	4.239E-01	
RU-103	497.05	40.	6.	0.003	234.09	1.801E-01	P
RH-106	511.86	77.	65.	0.036	22.77	9.728E+00	
Nd-147	531.00	22.	4.	0.002	224.47	1.025E+00	
Ba-140	537.26	17.	10.	0.005	92.78	1.241E+00	
CS-134	563.24	9.	19.	0.011	38.51	7.434E+00	
CS-134	569.32	30.	-6.	-0.004	129.24	-1.333E+00	
BI-207	569.70	33.	6.	0.004	131.53	2.139E-01	P
SB-125	600.50	238.	10.	0.006	217.13	1.912E+00	
SB-124	602.73	247.	10.	0.006	221.03	3.490E-01	
CS-134	604.71	257.	5.	0.003	485.81	1.626E-01	
RH-106	621.92	14.	9.	0.005	96.84	3.053E+00	P
SB-125	635.89	33.	-1.	-0.001	818.54	-3.104E-01	
I-131	636.97	60.	-17.	-0.010	67.94	-8.432E+00	
AG-110M	657.76	37.	12.	0.007	78.59	4.464E-01	
CS-137	661.66	41.	8.	0.004	119.68	3.364E-01	
PM-144	696.54	71.	-10.	-0.005	127.12	-3.667E-01	
NB-94	702.63	72.	8.	0.004	161.76	2.935E-01	P
SB-124	722.79	47.	7.	0.004	147.19	2.440E+00	
ZR-95	724.20	48.	-1.	-0.001	984.89	-8.754E-02	
BI-212	727.17	45.	10.	0.005	103.62	4.964E+00	
PM-146	735.72	15.	7.	0.004	118.42	1.245E+00	P
PM-146	747.16	19.	5.	0.003	177.22	6.205E-01	
ZR-95	756.73	28.	-4.	-0.002	199.44	-3.138E-01	P
AG-110M	763.94	43.	6.	0.003	164.58	1.053E+00	
PA-234M	766.41	63.	-14.	-0.008	85.38	-1.897E+02	
EU-152	778.92	33.	-8.	-0.004	162.22	-2.417E+00	
BI-212	785.42	42.	-9.	-0.005	93.45	-2.944E+01	P
CS-134	795.87	88.	-18.	-0.010	77.84	-8.687E-01	
TL-210	799.60	69.	14.	0.008	88.58	5.847E-01	
CS-134	801.95	40.	11.	0.006	84.08	5.455E+00	
CO-58	810.78	28.	10.	0.005	82.68	4.181E-01	
La-140	815.77	38.	5.	0.003	195.81	8.358E-01	
Cs-136	818.50	45.	2.	0.001	479.58	8.467E-02	
MN-54	834.85	35.	-1.	-0.001	774.34	-4.776E-02	P
Co-56	846.77	61.	-21.	-0.012	41.70	-9.089E-01	P
NB-94	871.10	45.	-18.	-0.010	86.76	-7.847E-01	
PA-234	880.53	64.	-15.	-0.008	82.32	-1.080E+01	
PA-234	883.24	79.	-9.	-0.005	135.85	-4.433E+00	
Y-88	898.04	5.	6.	0.003	100.10	2.685E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
AG-110M	937.49	35.	-16.	-0.009	85.05	-2.182E+00		
PA-234	946.02	5.	6.	0.003	89.99	2.152E+00		
EU-152	964.11	96.	-23.	-0.013	63.44	-7.561E+00		
PA-234M	1001.00	57.	-1.	-0.001	426.39	-8.140E+00		P
Co-56	1037.84	27.	-1.	-0.001	415.21	-5.225E-01		P
Cs-136	1048.07	18.	11.	0.006	61.11	7.076E-01		
RH-106	1050.36	39.	-3.	-0.002	289.78	-1.018E+01		
BI-207	1063.66	16.	8.	0.004	119.02	5.531E-01		
Ga-68	1077.40	11.	4.	0.002	177.92	8.041E+00		
FE-59	1099.25	16.	8.	0.004	122.45	7.281E-01		P
EU-152	1112.07	90.	-13.	-0.007	105.25	-5.156E+00		
ZN-65	1115.55	77.	-9.	-0.005	144.92	-9.278E-01		
Sc-46	1120.55	52.	13.	0.007	81.75	7.102E-01		
Ta-182	1121.30	39.	11.	0.006	81.92	1.764E+00		
CO-60	1173.24	6.	3.	0.001	220.18	1.498E-01		P
Ta-182	1221.41	6.	13.	0.007	50.03	2.823E+00		
Co-56	1238.28	11.	10.	0.005	87.15	8.538E-01		P
NA-22	1274.53	30.	-14.	-0.008	60.59	-8.358E-01		
TL-210	1313.00	11.	4.	0.002	221.56	1.054E+00		
CO-60	1332.50	28.	-7.	-0.004	174.19	-4.480E-01		
AG-110M	1384.30	12.	-2.	-0.001	424.26	-5.177E-01		
EU-152	1408.00	12.	-1.	-0.001	842.61	-3.032E-01		
La-140	1596.21	6.	3.	0.001	242.22	1.959E-01		
Co-56	1771.35	49.	-6.	-0.003	174.40	-2.860E+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	3.1113E+00	3.1113E+00	1.034E+02%	1.09E+01
NA-22	#A	-8.3584E-01	-8.3584E-01	6.059E+01%	1.66E+00
K-40		1.0270E+02	1.0270E+02	8.184E+00%	1.06E+01
Sc-46	#A	3.3257E-01	3.3258E-01	8.175E+01%	2.10E+00
CR-51	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.16E+01
MN-54	#A	-4.7762E-02	-4.7762E-02	7.743E+02%	1.30E+00
FE-59	#A	7.2814E-01	7.2815E-01	1.225E+02%	2.01E+00
Co-56	#A	-9.0889E-01	-9.0890E-01	4.170E+01%	1.70E+00
CO-57	#A	4.8808E-01	4.8808E-01	8.618E+01%	7.84E-01
CO-58	#A	4.1808E-01	4.1808E-01	8.268E+01%	1.17E+00
CO-60	#A	-4.4796E-01	-4.4796E-01	1.742E+02%	1.68E+00
ZN-65	#A	-9.2777E-01	-9.2777E-01	1.449E+02%	4.59E+00
NB-94	#A	2.9354E-01	2.9354E-01	1.618E+02%	1.63E+00
ZR-95	#A	-3.1383E-01	-3.1383E-01	1.994E+02%	2.02E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.43E+00
RU-103	#A	1.8013E-01	1.8013E-01	2.341E+02%	1.04E+00

RH-106 #A	3.0528E+00	3.0528E+00	9.684E+01%	7.03E+00
AG-108M#A	2.1508E-01	2.1508E-01	1.680E+02%	8.84E-01
AG-110M#A	3.4653E-01	3.4653E-01	7.859E+01%	2.87E+00
SN-113 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.75E+00
SB-124 #A	5.5621E-01	5.5621E-01	1.328E+02%	2.61E+00
SB-125 #A	7.8511E-01	7.8511E-01	8.971E+01%	3.10E+00
I-131 #A	3.1490E-01	3.1492E-01	1.219E+02%	9.63E-01
Gd-153 #A	0.0000E+00	0.0000E+00	7.071E+02%	6.66E+00
Ga-68 #A	7.9318E+00	8.0407E+00	1.779E+02%	3.33E+01
Tc-99m #A	-3.2999E-01	-3.3084E-01	1.554E+02%	1.72E+00
BA-133 #A	-5.7673E-01	-5.7673E-01	1.470E+02%	2.85E+00
CS-134 #A	3.4302E-01	3.4302E-01	3.851E+01%	2.25E+00
CS-137 #A	3.3644E-01	3.3644E-01	1.197E+02%	1.38E+00
CE-139 #A	8.0871E-02	8.0871E-02	4.060E+02%	1.12E+00
Ba-140 #A	1.2410E+00	1.2410E+00	9.278E+01%	2.81E+00
La-140 #A	4.9566E-01	4.9569E-01	9.416E+01%	1.06E+00
CE-141 #A	-6.4275E-01	-6.4276E-01	1.468E+02%	3.15E+00
CE-144 #A	2.1134E+00	2.1134E+00	1.548E+02%	1.10E+01
PM-144 #A	-3.6666E-01	-3.6666E-01	1.271E+02%	1.59E+00
EU-152 #A	-9.4504E-01	-9.4504E-01	9.848E+01%	3.11E+00
EU-154 A	9.9861E-01	9.9861E-01	6.648E+01%	1.76E+00
EU-155 #A	-1.0252E-01	-1.0252E-01	1.188E+03%	9.32E+00
HF-181 #A	5.7294E-01	5.7295E-01	8.553E+01%	1.55E+00
Ta-182 #A	2.2258E+00	2.2258E+00	4.800E+01%	4.86E+00
Hg-203 #A	-3.7147E-01	-3.7148E-01	9.743E+01%	1.22E+00
TL-208	3.8326E+00	3.8326E+00	1.387E+01%	9.65E-01
PM-146 #A	4.4186E-01	4.4186E-01	1.184E+02%	1.20E+00
Y-88 #A	1.3019E-01	1.3019E-01	1.001E+02%	5.80E-01
Cd-113m#A	-6.2217E+03	-6.2217E+03	8.772E+01%	1.82E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	5.45E+01
Cf-251 #A	-1.8996E+00	-1.8996E+00	9.776E+01%	4.74E+00
Cf-249 #A	6.7311E-01	6.7311E-01	1.106E+02%	1.60E+00
Sn-126 #A	2.8661E+00	2.8661E+00	1.680E+02%	1.61E+01
PB-210 #A	1.3435E+01	1.3435E+01	6.320E+01%	2.78E+01
PB-212	9.9578E+00	9.9579E+00	8.064E+00%	1.74E+00
PB-214	9.3422E+00	9.3422E+00	1.049E+01%	1.76E+00
BI-207 #A	3.6064E-01	3.6064E-01	8.869E+01%	1.48E+00
BI-212 #A	4.9637E+00	4.9637E+00	1.036E+02%	1.75E+01
U-235 #A	-1.4752E-01	-1.4752E-01	9.007E+01%	1.35E+01
BI-214	1.1108E+01	1.1108E+01	9.923E+00%	1.72E+00
BI-210M#A	-2.0029E-01	-2.0029E-01	3.218E+02%	2.21E+00
AC-228 #	1.6920E+01	1.6920E+01	9.667E+00%	1.17E+00
TH-227 #A	4.1529E+00	4.1529E+00	1.068E+02%	1.10E+01
TH-229 #A	3.9694E+00	3.9694E+00	9.543E+01%	1.75E+01
TH-234 A	1.0893E+01	1.0893E+01	3.996E+01%	1.55E+01
PA-231 #A	-1.2154E+01	-1.2154E+01	1.798E+02%	7.33E+01
PA-233 #A	0.0000E+00	0.0000E+00	1.000E+03%	5.85E+00
PA-234 #A	1.6203E+00	1.6203E+00	8.999E+01%	6.43E+00
PA-234M#A	-8.1404E+00	-8.1404E+00	4.264E+02%	2.23E+02

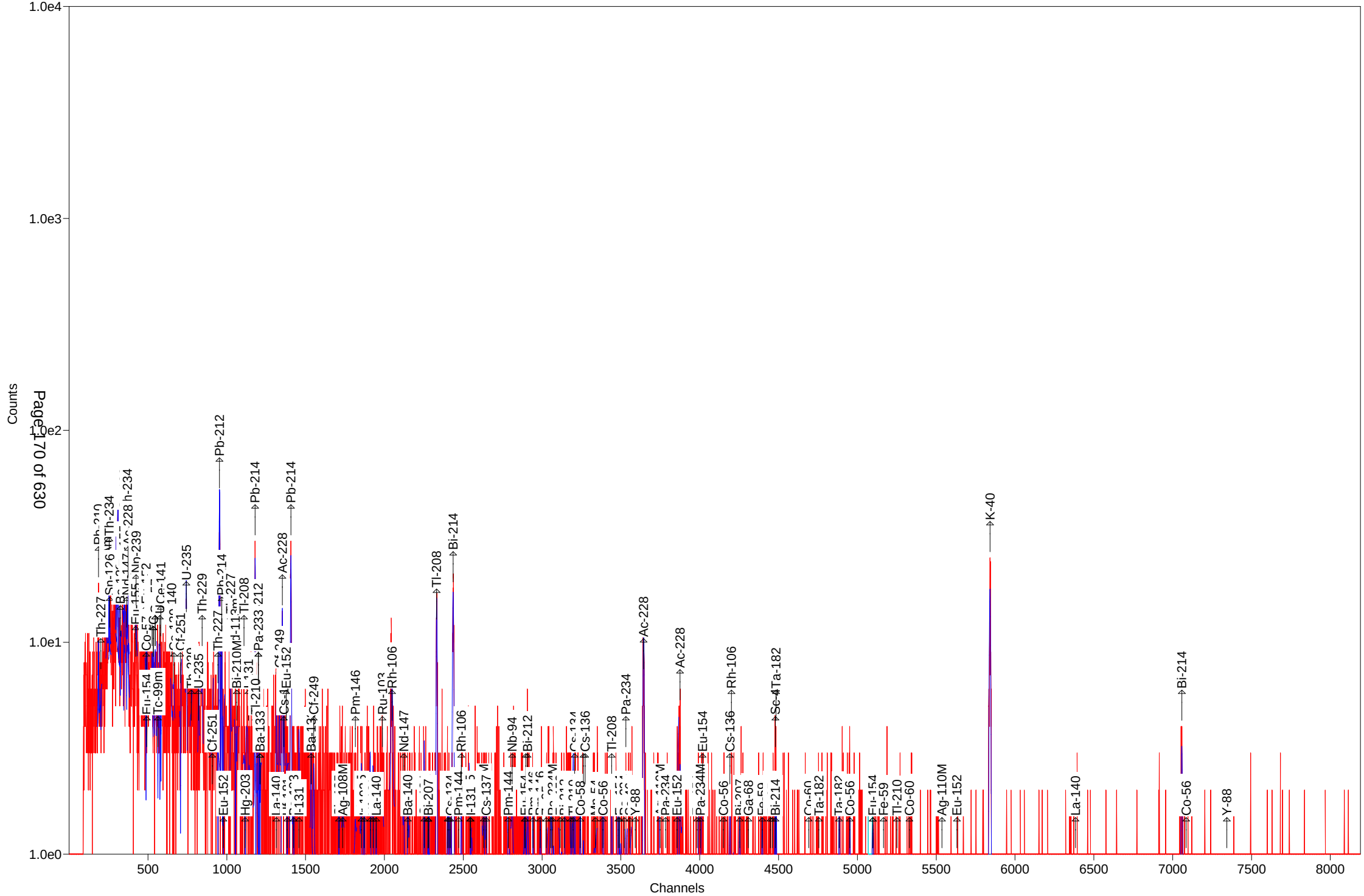
AM-241 #A	8.9527E-01	8.9527E-01	1.581E+02%		4.74E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.57E+01
Ir-192 #A	1.8852E-01	1.8852E-01	1.010E+02%		2.44E+00
Cs-136 #A	4.4356E-01	4.4358E-01	6.111E+01%		1.44E+00
Np-239 #A	1.1633E+00	1.1636E+00	2.206E+02%		8.56E+00
Nd-147 #A	1.0250E+00	1.0250E+00	2.245E+02%		5.77E+00
TL-210 #A	5.8465E-01	5.8465E-01	8.858E+01%		1.74E+00
Kr-85 #A	0.0000E+00	0.0000E+00	1.000E+03%		4.07E+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) 1.782E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.6 keV) 1.7818365E+02 Bq/Sample

405451_Gamma_490-164491-A-3-A. 16_Gamma_20190006.spc.



Test America St. Louis Spectrum ID: 9_Gamma_20190007

Sample Description: 405451_Gamma_490-164491-A-4-A
Detector: Detector # 9
Batch ID: 405451
Work Order Number: Gamma
Lot Number: 490-164491-A-4-A

Decay to Time: 1/2/2019 13:30 Live Time: 1800 sec
Acquisition Time: 1/2/2019 13:30:32 Real Time: 1802 sec
Analysis Time: 1/2/2019 14:00 Dead Time: 0.14 %
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_2018-12-22_1357.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	3.065E-01	40.8	1.251E-01	1.260E-01	3.764E-01
K-40	7.902E+01	8.7	6.861E+00	7.964E+00	8.509E+00
Sc-46	4.273E-01	60.8	2.598E-01	2.607E-01	1.006E+00
CR-51	-1.694E-01	1628.7	2.759E+00	2.759E+00	1.870E+01
MN-54	2.661E-01	141.4	3.763E-01	3.766E-01	8.765E-01
FE-59	-5.890E-01	147.8	8.708E-01	8.713E-01	1.946E+00
Co-56	2.953E-01	50.3	1.486E-01	1.494E-01	9.636E-01
CO-57	-2.040E-03	9457.8	1.929E-01	1.929E-01	6.687E-01
CO-58	3.600E-02	781.0	2.812E-01	2.812E-01	1.016E+00
CO-60	1.012E-01	90.6	9.168E-02	9.182E-02	9.987E-01
ZN-65	-3.253E-01	340.2	1.107E+00	1.107E+00	3.848E+00
NB-94	4.033E-01	84.9	3.424E-01	3.431E-01	1.152E+00
ZR-95	-5.036E-01	106.6	5.368E-01	5.374E-01	1.891E+00
NB-95	2.519E-01	126.9	3.198E-01	3.201E-01	1.101E+00
RU-103	6.206E-02	534.1	3.315E-01	3.315E-01	8.248E-01
RH-106	-3.701E+00	195.6	7.239E+00	7.242E+00	2.440E+01
AG-108M	1.548E-01	186.0	2.879E-01	2.881E-01	7.113E-01
AG-110M	8.634E-02	151.7	1.310E-01	1.311E-01	1.814E+00
SN-113	0.000E+00	1.#INF	8.016E-02	8.016E-02	1.583E+00
SB-124	8.300E-03	40.0	3.320E-03	3.348E-03	2.437E+00
SB-125	5.280E-01	84.5	4.463E-01	4.471E-01	2.272E+00
I-131	4.165E-01	95.9	3.993E-01	3.999E-01	8.527E-01
Gd-153	3.979E-01	385.8	1.535E+00	1.535E+00	5.139E+00
Ga-68	1.580E+00	914.7	1.446E+01	1.446E+01	3.374E+01
Tc-99m	0.000E+00	1.#INF	1.670E-01	1.670E-01	1.489E+00
BA-133	1.525E-01	468.7	7.148E-01	7.149E-01	2.430E+00
CS-134	3.362E-01	81.6	2.742E-01	2.748E-01	9.279E-01
CS-137	-5.816E-01	78.1	4.540E-01	4.550E-01	1.515E+00
CE-139	2.691E-01	107.2	2.885E-01	2.896E-01	9.671E-01
Ba-140	-4.901E-01	267.5	1.311E+00	1.311E+00	3.070E+00
La-140	-3.330E-01	248.1	8.262E-01	8.264E-01	1.219E+00
CE-141	-6.235E-01	142.4	8.877E-01	8.883E-01	2.961E+00

CE-144	0.000E+00	1.#INF	1.084E+00	1.084E+00	1.142E+01
PM-144	1.091E-01	137.6	1.501E-01	1.502E-01	1.211E+00
EU-152	2.717E-01	139.4	3.789E-01	3.792E-01	2.223E+00
EU-154	1.803E+00	25.5	4.602E-01	4.698E-01	1.546E+00
EU-155	8.926E-01	115.1	1.027E+00	1.028E+00	3.445E+00
HF-181	-4.633E-01	106.9	4.954E-01	4.960E-01	1.667E+00
Ta-182	1.285E+00	85.7	1.101E+00	1.103E+00	4.366E+00
Hg-203	1.321E-01	193.1	2.550E-01	2.551E-01	8.778E-01
TL-208	3.328E+00	13.1	4.347E-01	4.677E-01	6.729E-01
PM-146	2.449E-01	96.1	2.354E-01	2.357E-01	1.197E+00
Y-88	-3.276E-01	159.3	5.219E-01	5.222E-01	1.340E+00
Cd-113m	3.096E+02	1279.5	3.961E+03	3.961E+03	1.374E+04
Cd-109	-3.541E+00	360.5	1.277E+01	1.277E+01	4.272E+01
Cf-251	-1.365E+00	110.7	1.511E+00	1.516E+00	3.877E+00
Cf-249	0.000E+00	1.#INF	8.915E-02	8.915E-02	1.524E+00
Sn-126	-4.117E+00	110.2	4.538E+00	4.543E+00	1.512E+01
PB-210	6.595E+00	150.9	9.954E+00	9.962E+00	3.362E+01
PB-212	8.769E+00	7.6	6.621E-01	8.719E-01	1.313E+00
PB-214	1.026E+01	7.5	7.716E-01	9.380E-01	1.474E+00
BI-207	-8.237E-01	81.4	6.702E-01	6.714E-01	1.863E+00
BI-212	1.688E+01	23.4	3.946E+00	4.043E+00	7.056E+00
U-235	-2.750E+00	134.8	3.706E+00	3.709E+00	1.236E+01
BI-214	9.747E+00	11.0	1.070E+00	1.184E+00	1.696E+00
BI-210M	-3.565E-01	126.8	4.522E-01	4.527E-01	1.503E+00
AC-228	1.047E+01	10.4	1.085E+00	1.209E+00	9.956E-01
TH-227	-3.792E+00	115.4	4.377E+00	4.383E+00	1.079E+01
TH-229	3.154E+00	140.3	4.426E+00	4.433E+00	1.532E+01
TH-234	1.568E+01	24.1	3.779E+00	3.878E+00	1.150E+01
PA-231	0.000E+00	1.#INF	4.545E+00	4.545E+00	6.202E+01
PA-233	0.000E+00	1.#INF	4.152E-01	4.152E-01	5.067E+00
PA-234	-4.291E-01	142.6	6.117E-01	6.121E-01	6.766E+00
PA-234M	2.770E+01	72.7	2.015E+01	2.020E+01	1.594E+02
AM-241	-1.179E+00	106.8	1.259E+00	1.260E+00	4.196E+00
Np-237	-2.113E+00	184.8	3.905E+00	3.907E+00	1.302E+01
Ir-192	2.451E-01	98.6	2.417E-01	2.422E-01	2.116E+00
Cs-136	-5.555E-01	81.5	4.525E-01	4.536E-01	1.514E+00
Np-239	9.686E-01	101.7	9.852E-01	9.870E-01	3.296E+00
Nd-147	-2.006E+00	108.8	2.182E+00	2.185E+00	5.310E+00
TL-210	-2.200E-01	147.8	3.251E-01	3.253E-01	1.127E+00
Kr-85	0.000E+00	1.#INF	3.020E+01	3.020E+01	3.196E+02
Total	5.132E+02				

Analyst: Joey Sausto

Sample description
405451_Gamma_490-164491-A-4-A

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20190007.An1

Acquisition information
Start time: 1/2/2019 1:30:32 PM
Live time: 1800
Real time: 1802
Dead time: 0.14 %
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	1/2/2019 1:30:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2018-12-22_1357.PBC 12/22/2018 1:57:02 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 22 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1698

***** 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.	150.93	1.00	2.577E-02	46.54	4.250	PBC<MDA	PB210
63.19	61.	34.60	1.06	3.921E-02	63.29	3.810	2.281E+01	TH234
74.78	102.	17.62	1.03	4.571E-02				
77.20	207.	9.50	1.03	4.679E-02				
89.72	38.	36.34	1.04	5.098E-02				
92.80	73.	25.52	1.04	5.164E-02	92.59	5.584	1.401E+01	TH234
					93.35	5.561	1.403E+01	AC228
97.50	11.	385.81	1.05	5.240E-02	97.50	30.000	PBC<MDA	Gd153
105.31	18.	115.06	1.05	5.318E-02	105.31	21.200	PBC<MDA	EU155
106.13	21.	101.72	1.05	5.323E-02	106.13	22.700	PBC<MDA	Np239
121.78	3.	530.47	1.07	5.305E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	4.079E-02	CO57
165.85	18.	107.21	1.11	4.736E-02	165.85	79.900	PBC<MDA	CE139
185.75	115.	16.93	1.30	4.402E-02	185.72	54.000	2.687E+00	U235
210.85	17.	140.32	1.15	4.052E-02	210.85	2.990	PBC<MDA	TH229
235.97	18.	182.75	1.18	3.760E-02	235.97	12.300	PBC<MDA	TH227
238.49	246.	8.94	1.10	3.733E-02	238.63	43.300	8.440E+00	PB212
241.87	69.	20.29	1.18	3.697E-02	242.00	7.430	1.399E+01	PB214
277.65	18.	60.94	0.45	3.372E-02	277.28	6.310	PBC<MDA	TL208
279.20	6.	193.08	1.22	3.356E-02	279.20	81.460	PBC<MDA	Hg203
284.30	15.	95.88	1.22	3.315E-02	284.30	6.140	PBC<MDA	I131
295.09	167.	10.70	1.10	3.232E-02	295.09	19.300	1.484E+01	PB214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					296.00	79.000	3.634E+00	TL210
300.00	6.	513.01	1.24	3.195E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	4.143E+00	PA231
					300.18	6.200	1.644E+00	PA233
338.30	76.	17.12	1.41	2.940E-02	338.32	12.010	1.193E+01	AC228
344.29	6.	139.44	1.28	2.905E-02	344.29	26.500	PBC<MDA	EU152
351.96	188.	9.30	1.07	2.860E-02	351.93	37.600	9.727E+00	PB214
356.00	5.	468.69	1.29	2.837E-02	356.00	62.050	PBC<MDA	BA133
364.48	6.	229.73	1.29	2.791E-02	364.48	81.700	PBC<MDA	I131
383.84	48.	24.70	1.31	2.691E-02	383.84	8.940	1.120E+01	BA133
433.94	6.	185.99	1.35	2.466E-02	433.94	90.480	PBC<MDA	AG108M
468.06	14.	98.63	1.38	2.335E-02	468.06	51.750	PBC<MDA	Ir192
497.05	2.	534.12	1.41	2.236E-02	497.05	90.900	PBC<MDA	RU103
511.86	86.	14.52	2.67	2.188E-02	511.86	20.000	1.092E+01	RH106
583.08	101.	13.06	1.25	1.989E-02	583.02	84.500	3.328E+00	TL208
609.30	156.	10.98	1.87	1.925E-02	609.31	46.090	9.747E+00	BI214
618.06	13.	170.21	1.51	1.904E-02	618.06	99.100	PBC<MDA	PM144
635.89	7.	84.52	1.53	1.864E-02	635.89	11.310	PBC<MDA	SB125
657.76	5.	151.72	1.54	1.818E-02	657.76	94.640	PBC<MDA	AG110M
702.63	12.	84.90	1.58	1.730E-02	702.63	97.900	PBC<MDA	NB94
727.23	39.	23.38	1.79	1.686E-02	727.17	7.550	1.688E+01	BI212
735.72	2.	619.68	1.61	1.671E-02	735.72	22.500	PBC<MDA	PM146
747.16	9.	96.12	1.62	1.651E-02	747.16	34.000	PBC<MDA	PM146
765.79	7.	126.95	1.63	1.621E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	8.556E+01	PA234M
766.41	10.	72.75	1.63	1.620E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.147E+02	PA234M
785.73	8.	95.14	1.65	1.590E-02	785.42	1.280	PBC<MDA	BI212
795.87	8.	81.58	1.66	1.574E-02	795.87	85.530	PBC<MDA	CS134
810.78	1.	781.02	1.67	1.551E-02	810.78	99.460	PBC<MDA	CO58
834.85	7.	141.44	1.69	1.517E-02	834.85	99.980	PBC<MDA	MN54
873.23	10.	87.74	1.72	1.465E-02	873.23	12.270	PBC<MDA	EU154
889.28	9.	90.46	1.73	1.445E-02	889.28	99.984	PBC<MDA	Sc46
898.04	2.	647.96	1.74	1.434E-02	898.04	93.700	PBC<MDA	Y88
910.93	73.	11.70	1.34	1.418E-02	911.07	29.000	9.861E+00	AC228
946.02	3.	289.64	1.77	1.377E-02	946.02	13.400	PBC<MDA	PA234
969.21	12.	88.97	1.79	1.352E-02	968.97	17.460	PBC<MDA	AC228
996.33	27.	25.52	1.81	1.323E-02	996.33	10.600	1.083E+01	EU154
1004.77	3.	308.52	1.82	1.314E-02	1004.77	18.010	PBC<MDA	EU154
1048.07	10.	31.62	1.85	1.271E-02	1048.07	80.000	5.463E-01	Cs136
1077.40	1.	914.69	1.87	1.244E-02	1077.40	3.300	PBC<MDA	Ga68
1120.42	9.	113.89	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1120.55	11.	81.24	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	5.276E-01	Sc46
					1121.30	34.900	1.512E+00	Ta182
1121.35	11.	85.65	1.90	1.205E-02	1120.29	15.100	PBC<MDA	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					1120.55	99.987	5.278E-01	Sc46
					1121.30	34.900	1.513E+00	Ta182
1173.24	6.	90.57	1.94	1.163E-02	1173.24	99.900	PBC<MDA	CO60
1189.05	3.	302.33	1.95	1.150E-02	1189.05	16.200	PBC<MDA	Ta182
1238.28	14.	50.33	1.98	1.114E-02	1238.28	66.070	PBC<MDA	Co56
1274.53	6.	40.82	2.01	1.088E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	8.704E-01	EU154
1313.00	5.	113.28	2.03	1.063E-02	1313.00	21.000	PBC<MDA	TL210
1408.00	6.	99.47	2.10	1.004E-02	1408.00	21.005	PBC<MDA	EU152
1460.61	148.	8.68	1.79	9.749E-03	1460.83	10.670	7.902E+01	K40
1690.98	7.	40.00	2.27	8.649E-03	1690.98	47.790	PBC<MDA	SB124
1764.45	8.	94.15	2.31	8.350E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	5.	170.45	2.32	8.323E-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
298.73	74.76	111.	102.	2.236E+03	17.62	1.025	- sD
308.40	77.17	90.	207.	4.428E+03	9.50	1.027	- D
358.80	89.92	109.	54.	1.052E+03	30.74	1.039	- sD
742.49	185.75	66.	115.	2.612E+03	16.93	1.297	- 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	185.80	46.54	186.	13.	0.007	150.93	0.998s
TH-227	200.20	50.14	307.	-24.	-0.014	103.72	1.001s
AM-241	237.77	59.54	429.	-28.	-0.015	106.76	1.010s
TH-234	252.39	63.19	117.	61.	0.034	34.60	1.056
Sn-126	256.74	64.28	484.	-29.	-0.016	110.21	1.015
BA-133	323.56	80.99	837.	-29.	-0.016	141.78	1.031
Np-237	345.55	86.49	1051.	-25.	-0.014	184.80	1.036
EU-155	345.76	86.54	1096.	-26.	-0.015	177.94	1.036s
Sn-126	347.35	86.94	1069.	-26.	-0.015	175.77	1.037
Sn-126	349.87	87.57	1043.	-26.	-0.015	173.49	1.037
Cd-109	351.75	88.04	961.	-12.	-0.007	360.49	1.038s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-234	369.94	92.59	149.	56.	0.031	33.54	1.042D
AC-228	372.98	93.35	925.	27.	0.015	162.64	1.043s
Gd-153	389.58	97.50	938.	11.	0.006	385.81	1.047s
Gd-153	412.37	103.20	517.	-26.	-0.014	125.87	1.052s
Np-239	414.37	103.70	543.	-26.	-0.014	128.85	1.053
EU-155	420.82	105.31	208.	18.	0.010	115.06	1.054
Np-239	424.09	106.13	219.	21.	0.012	101.72	1.055s
EU-152	486.67	121.78	155.	3.	0.002	530.47	1.070s
EU-154	491.95	123.10	152.	-17.	-0.009	107.33	1.071s
PA-234	524.72	131.29	574.	-24.	-0.013	142.58	1.079s
HF-181	531.64	133.02	598.	-17.	-0.009	205.01	1.081s
CE-144	533.69	133.54	615.	0.	0.000	1000.00	1.081s
HF-181	544.74	136.30	615.	0.	0.000	1000.00	1.084s
CO-57	545.43	136.47	615.	0.	0.000	1000.00	1.084s
Tc-99m	561.57	140.51	615.	0.	0.000	1000.00	1.088s
U-235	574.67	143.79	665.	-27.	-0.015	134.77	1.091s
CE-141	581.29	145.44	731.	-27.	-0.015	142.38	1.092s
Ba-140	650.15	162.66	266.	-25.	-0.014	95.73	1.108s
U-235	653.03	163.38	293.	-26.	-0.015	79.73	1.109s
CE-139	662.92	165.85	184.	18.	0.010	107.21	1.111s
Cf-251	705.90	176.60	121.	-19.	-0.011	110.71	1.122s
U-235	742.37	185.72	273.	-24.	-0.013	98.69	1.130s
TH-229	773.52	193.51	112.	0.	0.000	1000.00	1.137s
U-235	820.80	205.33	156.	-25.	-0.014	78.86	1.148
TH-229	842.87	210.85	144.	17.	0.009	140.32	1.153s
Cf-251	907.45	227.00	124.	-23.	-0.013	98.70	1.168s
TH-227	943.33	235.97	522.	18.	0.010	182.75	1.176s
PB-212	953.97	238.63	58.	255.	0.142	7.55	1.179D
PB-214	967.43	242.00	64.	69.	0.038	20.29	1.182D
EU-152	978.21	244.69	579.	-20.	-0.011	170.25	1.185s
TH-227	1024.39	256.24	96.	-17.	-0.009	115.42	1.195s
BI-210M	1062.75	265.83	90.	-11.	-0.006	126.84	1.204
TL-208	1110.00	277.65	28.	18.	0.010	60.94	0.447s
Hg-203	1116.22	279.20	76.	6.	0.004	193.08	1.216
I-131	1136.61	284.30	48.	15.	0.008	95.88	1.221s
PB-214	1179.77	295.09	48.	127.	0.071	11.82	1.231D
TL-210	1183.41	296.00	461.	-6.	-0.003	539.57	1.231s
PB-212	1199.52	300.03	449.	6.	0.003	513.01	1.235s
PA-231	1199.68	300.07	455.	0.	0.000	1000.00	1.235s
PA-233	1200.12	300.18	455.	0.	0.000	1000.00	1.235s
PA-231	1210.00	302.65	455.	0.	0.000	1000.00	1.237s
BA-133	1210.81	302.85	455.	0.	0.000	1000.00	1.238s
Ba-140	1218.80	304.85	455.	0.	0.000	1000.00	1.240s
BI-210M	1218.99	304.90	455.	0.	0.000	1000.00	1.240s
Ir-192	1233.16	308.44	455.	0.	0.000	1000.00	1.243
PA-233	1247.44	312.01	455.	0.	0.000	1000.00	1.246s
Ir-192	1265.35	316.49	455.	0.	0.000	1000.00	1.250
La-140	1314.43	328.76	283.	-17.	-0.009	90.83	1.261s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-249	1333.15	333.44	266.	-5.	-0.003	476.38	1.265s
AC-228	1352.57	338.30	19.	76.	0.042	17.12	1.407s
EU-152	1376.53	344.29	32.	6.	0.003	139.44	1.275s
HF-181	1382.70	345.83	66.	-15.	-0.009	78.98	1.276s
PB-214	1407.22	351.96	31.	188.	0.105	9.30	1.069
BA-133	1423.37	356.00	254.	5.	0.003	468.69	1.285s
I-131	1457.31	364.48	48.	6.	0.003	229.73	1.293s
BA-133	1534.73	383.84	48.	48.	0.027	24.70	1.310s
Cf-249	1551.17	387.95	96.	0.	0.000	1000.00	1.314s
SN-113	1566.12	391.69	96.	0.	0.000	1000.00	1.317s
AG-108M	1735.10	433.94	31.	6.	0.003	185.99	1.354s
PM-146	1814.87	453.88	44.	-3.	-0.001	462.65	1.372s
SB-125	1852.82	463.37	104.	-17.	-0.010	86.77	1.380s
Ir-192	1871.59	468.06	92.	14.	0.008	98.63	1.384s
BE-7	1909.73	477.60	112.	-15.	-0.009	100.91	1.392s
HF-181	1927.34	482.00	127.	-15.	-0.009	106.92	1.396s
La-140	1947.43	487.02	157.	-17.	-0.009	107.74	1.400s
RU-103	1987.56	497.05	35.	2.	0.001	534.12	1.409s
RH-106	2046.81	511.86	35.	86.	0.048	14.52	2.672s
Kr-85	2055.27	513.98	121.	0.	0.000	1000.00	1.424s
Nd-147	2123.35	531.00	26.	-10.	-0.006	108.78	1.438s
Ba-140	2148.39	537.26	31.	-5.	-0.003	267.46	1.444s
CS-134	2276.64	569.32	37.	-4.	-0.002	205.11	1.471s
PA-234	2277.24	569.47	42.	0.	0.000	1000.00	1.471s
TL-208	2331.68	583.08	14.	101.	0.056	13.06	1.246s
SB-125	2401.36	600.50	316.	-15.	-0.008	172.84	1.497s
SB-124	2410.29	602.73	302.	-15.	-0.008	168.66	1.499s
CS-134	2418.21	604.71	287.	-4.	-0.002	620.49	1.500s
BI-214	2436.58	609.30	27.	156.	0.086	10.98	1.871s
RU-103	2440.56	610.30	283.	0.	0.000	1000.00	1.505s
AG-108M	2456.49	614.28	283.	0.	0.000	1000.00	1.508s
PM-144	2471.62	618.06	234.	13.	0.007	170.21	1.512s
RH-106	2487.04	621.92	295.	-13.	-0.007	195.57	1.515s
SB-125	2542.94	635.89	14.	7.	0.004	84.52	1.526
I-131	2547.28	636.97	29.	-4.	-0.002	443.25	1.527s
AG-110M	2630.43	657.76	23.	5.	0.003	151.72	1.544
CS-137	2646.03	661.66	71.	-16.	-0.009	78.06	1.548s
PM-144	2785.58	696.54	56.	-5.	-0.003	216.33	1.576s
NB-94	2809.93	702.63	48.	12.	0.007	84.90	1.581s
SB-124	2890.57	722.79	75.	-2.	-0.001	737.29	1.598s
AG-108M	2891.17	722.94	73.	0.	0.000	1000.00	1.598s
EU-154	2892.86	723.36	73.	0.	0.000	1000.00	1.598s
ZR-95	2896.22	724.20	80.	-9.	-0.005	139.70	1.599s
BI-212	2908.33	727.23	8.	39.	0.021	23.38	1.791
PM-146	2942.31	735.72	23.	2.	0.001	619.68	1.608s
PM-146	2988.08	747.16	15.	9.	0.005	96.12	1.617
ZR-95	3026.36	756.73	35.	-8.	-0.004	106.59	1.625s
AG-110M	3055.23	763.94	36.	-8.	-0.004	111.80	1.631s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
NB-95	3062.61	765.79	40.	7.	0.004	126.95	1.632s
PA-234M	3065.10	766.41	21.	10.	0.005	72.75	1.633s
EU-152	3115.14	778.92	20.	-7.	-0.004	145.45	1.643s
BI-212	3141.15	785.42	26.	8.	0.005	95.14	1.648s
CS-134	3182.96	795.87	18.	8.	0.005	81.58	1.656s
TL-210	3197.88	799.60	38.	-6.	-0.003	147.77	1.659s
CS-134	3207.29	801.95	38.	0.	0.000	1000.00	1.661s
CO-58	3242.59	810.78	30.	1.	0.001	781.02	1.668s
La-140	3262.58	815.77	31.	0.	0.000	1000.00	1.672s
Cs-136	3273.50	818.50	71.	-15.	-0.009	81.47	1.674s
MN-54	3338.91	834.85	21.	7.	0.004	141.44	1.687s
Co-56	3386.61	846.77	25.	-5.	-0.003	224.35	1.696s
NB-94	3483.94	871.10	32.	-13.	-0.007	68.82	1.715s
EU-154	3492.47	873.23	32.	10.	0.005	87.74	1.717s
PA-234	3521.68	880.53	43.	-4.	-0.002	257.29	1.722s
PA-234	3532.53	883.24	46.	0.	0.000	1000.00	1.724s
AG-110M	3538.30	884.68	46.	0.	0.000	1000.00	1.725s
Sc-46	3556.69	889.28	25.	9.	0.005	90.46	1.729s
Y-88	3591.74	898.04	25.	2.	0.001	647.96	1.736s
AC-228	3643.32	910.93	0.	73.	0.041	11.70	1.339s
AG-110M	3749.60	937.49	40.	-14.	-0.008	102.85	1.766s
PA-234	3783.72	946.02	15.	3.	0.002	289.64	1.772s
AC-228	3875.56	968.97	21.	12.	0.007	88.97	1.790s
EU-154	3985.03	996.33	11.	27.	0.015	25.52	1.810s
EU-154	4018.82	1004.77	16.	3.	0.002	308.52	1.816s
Co-56	4151.13	1037.84	22.	-11.	-0.006	105.25	1.841s
Cs-136	4192.07	1048.07	0.	10.	0.006	31.62	1.848s
RH-106	4201.23	1050.36	24.	-5.	-0.003	154.52	1.850s
BI-207	4254.46	1063.66	38.	-14.	-0.008	81.36	1.860s
Ga-68	4309.44	1077.40	16.	1.	0.001	914.69	1.870s
FE-59	4396.88	1099.25	21.	-7.	-0.004	147.85	1.886s
EU-152	4448.20	1112.07	84.	-11.	-0.006	117.35	1.895s
ZN-65	4462.09	1115.55	73.	-4.	-0.002	340.15	1.897s
BI-214	4481.06	1120.29	51.	9.	0.005	113.89	1.901
Sc-46	4482.12	1120.55	38.	11.	0.006	81.24	1.901
Ta-182	4485.12	1121.30	42.	11.	0.006	85.65	1.901
CO-60	4692.96	1173.24	6.	6.	0.004	90.57	1.938s
Ta-182	4756.25	1189.05	11.	3.	0.001	302.33	1.949
Ta-182	4885.75	1221.41	29.	-3.	-0.002	202.62	1.972
Co-56	4953.27	1238.28	6.	14.	0.008	50.33	1.984
NA-22	5098.35	1274.53	0.	6.	0.003	40.82	2.008s
EU-154	5098.39	1274.54	6.	0.	0.000	1000.00	2.008s
FE-59	5166.65	1291.60	17.	-7.	-0.004	143.21	2.020s
TL-210	5252.32	1313.00	6.	5.	0.003	113.28	2.034s
CO-60	5330.37	1332.50	12.	-2.	-0.001	340.89	2.047s
AG-110M	5537.69	1384.30	0.	0.	0.000	1000.00	2.082s
EU-152	5632.56	1408.00	6.	6.	0.003	99.47	2.097s
K-40	5843.14	1460.61	8.	148.	0.082	8.68	1.789

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	6385.95	1596.21	12.	-5.	-0.003	248.14	2.215s
SB-124	6765.35	1690.98	0.	7.	0.004	40.00	2.272s
BI-214	7059.65	1764.49	24.	8.	0.004	94.15	2.314s
Co-56	7087.11	1771.35	33.	5.	0.003	170.45	2.318s
Y-88	7346.20	1836.06	13.	-5.	-0.003	159.28	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	3.0646E-01				9.50E+02	
			1274.53	3.065E-01	?(	3.764E-01 4.08E+01	9.99E+01 G
K-40	N	7.9019E+01				4.66E+11	
			1460.83	7.902E+01	(P	8.509E+00 8.68E+00	1.07E+01 G
Sc-46	F	4.2731E-01				8.38E+01	
			889.28	3.270E-01	?(	1.006E+00 9.05E+01	1.00E+02 G
			1120.55	5.276E-01	?(	1.441E+00 8.12E+01	1.00E+02 G
CR-51	F	-1.6939E-01				2.77E+01	
			320.08	-1.694E-01	&(P	1.870E+01 1.63E+03	9.94E+00 G
MN-54	C	2.6608E-01				3.12E+02	
			834.85	2.661E-01	?(P	8.765E-01 1.41E+02	1.00E+02 G
FE-59	F	-5.8895E-01				4.45E+01	
			1099.25	-5.890E-01	?(	1.946E+00 1.48E+02	5.65E+01 G
			1291.60	-8.360E-01	+	2.618E+00 1.43E+02	4.32E+01 G
Co-56	C	2.9530E-01				7.73E+01	
			846.77	-1.852E-01	?(	9.636E-01 2.24E+02	9.99E+01 G
			1238.28	1.022E+00	?(P	1.099E+00 5.03E+01	6.61E+01 G
			1037.84	-3.275E+00	+ P	7.490E+00 1.05E+02	1.41E+01 G
			1771.35	2.132E+00	?	1.272E+01 1.70E+02	1.55E+01 A
CO-57	C	-2.0399E-03				2.72E+02	
			122.06	-2.040E-03	&(	6.687E-01 9.46E+03	8.56E+01 G
			136.47	0.000E+00	&	1.195E+01 1.00E+03	1.07E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

CO-58    C   3.6002E-02                                     7.09E+01
                          810.78 3.600E-02 ?(  1.016E+00 7.81E+02 9.95E+01 G

CO-60    F   1.0123E-01                                     1.93E+03
                         1332.50-1.076E-01 ?(P 9.987E-01 3.41E+02 1.00E+02 G
                         1173.24 3.102E-01 &(P 6.530E-01 9.06E+01 9.99E+01 G

ZN-65    F  -3.2531E-01                                     2.44E+02
                         1115.55-3.253E-01 ?(  3.848E+00 3.40E+02 5.06E+01 G

NB-94    I   4.0330E-01                                     7.41E+06
                          702.63 4.033E-01 &(  1.152E+00 8.49E+01 9.79E+01 G
                          871.10-4.798E-01 -   1.096E+00 6.88E+01 9.99E+01 G

ZR-95    I  -5.0361E-01                                     6.40E+01
                          756.73-5.036E-01 ?(P 1.891E+00 1.07E+02 5.45E+01 G
                          724.20-6.946E-01 +   3.310E+00 1.40E+02 4.42E+01 G

NB-95    I   2.5192E-01                                     6.40E+01
                          765.79 2.519E-01 ?(  1.101E+00 1.27E+02 9.98E+01 G

RU-103   I   6.2059E-02                                     3.93E+01
                          497.05 6.206E-02  (P 8.248E-01 5.34E+02 9.09E+01 G
                          610.30 0.000E+00 -   4.076E+01 1.00E+03 5.75E+00 GA

RH-106   I  -3.7015E+00                                     3.74E+02
                          621.92-3.701E+00 ?(  2.440E+01 1.96E+02 9.93E+00 G
                         1050.36-1.310E+01 +   7.122E+01 1.55E+02 1.56E+00 G
                          511.86 1.092E+01 ?   3.843E+00 1.45E+01 2.00E+01 GA

AG-108M  C   1.5481E-01                                     1.53E+05
                          433.94 1.548E-01 &(P 7.113E-01 1.86E+02 9.05E+01 G
                          722.94 0.000E+00 -   1.536E+00 1.00E+03 9.08E+01 G
                          614.28 0.000E+00 -   2.621E+00 1.00E+03 8.98E+01 G

AG-110M  F   8.6337E-02                                     2.50E+02
                          884.68 0.000E+00 ?(  1.814E+00 1.00E+03 7.27E+01 G
                          657.76 1.526E-01 &(P 8.134E-01 1.52E+02 9.46E+01 G
                          937.49-1.632E+00 +   3.752E+00 1.03E+02 3.44E+01 G
                         1384.30 0.000E+00 -   1.655E+00 1.00E+03 2.43E+01 G
                          763.94-1.229E+00 +   4.710E+00 1.12E+02 2.23E+01 G

SB-124   F   8.2999E-03                                     6.02E+01
                          602.73-4.295E-01 ?(  2.437E+00 1.69E+02 9.83E+01 G
                         1690.98 9.084E-01 ?(P 9.906E-01 4.00E+01 4.78E+01 G
                          722.79-5.058E-01 +   1.304E+01 7.37E+02 1.08E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	I	5.2802E-01					1.01E+03	
			427.88	2.512E-02	&(	2.272E+00	3.61E+03	2.96E+01 G
			600.50	-2.353E+00	+	1.368E+01	1.73E+02	1.79E+01 G
			635.89	1.844E+00	?(	5.308E+00	8.45E+01	1.13E+01 G
			463.37	-3.902E+00	+	1.133E+01	8.68E+01	1.05E+01 G
I-131	I	4.1645E-01					8.02E+00	
			364.48	1.462E-01	?(	8.527E-01	2.30E+02	8.17E+01 G
			284.30	4.013E+00	?(	9.552E+00	9.59E+01	6.14E+00 G
			636.97	-1.608E+00	+ P	1.155E+01	4.43E+02	7.17E+00 G
Gd-153	F	3.9789E-01					2.42E+02	
			97.50	3.979E-01	?(	5.139E+00	3.86E+02	3.00E+01 G
			103.20	-1.243E+00	&	5.220E+00	1.26E+02	2.18E+01 G
Ga-68	C	1.5805E+00					4.71E-02	
			1077.40	1.580E+00	?(	3.374E+01	9.15E+02	3.30E+00 G
BA-133	F	1.5252E-01					3.85E+03	
			356.00	1.525E-01	?(	2.430E+00	4.69E+02	6.20E+01 G
			302.85	0.000E+00	-	9.749E+00	1.00E+03	1.83E+01 G
			383.84	1.120E+01	?	8.043E+00	2.47E+01	8.94E+00 GA
			80.99	-9.832E-01	+	4.645E+00	1.42E+02	3.41E+01 GA
CS-134	I	3.3615E-01					7.54E+02	
			795.87	3.362E-01	?(	9.279E-01	8.16E+01	8.55E+01 G
			604.71	-1.139E-01	-	2.400E+00	6.20E+02	9.76E+01 G
			569.32	-7.734E-01	+	5.565E+00	2.05E+02	1.54E+01 G
			801.95	0.000E+00	-	1.285E+01	1.00E+03	8.69E+00 G
			563.24	-1.087E-01	%	8.225E+00	3.08E+03	8.35E+00 G
CS-137	I	-5.8158E-01					1.10E+04	
			661.66	-5.816E-01	?(	1.515E+00	7.81E+01	8.52E+01 G
CE-139	F	2.6906E-01					1.38E+02	
			165.85	2.691E-01	?(P	9.671E-01	1.07E+02	7.99E+01 G
Ba-140	I	-4.9015E-01					1.28E+01	
			537.26	-4.901E-01	?(P	3.070E+00	2.67E+02	2.44E+01 G
			162.66	-4.698E+00	+	1.500E+01	9.57E+01	6.22E+00 G
			304.85	0.000E+00	+	4.184E+01	1.00E+03	4.29E+00 G
La-140	I	-3.3296E-01					1.28E+01	
			1596.21	-3.330E-01	?(P	1.219E+00	2.48E+02	9.54E+01 G
			487.02	-9.076E-01	+	3.285E+00	1.08E+02	4.55E+01 G
			328.76	-1.523E+00	+ P	7.395E+00	9.08E+01	2.03E+01 G
			815.77	0.000E+00	+	4.429E+00	1.00E+03	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	-6.2347E-01					3.25E+01	
			145.44	-6.235E-01	&(	2.961E+00	1.42E+02	4.82E+01 G
PM-144	C	1.0906E-01					3.63E+02	
			696.54	-1.611E-01	?(	1.211E+00	2.16E+02	9.90E+01 G
			618.06	3.790E-01	?(	2.177E+00	1.70E+02	9.91E+01 G
EU-152	F	2.7173E-01					4.94E+03	
			121.78	1.221E-01	&(	2.223E+00	5.30E+02	2.86E+01 G
			344.29	4.331E-01	?(	2.098E+00	1.39E+02	2.65E+01 G
			1112.07	-3.831E+00	+	1.524E+01	1.17E+02	1.36E+01 G
			778.92	-1.879E+00	+	6.320E+00	1.45E+02	1.29E+01 G
			964.11	-4.065E-02	% P	9.916E+00	7.68E+03	1.46E+01 G
			244.69	-4.027E+00	+	2.294E+01	1.70E+02	7.58E+00 G
			1408.00	1.626E+00	? P	3.675E+00	9.95E+01	2.10E+01 GA
EU-154	I	1.8030E+00					3.14E+03	
			123.10	-4.287E-01	&(	1.546E+00	1.07E+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	+	6.904E+00	1.00E+03	2.02E+01 G
			873.23	3.036E+00	?(P	9.005E+00	8.77E+01	1.23E+01 G
			1004.77	7.043E-01	?(	5.012E+00	3.09E+02	1.80E+01 G
			996.33	1.083E+01	?(	7.104E+00	2.55E+01	1.06E+01 G
EU-155	I	8.9264E-01					1.81E+03	
			105.31	8.926E-01	?(P	3.445E+00	1.15E+02	2.12E+01 G
			86.54	-9.561E-01	+	5.670E+00	1.78E+02	3.07E+01 G
HF-181	F	-4.6335E-01					4.24E+01	
			482.00	-4.633E-01	&(	1.667E+00	1.07E+02	8.05E+01 G
			133.02	-4.196E-01	+	2.881E+00	2.05E+02	4.33E+01 G
			345.83	-1.957E+00	+	5.165E+00	7.90E+01	1.51E+01 G
			136.30	0.000E+00	+	2.180E+01	1.00E+03	5.85E+00 G
Ta-182	F	1.2852E+00					1.14E+02	
			1121.30	1.513E+00	(	4.366E+00	8.57E+01	3.49E+01 G
			1221.41	-5.405E-01	- P	5.077E+00	2.03E+02	2.70E+01 G
			1189.05	7.949E-01	(	5.484E+00	3.02E+02	1.62E+01 G
Hg-203	F	1.3208E-01					4.66E+01	
			279.20	1.321E-01	&(	8.778E-01	1.93E+02	8.15E+01 G
TL-208	N	3.3278E+00					6.98E+02	
			583.02	3.328E+00	(P	6.729E-01	1.31E+01	8.45E+01 G
			277.28	4.569E+00	+	7.088E+00	6.09E+01	6.31E+00 G
			860.56	2.117E-01	% P	7.892E+00	1.58E+03	1.24E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PM-146	C	2.4489E-01					2.02E+03	
			453.88	-8.972E-02	*(P	1.197E+00	4.63E+02	6.50E+01 G
			747.16	8.837E-01	?(P	2.043E+00	9.61E+01	3.40E+01 G
			735.72	2.463E-01	?(	3.727E+00	6.20E+02	2.25E+01 G
Y-88	F	-3.2765E-01					1.07E+02	
			1836.06	-3.276E-01	?(P	1.340E+00	1.59E+02	9.92E+01 G
			898.04	7.085E-02	+ P	1.081E+00	6.48E+02	9.37E+01 G
Cd-113m		3.0960E+02					5.33E+03	
			263.70	3.096E+02	&(	1.374E+04	1.28E+03	6.00E-03 K
Cd-109	F	-3.5411E+00					4.53E+02	
			88.04	-3.541E+00	?(	4.272E+01	3.60E+02	3.79E+00 G
Cf-251	T	-1.3650E+00					3.28E+05	
			176.60	-1.365E+00	(	3.877E+00	1.11E+02	1.70E+01 G
			227.00	-5.167E+00	+	1.248E+01	9.87E+01	6.30E+00 GA
Sn-126		-4.1174E+00					3.65E+07	
			87.57	-7.790E-01	+	4.505E+00	1.73E+02	3.75E+01 GA
			64.28	-4.117E+00	(	1.512E+01	1.10E+02	9.70E+00 G
			86.94	-3.240E+00	+	1.898E+01	1.76E+02	9.04E+00 GA
PB-210	N	6.5952E+00					8.14E+03	
			46.54	6.595E+00	?(	3.362E+01	1.51E+02	4.25E+00 G
PB-212	N	8.7693E+00					6.98E+02	
			238.63	8.769E+00	(	1.313E+00	7.55E+00	4.33E+01 G
			300.03	3.107E+00	&	5.379E+01	5.13E+02	3.28E+00 GA
PB-214	N	1.0263E+01					5.84E+05	
			351.93	9.727E+00	(P	1.474E+00	9.30E+00	3.76E+01 G
			295.09	1.131E+01	(P	3.119E+00	1.18E+01	1.93E+01 G
			242.00	1.399E+01	+ P	8.076E+00	2.03E+01	7.43E+00 GA
BI-207	C	-8.2375E-01					1.18E+04	
			1063.66	-8.237E-01	?(P	1.863E+00	8.14E+01	7.45E+01 G
			569.70	1.873E-02	%	9.347E-01	1.40E+03	9.77E+01 G
BI-212	N	1.6880E+01					6.98E+02	
			727.17	1.688E+01	(	7.056E+00	2.34E+01	7.55E+00 G
			785.42	2.212E+01	?	7.186E+01	9.51E+01	1.28E+00 GA
U-235	N	-2.7500E+00					2.57E+11	
			143.79	-2.750E+00	(	1.236E+01	1.35E+02	1.10E+01 G
			205.33	-6.706E+00	+ P	1.638E+01	7.89E+01	5.01E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			163.38	-6.141E+00	+ P	1.928E+01	7.97E+01	5.08E+00 G
			185.72	-5.657E-01	+	1.864E+00	9.87E+01	5.40E+01 GA
BI-214	N	9.7473E+00						5.84E+05
			609.31	9.747E+00	@(P	1.696E+00	1.10E+01	4.61E+01 G
			1120.29	2.834E+00	- P	1.099E+01	1.14E+02	1.51E+01 G
			1764.49	3.447E+00	- P	1.105E+01	9.42E+01	1.54E+01 G
BI-210M	T	-3.5654E-01						1.10E+09
			265.83	-3.565E-01	(P	1.503E+00	1.27E+02	5.00E+01 G
			304.90	0.000E+00	+	6.412E+00	1.00E+03	2.80E+01 G
AC-228	N	1.0467E+01						2.10E+03
			911.07	9.861E+00	(	9.956E-01	1.17E+01	2.90E+01 G
			968.97	2.930E+00	-	5.704E+00	8.90E+01	1.75E+01 G
			338.32	1.193E+01	*(	3.636E+00	1.71E+01	1.20E+01 G
			93.35	5.146E+00	-	2.790E+01	1.63E+02	5.56E+00 XA
TH-227	N	-3.7925E+00						7.95E+03
			256.24	-3.792E+00	?(	1.079E+01	1.15E+02	7.00E+00 G
			235.97	2.141E+00	+	1.311E+01	1.83E+02	1.23E+01 G
			50.14	-5.834E+00	+	2.020E+01	1.04E+02	8.00E+00 G
TH-229	N	3.1541E+00						2.68E+06
			193.51	0.000E+00	?(	1.532E+01	1.00E+03	4.40E+00 G
			210.85	7.796E+00	&(	2.689E+01	1.40E+02	2.99E+00 G
TH-234	N	1.5684E+01						1.63E+12
			92.59	1.082E+01	(	1.150E+01	3.35E+01	5.58E+00 G
			63.29	2.281E+01	(	1.972E+01	3.46E+01	3.81E+00 G
PA-234	N	-4.2906E-01						1.63E+12
			131.29	-1.421E+00	?(	6.766E+00	1.43E+02	1.80E+01 G
			946.02	9.031E-01	?(	6.249E+00	2.90E+02	1.34E+01 G
			569.47	0.000E+00	+	1.098E+01	1.00E+03	8.20E+00 G
			883.24	0.000E+00	+	1.372E+01	1.00E+03	9.60E+00 G
			880.53	-2.332E+00	+	2.108E+01	2.57E+02	6.00E+00 GA
PA-234M	N	2.7699E+01						1.63E+12
			1001.00	-2.869E+00	%(P	1.594E+02	1.96E+03	8.37E-01 G
			766.41	1.147E+02	?(	2.788E+02	7.27E+01	2.94E-01 G
AM-241	T	-1.1790E+00						1.58E+05
			59.54	-1.179E+00	?(	4.196E+00	1.07E+02	3.59E+01 G
Np-237	F	-2.1131E+00						2.14E+06
			86.49	-2.113E+00	&(	1.302E+01	1.85E+02	1.31E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Ir-192   F   2.4511E-01                                      7.40E+01
                          316.49 0.000E+00 ?(  2.116E+00 1.00E+03 8.70E+01 G
                          468.06 6.574E-01 &(  2.183E+00 9.86E+01 5.18E+01 G
                          308.44 0.000E+00 -   5.700E+00 1.00E+03 3.18E+01 G

Cs-136   F  -5.5546E-01                                      1.30E+01
                          818.50-5.555E-01 ?(  1.514E+00 8.15E+01 1.00E+02 G
                         1048.07 5.463E-01 +   4.026E-01 3.16E+01 8.00E+01 G
                          340.57 1.544E-07 %   3.157E+00 5.99E+08 4.69E+01 G

Np-239   T   9.6859E-01                                      2.36E+00
                          103.70-1.128E+00 &   4.853E+00 1.29E+02 2.40E+01 X
                          106.13 9.686E-01 @(  3.296E+00 1.02E+02 2.27E+01 G
                           99.50-5.366E-07 &   1.029E+01 5.71E+08 1.50E+01 X

Nd-147      -2.0060E+00                                      1.11E+01
                          531.00-2.006E+00 ?(  5.310E+00 1.09E+02 1.30E+01 G
                           91.10 2.923E-07 %   5.603E+00 5.71E+08 2.83E+01 G

TL-210   N  -2.1997E-01                                      5.84E+05
                          799.60-2.200E-01 ?(  1.127E+00 1.48E+02 9.90E+01 G
                          296.00-1.230E-01 +   2.240E+00 5.40E+02 7.90E+01 G
                         1313.00 1.328E+00 ?   3.436E+00 1.13E+02 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
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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

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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	186.	13.	0.007	150.93	6.595E+00	
TH-227	50.14	307.	-24.	-0.014	103.72	-5.834E+00	
AM-241	59.54	429.	-28.	-0.015	106.76	-1.179E+00	
Sn-126	64.28	484.	-29.	-0.016	110.21	-4.117E+00	
BA-133	80.99	837.	-29.	-0.016	141.78	-9.832E-01	
Np-237	86.49	1051.	-25.	-0.014	184.80	-2.113E+00	
EU-155	86.54	1096.	-26.	-0.015	177.94	-9.561E-01	
Sn-126	86.94	1069.	-26.	-0.015	175.77	-3.240E+00	
Sn-126	87.57	1043.	-26.	-0.015	173.49	-7.790E-01	
Cd-109	88.04	961.	-12.	-0.007	360.49	-3.541E+00	
Gd-153	97.50	938.	11.	0.006	385.81	3.979E-01	
Gd-153	103.20	517.	-26.	-0.014	125.87	-1.243E+00	
Np-239	103.70	543.	-26.	-0.014	128.85	-1.128E+00	
EU-155	105.31	208.	18.	0.010	115.06	8.926E-01	P
Np-239	106.13	219.	21.	0.012	101.72	9.686E-01	
EU-152	121.78	155.	3.	0.002	530.47	1.221E-01	
PA-234	131.29	574.	-24.	-0.013	142.58	-1.421E+00	
HF-181	133.02	598.	-17.	-0.009	205.01	-4.196E-01	
U-235	143.79	665.	-27.	-0.015	134.77	-2.750E+00	
CE-141	145.44	731.	-27.	-0.015	142.38	-6.235E-01	
Ba-140	162.66	266.	-25.	-0.014	95.73	-4.698E+00	
U-235	163.38	293.	-26.	-0.015	79.73	-6.141E+00	P
CE-139	165.85	184.	18.	0.010	107.21	2.691E-01	P
Cf-251	176.60	121.	-19.	-0.011	110.71	-1.365E+00	
U-235	185.72	273.	-24.	-0.013	98.69	-5.657E-01	
U-235	205.33	156.	-25.	-0.014	78.86	-6.706E+00	P
TH-229	210.85	144.	17.	0.009	140.32	7.796E+00	
Cf-251	227.00	124.	-23.	-0.013	98.70	-5.167E+00	
TH-227	235.97	522.	18.	0.010	182.75	2.141E+00	
EU-152	244.69	579.	-20.	-0.011	170.25	-4.027E+00	
TH-227	256.24	96.	-17.	-0.009	115.42	-3.792E+00	
BI-210M	265.83	90.	-11.	-0.006	126.84	-3.565E-01	P
Hg-203	279.20	76.	6.	0.004	193.08	1.321E-01	
I-131	284.30	48.	15.	0.008	95.88	4.013E+00	
TL-210	296.00	461.	-6.	-0.003	539.57	-1.230E-01	
La-140	328.76	283.	-17.	-0.009	90.83	-1.523E+00	P
Cf-249	333.44	266.	-5.	-0.003	476.38	-5.864E-01	
EU-152	344.29	32.	6.	0.003	139.44	4.331E-01	
HF-181	345.83	66.	-15.	-0.009	78.98	-1.957E+00	
BA-133	356.00	254.	5.	0.003	468.69	1.525E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
I-131	364.48	48.	6.	0.003	229.73	1.462E-01		
BA-133	383.84	48.	48.	0.027	24.70	1.120E+01		
AG-108M	433.94	31.	6.	0.003	185.99	1.548E-01		P
PM-146	453.88	44.	-3.	-0.001	462.65	-8.972E-02		P
SB-125	463.37	104.	-17.	-0.010	86.77	-3.902E+00		
Ir-192	468.06	92.	14.	0.008	98.63	6.574E-01		
BE-7	477.60	112.	-15.	-0.009	100.91	-3.513E+00		
HF-181	482.00	127.	-15.	-0.009	106.92	-4.633E-01		
La-140	487.02	157.	-17.	-0.009	107.74	-9.076E-01		
RU-103	497.05	35.	2.	0.001	534.12	6.206E-02		P
RH-106	511.86	35.	86.	0.048	14.52	1.092E+01		
Nd-147	531.00	26.	-10.	-0.006	108.78	-2.006E+00		
Ba-140	537.26	31.	-5.	-0.003	267.46	-4.901E-01		P
CS-134	569.32	37.	-4.	-0.002	205.11	-7.734E-01		
SB-125	600.50	316.	-15.	-0.008	172.84	-2.353E+00		
SB-124	602.73	302.	-15.	-0.008	168.66	-4.295E-01		
CS-134	604.71	287.	-4.	-0.002	620.49	-1.139E-01		
PM-144	618.06	234.	13.	0.007	170.21	3.790E-01		
RH-106	621.92	295.	-13.	-0.007	195.57	-3.701E+00		
SB-125	635.89	14.	7.	0.004	84.52	1.844E+00		
I-131	636.97	29.	-4.	-0.002	443.25	-1.608E+00		P
AG-110M	657.76	23.	5.	0.003	151.72	1.526E-01		P
CS-137	661.66	71.	-16.	-0.009	78.06	-5.816E-01		
PM-144	696.54	56.	-5.	-0.003	216.33	-1.611E-01		
NB-94	702.63	48.	12.	0.007	84.90	4.033E-01		
SB-124	722.79	75.	-2.	-0.001	737.29	-5.058E-01		
ZR-95	724.20	80.	-9.	-0.005	139.70	-6.946E-01		
PM-146	735.72	23.	2.	0.001	619.68	2.463E-01		
PM-146	747.16	15.	9.	0.005	96.12	8.837E-01		P
ZR-95	756.73	35.	-8.	-0.004	106.59	-5.036E-01		P
AG-110M	763.94	36.	-8.	-0.004	111.80	-1.229E+00		
NB-95	765.79	40.	7.	0.004	126.95	2.519E-01		
PA-234M	766.41	21.	10.	0.005	72.75	1.147E+02		
EU-152	778.92	20.	-7.	-0.004	145.45	-1.879E+00		
CS-134	795.87	18.	8.	0.005	81.58	3.362E-01		
TL-210	799.60	38.	-6.	-0.003	147.77	-2.200E-01		
CO-58	810.78	30.	1.	0.001	781.02	3.600E-02		
Cs-136	818.50	71.	-15.	-0.009	81.47	-5.555E-01		
MN-54	834.85	21.	7.	0.004	141.44	2.661E-01		P
Co-56	846.77	25.	-5.	-0.003	224.35	-1.852E-01		
NB-94	871.10	32.	-13.	-0.007	68.82	-4.798E-01		
PA-234	880.53	43.	-4.	-0.002	257.29	-2.332E+00		
Sc-46	889.28	25.	9.	0.005	90.46	3.270E-01		
Y-88	898.04	25.	2.	0.001	647.96	7.085E-02		P
AG-110M	937.49	40.	-14.	-0.008	102.85	-1.632E+00		
PA-234	946.02	15.	3.	0.002	289.64	9.031E-01		
Co-56	1037.84	22.	-11.	-0.006	105.25	-3.275E+00		P
Cs-136	1048.07	0.	10.	0.006	31.62	5.463E-01		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RH-106	1050.36	24.	-5.	-0.003	154.52	-1.310E+01	
BI-207	1063.66	38.	-14.	-0.008	81.36	-8.237E-01	P
Ga-68	1077.40	16.	1.	0.001	914.69	1.580E+00	
FE-59	1099.25	21.	-7.	-0.004	147.85	-5.890E-01	
EU-152	1112.07	84.	-11.	-0.006	117.35	-3.831E+00	
ZN-65	1115.55	73.	-4.	-0.002	340.15	-3.253E-01	
Sc-46	1120.55	38.	11.	0.006	81.24	5.276E-01	
Ta-182	1121.30	42.	11.	0.006	85.65	1.513E+00	
CO-60	1173.24	6.	6.	0.004	90.57	3.102E-01	P
Ta-182	1189.05	11.	3.	0.001	302.33	7.949E-01	
Ta-182	1221.41	29.	-3.	-0.002	202.62	-5.405E-01	P
Co-56	1238.28	6.	14.	0.008	50.33	1.022E+00	P
NA-22	1274.53	0.	6.	0.003	40.82	3.065E-01	
FE-59	1291.60	17.	-7.	-0.004	143.21	-8.360E-01	
TL-210	1313.00	6.	5.	0.003	113.28	1.328E+00	
CO-60	1332.50	12.	-2.	-0.001	340.89	-1.076E-01	P
EU-152	1408.00	6.	6.	0.003	99.47	1.626E+00	P
La-140	1596.21	12.	-5.	-0.003	248.14	-3.330E-01	P
SB-124	1690.98	0.	7.	0.004	40.00	9.084E-01	P
Co-56	1771.35	33.	5.	0.003	170.45	2.132E+00	
Y-88	1836.06	13.	-5.	-0.003	159.28	-3.276E-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	-3.5128E+00	-3.5128E+00	1.009E+02%	1.19E+01
NA-22	#A	3.0646E-01	3.0646E-01	4.082E+01%	3.76E-01
K-40		7.9019E+01	7.9019E+01	8.683E+00%	8.51E+00
Sc-46	#A	4.2731E-01	4.2731E-01	6.079E+01%	1.01E+00
CR-51	#A	-1.6939E-01	-1.6939E-01	1.629E+03%	1.87E+01
MN-54	#A	2.6608E-01	2.6608E-01	1.414E+02%	8.77E-01
FE-59	#A	-5.8895E-01	-5.8895E-01	1.478E+02%	1.95E+00
Co-56	#A	2.9530E-01	2.9530E-01	5.033E+01%	9.64E-01
CO-57	#A	-2.0399E-03	-2.0399E-03	9.458E+03%	6.69E-01
CO-58	#A	3.6002E-02	3.6002E-02	7.810E+02%	1.02E+00
CO-60	#A	1.0123E-01	1.0123E-01	9.057E+01%	9.99E-01
ZN-65	#A	-3.2530E-01	-3.2531E-01	3.402E+02%	3.85E+00
NB-94	#A	4.0330E-01	4.0330E-01	8.490E+01%	1.15E+00
ZR-95	#A	-5.0361E-01	-5.0361E-01	1.066E+02%	1.89E+00
NB-95	#A	2.5192E-01	2.5192E-01	1.269E+02%	1.10E+00
RU-103	#A	6.2058E-02	6.2059E-02	5.341E+02%	8.25E-01
RH-106	#A	-3.7015E+00	-3.7015E+00	1.956E+02%	2.44E+01
AG-108M	#A	1.5481E-01	1.5481E-01	1.860E+02%	7.11E-01
AG-110M	#A	8.6336E-02	8.6337E-02	1.517E+02%	1.81E+00

SN-113 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.58E+00
SB-124 #A	8.2999E-03	8.2999E-03	4.000E+01%	2.44E+00
SB-125 #A	5.2802E-01	5.2802E-01	8.452E+01%	2.27E+00
I-131 #A	4.1644E-01	4.1645E-01	9.588E+01%	8.53E-01
Gd-153 #A	3.9789E-01	3.9789E-01	3.858E+02%	5.14E+00
Ga-68 #A	1.5719E+00	1.5805E+00	9.147E+02%	3.37E+01
Tc-99m #A	0.0000E+00	0.0000E+00	1.000E+03%	1.49E+00
BA-133 #A	1.5252E-01	1.5252E-01	4.687E+02%	2.43E+00
CS-134 #A	3.3615E-01	3.3615E-01	8.158E+01%	9.28E-01
CS-137 #A	-5.8158E-01	-5.8158E-01	7.806E+01%	1.52E+00
CE-139 #A	2.6906E-01	2.6906E-01	1.072E+02%	9.67E-01
Ba-140 #A	-4.9014E-01	-4.9015E-01	2.675E+02%	3.07E+00
La-140 #A	-3.3296E-01	-3.3296E-01	2.481E+02%	1.22E+00
CE-141 #A	-6.2347E-01	-6.2347E-01	1.424E+02%	2.96E+00
CE-144 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.14E+01
PM-144 #A	1.0906E-01	1.0906E-01	1.376E+02%	1.21E+00
EU-152 #A	2.7173E-01	2.7173E-01	1.394E+02%	2.22E+00
EU-154 #C	1.8030E+00	1.8030E+00	2.552E+01%	1.55E+00
EU-155 #A	8.9264E-01	8.9264E-01	1.151E+02%	3.45E+00
HF-181 #A	-4.6334E-01	-4.6335E-01	1.069E+02%	1.67E+00
Ta-182 #A	1.2852E+00	1.2852E+00	8.565E+01%	4.37E+00
Hg-203 #A	1.3208E-01	1.3208E-01	1.931E+02%	8.78E-01
TL-208	3.3278E+00	3.3278E+00	1.306E+01%	6.73E-01
PM-146 #A	2.4489E-01	2.4489E-01	9.612E+01%	1.20E+00
Y-88 #A	-3.2765E-01	-3.2765E-01	1.593E+02%	1.34E+00
Cd-113m#B	3.0960E+02	3.0960E+02	1.280E+03%	1.37E+04
Cd-109 #A	-3.5411E+00	-3.5411E+00	3.605E+02%	4.27E+01
Cf-251 #A	-1.3650E+00	-1.3650E+00	1.107E+02%	3.88E+00
Cf-249 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.52E+00
Sn-126 #A	-4.1174E+00	-4.1174E+00	1.102E+02%	1.51E+01
PB-210 #A	6.5952E+00	6.5952E+00	1.509E+02%	3.36E+01
PB-212	8.7693E+00	8.7693E+00	7.551E+00%	1.31E+00
PB-214	1.0263E+01	1.0263E+01	7.519E+00%	1.47E+00
BI-207 #A	-8.2375E-01	-8.2375E-01	8.136E+01%	1.86E+00
BI-212	1.6880E+01	1.6880E+01	2.338E+01%	7.06E+00
U-235 #A	-2.7500E+00	-2.7500E+00	1.348E+02%	1.24E+01
BI-214 #	9.7473E+00	9.7473E+00	1.098E+01%	1.70E+00
BI-210M#A	-3.5654E-01	-3.5654E-01	1.268E+02%	1.50E+00
AC-228	1.0467E+01	1.0467E+01	1.037E+01%	9.96E-01
TH-227 #A	-3.7925E+00	-3.7925E+00	1.154E+02%	1.08E+01
TH-229 #A	3.1541E+00	3.1541E+00	1.403E+02%	1.53E+01
TH-234	1.5684E+01	1.5684E+01	2.409E+01%	1.15E+01
PA-231 #A	0.0000E+00	0.0000E+00	7.071E+02%	6.20E+01
PA-233 #A	0.0000E+00	0.0000E+00	7.071E+02%	5.07E+00
PA-234 #A	-4.2906E-01	-4.2906E-01	1.426E+02%	6.77E+00
PA-234M#A	2.7699E+01	2.7699E+01	7.275E+01%	1.59E+02
AM-241 #A	-1.1790E+00	-1.1790E+00	1.068E+02%	4.20E+00
Np-237 #A	-2.1131E+00	-2.1131E+00	1.848E+02%	1.30E+01
Ir-192 #A	2.4511E-01	2.4511E-01	9.863E+01%	2.12E+00

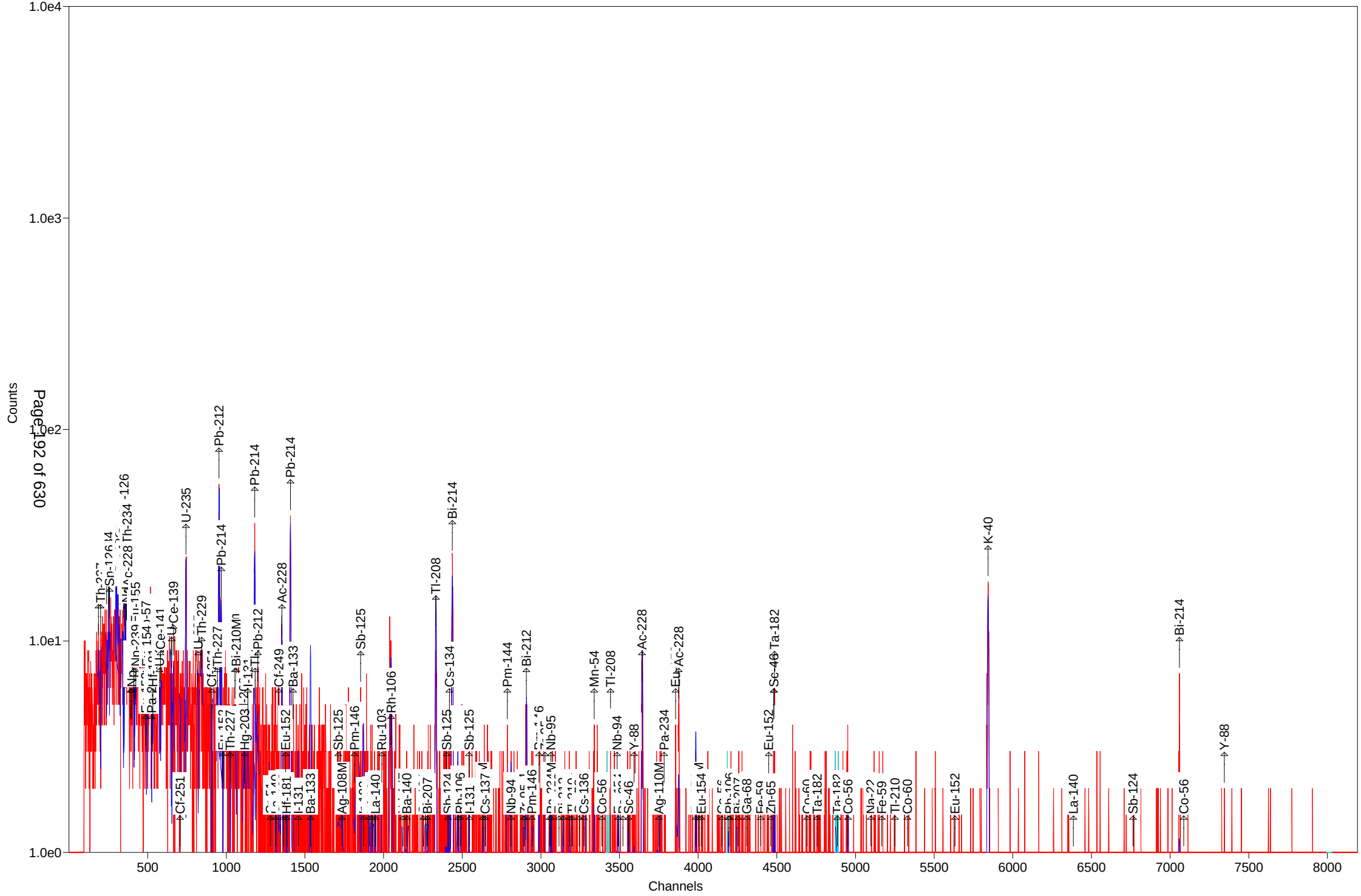
Cs-136	#A	-5.5545E-01	-5.5546E-01	8.147E+01%	1.51E+00
Np-239	#A	9.6849E-01	9.6859E-01	1.017E+02%	3.30E+00
Nd-147	#A	-2.0060E+00	-2.0060E+00	1.088E+02%	5.31E+00
TL-210	#A	-2.1997E-01	-2.1997E-01	1.478E+02%	1.13E+00
Kr-85	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.20E+02

- 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 (25.1 to 1999.3 keV) 1.542E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.3 keV) 1.5415782E+02 Bq/Sample

405451_Gamma_490-164491-A-4-A. 9_Gamma_20190007.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20190007

Sample Description: 405451_Gamma_490-164491-A-5-A
Detector: Detector #12
Batch ID: 405451
Work Order Number: Gamma
Lot Number: 490-164491-A-5-A

Decay to Time: 1/2/2019 13:31 Live Time: 1800 sec
Acquisition Time: 1/2/2019 13:31:17 Real Time: 1801 sec
Analysis Time: 1/2/2019 14:01 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_2018-12-22_1532.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-4.328E+00	106.6	4.614E+00	4.619E+00	1.557E+01
NA-22	4.449E-01	66.4	2.952E-01	2.961E-01	9.696E-01
K-40	7.687E+01	9.8	7.502E+00	8.447E+00	5.395E+00
Sc-46	1.002E-01	409.6	4.103E-01	4.103E-01	1.476E+00
CR-51	-3.569E+00	199.3	7.112E+00	7.115E+00	2.391E+01
MN-54	-6.169E-01	97.9	6.040E-01	6.048E-01	1.407E+00
FE-59	3.841E-01	176.2	6.768E-01	6.771E-01	1.993E+00
Co-56	3.689E-01	90.6	3.341E-01	3.346E-01	1.467E+00
CO-57	-3.130E-01	96.1	3.006E-01	3.011E-01	1.007E+00
CO-58	3.964E-01	86.4	3.426E-01	3.432E-01	1.165E+00
CO-60	-2.422E-02	2374.9	5.752E-01	5.752E-01	1.337E+00
ZN-65	-6.224E-01	219.8	1.368E+00	1.369E+00	4.753E+00
NB-94	1.149E-01	91.3	1.049E-01	1.051E-01	1.269E+00
ZR-95	1.319E+00	25.8	3.405E-01	3.471E-01	6.480E-01
NB-95	-4.840E-01	112.2	5.433E-01	5.438E-01	1.849E+00
RU-103	-3.868E-01	115.2	4.455E-01	4.460E-01	1.124E+00
RH-106	5.087E+00	160.2	8.149E+00	8.153E+00	2.755E+01
AG-108M	3.507E-02	881.3	3.090E-01	3.091E-01	8.258E-01
AG-110M	5.340E-01	68.9	3.677E-01	3.687E-01	1.813E+00
SN-113	-6.029E-01	91.4	5.511E-01	5.519E-01	1.856E+00
SB-124	-4.920E-01	175.4	8.630E-01	8.634E-01	2.916E+00
SB-125	3.123E+00	20.6	6.442E-01	6.631E-01	3.566E+00
I-131	1.359E-01	263.8	3.586E-01	3.587E-01	9.302E-01
Gd-153	-6.151E-02	100.5	6.180E-02	6.191E-02	4.328E+00
Ga-68	-4.368E+00	460.1	2.010E+01	2.010E+01	4.663E+01
Tc-99m	-3.769E-01	162.4	6.121E-01	6.124E-01	2.047E+00
BA-133	-5.054E-01	157.1	7.941E-01	7.945E-01	2.689E+00
CS-134	-1.008E+00	78.8	7.947E-01	7.964E-01	2.652E+00
CS-137	5.464E-01	94.8	5.181E-01	5.188E-01	1.754E+00
CE-139	-3.380E-01	103.0	3.481E-01	3.485E-01	1.169E+00
Ba-140	3.859E-01	329.2	1.271E+00	1.271E+00	4.045E+00
La-140	1.405E-01	121.7	1.709E-01	1.711E-01	1.243E+00
CE-141	-3.748E-01	283.7	1.063E+00	1.064E+00	3.572E+00

CE-144	-2.889E+00	160.6	4.639E+00	4.642E+00	1.552E+01
PM-144	0.000E+00	1.#INF	1.440E-01	1.440E-01	1.247E+00
EU-152	1.128E+00	101.2	1.142E+00	1.143E+00	2.805E+00
EU-154	5.509E-01	84.0	4.627E-01	4.636E-01	2.054E+00
EU-155	7.812E-01	208.6	1.630E+00	1.630E+00	5.505E+00
HF-181	-1.341E-02	327.8	4.395E-02	4.395E-02	2.181E+00
Ta-182	3.100E+00	27.7	8.599E-01	8.737E-01	5.962E+00
Hg-203	-4.332E-01	103.7	4.492E-01	4.498E-01	1.511E+00
TL-208	3.733E+00	12.9	4.825E-01	5.185E-01	6.765E-01
PM-146	7.349E-01	70.3	5.166E-01	5.180E-01	1.382E+00
Y-88	0.000E+00	1.#INF	1.350E-01	1.350E-01	7.036E-01
Cd-113m	3.625E+02	1187.4	4.305E+03	4.305E+03	1.512E+04
Cd-109	0.000E+00	1.#INF	1.198E+01	1.198E+01	4.049E+01
Cf-251	5.607E-01	285.8	1.603E+00	1.603E+00	4.217E+00
Cf-249	4.179E-01	99.3	4.151E-01	4.156E-01	1.905E+00
Sn-126	3.537E+00	132.6	4.692E+00	4.696E+00	1.574E+01
PB-210	2.902E+01	39.8	1.156E+01	1.170E+01	3.251E+01
PB-212	7.906E+00	9.8	7.728E-01	8.759E-01	1.683E+00
PB-214	7.059E+00	12.0	8.485E-01	9.210E-01	2.046E+00
BI-207	-9.874E-01	111.0	1.096E+00	1.097E+00	2.392E+00
BI-212	1.540E+01	20.0	3.081E+00	3.180E+00	4.541E+00
U-235	-3.552E-01	97.7	3.469E-01	3.474E-01	1.659E+01
BI-214	9.879E+00	10.2	1.006E+00	1.124E+00	1.032E+00
BI-210M	-5.251E-01	130.8	6.870E-01	6.875E-01	1.788E+00
AC-228	6.332E+00	21.2	1.345E+00	1.383E+00	4.446E+00
TH-227	-4.900E+00	100.1	4.907E+00	4.913E+00	1.266E+01
TH-229	-7.261E+00	105.7	7.677E+00	7.686E+00	1.973E+01
TH-234	1.407E+01	28.8	4.055E+00	4.129E+00	1.452E+01
PA-231	5.451E+00	212.4	1.158E+01	1.158E+01	7.416E+01
PA-233	0.000E+00	1.#INF	2.906E-01	2.906E-01	6.071E+00
PA-234	1.935E+00	81.1	1.569E+00	1.572E+00	5.128E+00
PA-234M	4.179E+01	101.4	4.236E+01	4.242E+01	1.507E+02
AM-241	-1.095E+00	127.9	1.400E+00	1.401E+00	4.689E+00
Np-237	8.439E-01	367.3	3.100E+00	3.100E+00	1.048E+01
Ir-192	-3.871E-01	202.2	7.826E-01	7.829E-01	2.633E+00
Cs-136	3.410E-01	75.6	2.577E-01	2.584E-01	1.262E+00
Np-239	6.127E-01	244.9	1.501E+00	1.501E+00	5.078E+00
Nd-147	1.315E+00	102.9	1.353E+00	1.355E+00	3.527E+00
TL-210	5.059E-01	88.5	4.479E-01	4.488E-01	1.848E+00
Kr-85	5.419E+01	230.8	1.251E+02	1.251E+02	4.288E+02
Total	6.637E+02				

Analyst: Joey Sausto

Sample description
405451_Gamma_490-164491-A-5-A

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20190007.An1

Acquisition information
Start time: 1/2/2019 1:31:17 PM
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	1/2/2019 1:31:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2018-12-22_1532.PBC 12/22/2018 3:32:10 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 23 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1735

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.61	40.	39.85	0.82	1.809E-02	46.54	4.250	PBC<MDA	PB210
50.14	9.	229.96	0.85	2.193E-02	50.14	8.000	PBC<MDA	TH227
63.23	57.	32.56	0.70	2.975E-02	63.29	3.810	2.808E+01	TH234
					64.28	9.700	1.089E+01	Sn126
77.20	101.	17.65	0.86	3.387E-02				
86.48	7.	367.32	0.89	3.559E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	3.600E-01	EU155
					86.94	9.040	1.221E+00	Sn126
86.84	12.	128.20	0.89	3.566E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	6.066E-01	EU155
					86.94	9.040	2.057E+00	Sn126
87.47	49.	27.59	0.89	3.575E-02	87.57	37.500	PBC<MDA	Sn126
92.69	44.	45.66	0.89	3.639E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	1.193E+01	AC228
99.50	16.	144.73	0.91	3.697E-02	99.50	15.000	PBC<MDA	Np239
103.20	16.	139.68	0.91	3.717E-02	103.20	21.800	PBC<MDA	Gd153
103.70	16.	142.93	0.91	3.720E-02	103.70	24.000	PBC<MDA	Np239
105.31	11.	208.62	0.91	3.726E-02	105.31	21.200	PBC<MDA	EU155
106.13	9.	244.95	0.91	3.729E-02	106.13	22.700	PBC<MDA	Np239
121.78	16.	101.25	0.93	3.725E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.753E-01	CO57
131.29	15.	121.66	0.94	3.683E-02	131.29	18.000	PBC<MDA	PA234
133.02	6.	458.29	0.94	3.673E-02	133.02	43.300	PBC<MDA	HF181
162.66	5.	329.24	0.97	3.435E-02	162.66	6.220	PBC<MDA	Ba140
176.60	6.	285.82	0.98	3.303E-02	176.60	17.000	PBC<MDA	Cf251
185.95	74.	16.79	0.69	3.213E-02	185.72	54.000	PBC<MDA	U235
205.33	15.	105.09	1.01	3.030E-02	205.33	5.010	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
210.85	8.	204.59	1.02	2.980E-02	210.85	2.990	PBC<MDA	TH229
227.00	12.	103.85	1.03	2.839E-02	227.00	6.300	PBC<MDA	Cf251
235.97	14.	195.75	1.04	2.764E-02	235.97	12.300	PBC<MDA	TH227
238.45	169.	12.63	1.16	2.744E-02	238.63	43.300	7.893E+00	PB212
241.94	44.	26.58	1.05	2.716E-02	242.00	7.430	1.208E+01	PB214
244.69	12.	224.90	1.05	2.695E-02	244.69	7.580	PBC<MDA	EU152
277.13	29.	31.62	0.80	2.462E-02	277.28	6.310	1.031E+01	TL208
294.71	68.	18.32	1.09	2.350E-02	295.09	19.300	8.281E+00	PB214
296.00	12.	209.27	1.10	2.345E-02	296.00	79.000	PBC<MDA	TL210
300.07	12.	212.42	1.11	2.321E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.183E+01	PA231
					300.18	6.200	4.696E+00	PA233
300.19	28.	30.86	1.13	2.321E-02	300.03	3.280	2.044E+01	PB212
					300.07	2.460	2.725E+01	PA231
					300.18	6.200	1.081E+01	PA233
328.76	2.	980.93	1.13	2.165E-02	328.76	20.300	PBC<MDA	La140
333.44	13.	99.32	1.14	2.142E-02	333.44	15.510	PBC<MDA	Cf249
338.17	56.	21.24	1.17	2.118E-02	338.32	12.010	1.230E+01	AC228
344.29	9.	182.39	1.15	2.090E-02	344.29	26.500	PBC<MDA	EU152
351.85	89.	15.57	1.33	2.055E-02	351.93	37.600	6.431E+00	PB214
364.48	4.	263.79	1.17	2.001E-02	364.48	81.700	PBC<MDA	I131
433.94	1.	881.29	1.24	1.751E-02	433.94	90.480	PBC<MDA	AG108M
453.88	9.	119.84	1.26	1.692E-02	453.88	65.000	PBC<MDA	PM146
463.37	46.	20.62	1.27	1.666E-02	463.37	10.470	1.465E+01	SB125
487.02	2.	989.95	1.29	1.604E-02	487.02	45.500	PBC<MDA	La140
511.86	94.	12.31	2.56	1.546E-02	511.86	20.000	1.689E+01	RH106
513.98	6.	230.76	1.31	1.541E-02	513.98	0.430	PBC<MDA	Kr85
531.00	5.	102.93	1.33	1.504E-02	531.00	13.000	PBC<MDA	Nd147
569.32	6.	112.07	1.37	1.428E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.689E+00	PA234
					569.70	97.740	2.257E-01	BI207
583.19	80.	12.93	1.03	1.403E-02	583.02	84.500	3.733E+00	TL208
609.36	111.	10.18	1.26	1.358E-02	609.31	46.090	9.879E+00	BI214
621.92	12.	160.19	1.42	1.338E-02	621.92	9.930	PBC<MDA	RH106
657.76	11.	79.92	1.45	1.284E-02	657.76	94.640	PBC<MDA	AG110M
661.66	11.	94.81	1.45	1.279E-02	661.66	85.210	PBC<MDA	CS137
727.36	25.	20.00	1.00	1.194E-02	727.17	7.550	1.540E+01	BI212
735.72	7.	104.64	1.52	1.184E-02	735.72	22.500	PBC<MDA	PM146
747.16	6.	138.44	1.53	1.171E-02	747.16	34.000	PBC<MDA	PM146
756.73	15.	25.82	1.54	1.160E-02	756.73	54.460	1.319E+00	ZR95
766.41	2.	513.69	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	3.835E+01	PA234M
785.71	5.	177.22	1.57	1.129E-02	785.42	1.280	PBC<MDA	BI212
799.60	12.	88.53	1.58	1.115E-02	799.60	98.960	PBC<MDA	TL210
810.78	8.	86.42	1.59	1.104E-02	810.78	99.460	PBC<MDA	CO58
815.77	5.	121.67	1.60	1.099E-02	815.77	23.280	PBC<MDA	La140
818.50	5.	133.46	1.60	1.096E-02	818.50	100.000	PBC<MDA	Cs136
858.37	20.	41.33	1.64	1.057E-02	860.56	12.420	8.461E+00	TL208

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
871.10	6.	91.29	1.65	1.048E-02	871.10	99.890	PBC<MDA	NB94
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
889.28	2.	409.56	1.66	1.033E-02	889.28	99.984	PBC<MDA	Sc46
911.05	28.	39.88	1.68	1.015E-02	911.07	29.000	5.286E+00	AC228
937.49	5.	146.06	1.71	9.939E-03	937.49	34.360	PBC<MDA	AG110M
969.13	12.	83.42	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
1037.84	4.	152.39	1.80	9.228E-03	1037.84	14.130	PBC<MDA	Co56
1048.07	6.	75.56	1.81	9.162E-03	1048.07	80.000	PBC<MDA	Cs136
1099.25	2.	324.82	1.85	8.846E-03	1099.25	56.500	PBC<MDA	FE59
1120.20	11.	92.09	1.87	8.722E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	7.105E-01	Sc46
1121.21	11.	85.92	1.87	8.716E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.059E+00	Ta182
1189.13	13.	27.74	1.93	8.342E-03	1189.05	16.200	5.344E+00	Ta182
1238.28	11.	92.93	1.97	8.090E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	6.	66.37	2.00	7.914E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.263E+00	EU154
1291.60	3.	176.21	2.02	7.834E-03	1291.60	43.200	PBC<MDA	FE59
1313.00	12.	28.87	2.04	7.735E-03	1313.00	21.000	4.104E+00	TL210
1460.58	105.	9.76	2.01	7.112E-03	1460.83	10.670	7.687E+01	K40
1764.34	22.	21.32	2.40	6.075E-03	1764.49	15.400	1.306E+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	
308.34	77.20	82.	101.	2.979E+03	17.65	0.858	-	
743.09	185.95	22.	74.	2.288E+03	16.79	0.692	-	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	186.07	46.61	82.	40.	0.022	39.85	0.822
TH-227	200.18	50.14	226.	9.	0.005	229.96	0.855s
AM-241	237.74	59.54	315.	-20.	-0.011	127.87	0.865s
TH-234	252.74	63.29	67.	47.	0.026	28.81	0.869D
Sn-126	256.71	64.28	296.	19.	0.010	132.64	0.869s
BA-133	323.50	80.99	401.	-22.	-0.012	129.25	0.887s
Np-237	345.49	86.49	335.	7.	0.004	367.32	0.892A
EU-155	345.70	86.54	478.	-21.	-0.011	152.04	0.892s
Sn-126	347.29	86.94	458.	12.	0.007	128.20	0.892D
Sn-126	349.81	87.57	449.	49.	0.027	27.59	0.893D
Cd-109	351.68	88.04	426.	0.	0.000	864.03	0.894A
TH-234	369.87	92.59	117.	29.	0.016	55.85	0.898D
AC-228	372.91	93.35	166.	17.	0.009	113.11	0.899s
Gd-153	389.50	97.50	320.	-18.	-0.010	144.45	0.903s
Np-239	397.50	99.50	251.	16.	0.009	144.73	0.905
Gd-153	412.29	103.20	235.	16.	0.009	139.68	0.909s
Np-239	414.29	103.70	247.	16.	0.009	142.93	0.909
EU-155	420.73	105.31	263.	11.	0.006	208.62	0.911s
Np-239	424.00	106.13	257.	9.	0.005	244.95	0.912s
EU-152	486.56	121.78	120.	16.	0.009	101.25	0.928
CO-57	487.69	122.06	140.	-18.	-0.010	96.06	0.928
EU-154	491.84	123.10	131.	-5.	-0.003	326.86	0.929
PA-234	524.60	131.29	158.	15.	0.008	121.66	0.938s
HF-181	531.51	133.02	384.	6.	0.003	458.29	0.939s
CE-144	533.57	133.54	567.	-21.	-0.012	160.58	0.940s
HF-181	544.61	136.30	546.	-21.	-0.012	157.20	0.943s
CO-57	545.30	136.47	567.	-21.	-0.012	160.17	0.943s
Tc-99m	561.44	140.51	589.	-21.	-0.012	162.39	0.947s
U-235	574.53	143.79	610.	-21.	-0.012	164.64	0.950
CE-141	581.15	145.44	541.	-12.	-0.006	283.70	0.952s
Ba-140	649.99	162.66	133.	5.	0.003	329.24	0.969s
U-235	652.87	163.38	138.	0.	0.000	1000.00	0.970s
CE-139	662.76	165.85	137.	-17.	-0.009	102.97	0.973s
Cf-251	705.72	176.60	73.	6.	0.003	285.82	0.983s
U-235	742.18	185.72	175.	-34.	-0.019	51.91	0.992s
TH-229	773.32	193.51	99.	-18.	-0.010	105.73	1.000s
U-235	820.59	205.33	66.	15.	0.008	105.09	1.012s
TH-229	842.65	210.85	81.	8.	0.005	204.59	1.018s
Cf-251	907.22	227.00	40.	12.	0.007	103.85	1.034s
TH-227	943.09	235.97	370.	14.	0.008	195.75	1.043s
PB-212	953.73	238.63	51.	169.	0.094	9.77	1.045D
PB-214	967.18	242.00	46.	44.	0.024	26.58	1.049D
EU-152	977.96	244.69	332.	12.	0.006	224.90	1.051s
TH-227	1024.13	256.24	70.	-16.	-0.009	100.13	1.063

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	1062.48	265.83	67.	-12.	-0.007	130.84	1.072
TL-208	1107.64	277.13	14.	29.	0.016	31.62	0.800s
Hg-203	1115.93	279.20	122.	-16.	-0.009	103.69	1.086s
PB-214	1177.96	294.71	24.	68.	0.038	18.32	1.088
TL-210	1183.11	296.00	315.	12.	0.007	209.27	1.102s
PB-212	1199.86	300.19	14.	28.	0.016	30.86	1.125
PA-231	1199.38	300.07	327.	12.	0.007	212.42	1.106
PA-231	1209.70	302.65	340.	0.	0.000	1000.00	1.109s
BA-133	1210.50	302.85	340.	0.	0.000	1000.00	1.109s
Ba-140	1218.49	304.85	340.	0.	0.000	1000.00	1.111s
BI-210M	1218.68	304.90	340.	0.	0.000	1000.00	1.111s
Ir-192	1232.85	308.44	340.	0.	0.000	1000.00	1.115s
PA-233	1247.13	312.01	340.	0.	0.000	1000.00	1.118s
Ir-192	1265.04	316.49	367.	-14.	-0.008	202.20	1.123s
CR-51	1279.41	320.08	388.	-14.	-0.008	199.28	1.126s
La-140	1314.10	328.76	108.	2.	0.001	980.93	1.135s
Cf-249	1332.81	333.44	78.	13.	0.007	99.32	1.139s
AC-228	1351.73	338.17	23.	56.	0.031	21.24	1.167s
Cs-136	1361.32	340.57	212.	-16.	-0.009	127.81	1.146s
EU-152	1376.18	344.29	123.	9.	0.005	182.39	1.150s
HF-181	1382.35	345.83	184.	-15.	-0.009	126.24	1.151s
PB-214	1406.45	351.85	31.	89.	0.050	15.57	1.330
BA-133	1423.02	356.00	158.	-12.	-0.006	157.12	1.162s
I-131	1456.95	364.48	28.	4.	0.002	263.79	1.170s
Cf-249	1550.79	387.95	75.	0.	0.000	1000.00	1.193s
SN-113	1565.74	391.69	66.	-13.	-0.007	91.40	1.196s
SB-125	1710.45	427.88	44.	-9.	-0.005	148.10	1.232
AG-108M	1734.69	433.94	20.	1.	0.001	881.29	1.238s
PM-146	1814.45	453.88	28.	9.	0.005	119.84	1.257s
SB-125	1852.39	463.37	22.	46.	0.026	20.62	1.266
Ir-192	1871.16	468.06	82.	-10.	-0.005	133.40	1.271s
BE-7	1909.29	477.60	94.	-13.	-0.007	106.60	1.280s
HF-181	1926.90	482.00	108.	-3.	-0.002	468.81	1.284s
La-140	1946.98	487.02	110.	2.	0.001	989.95	1.289
RU-103	1987.11	497.05	32.	-10.	-0.006	115.18	1.298
RH-106	2046.35	511.86	20.	94.	0.052	12.31	2.563
Kr-85	2054.81	513.98	108.	6.	0.004	230.76	1.315s
Nd-147	2122.88	531.00	4.	5.	0.003	102.93	1.331s
CS-134	2251.82	563.24	35.	-9.	-0.005	142.77	1.362s
CS-134	2276.15	569.32	17.	6.	0.003	112.07	1.367s
BI-207	2277.68	569.70	29.	-4.	-0.002	183.17	1.368s
TL-208	2331.62	583.19	6.	80.	0.044	12.93	1.033s
SB-125	2400.87	600.50	224.	-12.	-0.007	180.38	1.397s
SB-124	2409.79	602.73	212.	-12.	-0.007	175.39	1.399s
CS-134	2417.71	604.71	273.	-15.	-0.009	153.68	1.401s
BI-214	2436.31	609.36	4.	111.	0.062	10.18	1.255
RU-103	2440.06	610.30	257.	-15.	-0.009	148.85	1.406s
AG-108M	2455.99	614.28	242.	-16.	-0.009	144.06	1.410s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-144	2471.12	618.06	196.	-7.	-0.004	299.93	1.414s
RH-106	2486.54	621.92	184.	12.	0.007	160.19	1.417s
SB-125	2542.43	635.89	22.	-4.	-0.002	186.97	1.430s
I-131	2546.77	636.97	35.	-3.	-0.002	255.73	1.432s
AG-110M	2629.92	657.76	35.	11.	0.006	79.92	1.451s
CS-137	2645.51	661.66	46.	11.	0.006	94.81	1.455s
PM-144	2785.05	696.54	28.	0.	0.000	1000.00	1.487s
NB-94	2809.41	702.63	28.	-2.	-0.001	565.69	1.493s
SB-124	2890.04	722.79	63.	-12.	-0.007	100.10	1.512s
AG-108M	2890.65	722.94	52.	-12.	-0.007	91.19	1.512s
EU-154	2892.34	723.36	40.	-2.	-0.001	494.92	1.512s
BI-212	2908.32	727.36	0.	25.	0.014	20.00	1.000s
PM-146	2941.78	735.72	9.	7.	0.004	104.64	1.524s
PM-146	2987.55	747.16	14.	6.	0.003	138.44	1.535s
ZR-95	3025.83	756.73	0.	15.	0.008	25.82	1.543s
AG-110M	3054.69	763.94	35.	-10.	-0.006	89.44	1.550s
NB-95	3062.08	765.79	58.	-10.	-0.006	112.25	1.552s
PA-234M	3064.57	766.41	71.	2.	0.001	513.69	1.552s
EU-152	3114.61	778.92	23.	-8.	-0.005	127.75	1.564s
BI-212	3140.62	785.42	19.	5.	0.003	177.22	1.570s
CS-134	3182.43	795.87	85.	-17.	-0.010	78.82	1.579s
TL-210	3197.35	799.60	53.	12.	0.007	88.53	1.583s
CS-134	3206.76	801.95	76.	-16.	-0.009	82.91	1.585s
CO-58	3242.06	810.78	19.	8.	0.004	86.42	1.593s
La-140	3262.05	815.77	16.	5.	0.003	121.67	1.598s
Cs-136	3272.97	818.50	23.	5.	0.003	133.46	1.600s
MN-54	3338.38	834.85	28.	-12.	-0.007	97.89	1.615s
Co-56	3386.08	846.77	30.	-6.	-0.003	204.80	1.626s
TL-208	3441.27	860.56	10.	20.	0.011	41.33	1.638s
NB-94	3483.41	871.10	12.	6.	0.003	91.29	1.648s
EU-154	3491.95	873.23	6.	0.	0.000	1000.00	1.650s
PA-234	3521.16	880.53	10.	6.	0.003	89.80	1.657
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	28.	2.	0.001	409.56	1.664s
Y-88	3591.22	898.04	15.	-3.	-0.002	289.64	1.672s
AC-228	3643.36	911.07	20.	28.	0.016	39.88	1.684s
AG-110M	3749.09	937.49	10.	5.	0.003	146.06	1.708s
PA-234	3783.21	946.02	15.	-3.	-0.002	289.64	1.716s
EU-152	3855.60	964.11	61.	-12.	-0.007	96.34	1.732s
AC-228	3875.05	968.97	45.	12.	0.007	83.42	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	33.	-9.	-0.005	99.72	1.768s
Co-56	4150.66	1037.84	5.	4.	0.002	152.39	1.798s
Cs-136	4191.60	1048.07	6.	6.	0.003	75.56	1.807s
RH-106	4200.76	1050.36	26.	-11.	-0.006	72.98	1.809s
BI-207	4253.99	1063.66	32.	-12.	-0.007	110.97	1.820s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ga-68	4308.98	1077.40	16.	-2.	-0.001	460.07	1.833s
FE-59	4396.44	1099.25	11.	2.	0.001	324.82	1.852s
EU-152	4447.76	1112.07	70.	-13.	-0.007	95.38	1.863s
ZN-65	4461.66	1115.55	57.	-5.	-0.003	219.84	1.866s
BI-214	4480.63	1120.29	47.	11.	0.006	92.09	1.870
Sc-46	4481.68	1120.55	52.	0.	0.000	1000.00	1.870s
Ta-182	4484.69	1121.30	41.	11.	0.006	85.92	1.871s
CO-60	4692.57	1173.24	21.	-10.	-0.006	106.26	1.916s
Ta-182	4755.86	1189.05	0.	13.	0.007	27.74	1.930s
Co-56	4952.92	1238.28	17.	11.	0.006	92.93	1.972
NA-22	5098.03	1274.53	6.	6.	0.004	66.37	2.003s
EU-154	5098.08	1274.54	12.	0.	0.000	1000.00	2.003s
FE-59	5166.35	1291.60	6.	3.	0.002	176.21	2.017s
TL-210	5252.04	1313.00	0.	12.	0.007	28.87	2.036s
EU-152	5632.39	1408.00	24.	-8.	-0.004	152.07	2.115s
K-40	5842.90	1460.58	0.	105.	0.058	9.76	2.009
La-140	6386.02	1596.21	6.	-1.	-0.001	600.00	2.269s
BI-214	7060.00	1764.49	0.	22.	0.012	21.32	2.403
Co-56	7087.48	1771.35	22.	0.	0.000	1000.00	2.408s
Y-88	7346.69	1836.06	0.	0.	0.000	1000.00	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	-4.3280E+00				5.31E+01	
			477.60	-4.328E+00	&(	1.557E+01 1.07E+02 1.05E+01	G
NA-22	C	4.4487E-01				9.50E+02	
			1274.53	4.449E-01	?(	9.696E-01 6.64E+01 9.99E+01	G
K-40	N	7.6868E+01				4.66E+11	
			1460.83	7.687E+01	(	5.395E+00 9.76E+00 1.07E+01	G
Sc-46	F	1.0018E-01				8.38E+01	
			889.28	1.002E-01	?(	1.476E+00 4.10E+02 1.00E+02	G
			1120.55	0.000E+00	-	2.314E+00 1.00E+03 1.00E+02	G
CR-51	F	-3.5690E+00				2.77E+01	
			320.08	-3.569E+00	?(	2.391E+01 1.99E+02 9.94E+00	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C	-6.1695E-01					3.12E+02	
			834.85	-6.169E-01	?(	1.407E+00	9.79E+01	1.00E+02 G
FE-59	F	3.8410E-01					4.45E+01	
			1099.25	2.594E-01	?(	1.993E+00	3.25E+02	5.65E+01 G
			1291.60	5.472E-01	?(	2.266E+00	1.76E+02	4.32E+01 G
Co-56	C	3.6891E-01					7.73E+01	
			846.77	-3.118E-01	?(	1.467E+00	2.05E+02	9.99E+01 G
			1238.28	1.143E+00	?(	2.279E+00	9.29E+01	6.61E+01 G
			1037.84	1.562E+00	?(	5.740E+00	1.52E+02	1.41E+01 G
			1771.35	0.000E+00	-	1.456E+01	1.00E+03	1.55E+01 A
CO-57	C	-3.1296E-01					2.72E+02	
			122.06	-3.130E-01	?(	1.007E+00	9.61E+01	8.56E+01 G
			136.47	-3.024E+00	&	1.620E+01	1.60E+02	1.07E+01 G
CO-58	C	3.9640E-01					7.09E+01	
			810.78	3.964E-01	?(	1.165E+00	8.64E+01	9.95E+01 G
CO-60	F	-2.4221E-02					1.93E+03	
			1332.50	-2.422E-02	%(	1.337E+00	2.37E+03	1.00E+02 G
			1173.24	-6.820E-01	+	1.599E+00	1.06E+02	9.99E+01 G
ZN-65	F	-6.2235E-01					2.44E+02	
			1115.55	-6.224E-01	&(	4.753E+00	2.20E+02	5.06E+01 G
NB-94	I	1.1490E-01					7.41E+06	
			702.63	-9.270E-02	?(	1.269E+00	5.66E+02	9.79E+01 G
			871.10	3.184E-01	&(	1.000E+00	9.13E+01	9.99E+01 G
ZR-95	I	1.3188E+00					6.40E+01	
			756.73	1.319E+00	?(	6.480E-01	2.58E+01	5.45E+01 G
			724.20	3.444E-08	%	3.329E+00	2.68E+09	4.42E+01 G
NB-95	I	-4.8397E-01					6.40E+01	
			765.79	-4.840E-01	?(	1.849E+00	1.12E+02	9.98E+01 G
RU-103	I	-3.8681E-01					3.93E+01	
			497.05	-3.868E-01	?(	1.124E+00	1.15E+02	9.09E+01 G
			610.30	-1.101E+01	+	5.514E+01	1.49E+02	5.75E+00 GA
RH-106	I	5.0869E+00					3.74E+02	
			621.92	5.087E+00	?(	2.755E+01	1.60E+02	9.93E+00 G
			1050.36	-4.242E+01	+	1.034E+02	7.30E+01	1.56E+00 G
			511.86	1.689E+01		4.232E+00	1.23E+01	2.00E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-108M	C	3.5068E-02					1.53E+05	
			433.94	3.507E-02	?(	8.258E-01	8.81E+02	9.05E+01 G
			722.94	-5.995E-01	+	1.845E+00	9.12E+01	9.08E+01 G
			614.28	-7.099E-01	+	3.441E+00	1.44E+02	8.98E+01 G
AG-110M	F	5.3399E-01					2.50E+02	
			884.68	4.259E-01	?(	1.813E+00	1.22E+02	7.27E+01 G
			657.76	5.156E-01	?(	1.384E+00	7.99E+01	9.46E+01 G
			937.49	8.134E-01	?(	2.838E+00	1.46E+02	3.44E+01 G
			1384.30	1.027E-01	%	4.253E+00	1.68E+03	2.43E+01 G
			763.94	-2.164E+00	&	6.552E+00	8.94E+01	2.23E+01 G
SN-113	F	-6.0292E-01					1.15E+02	
			391.69	-6.029E-01	?(	1.856E+00	9.14E+01	6.40E+01 G
SB-124	F	-4.9203E-01					6.02E+01	
			602.73	-4.920E-01	?(	2.916E+00	1.75E+02	9.83E+01 G
			1690.98	-6.148E-02	%	2.663E+00	1.88E+03	4.78E+01 G
			722.79	-5.036E+00	+	1.705E+01	1.00E+02	1.08E+01 G
SB-125	I	3.1234E+00					1.01E+03	
			427.88	-9.545E-01	&(	3.566E+00	1.48E+02	2.96E+01 G
			600.50	-2.696E+00	&	1.643E+01	1.80E+02	1.79E+01 G
			635.89	-1.368E+00	+	9.104E+00	1.87E+02	1.13E+01 G
			463.37	1.465E+01	(	7.825E+00	2.06E+01	1.05E+01 G
I-131	I	1.3595E-01					8.02E+00	
			364.48	1.359E-01	(	9.302E-01	2.64E+02	8.17E+01 G
			284.30	-4.993E-01	&	1.352E+01	1.01E+03	6.14E+00 G
			636.97	-1.964E+00	+	1.777E+01	2.56E+02	7.17E+00 G
Gd-153	F	-6.1510E-02					2.42E+02	
			97.50	-8.928E-01	&(	4.328E+00	1.44E+02	3.00E+01 G
			103.20	1.083E+00	?(	5.087E+00	1.40E+02	2.18E+01 G
Ga-68	C	-4.3679E+00					4.71E-02	
			1077.40	-4.368E+00	?(	4.663E+01	4.60E+02	3.30E+00 G
Tc-99m	I	-3.7691E-01					2.51E-01	
			140.51	-3.769E-01	?(	2.047E+00	1.62E+02	8.93E+01 G
BA-133	F	-5.0541E-01					3.85E+03	
			356.00	-5.054E-01	?(	2.689E+00	1.57E+02	6.20E+01 G
			302.85	0.000E+00	+	1.166E+01	1.00E+03	1.83E+01 G
			383.84	-2.154E-01	%	1.389E+01	1.84E+03	8.94E+00 GA
			80.99	-1.045E+00	+	4.519E+00	1.29E+02	3.41E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	I	-1.0082E+00					7.54E+02	
			795.87	-1.008E+00	(	2.652E+00	7.88E+01	8.55E+01 G
			604.71	-6.418E-01	+	3.318E+00	1.54E+02	9.76E+01 G
			569.32	1.433E+00	+	5.593E+00	1.12E+02	1.54E+01 G
			801.95	-8.957E+00	+	2.486E+01	8.29E+01	8.69E+00 G
			563.24	-4.006E+00	+	1.393E+01	1.43E+02	8.35E+00 G
CS-137	I	5.4644E-01					1.10E+04	
			661.66	5.464E-01	*(	1.754E+00	9.48E+01	8.52E+01 G
CE-139	F	-3.3803E-01					1.38E+02	
			165.85	-3.380E-01	?(	1.169E+00	1.03E+02	7.99E+01 G
Ba-140	I	3.8592E-01					1.28E+01	
			537.26	1.528E-01	%(	4.045E+00	1.05E+03	2.44E+01 G
			162.66	1.300E+00	?(	1.468E+01	3.29E+02	6.22E+00 G
			304.85	0.000E+00	-	5.006E+01	1.00E+03	4.29E+00 G
La-140	I	1.4050E-01					1.28E+01	
			1596.21	-8.802E-02	?(	1.243E+00	6.00E+02	9.54E+01 G
			487.02	1.142E-01	?(	3.917E+00	9.90E+02	4.55E+01 G
			328.76	1.896E-01	?(	6.450E+00	9.81E+02	2.03E+01 G
			815.77	1.086E+00	?(	4.636E+00	1.22E+02	2.33E+01 G
CE-141	I	-3.7483E-01					3.25E+01	
			145.44	-3.748E-01	?(	3.572E+00	2.84E+02	4.82E+01 G
CE-144	I	-2.8891E+00					2.85E+02	
			133.54	-2.889E+00	(	1.552E+01	1.61E+02	1.11E+01 G
EU-152	F	1.1277E+00					4.94E+03	
			121.78	8.243E-01	?(	2.805E+00	1.01E+02	2.86E+01 G
			344.29	8.786E-01	&(	5.461E+00	1.82E+02	2.65E+01 G
			1112.07	-6.017E+00	+	1.935E+01	9.54E+01	1.36E+01 G
			778.92	-3.149E+00	+	9.529E+00	1.28E+02	1.29E+01 G
			964.11	-4.706E+00	+	1.531E+01	9.63E+01	1.46E+01 G
			244.69	3.142E+00	?(	2.382E+01	2.25E+02	7.58E+00 G
			1408.00	-2.889E+00	+	9.223E+00	1.52E+02	2.10E+01 GA
EU-154	I	5.5088E-01					3.14E+03	
			123.10	-1.832E-01	?(	2.054E+00	3.27E+02	4.08E+01 G
			1274.54	0.000E+00	+	3.761E+00	1.00E+03	3.52E+01 G
			723.36	-4.180E-01	+	7.361E+00	4.95E+02	2.02E+01 G
			873.23	0.000E+00	+	6.112E+00	1.00E+03	1.23E+01 G
			1004.77	-2.839E+00	+	9.658E+00	9.97E+01	1.80E+01 G
			996.33	3.376E+00	?(	9.684E+00	8.40E+01	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	7.8115E-01					1.81E+03	
			105.31	7.812E-01	?(	5.505E+00	2.09E+02	2.12E+01 G
			86.54	-1.045E+00	+	5.319E+00	1.52E+02	3.07E+01 G
HF-181	F	-1.3407E-02					4.24E+01	
			482.00	-1.347E-01	(	2.181E+00	4.69E+02	8.05E+01 G
			133.02	2.120E-01	(	3.284E+00	4.58E+02	4.33E+01 G
			345.83	-2.743E+00	&	1.166E+01	1.26E+02	1.51E+01 G
			136.30	-5.519E+00	&	2.902E+01	1.57E+02	5.85E+00 G
Ta-182	F	3.1003E+00					1.14E+02	
			1121.30	2.059E+00	?(	5.962E+00	8.59E+01	3.49E+01 G
			1221.41	1.678E-01	%	4.631E+00	1.19E+03	2.70E+01 G
			1189.05	5.344E+00	?(	3.030E+00	2.77E+01	1.62E+01 G
Hg-203	F	-4.3323E-01					4.66E+01	
			279.20	-4.332E-01	?(	1.511E+00	1.04E+02	8.15E+01 G
TL-208	N	3.7328E+00					6.98E+02	
			583.02	3.733E+00	(	6.765E-01	1.29E+01	8.45E+01 G
			277.28	1.031E+01	+	7.242E+00	3.16E+01	6.31E+00 G
			860.56	8.461E+00	&	7.380E+00	4.13E+01	1.24E+01 G
PM-146	C	7.3491E-01					2.02E+03	
			453.88	4.546E-01	?(	1.382E+00	1.20E+02	6.50E+01 G
			747.16	8.372E-01	&(	2.811E+00	1.38E+02	3.40E+01 G
			735.72	1.390E+00	?(	3.534E+00	1.05E+02	2.25E+01 G
Cd-113m		3.6251E+02					5.33E+03	
			263.70	3.625E+02	%(	1.512E+04	1.19E+03	6.00E-03 K
Cf-251	T	5.6073E-01					3.28E+05	
			176.60	5.607E-01	(	4.217E+00	2.86E+02	1.70E+01 G
			227.00	3.701E+00	&	1.004E+01	1.04E+02	6.30E+00 GA
Cf-249	T	4.1792E-01					1.28E+05	
			387.95	0.000E+00	?(	1.905E+00	1.00E+03	6.60E+01 G
			333.44	2.196E+00	&(	7.358E+00	9.93E+01	1.55E+01 G
Sn-126		3.5371E+00					3.65E+07	
			87.57	2.012E+00	}	4.204E+00	2.76E+01	3.75E+01 GA
			64.28	3.537E+00	?(	1.574E+01	1.33E+02	9.70E+00 G
			86.94	2.057E+00	}	1.765E+01	1.28E+02	9.04E+00 GA
PB-210	N	2.9015E+01					8.14E+03	
			46.54	2.902E+01	(P	3.251E+01	3.98E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	7.9060E+00					6.98E+02	
			238.63	7.906E+00	(P	1.683E+00	9.77E+00	4.33E+01 G
			300.03	2.044E+01	+	1.470E+01	3.09E+01	3.28E+00 GA
PB-214	N	7.0587E+00					5.84E+05	
			351.93	6.431E+00	(P	2.046E+00	1.56E+01	3.76E+01 G
			295.09	8.281E+00	(P	3.151E+00	1.83E+01	1.93E+01 G
			242.00	1.208E+01	+	9.456E+00	2.66E+01	7.43E+00 GA
BI-207	C	-9.8735E-01					1.18E+04	
			1063.66	-9.874E-01	?(	2.392E+00	1.11E+02	7.45E+01 G
			569.70	-1.726E-01	+	1.113E+00	1.83E+02	9.77E+01 G
BI-212	N	1.5405E+01					6.98E+02	
			727.17	1.540E+01	(	4.541E+00	2.00E+01	7.55E+00 G
			785.42	2.049E+01	?	8.778E+01	1.77E+02	1.28E+00 GA
U-235	N	-3.5523E-01					2.57E+11	
			143.79	-3.014E+00	(	1.659E+01	1.65E+02	1.10E+01 G
			205.33	5.462E+00	&(	1.485E+01	1.05E+02	5.01E+00 G
			163.38	0.000E+00	+	1.833E+01	1.00E+03	5.08E+00 G
			185.72	-1.080E+00	+ P	2.060E+00	5.19E+01	5.40E+01 GA
BI-214	N	9.8793E+00					5.84E+05	
			609.31	9.879E+00	(	1.032E+00	1.02E+01	4.61E+01 G
			1120.29	4.704E+00	&	1.464E+01	9.21E+01	1.51E+01 G
			1764.49	1.306E+01	+	4.376E+00	2.13E+01	1.54E+01 G
BI-210M	T	-5.2509E-01					1.10E+09	
			265.83	-5.251E-01	&(	1.788E+00	1.31E+02	5.00E+01 G
			304.90	0.000E+00	+	7.670E+00	1.00E+03	2.80E+01 G
AC-228	N	6.3315E+00					2.10E+03	
			911.07	5.286E+00	?(	4.446E+00	3.99E+01	2.90E+01 G
			968.97	3.960E+00	?(	1.111E+01	8.34E+01	1.75E+01 G
			338.32	1.230E+01	@(	5.437E+00	2.12E+01	1.20E+01 G
			93.35	4.530E+00	?	1.722E+01	1.13E+02	5.56E+00 XA
TH-227	N	-4.8999E+00					7.95E+03	
			256.24	-4.900E+00	&(	1.266E+01	1.00E+02	7.00E+00 G
			235.97	2.293E+00	+	1.510E+01	1.96E+02	1.23E+01 G
			50.14	2.955E+00	+	2.302E+01	2.30E+02	8.00E+00 G
TH-229	N	-7.2610E+00					2.68E+06	
			193.51	-7.261E+00	&(	1.973E+01	1.06E+02	4.40E+00 G
			210.85	5.197E+00	&	2.779E+01	2.05E+02	2.99E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	1.4073E+01					1.63E+12	
			92.59	7.983E+00	(P	1.452E+01	5.58E+01	5.58E+00 G
			63.29	2.300E+01	(P	1.996E+01	2.88E+01	3.81E+00 G
PA-231	N	5.4510E+00					1.20E+07	
			302.65	0.000E+00	?(	7.416E+01	1.00E+03	2.88E+00 G
			300.07	1.183E+01	(	8.470E+01	2.12E+02	2.46E+00 G
PA-234	N	1.9351E+00					1.63E+12	
			131.29	1.251E+00	&(	5.128E+00	1.22E+02	1.80E+01 G
			946.02	-1.260E+00	+	8.716E+00	2.90E+02	1.34E+01 G
			569.47	1.582E-01	%	1.204E+01	2.07E+03	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	4.1789E+01					1.63E+12	
			1001.00	4.300E+01	?(	1.507E+02	1.01E+02	8.37E-01 G
			766.41	3.835E+01	?(	6.884E+02	5.14E+02	2.94E-01 G
AM-241	T	-1.0945E+00					1.58E+05	
			59.54	-1.095E+00	(	4.689E+00	1.28E+02	3.59E+01 G
Np-237	F	8.4391E-01					2.14E+06	
							Derived Ave Activity	
			86.49	8.439E-01	}(	1.048E+01	3.67E+02	1.31E+01 G
Ir-192	F	-3.8705E-01					7.40E+01	
			316.49	-3.871E-01	?(	2.633E+00	2.02E+02	8.70E+01 G
			468.06	-6.412E-01	+	2.913E+00	1.33E+02	5.18E+01 G
			308.44	0.000E+00	+	6.824E+00	1.00E+03	3.18E+01 G
Cs-136	F	3.4104E-01					1.30E+01	
			818.50	2.703E-01	?(	1.262E+00	1.33E+02	1.00E+02 G
			1048.07	4.295E-01	?(	1.094E+00	7.56E+01	8.00E+01 G
			340.57	-9.232E-01	+	3.967E+00	1.28E+02	4.69E+01 G
Np-239	T	6.1265E-01					2.36E+00	
			103.70	9.833E-01	?	4.727E+00	1.43E+02	2.40E+01 X
			106.13	6.127E-01	?(	5.078E+00	2.45E+02	2.27E+01 G
			99.50	1.575E+00		7.670E+00	1.45E+02	1.50E+01 X
Nd-147		1.3149E+00					1.11E+01	
			531.00	1.315E+00	&(	3.527E+00	1.03E+02	1.30E+01 G
			91.10	-1.034E-07	%	5.343E+00	1.52E+09	2.83E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TL-210   N   5.0586E-01                                      5.84E+05
                          799.60 6.196E-01 ?(  1.848E+00 8.85E+01 9.90E+01 G
                          296.00 3.634E-01 ?(  2.563E+00 2.09E+02 7.90E+01 G
                         1313.00 4.104E+00 ?   2.521E+00 2.89E+01 2.10E+01 GA

Kr-85    I   5.4194E+01                                      3.92E+03
                          513.98 5.419E+01 ?(  4.288E+02 2.31E+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	226.	9.	0.005	229.96	2.955E+00
AM-241	59.54	315.	-20.	-0.011	127.87	-1.095E+00
BA-133	80.99	401.	-22.	-0.012	129.25	-1.045E+00
EU-155	86.54	478.	-21.	-0.011	152.04	-1.045E+00
Gd-153	97.50	320.	-18.	-0.010	144.45	-8.928E-01
Np-239	99.50	251.	16.	0.009	144.73	1.575E+00
Gd-153	103.20	235.	16.	0.009	139.68	1.083E+00

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-239	103.70	247.	16.	0.009	142.93	9.833E-01	
EU-155	105.31	263.	11.	0.006	208.62	7.812E-01	
Np-239	106.13	257.	9.	0.005	244.95	6.127E-01	
EU-152	121.78	120.	16.	0.009	101.25	8.243E-01	
CO-57	122.06	140.	-18.	-0.010	96.06	-3.130E-01	
EU-154	123.10	131.	-5.	-0.003	326.86	-1.832E-01	
PA-234	131.29	158.	15.	0.008	121.66	1.251E+00	
HF-181	133.02	384.	6.	0.003	458.29	2.120E-01	
CE-144	133.54	567.	-21.	-0.012	160.58	-2.889E+00	
HF-181	136.30	546.	-21.	-0.012	157.20	-5.519E+00	
CO-57	136.47	567.	-21.	-0.012	160.17	-3.024E+00	
Tc-99m	140.51	589.	-21.	-0.012	162.39	-3.769E-01	
U-235	143.79	610.	-21.	-0.012	164.64	-3.014E+00	
CE-141	145.44	541.	-12.	-0.006	283.70	-3.748E-01	
Ba-140	162.66	133.	5.	0.003	329.24	1.300E+00	
CE-139	165.85	137.	-17.	-0.009	102.97	-3.380E-01	
Cf-251	176.60	73.	6.	0.003	285.82	5.607E-01	
U-235	185.72	175.	-34.	-0.019	51.91	-1.080E+00	P
TH-229	193.51	99.	-18.	-0.010	105.73	-7.261E+00	
U-235	205.33	66.	15.	0.008	105.09	5.462E+00	
TH-229	210.85	81.	8.	0.005	204.59	5.197E+00	
Cf-251	227.00	40.	12.	0.007	103.85	3.701E+00	
TH-227	235.97	370.	14.	0.008	195.75	2.293E+00	
EU-152	244.69	332.	12.	0.006	224.90	3.142E+00	
TH-227	256.24	70.	-16.	-0.009	100.13	-4.900E+00	
BI-210M	265.83	67.	-12.	-0.007	130.84	-5.251E-01	
Hg-203	279.20	122.	-16.	-0.009	103.69	-4.332E-01	
TL-210	296.00	315.	12.	0.007	209.27	3.634E-01	
PA-231	300.07	327.	12.	0.007	212.42	1.183E+01	
Ir-192	316.49	367.	-14.	-0.008	202.20	-3.871E-01	
CR-51	320.08	388.	-14.	-0.008	199.28	-3.569E+00	
La-140	328.76	108.	2.	0.001	980.93	1.896E-01	
Cf-249	333.44	78.	13.	0.007	99.32	2.196E+00	
Cs-136	340.57	212.	-16.	-0.009	127.81	-9.232E-01	
EU-152	344.29	123.	9.	0.005	182.39	8.786E-01	
HF-181	345.83	184.	-15.	-0.009	126.24	-2.743E+00	
BA-133	356.00	158.	-12.	-0.006	157.12	-5.054E-01	
I-131	364.48	28.	4.	0.002	263.79	1.359E-01	
SN-113	391.69	66.	-13.	-0.007	91.40	-6.029E-01	
SB-125	427.88	44.	-9.	-0.005	148.10	-9.545E-01	
AG-108M	433.94	20.	1.	0.001	881.29	3.507E-02	
PM-146	453.88	28.	9.	0.005	119.84	4.546E-01	
SB-125	463.37	22.	46.	0.026	20.62	1.465E+01	
Ir-192	468.06	82.	-10.	-0.005	133.40	-6.412E-01	
BE-7	477.60	94.	-13.	-0.007	106.60	-4.328E+00	
HF-181	482.00	108.	-3.	-0.002	468.81	-1.347E-01	
La-140	487.02	110.	2.	0.001	989.95	1.142E-01	
RU-103	497.05	32.	-10.	-0.006	115.18	-3.868E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RH-106	511.86	20.	94.	0.052	12.31	1.689E+01	
Kr-85	513.98	108.	6.	0.004	230.76	5.419E+01	
Nd-147	531.00	4.	5.	0.003	102.93	1.315E+00	
CS-134	563.24	35.	-9.	-0.005	142.77	-4.006E+00	
CS-134	569.32	17.	6.	0.003	112.07	1.433E+00	
BI-207	569.70	29.	-4.	-0.002	183.17	-1.726E-01	
SB-125	600.50	224.	-12.	-0.007	180.38	-2.696E+00	
SB-124	602.73	212.	-12.	-0.007	175.39	-4.920E-01	
CS-134	604.71	273.	-15.	-0.009	153.68	-6.418E-01	
RU-103	610.30	257.	-15.	-0.009	148.85	-1.101E+01	
AG-108M	614.28	242.	-16.	-0.009	144.06	-7.099E-01	
PM-144	618.06	196.	-7.	-0.004	299.93	-2.774E-01	
RH-106	621.92	184.	12.	0.007	160.19	5.087E+00	
SB-125	635.89	22.	-4.	-0.002	186.97	-1.368E+00	
I-131	636.97	35.	-3.	-0.002	255.73	-1.964E+00	
AG-110M	657.76	35.	11.	0.006	79.92	5.156E-01	
CS-137	661.66	46.	11.	0.006	94.81	5.464E-01	
NB-94	702.63	28.	-2.	-0.001	565.69	-9.270E-02	
SB-124	722.79	63.	-12.	-0.007	100.10	-5.036E+00	
AG-108M	722.94	52.	-12.	-0.007	91.19	-5.995E-01	
EU-154	723.36	40.	-2.	-0.001	494.92	-4.180E-01	
PM-146	735.72	9.	7.	0.004	104.64	1.390E+00	
PM-146	747.16	14.	6.	0.003	138.44	8.372E-01	
AG-110M	763.94	35.	-10.	-0.006	89.44	-2.164E+00	
NB-95	765.79	58.	-10.	-0.006	112.25	-4.840E-01	
PA-234M	766.41	71.	2.	0.001	513.69	3.835E+01	
EU-152	778.92	23.	-8.	-0.005	127.75	-3.149E+00	
CS-134	795.87	85.	-17.	-0.010	78.82	-1.008E+00	
TL-210	799.60	53.	12.	0.007	88.53	6.196E-01	
CS-134	801.95	76.	-16.	-0.009	82.91	-8.957E+00	
CO-58	810.78	19.	8.	0.004	86.42	3.964E-01	
La-140	815.77	16.	5.	0.003	121.67	1.086E+00	
Cs-136	818.50	23.	5.	0.003	133.46	2.703E-01	
MN-54	834.85	28.	-12.	-0.007	97.89	-6.169E-01	
Co-56	846.77	30.	-6.	-0.003	204.80	-3.118E-01	
NB-94	871.10	12.	6.	0.003	91.29	3.184E-01	
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	28.	2.	0.001	409.56	1.002E-01	
Y-88	898.04	15.	-3.	-0.002	289.64	-1.735E-01	
AG-110M	937.49	10.	5.	0.003	146.06	8.134E-01	
PA-234	946.02	15.	-3.	-0.002	289.64	-1.260E+00	
EU-152	964.11	61.	-12.	-0.007	96.34	-4.706E+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	33.	-9.	-0.005	99.72	-2.839E+00	
Co-56	1037.84	5.	4.	0.002	152.39	1.562E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cs-136	1048.07	6.	6.	0.003	75.56	4.295E-01	
RH-106	1050.36	26.	-11.	-0.006	72.98	-4.242E+01	
BI-207	1063.66	32.	-12.	-0.007	110.97	-9.874E-01	
Ga-68	1077.40	16.	-2.	-0.001	460.07	-4.368E+00	
FE-59	1099.25	11.	2.	0.001	324.82	2.594E-01	
EU-152	1112.07	70.	-13.	-0.007	95.38	-6.017E+00	
ZN-65	1115.55	57.	-5.	-0.003	219.84	-6.224E-01	
CO-60	1173.24	21.	-10.	-0.006	106.26	-6.820E-01	
Co-56	1238.28	17.	11.	0.006	92.93	1.143E+00	
NA-22	1274.53	6.	6.	0.004	66.37	4.449E-01	
FE-59	1291.60	6.	3.	0.002	176.21	5.472E-01	
TL-210	1313.00	0.	12.	0.007	28.87	4.104E+00	
EU-152	1408.00	24.	-8.	-0.004	152.07	-2.889E+00	
La-140	1596.21	6.	-1.	-0.001	600.00	-8.802E-02	

P - Peakbackground subtraction

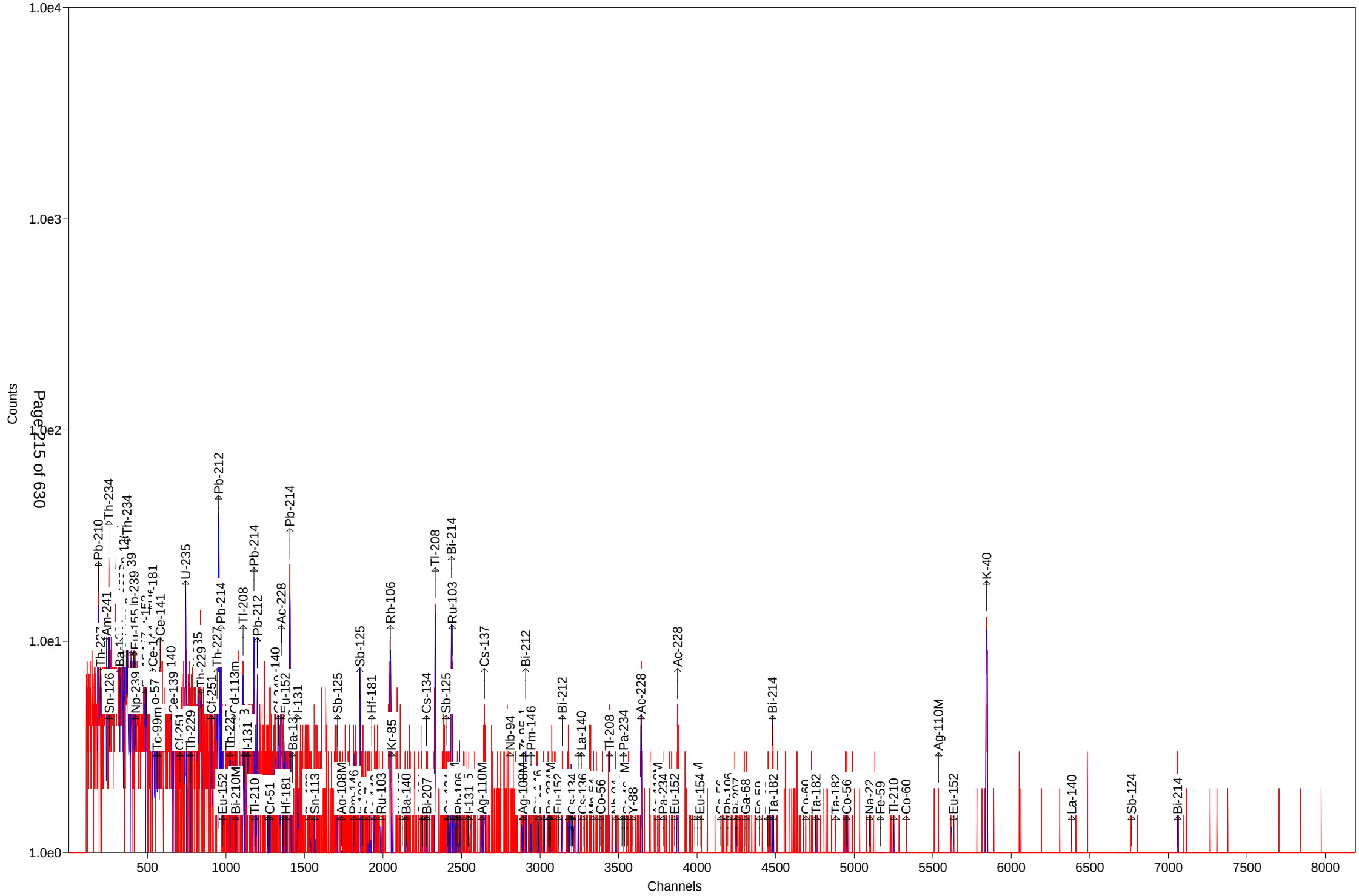
***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-4.3280E+00	-4.3280E+00	1.066E+02%	1.56E+01
NA-22	#A	4.4487E-01	4.4487E-01	6.637E+01%	9.70E-01
K-40		7.6868E+01	7.6868E+01	9.759E+00%	5.40E+00
Sc-46	#A	1.0018E-01	1.0018E-01	4.096E+02%	1.48E+00
CR-51	#A	-3.5690E+00	-3.5690E+00	1.993E+02%	2.39E+01
MN-54	#A	-6.1695E-01	-6.1695E-01	9.789E+01%	1.41E+00
FE-59	#A	3.8410E-01	3.8410E-01	1.762E+02%	1.99E+00
Co-56	#A	3.6891E-01	3.6891E-01	9.056E+01%	1.47E+00
CO-57	#A	-3.1296E-01	-3.1296E-01	9.606E+01%	1.01E+00
CO-58	#A	3.9640E-01	3.9640E-01	8.642E+01%	1.16E+00
CO-60	#A	-2.4221E-02	-2.4221E-02	2.375E+03%	1.34E+00
ZN-65	#A	-6.2235E-01	-6.2235E-01	2.198E+02%	4.75E+00
NB-94	#A	1.1490E-01	1.1490E-01	9.129E+01%	1.27E+00
ZR-95	#	1.3188E+00	1.3188E+00	2.582E+01%	6.48E-01
NB-95	#A	-4.8397E-01	-4.8397E-01	1.122E+02%	1.85E+00
RU-103	#A	-3.8680E-01	-3.8681E-01	1.152E+02%	1.12E+00
RH-106	#A	5.0869E+00	5.0869E+00	1.602E+02%	2.75E+01
AG-108M	#A	3.5068E-02	3.5068E-02	8.813E+02%	8.26E-01
AG-110M	#A	5.3399E-01	5.3399E-01	6.885E+01%	1.81E+00
SN-113	#A	-6.0292E-01	-6.0292E-01	9.140E+01%	1.86E+00
SB-124	#A	-4.9203E-01	-4.9203E-01	1.754E+02%	2.92E+00
SB-125	#A	3.1234E+00	3.1234E+00	2.062E+01%	3.57E+00
I-131	#A	1.3595E-01	1.3595E-01	2.638E+02%	9.30E-01
Gd-153	#A	-6.1510E-02	-6.1510E-02	1.005E+02%	4.33E+00
Ga-68	#A	-4.3553E+00	-4.3679E+00	4.601E+02%	4.66E+01
Tc-99m	#A	-3.7671E-01	-3.7691E-01	1.624E+02%	2.05E+00

BA-133	#A	-5.0541E-01	-5.0541E-01	1.571E+02%	2.69E+00
CS-134	#A	-1.0082E+00	-1.0082E+00	7.882E+01%	2.65E+00
CS-137	#A	5.4644E-01	5.4644E-01	9.481E+01%	1.75E+00
CE-139	#A	-3.3803E-01	-3.3803E-01	1.030E+02%	1.17E+00
Ba-140	#A	3.8592E-01	3.8592E-01	3.292E+02%	4.04E+00
La-140	#A	1.4049E-01	1.4050E-01	1.217E+02%	1.24E+00
CE-141	#A	-3.7483E-01	-3.7483E-01	2.837E+02%	3.57E+00
CE-144	#A	-2.8891E+00	-2.8891E+00	1.606E+02%	1.55E+01
PM-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.25E+00
EU-152	#A	1.1277E+00	1.1277E+00	1.012E+02%	2.81E+00
EU-154	#A	5.5088E-01	5.5088E-01	8.399E+01%	2.05E+00
EU-155	#A	7.8115E-01	7.8115E-01	2.086E+02%	5.50E+00
HF-181	#A	-1.3407E-02	-1.3407E-02	3.278E+02%	2.18E+00
Ta-182	#A	3.1003E+00	3.1003E+00	2.774E+01%	5.96E+00
Hg-203	#A	-4.3322E-01	-4.3323E-01	1.037E+02%	1.51E+00
TL-208		3.7328E+00	3.7328E+00	1.293E+01%	6.76E-01
PM-146	#A	7.3491E-01	7.3491E-01	7.030E+01%	1.38E+00
Y-88	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.04E-01
Cd-113m	#B	3.6251E+02	3.6251E+02	1.187E+03%	1.51E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.05E+01
Cf-251	#A	5.6073E-01	5.6073E-01	2.858E+02%	4.22E+00
Cf-249	#A	4.1792E-01	4.1792E-01	9.932E+01%	1.90E+00
Sn-126	#A	3.5371E+00	3.5371E+00	1.326E+02%	1.57E+01
PB-210	A	2.9015E+01	2.9015E+01	3.985E+01%	3.25E+01
PB-212		7.9060E+00	7.9060E+00	9.774E+00%	1.68E+00
PB-214		7.0587E+00	7.0587E+00	1.202E+01%	2.05E+00
BI-207	#A	-9.8735E-01	-9.8735E-01	1.110E+02%	2.39E+00
BI-212		1.5405E+01	1.5405E+01	2.000E+01%	4.54E+00
U-235	#A	-3.5523E-01	-3.5523E-01	9.766E+01%	1.66E+01
BI-214		9.8793E+00	9.8793E+00	1.018E+01%	1.03E+00
BI-210M	#A	-5.2509E-01	-5.2509E-01	1.308E+02%	1.79E+00
AC-228	#	6.3315E+00	6.3315E+00	2.124E+01%	4.45E+00
TH-227	#A	-4.8999E+00	-4.8999E+00	1.001E+02%	1.27E+01
TH-229	#A	-7.2610E+00	-7.2610E+00	1.057E+02%	1.97E+01
TH-234	A	1.4073E+01	1.4073E+01	2.881E+01%	1.45E+01
PA-231	#A	5.4510E+00	5.4510E+00	2.124E+02%	7.42E+01
PA-233	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.07E+00
PA-234	#A	1.9351E+00	1.9351E+00	8.109E+01%	5.13E+00
PA-234M	#A	4.1789E+01	4.1789E+01	1.014E+02%	1.51E+02
AM-241	#A	-1.0945E+00	-1.0945E+00	1.279E+02%	4.69E+00
Np-237	#A	8.4391E-01	8.4391E-01	3.673E+02%	1.05E+01
Ir-192	#A	-3.8705E-01	-3.8705E-01	2.022E+02%	2.63E+00
Cs-136	#A	3.4104E-01	3.4104E-01	7.556E+01%	1.26E+00
Np-239	#A	6.1262E-01	6.1265E-01	2.449E+02%	5.08E+00
Nd-147	#A	1.3148E+00	1.3149E+00	1.029E+02%	3.53E+00
TL-210	#A	5.0586E-01	5.0586E-01	8.853E+01%	1.85E+00
Kr-85	#A	5.4194E+01	5.4194E+01	2.308E+02%	4.29E+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)     1.703E+02  Bq/Sample
Total Decayed Activity (   25.1 to  1999.1 keV) 1.7026924E+02  Bq/Sample
```

405451_Gamma_490-164491-A-5-A. 12_Gamma_20190007.spc.



Test America St. Louis Spectrum ID: 14_Gamma_20190007

Sample Description: 405451_Gamma_490-164491-A-6-A
Detector: Detector #14
Batch ID: 405451
Work Order Number: Gamma
Lot Number: 490-164491-A-6-A

Decay to Time: 1/2/2019 13:30 Live Time: 1800 sec
Acquisition Time: 1/2/2019 13:30:59 Real Time: 1801 sec
Analysis Time: 1/2/2019 14:02 Dead Time: 0.05 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 14_Soil_TunaCan.Clb
Efficiency Cal Desc: 14_TunaCan_90099_042312
Efficiency Cal Date: 4/23/2012 11:29
Energy Cal Date: 2/28/2012 10:48
Library: Client_Long_Rev15.lib
Bkgd Correction File: 14_2018-12-22_1356.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	2.790E+00	108.3	3.021E+00	3.025E+00	1.031E+01
NA-22	-6.738E-01	77.3	5.206E-01	5.217E-01	1.749E+00
K-40	7.477E+01	10.4	7.778E+00	8.668E+00	8.386E+00
Sc-46	-4.568E-01	115.0	5.251E-01	5.257E-01	1.797E+00
CR-51	2.794E-01	1169.5	3.267E+00	3.267E+00	1.138E+01
MN-54	-2.020E-01	194.2	3.924E-01	3.925E-01	1.174E+00
FE-59	6.693E-01	92.7	6.202E-01	6.211E-01	1.485E+00
Co-56	6.285E-01	34.3	2.153E-01	2.177E-01	6.601E-01
CO-57	1.207E-01	212.7	2.567E-01	2.568E-01	8.744E-01
CO-58	-7.105E-01	53.5	3.801E-01	3.819E-01	2.049E+00
CO-60	3.903E-01	33.1	1.291E-01	1.306E-01	1.009E+00
ZN-65	-1.802E-01	529.0	9.531E-01	9.532E-01	4.359E+00
NB-94	6.354E-01	50.9	3.236E-01	3.252E-01	7.566E-01
ZR-95	5.907E-01	96.5	5.702E-01	5.711E-01	1.435E+00
NB-95	1.849E-01	193.2	3.573E-01	3.574E-01	1.265E+00
RU-103	2.662E-01	101.4	2.701E-01	2.704E-01	6.981E-01
RH-106	8.052E-01	450.9	3.631E+00	3.631E+00	9.284E+00
AG-108M	1.002E-01	298.1	2.988E-01	2.988E-01	8.207E-01
AG-110M	3.744E-01	76.6	2.868E-01	2.874E-01	2.140E+00
SN-113	5.651E-02	1042.1	5.888E-01	5.889E-01	2.051E+00
SB-124	7.927E-01	30.9	2.450E-01	2.485E-01	3.048E+00
SB-125	2.056E-01	113.0	2.323E-01	2.325E-01	3.395E+00
I-131	-1.910E-01	94.4	1.802E-01	1.805E-01	1.308E+00
Gd-153	6.572E-01	85.5	5.620E-01	5.634E-01	2.184E+00
Ga-68	8.935E+00	132.7	1.185E+01	1.186E+01	2.933E+01
Tc-99m	-2.621E-01	131.4	3.443E-01	3.446E-01	1.157E+00
BA-133	-2.084E-01	375.8	7.832E-01	7.833E-01	2.675E+00
CS-134	7.146E-01	79.1	5.649E-01	5.662E-01	1.685E+00
CS-137	-5.380E-01	84.2	4.532E-01	4.540E-01	1.660E+00
CE-139	2.608E-01	118.3	3.087E-01	3.097E-01	1.041E+00
Ba-140	1.600E+00	83.9	1.342E+00	1.345E+00	3.179E+00
La-140	4.556E-01	44.7	2.038E-01	2.052E-01	6.716E-01
CE-141	4.745E-01	135.0	6.407E-01	6.411E-01	2.152E+00

CE-144	0.000E+00	1.#INF	1.272E+00	1.272E+00	9.197E+00
PM-144	2.375E-01	120.7	2.867E-01	2.870E-01	7.317E-01
EU-152	1.706E+00	89.4	1.524E+00	1.527E+00	2.484E+00
EU-154	2.092E-01	100.2	2.096E-01	2.099E-01	2.029E+00
EU-155	-4.104E-03	24107.4	9.895E-01	9.895E-01	3.768E+00
HF-181	1.380E-01	387.4	5.345E-01	5.345E-01	1.469E+00
Ta-182	2.481E-01	706.2	1.752E+00	1.752E+00	6.233E+00
Hg-203	2.102E-01	169.6	3.564E-01	3.566E-01	1.220E+00
TL-208	2.816E+00	14.2	4.001E-01	4.259E-01	6.281E-01
PM-146	3.651E-01	112.1	4.092E-01	4.096E-01	1.135E+00
Y-88	0.000E+00	1.#INF	9.849E-02	9.849E-02	7.259E-01
Cd-113m	3.985E+03	99.7	3.975E+03	3.983E+03	1.345E+04
Cd-109	6.927E+00	150.4	1.042E+01	1.043E+01	3.490E+01
Cf-251	1.475E-01	917.6	1.354E+00	1.354E+00	3.772E+00
Cf-249	6.286E-01	81.2	5.106E-01	5.116E-01	1.783E+00
Sn-126	-2.934E+00	126.8	3.721E+00	3.724E+00	1.250E+01
PB-210	2.041E+01	41.1	8.392E+00	8.477E+00	2.356E+01
PB-212	8.496E+00	9.0	7.663E-01	9.430E-01	1.374E+00
PB-214	7.942E+00	10.9	8.630E-01	9.566E-01	1.308E+00
BI-207	3.137E-01	96.9	3.039E-01	3.044E-01	1.464E+00
BI-212	5.098E+00	99.3	5.061E+00	5.068E+00	1.728E+01
U-235	-2.305E+00	88.8	2.046E+00	2.050E+00	9.130E+00
BI-214	9.481E+00	11.4	1.081E+00	1.188E+00	1.712E+00
BI-210M	2.948E-01	163.5	4.820E-01	4.823E-01	1.658E+00
AC-228	1.021E+01	11.3	1.151E+00	1.264E+00	1.393E+00
TH-227	3.635E-01	1029.4	3.742E+00	3.742E+00	1.055E+01
TH-229	3.912E+00	136.3	5.330E+00	5.339E+00	1.459E+01
TH-234	9.622E+00	34.2	3.294E+00	3.338E+00	1.243E+01
PA-231	0.000E+00	1.#INF	2.741E+00	2.741E+00	6.078E+01
PA-233	8.878E-01	161.7	1.436E+00	1.436E+00	4.839E+00
PA-234	-1.319E+00	132.4	1.746E+00	1.747E+00	5.856E+00
PA-234M	-2.224E+00	3029.0	6.735E+01	6.735E+01	1.736E+02
AM-241	7.790E-01	113.1	8.809E-01	8.818E-01	2.513E+00
Np-237	0.000E+00	1.#INF	3.288E+00	3.288E+00	1.103E+01
Ir-192	-4.717E-02	75.2	3.546E-02	3.557E-02	1.094E+00
Cs-136	-6.829E-01	105.4	7.200E-01	7.211E-01	2.429E+00
Np-239	-8.566E-01	124.8	1.069E+00	1.070E+00	3.598E+00
Nd-147	4.094E+00	52.1	2.131E+00	2.144E+00	5.145E+00
TL-210	1.639E-01	170.5	2.794E-01	2.796E-01	1.495E+00
Kr-85	0.000E+00	1.#INF	8.039E+00	8.039E+00	3.440E+02
Total	4.177E+03				

Analyst: Joey Sausto

Sample description
405451_Gamma_490-164491-A-6-A

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20190007.An1

Acquisition information
Start time: 1/2/2019 1:30:59 PM
Live time: 1800
Real time: 1801
Dead time: 0.05 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_TunaCan.Clb
14_TunaCan_90099_042312

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 4/23/2012 11:29:47 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.02 %
Log(Eff): 2.101260E-01 + (-5.951973E-01*Log(E)) + (-1.605331E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -2.391492E+01 + (8.828985E+00*Log(E)) + (-9.371496E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_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	1/2/2019 1:30:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2018-12-22_1356.PBC 12/22/2018 1:56:07 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 25 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1737

***** 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
46.29	34.	41.12	0.91	2.171E-02	46.54	4.250	PBC<MDA	PB210
59.54	15.	113.08	0.76	3.065E-02	59.54	35.900	PBC<MDA	AM241
63.24	26.	50.25	0.77	3.281E-02	63.29	3.810	PBC<MDA	TH234
74.78	87.	19.35	0.78	3.809E-02				
77.14	142.	12.41	0.78	3.894E-02				
87.99	20.	150.43	0.79	4.196E-02	88.04	3.790	PBC<MDA	Cd109
91.10	19.	152.84	0.79	4.255E-02	91.10	28.300	PBC<MDA	Nd147
92.62	36.	46.52	0.80	4.279E-02	92.59	5.584	PBC<MDA	TH234
93.38	19.	149.50	0.80	4.291E-02	93.35	5.561	PBC<MDA	AC228
97.50	13.	118.84	0.80	4.345E-02	97.50	30.000	PBC<MDA	Gd153
103.20	14.	122.99	0.81	4.392E-02	103.20	21.800	PBC<MDA	Gd153
103.70	13.	135.35	0.81	4.395E-02	103.70	24.000	PBC<MDA	Np239
121.78	15.	109.47	0.83	4.380E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.252E-01	CO57
122.06	8.	212.67	0.83	4.378E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.207E-01	CO57
146.40	17.	135.02	0.85	4.125E-02	145.44	48.200	PBC<MDA	CE141
162.66	14.	131.32	0.87	3.853E-02	162.66	6.220	PBC<MDA	Ba140
165.85	15.	118.35	0.87	3.872E-02	165.85	79.900	PBC<MDA	CE139
176.50	2.	917.61	0.88	3.692E-02	176.60	17.000	PBC<MDA	Cf251
185.72	84.	19.26	0.89	3.553E-02	185.72	54.000	2.420E+00	U235
193.51	11.	136.25	0.90	3.443E-02	193.51	4.400	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
238.22	205.	8.43	0.65	2.935E-02	238.63	43.300	8.642E+00	PB212
242.00	11.	228.63	0.95	2.900E-02	242.00	7.430	PBC<MDA	PB214
244.69	12.	211.90	0.95	2.875E-02	244.69	7.580	PBC<MDA	EU152
263.70	12.	99.74	0.97	2.714E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	7.	163.50	0.97	2.697E-02	265.83	50.000	PBC<MDA	BI210M
279.20	8.	169.56	0.99	2.596E-02	279.20	81.460	PBC<MDA	Hg203
295.09	10.	216.21	1.00	2.487E-02	295.09	19.300	PBC<MDA	PB214
296.00	13.	170.49	1.00	2.481E-02	296.00	79.000	PBC<MDA	TL210
301.02	4.	631.95	1.01	2.455E-02	300.03	3.280	PBC<MDA	PB212
312.01	14.	161.70	1.02	2.381E-02	312.01	36.000	PBC<MDA	PA233
333.44	10.	104.38	1.04	2.261E-02	333.44	15.510	PBC<MDA	Cf249
338.04	52.	17.90	0.66	2.235E-02	338.32	12.010	1.067E+01	AC228
345.83	4.	387.44	1.05	2.197E-02	345.83	15.070	PBC<MDA	HF181
351.52	116.	10.87	1.04	2.169E-02	351.93	37.600	7.522E+00	PB214
383.84	9.	126.68	1.09	2.025E-02	383.84	8.940	PBC<MDA	BA133
387.95	10.	124.47	1.09	2.008E-02	387.95	66.000	PBC<MDA	Cf249
433.94	3.	298.14	1.13	1.838E-02	433.94	90.480	PBC<MDA	AG108M
453.88	5.	180.74	1.15	1.774E-02	453.88	65.000	PBC<MDA	PM146
463.37	7.	112.99	1.16	1.745E-02	463.37	10.470	PBC<MDA	SB125
468.06	7.	114.91	1.17	1.731E-02	468.06	51.750	PBC<MDA	Ir192
477.60	9.	108.30	1.18	1.704E-02	477.60	10.520	PBC<MDA	BE7
487.02	2.	522.81	1.18	1.677E-02	487.02	45.500	PBC<MDA	La140
497.05	7.	101.44	1.19	1.650E-02	497.05	90.900	PBC<MDA	RU103
511.86	47.	21.20	2.46	1.612E-02	511.86	20.000	8.154E+00	RH106
531.00	15.	52.07	1.23	1.566E-02	531.00	13.000	PBC<MDA	Nd147
537.26	8.	104.45	1.23	1.551E-02	537.26	24.390	PBC<MDA	Ba140
563.24	6.	138.13	1.25	1.494E-02	563.24	8.350	PBC<MDA	CS134
569.32	8.	79.06	1.26	1.481E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.660E+00	PA234
					569.70	97.740	3.071E-01	BI207
569.70	5.	147.43	1.26	1.481E-02	569.32	15.380	1.138E+00	CS134
					569.47	8.200	2.135E+00	PA234
					569.70	97.740	1.792E-01	BI207
582.89	62.	14.21	1.17	1.453E-02	583.02	84.500	2.816E+00	TL208
609.06	110.	11.40	1.28	1.403E-02	609.31	46.090	9.481E+00	BI214
					610.30	5.750	7.610E+01	RU103
621.92	2.	450.94	1.31	1.380E-02	621.92	9.930	PBC<MDA	RH106
636.97	6.	160.27	1.32	1.354E-02	636.97	7.170	PBC<MDA	I131
657.76	8.	82.29	1.34	1.319E-02	657.76	94.640	PBC<MDA	AG110M
696.54	5.	120.71	1.37	1.260E-02	696.54	99.000	PBC<MDA	PM144
702.63	14.	50.92	1.38	1.251E-02	702.63	97.900	PBC<MDA	NB94
722.79	30.	30.91	1.40	1.223E-02	722.79	10.810	1.261E+01	SB124
					722.94	90.840	1.500E+00	AG108M
					723.36	20.220	6.744E+00	EU154
727.17	8.	99.27	1.40	1.217E-02	727.17	7.550	PBC<MDA	BI212
735.72	4.	132.51	1.41	1.206E-02	735.72	22.500	PBC<MDA	PM146
756.73	7.	96.55	1.43	1.179E-02	756.73	54.460	PBC<MDA	ZR95
763.94	9.	76.60	1.43	1.170E-02	763.94	22.280	PBC<MDA	AG110M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
765.79	4.	193.21	1.43	1.167E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	6.281E+01	PA234M
801.95	8.	96.80	1.46	1.124E-02	801.95	8.690	PBC<MDA	CS134
846.77	5.	98.09	1.50	1.076E-02	846.77	99.935	PBC<MDA	Co56
860.60	12.	29.69	1.51	1.062E-02	860.56	12.420	5.242E+00	TL208
871.10	5.	81.28	1.52	1.052E-02	871.10	99.890	PBC<MDA	NB94
873.23	5.	110.94	1.52	1.049E-02	873.23	12.270	PBC<MDA	EU154
911.03	53.	13.74	1.29	1.014E-02	911.07	29.000	1.001E+01	AC228
964.11	8.	122.51	1.60	9.682E-03	964.11	14.605	PBC<MDA	EU152
968.19	11.	88.17	1.60	9.642E-03	968.97	17.460	PBC<MDA	AC228
1004.77	2.	255.77	1.63	9.360E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	9.	34.25	1.65	9.116E-03	1037.84	14.130	3.822E+00	Co56
1048.07	6.	72.92	1.66	9.043E-03	1048.07	80.000	PBC<MDA	Cs136
1063.66	6.	125.77	1.67	8.934E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	4.	132.68	1.69	8.841E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	6.	92.66	1.70	8.697E-03	1099.25	56.500	PBC<MDA	FE59
1120.36	30.	20.32	1.72	8.562E-03	1120.29	15.100	1.298E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	5.620E+00	Ta182
1120.88	1.	706.22	1.72	8.556E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	8.654E-02	Sc46
					1121.30	34.900	2.481E-01	Ta182
1173.24	10.	33.08	1.76	8.244E-03	1173.24	99.900	6.561E-01	CO60
1238.28	5.	205.15	1.80	7.886E-03	1238.28	66.070	PBC<MDA	Co56
1332.50	2.	324.35	1.87	7.423E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	1.	796.87	1.91	7.192E-03	1384.30	24.290	PBC<MDA	AG110M
1460.63	99.	10.40	1.23	6.879E-03	1460.83	10.670	7.477E+01	K40
1596.21	5.	44.72	2.04	6.391E-03	1596.21	95.400	PBC<MDA	La140
1765.27	6.	94.88	2.14	5.878E-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
298.50	74.71	99.	87.	2.290E+03	19.35	0.777	- sD
307.94	77.07	84.	142.	3.649E+03	12.41	0.780	- 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	184.58	46.29	61.	34.	0.019	41.12	0.907s
TH-227	199.98	50.14	120.	-17.	-0.009	114.33	0.751s
AM-241	237.55	59.54	102.	15.	0.009	113.08	0.761s
TH-234	252.55	63.29	71.	26.	0.014	50.25	0.765D
Sn-126	256.52	64.28	226.	-17.	-0.009	126.82	0.766s
BA-133	323.33	80.99	129.	-3.	-0.002	639.88	0.784s
Np-237	345.33	86.49	513.	0.	0.000	223.60	0.789A
EU-155	345.54	86.54	316.	-24.	-0.013	107.69	0.790s
Sn-126	347.13	86.94	330.	-24.	-0.013	109.98	0.790s
Sn-126	349.65	87.57	353.	-4.	-0.002	611.68	0.791s
Cd-109	351.53	88.04	435.	20.	0.011	150.43	0.791A
Nd-147	363.77	91.10	400.	19.	0.010	152.84	0.794s
TH-234	369.72	92.59	119.	36.	0.020	46.52	0.796D
AC-228	372.76	93.35	385.	19.	0.010	149.50	0.797
Gd-153	389.36	97.50	108.	13.	0.007	118.84	0.801s
Np-239	397.36	99.50	143.	-9.	-0.005	195.94	0.803s
Gd-153	412.15	103.20	142.	14.	0.008	122.99	0.807
Np-239	414.15	103.70	156.	13.	0.007	135.35	0.807s
Np-239	423.87	106.13	177.	-15.	-0.009	124.77	0.810s
EU-152	486.45	121.78	131.	15.	0.008	109.47	0.826s
CO-57	487.58	122.06	146.	8.	0.005	212.67	0.826s
EU-154	491.73	123.10	179.	-17.	-0.010	112.35	0.828s
PA-234	524.50	131.29	287.	-18.	-0.010	132.36	0.836s
HF-181	531.42	133.02	252.	-13.	-0.007	175.40	0.838s
CE-144	533.47	133.54	265.	0.	0.000	1000.00	0.838s
HF-181	544.52	136.30	265.	0.	0.000	1000.00	0.841
CO-57	545.21	136.47	265.	0.	0.000	1000.00	0.841
Tc-99m	561.35	140.51	245.	-17.	-0.010	131.37	0.845s
U-235	574.45	143.79	239.	-19.	-0.010	88.79	0.849
CE-141	581.07	145.44	254.	17.	0.009	135.02	0.850s
Ba-140	649.93	162.66	162.	14.	0.008	131.32	0.868s
U-235	652.81	163.38	176.	0.	0.000	1000.00	0.869s
CE-139	662.70	165.85	140.	15.	0.008	118.35	0.871s
Cf-251	705.68	176.60	73.	2.	0.001	917.61	0.882s
U-235	742.15	185.72	59.	84.	0.046	19.26	0.892s
TH-229	773.30	193.51	63.	11.	0.006	136.25	0.899
U-235	820.58	205.33	110.	-18.	-0.010	105.19	0.912s
TH-229	842.65	210.85	105.	-19.	-0.011	83.90	0.917s
Cf-251	907.23	227.00	113.	-19.	-0.011	102.77	0.933s
PB-212	952.10	238.22	38.	194.	0.108	9.02	0.651s
PB-214	967.21	242.00	307.	11.	0.006	228.63	0.948
EU-152	977.99	244.69	313.	12.	0.007	211.90	0.951s
Cd-113m	1054.01	263.70	62.	12.	0.006	99.74	0.970s
BI-210M	1062.53	265.83	65.	7.	0.004	163.50	0.972s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1108.33	277.28	85.	-13.	-0.007	97.90	0.983
Hg-203	1115.99	279.20	88.	8.	0.004	169.56	0.985s
I-131	1136.39	284.30	37.	-4.	-0.002	313.34	0.990s
PB-214	1179.54	295.09	230.	10.	0.006	216.21	1.001
TL-210	1183.18	296.00	240.	13.	0.007	170.49	1.002s
PB-212	1199.30	300.03	249.	4.	0.002	631.95	1.006s
PA-231	1199.46	300.07	253.	0.	0.000	1000.00	1.006s
PA-233	1199.90	300.18	253.	0.	0.000	1000.00	1.006s
PA-231	1209.78	302.65	253.	0.	0.000	1000.00	1.008s
BA-133	1210.59	302.85	253.	0.	0.000	1000.00	1.009s
Ba-140	1218.57	304.85	253.	0.	0.000	1000.00	1.011
BI-210M	1218.76	304.90	253.	0.	0.000	1000.00	1.011
Ir-192	1232.94	308.44	266.	-15.	-0.008	160.75	1.014s
PA-233	1247.22	312.01	238.	14.	0.008	161.70	1.018s
Ir-192	1265.13	316.49	65.	-12.	-0.007	96.96	1.022s
La-140	1314.21	328.76	48.	-2.	-0.001	778.84	1.034s
Cf-249	1332.92	333.44	26.	10.	0.005	104.38	1.039
AC-228	1351.34	338.04	10.	52.	0.029	17.90	0.657s
Cs-136	1361.44	340.57	168.	-13.	-0.007	142.41	1.045s
EU-152	1376.30	344.29	155.	-14.	-0.008	65.86	1.049s
HF-181	1382.47	345.83	113.	4.	0.002	387.44	1.050s
PB-214	1405.23	351.52	12.	116.	0.065	10.87	1.035
BA-133	1423.15	356.00	174.	-5.	-0.003	375.77	1.060s
I-131	1457.08	364.48	66.	-16.	-0.009	99.68	1.069s
BA-133	1534.50	383.84	64.	9.	0.005	126.68	1.087s
Cf-249	1550.94	387.95	73.	10.	0.006	124.47	1.091s
SB-125	1710.63	427.88	44.	-5.	-0.003	252.19	1.129s
AG-108M	1734.87	433.94	22.	3.	0.002	298.14	1.135s
PM-146	1814.64	453.88	20.	5.	0.003	180.74	1.154s
SB-125	1852.59	463.37	30.	7.	0.004	112.99	1.163s
Ir-192	1871.36	468.06	29.	7.	0.004	114.91	1.167s
BE-7	1909.50	477.60	43.	9.	0.005	108.30	1.176s
La-140	1947.19	487.02	28.	2.	0.001	522.81	1.185s
RU-103	1987.33	497.05	12.	7.	0.004	101.44	1.194s
RH-106	2046.57	511.86	27.	47.	0.026	21.20	2.458s
Kr-85	2055.03	513.98	74.	0.	0.000	1000.00	1.210s
Nd-147	2123.11	531.00	12.	15.	0.008	52.07	1.225s
Ba-140	2148.15	537.26	17.	8.	0.004	104.45	1.231s
CS-134	2252.06	563.24	16.	6.	0.003	138.13	1.255
CS-134	2276.40	569.32	16.	8.	0.004	79.06	1.260s
BI-207	2277.92	569.70	21.	5.	0.003	147.43	1.261s
TL-208	2330.66	582.89	6.	62.	0.035	14.21	1.170
SB-125	2401.12	600.50	262.	-13.	-0.007	68.80	1.289s
SB-124	2410.04	602.73	249.	-13.	-0.007	178.19	1.291s
CS-134	2417.96	604.71	237.	-13.	-0.007	173.47	1.292s
BI-214	2435.38	609.06	14.	110.	0.061	11.40	1.285
RU-103	2440.31	610.30	224.	-13.	-0.007	168.24	1.297s
AG-108M	2456.25	614.28	211.	-13.	-0.007	163.07	1.301

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RH-106	2486.79	621.92	19.	2.	0.001	450.94	1.308s
SB-125	2542.69	635.89	41.	-14.	-0.008	65.32	1.320s
I-131	2547.03	636.97	43.	6.	0.003	160.27	1.321s
AG-110M	2630.18	657.76	18.	8.	0.004	82.29	1.339
CS-137	2645.77	661.66	43.	-11.	-0.006	84.23	1.343s
PM-144	2785.32	696.54	9.	5.	0.003	120.71	1.374s
NB-94	2809.67	702.63	9.	14.	0.008	50.92	1.379s
SB-124	2890.31	722.79	28.	30.	0.017	30.91	1.396s
AG-108M	2890.91	722.94	58.	0.	0.000	1000.00	1.397s
EU-154	2892.60	723.36	58.	0.	0.000	1000.00	1.397s
ZR-95	2895.96	724.20	131.	-21.	-0.012	79.54	1.398s
BI-212	2907.84	727.17	31.	8.	0.005	99.27	1.400
PM-146	2942.05	735.72	4.	4.	0.002	132.51	1.408s
PM-146	2987.81	747.16	31.	-13.	-0.007	35.86	1.417s
ZR-95	3026.09	756.73	9.	7.	0.004	96.55	1.426s
AG-110M	3054.96	763.94	18.	9.	0.005	76.60	1.432s
NB-95	3062.34	765.79	26.	4.	0.002	193.21	1.433s
PA-234M	3064.83	766.41	36.	-6.	-0.003	161.09	1.434s
BI-212	3140.88	785.42	22.	-7.	-0.004	111.31	1.450
CS-134	3182.68	795.87	33.	-2.	-0.001	491.12	1.459s
TL-210	3197.61	799.60	34.	0.	0.000	1000.00	1.462s
CS-134	3207.01	801.95	27.	8.	0.005	96.80	1.464s
CO-58	3242.31	810.77	67.	-14.	-0.008	53.50	1.471s
La-140	3262.30	815.77	80.	-14.	-0.008	55.00	1.475s
Cs-136	3273.22	818.50	96.	-14.	-0.008	105.44	1.478s
MN-54	3338.63	834.85	19.	-4.	-0.002	194.24	1.492s
Co-56	3386.32	846.77	5.	5.	0.003	98.09	1.501s
TL-208	3441.51	860.56	1.	12.	0.007	29.69	1.513s
NB-94	3483.65	871.10	6.	5.	0.003	81.28	1.522s
EU-154	3492.19	873.23	11.	5.	0.003	110.94	1.523s
PA-234	3521.39	880.53	30.	-2.	-0.001	527.05	1.529s
PA-234	3532.24	883.24	32.	0.	0.000	1000.00	1.531s
AG-110M	3538.01	884.68	32.	0.	0.000	1000.00	1.533s
Sc-46	3556.40	889.28	44.	-8.	-0.005	114.97	1.536s
Y-88	3591.45	898.04	38.	-16.	-0.009	27.17	1.543s
AC-228	3643.42	911.03	0.	53.	0.029	13.74	1.291
AG-110M	3749.30	937.49	19.	-6.	-0.003	167.10	1.576s
PA-234	3783.42	946.02	14.	-4.	-0.002	100.81	1.582s
EU-152	3855.80	964.11	41.	8.	0.004	122.51	1.597s
AC-228	3875.25	968.97	40.	11.	0.006	88.17	1.601s
EU-154	3984.71	996.33	20.	-1.	-0.001	486.06	1.622s
EU-154	4018.51	1004.77	5.	2.	0.001	255.77	1.629s
Co-56	4150.81	1037.84	0.	9.	0.005	34.25	1.655s
Cs-136	4191.74	1048.07	6.	6.	0.003	72.92	1.663s
RH-106	4200.91	1050.36	19.	-2.	-0.001	351.86	1.665s
BI-207	4254.12	1063.66	10.	6.	0.003	125.77	1.675s
Ga-68	4309.10	1077.40	5.	4.	0.002	132.68	1.685s
FE-59	4396.54	1099.25	5.	6.	0.003	92.66	1.702s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	4447.85	1112.07	53.	-8.	-0.005	127.48	1.712s
ZN-65	4461.74	1115.55	45.	-1.	-0.001	528.95	1.714s
BI-214	4480.72	1120.29	4.	30.	0.017	20.32	1.718D
Sc-46	4481.77	1120.55	44.	0.	0.000	1000.00	1.718
Ta-182	4484.77	1121.30	44.	1.	0.001	706.22	1.719s
CO-60	4692.60	1173.24	0.	10.	0.005	33.08	1.757s
Ta-182	4755.88	1189.05	10.	-2.	-0.001	354.73	1.769
Ta-182	4885.38	1221.41	21.	-7.	-0.004	147.85	1.792
Co-56	4952.89	1238.28	16.	5.	0.003	205.15	1.805s
NA-22	5097.96	1274.53	21.	-9.	-0.005	77.26	1.831s
EU-154	5098.00	1274.54	31.	0.	0.000	1000.00	1.831s
FE-59	5166.25	1291.60	16.	-5.	-0.003	187.26	1.843s
TL-210	5251.92	1313.00	16.	-4.	-0.002	232.74	1.858s
CO-60	5329.96	1332.50	5.	2.	0.001	324.35	1.871s
AG-110M	5537.26	1384.30	5.	1.	0.000	796.87	1.907s
K-40	5842.75	1460.63	3.	99.	0.055	10.40	1.229s
La-140	6385.44	1596.21	0.	5.	0.003	44.72	2.044s
SB-124	6764.81	1690.98	11.	-6.	-0.004	130.84	2.102s
BI-214	7059.07	1764.49	12.	6.	0.003	94.88	2.145s
Co-56	7086.53	1771.35	7.	0.	0.000	1000.00	2.149s
Y-88	7345.59	1836.06	0.	0.	0.000	1000.00	2.185s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	2.7898E+00					5.31E+01	
			477.60	2.790E+00	?(	1.031E+01	1.08E+02 1.05E+01	G
NA-22	C	-6.7378E-01					9.50E+02	
			1274.53	-6.738E-01	?(	1.749E+00	7.73E+01 9.99E+01	G
K-40	N	7.4765E+01					4.66E+11	
			1460.83	7.477E+01	(P	8.386E+00	1.04E+01 1.07E+01	G
Sc-46	F	-4.5676E-01					8.38E+01	
			889.28	-4.568E-01	?(	1.797E+00	1.15E+02 1.00E+02	G
			1120.55	0.000E+00	+	2.182E+00	1.00E+03 1.00E+02	G
CR-51	F	2.7936E-01					2.77E+01	
			320.08	2.794E-01	%(	1.138E+01	1.17E+03 9.94E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C -2.0200E-01					3.12E+02	
		834.85	-2.020E-01	?(P	1.174E+00	1.94E+02	1.00E+02 G
FE-59	F 6.6929E-01					4.45E+01	
		1099.25	6.693E-01	?(	1.485E+00	9.27E+01	5.65E+01 G
		1291.60	-8.443E-01	+	3.605E+00	1.87E+02	4.32E+01 G
Co-56	C 6.2849E-01					7.73E+01	
		846.77	2.697E-01	?(	6.601E-01	9.81E+01	9.99E+01 G
		1238.28	4.881E-01	&(P	2.303E+00	2.05E+02	6.61E+01 G
		1037.84	3.822E+00	?(P	3.179E+00	3.43E+01	1.41E+01 G
		1771.35	0.000E+00	-	9.457E+00	1.00E+03	1.55E+01 A
CO-57	C 1.2070E-01					2.72E+02	
		122.06	1.207E-01	&(	8.744E-01	2.13E+02	8.56E+01 G
		136.47	0.000E+00	-	9.626E+00	1.00E+03	1.07E+01 G
CO-58	C -7.1047E-01					7.09E+01	
		810.78	-7.105E-01	?(P	2.049E+00	5.35E+01	9.95E+01 G
CO-60	F 3.9034E-01					1.93E+03	
		1332.50	1.248E-01	?(	1.009E+00	3.24E+02	1.00E+02 G
		1173.24	6.561E-01	&(P	4.972E-01	3.31E+01	9.99E+01 G
ZN-65	F -1.8019E-01					2.44E+02	
		1115.55	-1.802E-01	?(P	4.359E+00	5.29E+02	5.06E+01 G
NB-94	I 6.3542E-01					7.41E+06	
		702.63	6.354E-01	?(P	7.566E-01	5.09E+01	9.79E+01 G
		871.10	2.678E-01	& P	7.417E-01	8.13E+01	9.99E+01 G
ZR-95	I 5.9066E-01					6.40E+01	
		756.73	5.907E-01	&(P	1.435E+00	9.65E+01	5.45E+01 G
		724.20	-2.183E+00	+	5.782E+00	7.95E+01	4.42E+01 G
NB-95	I 1.8494E-01					6.40E+01	
		765.79	1.849E-01	&(	1.265E+00	1.93E+02	9.98E+01 G
RU-103	I 2.6623E-01					3.93E+01	
		497.05	2.662E-01	?(	6.981E-01	1.01E+02	9.09E+01 G
		610.30	-8.797E+00	+	4.995E+01	1.68E+02	5.75E+00 GA
RH-106	I 8.0516E-01					3.74E+02	
		621.92	8.052E-01	&(P	9.284E+00	4.51E+02	9.93E+00 G
		1050.36	-7.033E+00	+	9.037E+01	3.52E+02	1.56E+00 G
		511.86	8.154E+00	?	4.613E+00	2.12E+01	2.00E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-108M	C	1.0022E-01					1.53E+05	
			433.94	1.002E-01	?(	8.207E-01	2.98E+02	9.05E+01 G
			722.94	0.000E+00	-	1.910E+00	1.00E+03	9.08E+01 G
			614.28	-5.674E-01	&	3.124E+00	1.63E+02	8.98E+01 G
AG-110M	F	3.7436E-01					2.50E+02	
			884.68	0.000E+00	?(	2.140E+00	1.00E+03	7.27E+01 G
			657.76	3.589E-01	&(	1.000E+00	8.23E+01	9.46E+01 G
			937.49	-9.250E-01	+	3.729E+00	1.67E+02	3.44E+01 G
			1384.30	2.120E-01	?(	4.284E+00	7.97E+02	2.43E+01 G
			763.94	1.838E+00	?(	4.734E+00	7.66E+01	2.23E+01 G
SN-113	F	5.6507E-02					1.15E+02	
			391.69	5.651E-02	%(	2.051E+00	1.04E+03	6.40E+01 G
SB-124	F	7.9267E-01					6.02E+01	
			602.73	-5.070E-01	?(	3.048E+00	1.78E+02	9.83E+01 G
			1690.98	-1.209E+00	+	3.511E+00	1.31E+02	4.78E+01 G
			722.79	1.261E+01	?(	1.150E+01	3.09E+01	1.08E+01 G
SB-125	I	2.0557E-01					1.01E+03	
			427.88	-5.049E-01	@(	3.395E+00	2.52E+02	2.96E+01 G
			600.50	-2.834E+00	+ P	1.713E+01	6.88E+01	1.79E+01 G
			635.89	-5.031E+00	+ P	1.178E+01	6.53E+01	1.13E+01 G
			463.37	2.214E+00	&(P	8.603E+00	1.13E+02	1.05E+01 G
I-131	I	-1.9098E-01					8.02E+00	
			364.48	-5.083E-01	?(	1.308E+00	9.97E+01	8.17E+01 G
			284.30	-1.296E+00	+	1.093E+01	3.13E+02	6.14E+00 G
			636.97	3.424E+00	?(	1.904E+01	1.60E+02	7.17E+00 G
Gd-153	F	6.5722E-01					2.42E+02	
			97.50	5.437E-01	?(	2.184E+00	1.19E+02	3.00E+01 G
			103.20	8.135E-01	&(	3.375E+00	1.23E+02	2.18E+01 G
Ga-68	C	8.9345E+00					4.71E-02	
			1077.40	8.935E+00	?(	2.933E+01	1.33E+02	3.30E+00 G
Tc-99m	I	-2.6209E-01					2.51E-01	
			140.51	-2.621E-01	&(	1.157E+00	1.31E+02	8.93E+01 G
BA-133	F	-2.0842E-01					3.85E+03	
			356.00	-2.084E-01	?(	2.675E+00	3.76E+02	6.20E+01 G
			302.85	0.000E+00	+	9.555E+00	1.00E+03	1.83E+01 G
			383.84	2.835E+00	? P	1.225E+01	1.27E+02	8.94E+00 GA
			80.99	-1.217E-01	+	2.258E+00	6.40E+02	3.41E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	I	7.1461E-01					7.54E+02	
			795.87	-9.568E-02	?(	1.685E+00	4.91E+02	8.55E+01 G
			604.71	-5.124E-01	+	2.999E+00	1.73E+02	9.76E+01 G
			569.32	1.951E+00	?(	5.206E+00	7.91E+01	1.54E+01 G
			801.95	4.643E+00	?(	1.535E+01	9.68E+01	8.69E+00 G
			563.24	2.649E+00	?(P	9.521E+00	1.38E+02	8.35E+00 G
CS-137	I	-5.3802E-01					1.10E+04	
			661.66	-5.380E-01	?(P	1.660E+00	8.42E+01	8.52E+01 G
CE-139	F	2.6084E-01					1.38E+02	
			165.85	2.608E-01	?(	1.041E+00	1.18E+02	7.99E+01 G
Ba-140	I	1.6000E+00					1.28E+01	
			537.26	1.180E+00	&(P	3.179E+00	1.04E+02	2.44E+01 G
			162.66	3.246E+00	?(	1.438E+01	1.31E+02	6.22E+00 G
			304.85	0.000E+00	&	4.104E+01	1.00E+03	4.29E+00 G
La-140	I	4.5564E-01					1.28E+01	
			1596.21	4.556E-01	?(	6.716E-01	4.47E+01	9.54E+01 G
			487.02	1.456E-01	-	1.992E+00	5.23E+02	4.55E+01 G
			328.76	-1.995E-01	-	4.176E+00	7.79E+02	2.03E+01 G
			815.77	-2.987E+00	- P	9.571E+00	5.50E+01	2.33E+01 G
CE-141	I	4.7448E-01					3.25E+01	
			145.44	4.745E-01	&(	2.152E+00	1.35E+02	4.82E+01 G
PM-144	C	2.3752E-01					3.63E+02	
			696.54	2.375E-01	?(	7.317E-01	1.21E+02	9.90E+01 G
			618.06	-5.581E-02	%	2.735E+00	1.43E+03	9.91E+01 G
EU-152	F	1.7056E+00					4.94E+03	
			121.78	6.742E-01	&(	2.484E+00	1.09E+02	2.86E+01 G
			344.29	-1.351E+00	+ P	5.782E+00	6.59E+01	2.65E+01 G
			1112.07	-3.979E+00	+	1.738E+01	1.27E+02	1.36E+01 G
			778.92	2.076E-01	% P	7.382E+00	1.34E+03	1.29E+01 G
			964.11	3.033E+00	?(P	1.276E+01	1.23E+02	1.46E+01 G
			244.69	3.038E+00	?(	2.170E+01	2.12E+02	7.58E+00 G
			1408.00	-1.748E-01	% P	5.075E+00	2.01E+03	2.10E+01 GA
EU-154	I	2.0920E-01					3.14E+03	
			123.10	-5.377E-01	(	2.029E+00	1.12E+02	4.08E+01 G
			1274.54	0.000E+00	+	5.846E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	8.587E+00	1.00E+03	2.02E+01 G
			873.23	2.032E+00	?(	7.925E+00	1.11E+02	1.23E+01 G
			1004.77	6.591E-01	?(	4.327E+00	2.56E+02	1.80E+01 G
			996.33	-7.414E-01	+	1.319E+01	4.86E+02	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	-4.1043E-03					1.81E+03	
			105.31	-4.104E-03	&(P	3.768E+00	2.41E+04	2.12E+01 G
			86.54	-1.033E+00	&	3.716E+00	1.08E+02	3.07E+01 G
HF-181	F	1.3795E-01					4.24E+01	
			482.00	4.081E-02	%(	1.469E+00	1.01E+03	8.05E+01 G
			133.02	-3.881E-01	+	2.296E+00	1.75E+02	4.33E+01 G
			345.83	6.569E-01	?(	8.769E+00	3.87E+02	1.51E+01 G
			136.30	0.000E+00	-	1.756E+01	1.00E+03	5.85E+00 G
Ta-182	F	2.4807E-01					1.14E+02	
			1121.30	2.481E-01	?(	6.233E+00	7.06E+02	3.49E+01 G
			1221.41	-1.892E+00	+	6.252E+00	1.48E+02	2.70E+01 G
			1189.05	-8.412E-01	+	7.338E+00	3.55E+02	1.62E+01 G
Hg-203	F	2.1017E-01					4.66E+01	
			279.20	2.102E-01	(	1.220E+00	1.70E+02	8.15E+01 G
TL-208	N	2.8159E+00					6.98E+02	
			583.02	2.816E+00	(P	6.281E-01	1.42E+01	8.45E+01 G
			277.28	-4.525E+00	- P	1.544E+01	9.79E+01	6.31E+00 G
			860.56	5.242E+00	+ P	3.104E+00	2.97E+01	1.24E+01 G
PM-146	C	3.6515E-01					2.02E+03	
			453.88	2.409E-01	&(	1.135E+00	1.81E+02	6.50E+01 G
			747.16	-1.819E+00	+ P	3.906E+00	3.59E+01	3.40E+01 G
			735.72	7.240E-01	?(P	2.572E+00	1.33E+02	2.25E+01 G
Cd-113m		3.9849E+03					5.33E+03	
			263.70	3.985E+03	?(	1.345E+04	9.97E+01	6.00E-03 K
Cd-109	F	6.9270E+00					4.53E+02	
							Derived Ave Activity	
			88.04	6.927E+00	}(	3.490E+01	1.50E+02	3.79E+00 G
Cf-251	T	1.4754E-01					3.28E+05	
			176.60	1.475E-01	?(	3.772E+00	9.18E+02	1.70E+01 G
			227.00	-5.475E+00	+	1.515E+01	1.03E+02	6.30E+00 GA
Cf-249	T	6.2864E-01					1.28E+05	
			387.95	4.208E-01	?(	1.783E+00	1.24E+02	6.60E+01 G
			333.44	1.513E+00	&(	4.170E+00	1.04E+02	1.55E+01 G
Sn-126		-2.9342E+00					3.65E+07	
			87.57	-1.543E-01	}	3.196E+00	6.12E+02	3.75E+01 GA
			64.28	-2.934E+00	?(	1.250E+01	1.27E+02	9.70E+00 G
			86.94	-3.502E+00	}	1.287E+01	1.10E+02	9.04E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	2.0409E+01					8.14E+03	
			46.54	2.041E+01	*(P	2.356E+01	4.11E+01	4.25E+00 G
PB-212	N	8.4957E+00					6.98E+02	
			238.63	8.496E+00	(P	1.374E+00	9.02E+00	4.33E+01 G
			300.03	2.448E+00	& P	5.265E+01	6.32E+02	3.28E+00 GA
PB-214	N	7.9423E+00					5.84E+05	
			351.93	7.942E+00	(P	1.308E+00	1.09E+01	3.76E+01 G
			295.09	1.162E+00	+ P	8.493E+00	2.16E+02	1.93E+01 G
			242.00	2.819E+00		2.175E+01	2.29E+02	7.43E+00 GA
BI-207	C	3.1370E-01					1.18E+04	
			1063.66	4.902E-01	&(P	1.464E+00	1.26E+02	7.45E+01 G
			569.70	1.792E-01	?(	9.304E-01	1.47E+02	9.77E+01 G
BI-212	N	5.0981E+00					6.98E+02	
			727.17	5.098E+00	(	1.728E+01	9.93E+01	7.55E+00 G
			785.42	-2.553E+01	+ P	9.272E+01	1.11E+02	1.28E+00 GA
U-235	N	-2.3048E+00					2.57E+11	
			143.79	-2.305E+00	?(P	9.130E+00	8.88E+01	1.10E+01 G
			205.33	-6.134E+00	&	1.739E+01	1.05E+02	5.01E+00 G
			163.38	0.000E+00	+	1.837E+01	1.00E+03	5.08E+00 G
			185.72	2.420E+00	+ P	1.119E+00	1.93E+01	5.40E+01 GA
BI-214	N	9.4813E+00					5.84E+05	
			609.31	9.481E+00	(P	1.712E+00	1.14E+01	4.61E+01 G
			1120.29	1.298E+01	+ P	5.006E+00	2.03E+01	1.51E+01 G
			1764.49	3.488E+00	- P	1.141E+01	9.49E+01	1.54E+01 G
BI-210M	T	2.9479E-01					1.10E+09	
			265.83	2.948E-01	&(	1.658E+00	1.64E+02	5.00E+01 G
			304.90	0.000E+00	&	6.288E+00	1.00E+03	2.80E+01 G
AC-228	N	1.0205E+01					2.10E+03	
			911.07	1.001E+01	(	1.393E+00	1.37E+01	2.90E+01 G
			968.97	3.550E+00	- P	1.057E+01	8.82E+01	1.75E+01 G
			338.32	1.067E+01	(P	3.680E+00	1.79E+01	1.20E+01 G
			93.35	4.372E+00	-	2.191E+01	1.50E+02	5.56E+00 XA
TH-227	N	3.6354E-01					7.95E+03	
			256.24	3.635E-01	%(P	1.055E+01	1.03E+03	7.00E+00 G
			235.97	1.018E-01	%	1.225E+01	3.53E+03	1.23E+01 G
			50.14	-4.702E+00	+	1.531E+01	1.14E+02	8.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	3.9117E+00					2.68E+06	
			193.51	3.912E+00	?(	1.459E+01	1.36E+02	4.40E+00 G
			210.85	-1.114E+01	& P	2.907E+01	8.39E+01	2.99E+00 G
TH-234	N	9.6221E+00					1.63E+12	
			92.59	8.301E+00	(P	1.243E+01	4.65E+01	5.58E+00 G
			63.29	1.156E+01	(P	1.869E+01	5.03E+01	3.81E+00 G
PA-233	C	8.8779E-01					7.82E+08	
			312.01	8.878E-01	?(	4.839E+00	1.62E+02	3.60E+01 G
			300.18	0.000E+00	&	2.806E+01	1.00E+03	6.20E+00 G
PA-234	N	-1.3188E+00					1.63E+12	
			131.29	-1.319E+00	(	5.856E+00	1.32E+02	1.80E+01 G
			946.02	-1.798E+00	+ P	8.564E+00	1.01E+02	1.34E+01 G
			569.47	1.525E-01	%	1.183E+01	2.11E+03	8.20E+00 G
			883.24	0.000E+00	+	1.618E+01	1.00E+03	9.60E+00 G
			880.53	-1.332E+00	+	2.527E+01	5.27E+02	6.00E+00 GA
PA-234M	N	-2.2237E+00					1.63E+12	
			1001.00	-2.224E+00	%(P	1.736E+02	3.03E+03	8.37E-01 G
			766.41	-8.910E+01	&	5.000E+02	1.61E+02	2.94E-01 G
AM-241	T	7.7898E-01					1.58E+05	
			59.54	7.790E-01	(	2.513E+00	1.13E+02	3.59E+01 G
Ir-192	F	-4.7173E-02					7.40E+01	
			316.49	-3.343E-01	?(	1.094E+00	9.70E+01	8.70E+01 G
			468.06	4.358E-01	?(	1.727E+00	1.15E+02	5.18E+01 G
			308.44	-1.058E+00	&	5.729E+00	1.61E+02	3.18E+01 G
Cs-136	F	-6.8291E-01					1.30E+01	
			818.50	-6.829E-01	?(	2.429E+00	1.05E+02	1.00E+02 G
			1048.07	4.441E-01	+	1.085E+00	7.29E+01	8.00E+01 G
			340.57	-6.979E-01	+	3.357E+00	1.42E+02	4.69E+01 G
Np-239	T	-8.5659E-01					2.36E+00	
			103.70	7.013E-01	?	3.206E+00	1.35E+02	2.40E+01 X
			106.13	-8.566E-01	(	3.598E+00	1.25E+02	2.27E+01 G
			99.50	-7.431E-01	+	4.956E+00	1.96E+02	1.50E+01 X
Nd-147		4.0936E+00					1.11E+01	
			531.00	4.094E+00	?(	5.145E+00	5.21E+01	1.30E+01 G
			91.10	8.640E-01	-	4.426E+00	1.53E+02	2.83E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TL-210   N   1.6388E-01                                        5.84E+05
                          799.60 0.000E+00 ?(  1.495E+00 1.00E+03 9.90E+01 G
                          296.00 3.692E-01 ?(  2.123E+00 1.70E+02 7.90E+01 G
                         1313.00-1.408E+00 +   7.517E+00 2.33E+02 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
TH-227	50.14	120.	-17.	-0.009	114.33	-4.702E+00
AM-241	59.54	102.	15.	0.009	113.08	7.790E-01
Sn-126	64.28	226.	-17.	-0.009	126.82	-2.934E+00
BA-133	80.99	129.	-3.	-0.002	639.88	-1.217E-01
EU-155	86.54	316.	-24.	-0.013	107.69	-1.033E+00
Sn-126	86.94	330.	-24.	-0.013	109.98	-3.502E+00
Sn-126	87.57	353.	-4.	-0.002	611.68	-1.543E-01
Nd-147	91.10	400.	19.	0.010	152.84	8.640E-01
Gd-153	97.50	108.	13.	0.007	118.84	5.437E-01
Np-239	99.50	143.	-9.	-0.005	195.94	-7.431E-01

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Gd-153	103.20	142.	14.	0.008	122.99	8.135E-01	
Np-239	103.70	156.	13.	0.007	135.35	7.013E-01	
Np-239	106.13	177.	-15.	-0.009	124.77	-8.566E-01	
EU-152	121.78	131.	15.	0.008	109.47	6.742E-01	
CO-57	122.06	146.	8.	0.005	212.67	1.207E-01	
EU-154	123.10	179.	-17.	-0.010	112.35	-5.377E-01	
PA-234	131.29	287.	-18.	-0.010	132.36	-1.319E+00	
HF-181	133.02	252.	-13.	-0.007	175.40	-3.881E-01	
Tc-99m	140.51	245.	-17.	-0.010	131.37	-2.621E-01	
U-235	143.79	239.	-19.	-0.010	88.79	-2.305E+00	P
Ba-140	162.66	162.	14.	0.008	131.32	3.246E+00	
CE-139	165.85	140.	15.	0.008	118.35	2.608E-01	
U-235	185.72	59.	84.	0.046	19.26	2.420E+00	P
TH-229	193.51	63.	11.	0.006	136.25	3.912E+00	
U-235	205.33	110.	-18.	-0.010	105.19	-6.134E+00	
TH-229	210.85	105.	-19.	-0.011	83.90	-1.114E+01	P
EU-152	244.69	313.	12.	0.007	211.90	3.038E+00	
Cd-113m	263.70	62.	12.	0.006	99.74	3.985E+03	
BI-210M	265.83	65.	7.	0.004	163.50	2.948E-01	
Hg-203	279.20	88.	8.	0.004	169.56	2.102E-01	
I-131	284.30	37.	-4.	-0.002	313.34	-1.296E+00	
TL-210	296.00	240.	13.	0.007	170.49	3.692E-01	
Ir-192	308.44	266.	-15.	-0.008	160.75	-1.058E+00	
PA-233	312.01	238.	14.	0.008	161.70	8.878E-01	
Ir-192	316.49	65.	-12.	-0.007	96.96	-3.343E-01	
La-140	328.76	48.	-2.	-0.001	778.84	-1.995E-01	
Cf-249	333.44	26.	10.	0.005	104.38	1.513E+00	
Cs-136	340.57	168.	-13.	-0.007	142.41	-6.979E-01	
EU-152	344.29	155.	-14.	-0.008	65.86	-1.351E+00	P
HF-181	345.83	113.	4.	0.002	387.44	6.569E-01	
BA-133	356.00	174.	-5.	-0.003	375.77	-2.084E-01	
I-131	364.48	66.	-16.	-0.009	99.68	-5.083E-01	
BA-133	383.84	64.	9.	0.005	126.68	2.835E+00	P
Cf-249	387.95	73.	10.	0.006	124.47	4.208E-01	
SB-125	427.88	44.	-5.	-0.003	252.19	-5.049E-01	
AG-108M	433.94	22.	3.	0.002	298.14	1.002E-01	
PM-146	453.88	20.	5.	0.003	180.74	2.409E-01	
SB-125	463.37	30.	7.	0.004	112.99	2.214E+00	P
Ir-192	468.06	29.	7.	0.004	114.91	4.358E-01	
BE-7	477.60	43.	9.	0.005	108.30	2.790E+00	
La-140	487.02	28.	2.	0.001	522.81	1.456E-01	
RU-103	497.05	12.	7.	0.004	101.44	2.662E-01	
RH-106	511.86	27.	47.	0.026	21.20	8.154E+00	
Nd-147	531.00	12.	15.	0.008	52.07	4.094E+00	
Ba-140	537.26	17.	8.	0.004	104.45	1.180E+00	P
CS-134	563.24	16.	6.	0.003	138.13	2.649E+00	P
CS-134	569.32	16.	8.	0.004	79.06	1.951E+00	
BI-207	569.70	21.	5.	0.003	147.43	1.792E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	600.50	262.	-13.	-0.007	68.80	-2.834E+00	P
SB-124	602.73	249.	-13.	-0.007	178.19	-5.070E-01	
CS-134	604.71	237.	-13.	-0.007	173.47	-5.124E-01	
RU-103	610.30	224.	-13.	-0.007	168.24	-8.797E+00	
AG-108M	614.28	211.	-13.	-0.007	163.07	-5.674E-01	
RH-106	621.92	19.	2.	0.001	450.94	8.052E-01	P
SB-125	635.89	41.	-14.	-0.008	65.32	-5.031E+00	P
I-131	636.97	43.	6.	0.003	160.27	3.424E+00	
AG-110M	657.76	18.	8.	0.004	82.29	3.589E-01	
CS-137	661.66	43.	-11.	-0.006	84.23	-5.380E-01	P
PM-144	696.54	9.	5.	0.003	120.71	2.375E-01	
NB-94	702.63	9.	14.	0.008	50.92	6.354E-01	P
SB-124	722.79	28.	30.	0.017	30.91	1.261E+01	
ZR-95	724.20	131.	-21.	-0.012	79.54	-2.183E+00	
PM-146	735.72	4.	4.	0.002	132.51	7.240E-01	P
PM-146	747.16	31.	-13.	-0.007	35.86	-1.819E+00	P
ZR-95	756.73	9.	7.	0.004	96.55	5.907E-01	P
AG-110M	763.94	18.	9.	0.005	76.60	1.838E+00	
NB-95	765.79	26.	4.	0.002	193.21	1.849E-01	
PA-234M	766.41	36.	-6.	-0.003	161.09	-8.910E+01	
CS-134	795.87	33.	-2.	-0.001	491.12	-9.568E-02	
CS-134	801.95	27.	8.	0.005	96.80	4.643E+00	
CO-58	810.77	67.	-14.	-0.008	53.50	-7.105E-01	P
La-140	815.77	80.	-14.	-0.008	55.00	-2.987E+00	P
Cs-136	818.50	96.	-14.	-0.008	105.44	-6.829E-01	
MN-54	834.85	19.	-4.	-0.002	194.24	-2.020E-01	P
Co-56	846.77	5.	5.	0.003	98.09	2.697E-01	
NB-94	871.10	6.	5.	0.003	81.28	2.678E-01	P
EU-154	873.23	11.	5.	0.003	110.94	2.032E+00	
PA-234	880.53	30.	-2.	-0.001	527.05	-1.332E+00	
Sc-46	889.28	44.	-8.	-0.005	114.97	-4.568E-01	
Y-88	898.04	38.	-16.	-0.009	27.17	-8.981E-01	P
AG-110M	937.49	19.	-6.	-0.003	167.10	-9.250E-01	
PA-234	946.02	14.	-4.	-0.002	100.81	-1.798E+00	P
EU-152	964.11	41.	8.	0.004	122.51	3.033E+00	P
EU-154	996.33	20.	-1.	-0.001	486.06	-7.414E-01	
EU-154	1004.77	5.	2.	0.001	255.77	6.591E-01	
Co-56	1037.84	0.	9.	0.005	34.25	3.822E+00	P
Cs-136	1048.07	6.	6.	0.003	72.92	4.441E-01	
RH-106	1050.36	19.	-2.	-0.001	351.86	-7.033E+00	
BI-207	1063.66	10.	6.	0.003	125.77	4.902E-01	P
Ga-68	1077.40	5.	4.	0.002	132.68	8.935E+00	
FE-59	1099.25	5.	6.	0.003	92.66	6.693E-01	
EU-152	1112.07	53.	-8.	-0.005	127.48	-3.979E+00	
ZN-65	1115.55	45.	-1.	-0.001	528.95	-1.802E-01	P
CO-60	1173.24	0.	10.	0.005	33.08	6.561E-01	P
Co-56	1238.28	16.	5.	0.003	205.15	4.881E-01	P
NA-22	1274.53	21.	-9.	-0.005	77.26	-6.738E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
FE-59	1291.60	16.	-5.	-0.003	187.26	-8.443E-01	
TL-210	1313.00	16.	-4.	-0.002	232.74	-1.408E+00	
CO-60	1332.50	5.	2.	0.001	324.35	1.248E-01	
AG-110M	1384.30	5.	1.	0.000	796.87	2.120E-01	
La-140	1596.21	0.	5.	0.003	44.72	4.556E-01	
SB-124	1690.98	11.	-6.	-0.004	130.84	-1.209E+00	

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	2.7898E+00	2.7898E+00	1.083E+02%	1.03E+01
NA-22	#A	-6.7378E-01	-6.7378E-01	7.726E+01%	1.75E+00
K-40		7.4765E+01	7.4765E+01	1.040E+01%	8.39E+00
Sc-46	#A	-4.5676E-01	-4.5676E-01	1.150E+02%	1.80E+00
CR-51	#A	2.7936E-01	2.7936E-01	1.170E+03%	1.14E+01
MN-54	#A	-2.0200E-01	-2.0200E-01	1.942E+02%	1.17E+00
FE-59	#A	6.6929E-01	6.6929E-01	9.266E+01%	1.48E+00
Co-56	#A	6.2849E-01	6.2849E-01	3.425E+01%	6.60E-01
CO-57	#A	1.2070E-01	1.2070E-01	2.127E+02%	8.74E-01
CO-58	#A	-7.1046E-01	-7.1047E-01	5.350E+01%	2.05E+00
CO-60	#A	3.9034E-01	3.9034E-01	3.308E+01%	1.01E+00
ZN-65	#A	-1.8019E-01	-1.8019E-01	5.290E+02%	4.36E+00
NB-94	#A	6.3542E-01	6.3542E-01	5.092E+01%	7.57E-01
ZR-95	#A	5.9065E-01	5.9066E-01	9.655E+01%	1.43E+00
NB-95	#A	1.8493E-01	1.8494E-01	1.932E+02%	1.27E+00
RU-103	#A	2.6623E-01	2.6623E-01	1.014E+02%	6.98E-01
RH-106	#A	8.0516E-01	8.0516E-01	4.509E+02%	9.28E+00
AG-108M	#A	1.0022E-01	1.0022E-01	2.981E+02%	8.21E-01
AG-110M	#A	3.7436E-01	3.7436E-01	7.660E+01%	2.14E+00
SN-113	#A	5.6507E-02	5.6507E-02	1.042E+03%	2.05E+00
SB-124	#A	7.9266E-01	7.9267E-01	3.091E+01%	3.05E+00
SB-125	#A	2.0557E-01	2.0557E-01	1.130E+02%	3.40E+00
I-131	#A	-1.9097E-01	-1.9098E-01	9.437E+01%	1.31E+00
Gd-153	#A	6.5722E-01	6.5722E-01	8.551E+01%	2.18E+00
Ga-68	#A	8.8451E+00	8.9345E+00	1.327E+02%	2.93E+01
Tc-99m	#A	-2.6160E-01	-2.6209E-01	1.314E+02%	1.16E+00
BA-133	#A	-2.0842E-01	-2.0842E-01	3.758E+02%	2.68E+00
CS-134	#A	7.1461E-01	7.1461E-01	7.906E+01%	1.68E+00
CS-137	#A	-5.3802E-01	-5.3802E-01	8.423E+01%	1.66E+00
CE-139	#A	2.6084E-01	2.6084E-01	1.183E+02%	1.04E+00
Ba-140	#A	1.6000E+00	1.6000E+00	8.390E+01%	3.18E+00
La-140	#A	4.5562E-01	4.5564E-01	4.472E+01%	6.72E-01
CE-141	A	4.7447E-01	4.7448E-01	1.350E+02%	2.15E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	9.20E+00

PM-144 #A	2.3752E-01	2.3752E-01	1.207E+02%	7.32E-01
EU-152 #A	1.7056E+00	1.7056E+00	8.938E+01%	2.48E+00
EU-154 #A	2.0920E-01	2.0920E-01	1.002E+02%	2.03E+00
EU-155 #A	-4.1043E-03	-4.1043E-03	2.411E+04%	3.77E+00
HF-181 #A	1.3795E-01	1.3795E-01	3.874E+02%	1.47E+00
Ta-182 #A	2.4807E-01	2.4807E-01	7.062E+02%	6.23E+00
Hg-203 #A	2.1016E-01	2.1017E-01	1.696E+02%	1.22E+00
TL-208	2.8159E+00	2.8159E+00	1.421E+01%	6.28E-01
PM-146 #A	3.6515E-01	3.6515E-01	1.121E+02%	1.13E+00
Y-88 #A	0.0000E+00	0.0000E+00	1.000E+03%	7.26E-01
Cd-113m#A	3.9849E+03	3.9849E+03	9.974E+01%	1.34E+04
Cd-109 #A	6.9269E+00	6.9270E+00	1.504E+02%	3.49E+01
Cf-251 #A	1.4754E-01	1.4754E-01	9.176E+02%	3.77E+00
Cf-249 #A	6.2864E-01	6.2864E-01	8.122E+01%	1.78E+00
Sn-126 #A	-2.9342E+00	-2.9342E+00	1.268E+02%	1.25E+01
PB-210 #A	2.0409E+01	2.0409E+01	4.112E+01%	2.36E+01
PB-212	8.4957E+00	8.4957E+00	9.020E+00%	1.37E+00
PB-214	7.9423E+00	7.9423E+00	1.087E+01%	1.31E+00
BI-207 #A	3.1370E-01	3.1370E-01	9.689E+01%	1.46E+00
BI-212 A	5.0981E+00	5.0981E+00	9.927E+01%	1.73E+01
U-235 #A	-2.3048E+00	-2.3048E+00	8.879E+01%	9.13E+00
BI-214	9.4813E+00	9.4813E+00	1.140E+01%	1.71E+00
BI-210M#A	2.9479E-01	2.9479E-01	1.635E+02%	1.66E+00
AC-228	1.0205E+01	1.0205E+01	1.128E+01%	1.39E+00
TH-227 #A	3.6354E-01	3.6354E-01	1.029E+03%	1.05E+01
TH-229 #A	3.9117E+00	3.9117E+00	1.363E+02%	1.46E+01
TH-234 A	9.6221E+00	9.6221E+00	3.424E+01%	1.24E+01
PA-231 #A	0.0000E+00	0.0000E+00	7.071E+02%	6.08E+01
PA-233 #A	8.8779E-01	8.8779E-01	1.617E+02%	4.84E+00
PA-234 #A	-1.3188E+00	-1.3188E+00	1.324E+02%	5.86E+00
PA-234M#A	-2.2237E+00	-2.2237E+00	3.029E+03%	1.74E+02
AM-241 #A	7.7898E-01	7.7898E-01	1.131E+02%	2.51E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.10E+01
Ir-192 #A	-4.7173E-02	-4.7173E-02	7.518E+01%	1.09E+00
Cs-136 #A	-6.8289E-01	-6.8291E-01	1.054E+02%	2.43E+00
Np-239 #A	-8.5642E-01	-8.5659E-01	1.248E+02%	3.60E+00
Nd-147 #A	4.0934E+00	4.0936E+00	5.207E+01%	5.15E+00
TL-210 #A	1.6388E-01	1.6388E-01	1.705E+02%	1.49E+00
Kr-85 #A	0.0000E+00	0.0000E+00	1.000E+03%	3.44E+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

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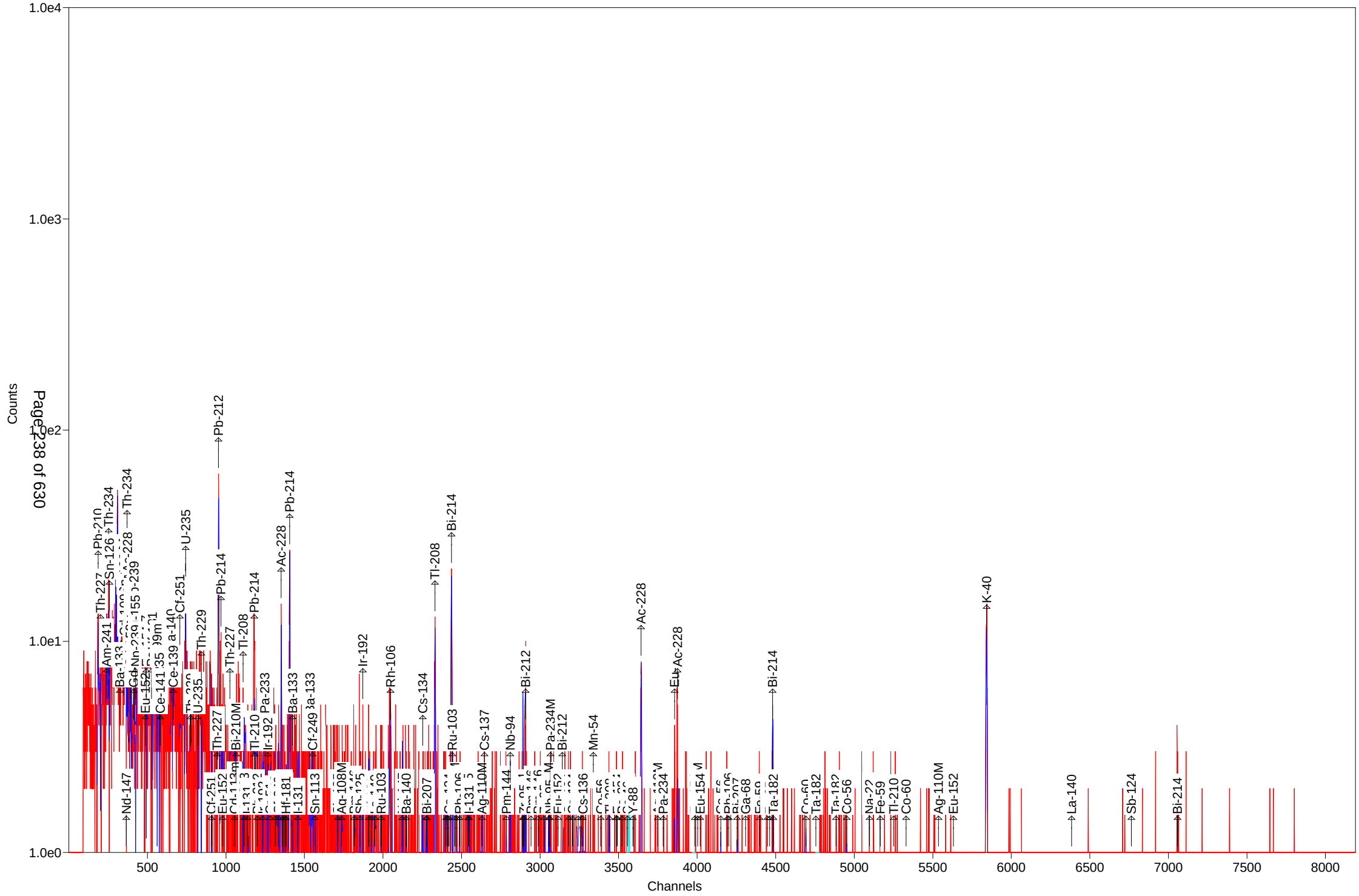
-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   25.1 to  1999.5 keV)     1.437E+02  Bq/Sample
Total Decayed Activity (   25.1 to  1999.5 keV) 1.4373656E+02  Bq/Sample
```

405451_Gamma_490-164491-A-6-A. 14_Gamma_20190007.spc.



Test America St. Louis Spectrum ID: 16_Gamma_20190007

Sample Description: 405451_Gamma_490-164491-A-7-A
Detector: Detector #16
Batch ID: 405451
Work Order Number: Gamma
Lot Number: 490-164491-A-7-A

Decay to Time: 1/2/2019 13:32 Live Time: 1800 sec
Acquisition Time: 1/2/2019 13:32:33 Real Time: 1803 sec
Analysis Time: 1/2/2019 14:02 Dead Time: 0.15 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 16_Soil_TunaCan.Clb
Efficiency Cal Desc: 16_TunaCan_90099_071012
Efficiency Cal Date: 7/13/2012 09:47
Energy Cal Date: 2/28/2012 09:35
Library: Client_Long_Rev15.lib
Bkgd Correction File: 16_2018-12-22_1359.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	1.307E+00	233.3	3.050E+00	3.051E+00	1.059E+01
NA-22	4.179E-01	60.7	2.535E-01	2.543E-01	8.155E-01
K-40	6.525E+01	10.6	6.903E+00	7.668E+00	1.057E+01
Sc-46	3.273E-01	84.5	2.765E-01	2.770E-01	1.245E+00
CR-51	0.000E+00	1.#INF	6.061E-01	6.061E-01	2.045E+01
MN-54	2.960E-01	129.7	3.838E-01	3.841E-01	8.948E-01
FE-59	5.284E-01	89.3	4.720E-01	4.728E-01	1.689E+00
Co-56	-9.434E-03	85.2	8.039E-03	8.054E-03	1.241E+00
CO-57	1.054E-01	111.1	1.171E-01	1.172E-01	1.043E+00
CO-58	3.414E-01	86.4	2.951E-01	2.956E-01	1.003E+00
CO-60	6.109E-01	31.6	1.932E-01	1.956E-01	4.502E-01
ZN-65	-1.575E-01	664.6	1.047E+00	1.047E+00	3.710E+00
NB-94	3.059E-01	58.3	1.784E-01	1.791E-01	1.069E+00
ZR-95	-5.094E-01	120.1	6.118E-01	6.124E-01	2.160E+00
NB-95	0.000E+00	1.#INF	1.142E-01	1.142E-01	1.851E+00
RU-103	2.972E-02	1321.3	3.927E-01	3.927E-01	9.895E-01
RH-106	3.954E+00	175.7	6.948E+00	6.951E+00	2.350E+01
AG-108M	3.617E-01	101.5	3.672E-01	3.677E-01	8.842E-01
AG-110M	2.781E-01	98.3	2.733E-01	2.737E-01	1.532E+00
SN-113	4.822E-01	112.9	5.442E-01	5.448E-01	1.841E+00
SB-124	-3.860E-01	195.3	7.538E-01	7.541E-01	2.548E+00
SB-125	1.148E+00	85.8	9.850E-01	9.868E-01	2.677E+00
I-131	7.239E-01	40.3	2.920E-01	2.943E-01	6.742E-01
Gd-153	-1.135E+00	174.5	1.980E+00	1.981E+00	6.593E+00
Ga-68	1.693E+01	87.2	1.476E+01	1.479E+01	3.300E+01
Tc-99m	3.095E-01	147.3	4.560E-01	4.563E-01	1.525E+00
BA-133	-6.195E-01	141.9	8.791E-01	8.797E-01	2.954E+00
CS-134	1.075E+00	31.1	3.341E-01	3.386E-01	8.027E-01
CS-137	-8.283E-02	469.1	3.885E-01	3.885E-01	1.380E+00
CE-139	2.259E-01	156.9	3.543E-01	3.550E-01	1.195E+00
Ba-140	4.239E-01	290.3	1.230E+00	1.231E+00	3.103E+00
La-140	3.689E-01	70.1	2.586E-01	2.593E-01	1.417E+00
CE-141	-2.761E-01	308.9	8.529E-01	8.530E-01	2.867E+00

CE-144	-3.236E-01	1168.3	3.780E+00	3.780E+00	1.273E+01
PM-144	-7.586E-02	469.0	3.558E-01	3.558E-01	1.262E+00
EU-152	4.085E-01	93.7	3.827E-01	3.833E-01	2.977E+00
EU-154	5.532E-01	80.0	4.423E-01	4.433E-01	2.159E+00
EU-155	-1.700E+00	111.0	1.887E+00	1.889E+00	8.944E+00
HF-181	3.059E-01	159.7	4.886E-01	4.889E-01	1.370E+00
Ta-182	2.287E+00	26.7	6.113E-01	6.219E-01	4.830E+00
Hg-203	3.569E-01	95.1	3.395E-01	3.401E-01	1.141E+00
TL-208	3.006E+00	18.1	5.455E-01	5.674E-01	1.057E+00
PM-146	1.896E-01	215.9	4.095E-01	4.096E-01	1.117E+00
Y-88	1.640E-02	203.8	3.342E-02	3.344E-02	1.160E+00
Cd-113m	-2.009E+03	244.0	4.901E+03	4.903E+03	1.678E+04
Cd-109	0.000E+00	1.#INF	1.065E+01	1.065E+01	3.596E+01
Cf-251	-1.917E+00	103.9	1.993E+00	2.000E+00	5.086E+00
Cf-249	2.375E-01	235.5	5.593E-01	5.594E-01	1.917E+00
Sn-126	3.756E+00	112.3	4.218E+00	4.223E+00	1.409E+01
PB-210	-1.035E+01	135.7	1.405E+01	1.406E+01	4.835E+01
PB-212	9.311E+00	8.4	7.783E-01	9.842E-01	1.692E+00
PB-214	9.756E+00	9.9	9.629E-01	1.088E+00	1.519E+00
BI-207	-3.457E-01	187.3	6.473E-01	6.476E-01	1.476E+00
BI-212	2.311E+01	17.9	4.140E+00	4.310E+00	6.177E+00
U-235	-2.713E+00	139.1	3.774E+00	3.777E+00	1.261E+01
BI-214	9.725E+00	10.7	1.043E+00	1.159E+00	1.569E+00
BI-210M	1.679E-01	342.5	5.749E-01	5.749E-01	1.977E+00
AC-228	3.958E+00	42.8	1.694E+00	1.706E+00	4.465E+00
TH-227	4.529E+00	74.1	3.357E+00	3.368E+00	9.083E+00
TH-229	1.235E+00	468.0	5.778E+00	5.779E+00	1.661E+01
TH-234	-3.059E+00	240.1	7.344E+00	7.346E+00	2.488E+01
PA-231	-5.868E+00	346.0	2.031E+01	2.031E+01	6.849E+01
PA-233	0.000E+00	1.#INF	1.423E-01	1.423E-01	5.545E+00
PA-234	5.570E-01	44.7	2.491E-01	2.508E-01	7.575E+00
PA-234M	6.575E+01	78.8	5.181E+01	5.191E+01	1.341E+02
AM-241	2.436E-01	492.0	1.199E+00	1.199E+00	4.055E+00
Np-237	0.000E+00	1.#INF	4.159E+00	4.159E+00	1.396E+01
Ir-192	2.981E-01	94.9	2.830E-01	2.836E-01	2.317E+00
Cs-136	4.405E-01	63.2	2.784E-01	2.796E-01	1.307E+00
Np-239	-1.481E+00	168.4	2.494E+00	2.495E+00	8.306E+00
Nd-147	1.503E+00	78.8	1.184E+00	1.187E+00	5.230E+00
TL-210	-5.337E-01	88.2	4.707E-01	4.717E-01	1.584E+00
Kr-85	4.073E+01	281.8	1.148E+02	1.148E+02	3.930E+02
Total	2.782E+02				

Analyst: Joey Sausto

Sample description
405451_Gamma_490-164491-A-7-A

Spectrum Filename: C:\User\SPC\Det16\16_Gamma_20190007.An1

Acquisition information
Start time: 1/2/2019 1:32:33 PM
Live time: 1800
Real time: 1803
Dead time: 0.15 %
Detector ID: 16

Detector system
Ge16 SN/11012217

Calibration
Filename: 16_Soil_TunaCan.Clb
16_TunaCan_90099_071012

Energy Calibration
Created: 2/28/2012 9:35:31 AM
Zero offset: 0.050 keV
Gain: 0.250 keV/channel
Quadratic: -2.285E-08 keV/channel^2

Efficiency Calibration
Created: 7/13/2012 9:47:24 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.01 %
Log(Eff): 1.477416E-02 + (-5.514266E-01*Log(E)) + (-1.443482E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.17 %
Log(Eff): -2.408438E+01 + (8.948554E+00*Log(E)) + (-9.513599E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_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	1/2/2019 1:32:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	16_2018-12-22_1359.PBC 12/22/2018 1:59:52 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 22 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2316

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.36	13.	154.44	0.60	2.337E-02	46.54	4.250	PBC<MDA	PB210
50.14	20.	108.06	0.96	2.644E-02	50.14	8.000	PBC<MDA	TH227
59.17	5.	492.05	0.97	3.327E-02	59.54	35.900	PBC<MDA	AM241
64.28	24.	112.30	0.98	3.619E-02	64.28	9.700	PBC<MDA	Sn126
74.73	99.	20.00	0.99	4.137E-02				
77.18	174.	12.55	0.99	4.232E-02				
87.25	94.	19.87	0.92	4.532E-02	86.49	13.100	8.815E+00	Np237
					86.54	30.700	3.760E+00	EU155
					86.94	9.040	1.274E+01	Sn126
					87.57	37.500	3.062E+00	Sn126
					88.04	3.790	3.023E+01	Cd109
91.10	27.	127.07	1.00	4.612E-02	91.10	28.300	PBC<MDA	Nd147
92.59	-14.	240.08	1.00	4.638E-02	92.59	5.584	PBC<MDA	TH234
136.47	22.	150.94	1.04	4.573E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.472E+00	CO57
140.51	22.	147.31	1.05	4.516E-02	140.51	89.300	PBC<MDA	Tc99m
165.85	14.	156.87	1.07	4.156E-02	165.85	79.900	PBC<MDA	CE139
185.72	68.	29.61	1.09	3.839E-02	185.72	54.000	1.813E+00	U235
193.51	4.	468.04	1.09	3.730E-02	193.51	4.400	PBC<MDA	TH229
210.85	2.	933.41	1.11	3.511E-02	210.85	2.990	PBC<MDA	TH229
238.37	251.	9.38	1.22	3.219E-02	238.63	43.300	9.491E+00	PB212
241.78	37.	32.70	1.14	3.185E-02	242.00	7.430	PBC<MDA	PB214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
244.69	5.	629.31	1.14	3.160E-02	244.69	7.580	PBC<MDA	EU152
256.24	14.	101.45	1.15	3.058E-02	256.24	7.000	PBC<MDA	TH227
265.83	4.	342.47	1.16	2.979E-02	265.83	50.000	PBC<MDA	BI210M
277.28	14.	87.61	1.17	2.890E-02	277.28	6.310	PBC<MDA	TL208
279.20	15.	95.12	1.17	2.876E-02	279.20	81.460	PBC<MDA	Hg203
294.85	98.	18.42	2.02	2.765E-02	295.09	19.300	1.021E+01	PB214
328.76	20.	70.10	1.22	2.559E-02	328.76	20.300	PBC<MDA	La140
338.32	13.	135.98	1.23	2.506E-02	338.32	12.010	PBC<MDA	AC228
340.57	15.	137.50	1.23	2.494E-02	340.57	46.900	PBC<MDA	Cs136
344.29	15.	143.25	1.23	2.475E-02	344.29	26.500	PBC<MDA	EU152
345.83	4.	580.09	1.23	2.467E-02	345.83	15.070	PBC<MDA	HF181
351.92	157.	9.87	1.51	2.436E-02	351.93	37.600	9.524E+00	PB214
364.48	25.	40.33	1.25	2.375E-02	364.48	81.700	7.157E-01	I131
383.84	13.	107.54	1.27	2.288E-02	383.84	8.940	PBC<MDA	BA133
387.95	6.	235.48	1.27	2.271E-02	387.95	66.000	PBC<MDA	Cf249
391.69	13.	112.87	1.27	2.255E-02	391.69	64.000	PBC<MDA	SN113
427.88	6.	195.40	1.31	2.115E-02	427.88	29.600	PBC<MDA	SB125
433.94	12.	101.52	1.31	2.093E-02	433.94	90.480	PBC<MDA	AG108M
453.88	3.	351.72	1.33	2.026E-02	453.88	65.000	PBC<MDA	PM146
468.06	15.	94.95	1.34	1.981E-02	468.06	51.750	PBC<MDA	Ir192
477.60	5.	233.31	1.35	1.952E-02	477.60	10.520	PBC<MDA	BE7
482.48	7.	159.72	1.35	1.939E-02	482.00	80.500	PBC<MDA	HF181
511.86	83.	16.70	2.63	1.856E-02	511.86	20.000	1.245E+01	RH106
514.30	6.	281.77	1.38	1.850E-02	513.98	0.430	PBC<MDA	Kr85
531.00	10.	93.12	1.40	1.807E-02	531.00	13.000	PBC<MDA	Nd147
537.26	3.	290.26	1.40	1.791E-02	537.26	24.390	PBC<MDA	Ba140
569.32	8.	86.26	1.43	1.717E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.289E+00	PA234
					569.70	97.740	PBC<MDA	BI207
582.72	75.	18.14	1.58	1.687E-02	583.02	84.500	2.907E+00	TL208
609.04	126.	10.72	1.79	1.633E-02	609.31	46.090	9.312E+00	BI214
621.92	11.	175.72	1.48	1.609E-02	621.92	9.930	PBC<MDA	RH106
635.89	9.	85.83	1.49	1.583E-02	635.89	11.310	PBC<MDA	SB125
636.97	2.	510.29	1.49	1.581E-02	636.97	7.170	PBC<MDA	I131
657.76	4.	124.10	1.51	1.543E-02	657.76	94.640	PBC<MDA	AG110M
702.63	9.	89.81	1.55	1.470E-02	702.63	97.900	PBC<MDA	NB94
727.15	45.	17.92	1.82	1.433E-02	727.17	7.550	2.311E+01	BI212
747.16	3.	250.62	1.59	1.404E-02	747.16	34.000	PBC<MDA	PM146
766.41	12.	84.64	1.60	1.378E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.710E+02	PA234M
778.92	4.	204.63	1.62	1.362E-02	778.92	12.940	PBC<MDA	EU152
785.83	23.	21.17	1.81	1.353E-02	785.42	1.280	7.319E+01	BI212
795.87	20.	31.07	1.63	1.340E-02	795.87	85.530	9.532E-01	CS134
801.95	9.	97.16	1.64	1.332E-02	801.95	8.690	PBC<MDA	CS134
810.78	8.	86.44	1.64	1.322E-02	810.78	99.460	PBC<MDA	CO58
815.77	8.	99.49	1.65	1.316E-02	815.77	23.280	PBC<MDA	La140
818.50	8.	111.06	1.65	1.312E-02	818.50	100.000	PBC<MDA	Cs136
834.85	7.	129.65	1.66	1.293E-02	834.85	99.980	PBC<MDA	MN54

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
860.23	5.	197.71	1.69	1.264E-02	860.56	12.420	PBC<MDA	TL208
871.10	6.	74.42	1.69	1.253E-02	871.10	99.890	PBC<MDA	NB94
873.23	6.	93.91	1.70	1.251E-02	873.23	12.270	PBC<MDA	EU154
880.53	6.	88.18	1.70	1.243E-02	880.53	6.000	PBC<MDA	PA234
883.24	6.	105.48	1.71	1.240E-02	883.24	9.600	PBC<MDA	PA234
884.68	6.	120.33	1.71	1.238E-02	884.68	72.680	PBC<MDA	AG110M
889.28	3.	229.98	1.71	1.234E-02	889.28	99.984	PBC<MDA	Sc46
898.04	4.	203.79	1.72	1.225E-02	898.04	93.700	PBC<MDA	Y88
910.22	31.	42.80	1.73	1.211E-02	911.07	29.000	4.902E+00	AC228
937.49	3.	238.82	1.75	1.186E-02	937.49	34.360	PBC<MDA	AG110M
946.02	5.	44.72	1.76	1.178E-02	946.02	13.400	PBC<MDA	PA234
968.97	12.	89.39	1.78	1.157E-02	968.97	17.460	PBC<MDA	AC228
996.33	6.	87.72	1.80	1.133E-02	996.33	10.600	PBC<MDA	EU154
1001.00	5.	132.93	1.81	1.129E-02	1001.00	0.837	PBC<MDA	PA234M
1037.84	6.	105.61	1.84	1.099E-02	1037.84	14.130	PBC<MDA	Co56
1048.07	6.	68.68	1.84	1.091E-02	1048.07	80.000	PBC<MDA	Cs136
1077.40	9.	87.21	1.87	1.068E-02	1077.40	3.300	PBC<MDA	Ga68
1099.25	2.	357.81	1.89	1.052E-02	1099.25	56.500	PBC<MDA	FE59
1119.93	6.	155.05	1.91	1.037E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	9.	84.48	1.91	1.037E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	5.022E-01	Sc46
1121.59	11.	81.49	1.91	1.037E-02	1121.30	34.900	PBC<MDA	Ta182
1173.24	3.	269.62	1.95	1.002E-02	1173.24	99.900	PBC<MDA	CO60
1219.98	14.	26.73	1.99	9.717E-03	1221.41	27.000	2.965E+00	Ta182
1274.53	7.	60.65	2.03	9.409E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.187E+00	EU154
1274.54	2.	233.07	2.03	9.409E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	3.792E-01	EU154
1291.60	7.	89.33	2.05	9.314E-03	1291.60	43.200	PBC<MDA	FE59
1313.00	2.	480.00	2.07	9.199E-03	1313.00	21.000	PBC<MDA	TL210
1332.50	10.	31.62	2.08	9.097E-03	1332.50	99.980	6.109E-01	CO60
1460.55	106.	10.58	2.71	8.482E-03	1460.83	10.670	6.525E+01	K40
1764.00	22.	32.41	2.43	7.342E-03	1764.49	15.400	1.096E+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
298.58	74.78	144.	99.	2.386E+03	20.00	0.985	- D
308.38	77.24	151.	174.	4.117E+03	12.55	0.988	- 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	185.86	46.54	327.	-19.	-0.010	135.74	0.959s
TH-227	200.26	50.14	232.	20.	0.011	108.06	0.963
AM-241	237.83	59.54	328.	5.	0.003	492.05	0.971s
TH-234	252.82	63.29	438.	-52.	-0.029	51.13	0.975s
Sn-126	256.79	64.28	343.	24.	0.013	112.30	0.976
BA-133	323.60	80.99	744.	-27.	-0.015	80.71	0.991
Np-237	345.59	86.49	980.	0.	0.000	1000.00	0.996A
EU-155	345.80	86.54	617.	-12.	-0.007	290.18	0.996s
Sn-126	349.91	87.57	536.	62.	0.034	27.48	0.997D
Cd-109	351.79	88.04	546.	0.	0.000	1000.00	0.998A
Nd-147	364.02	91.10	562.	27.	0.015	127.07	1.001s
TH-234	369.98	92.59	591.	-14.	-0.008	240.08	1.002s
AC-228	373.02	93.35	1280.	-29.	-0.016	177.12	1.003
Gd-153	389.61	97.50	1252.	-29.	-0.016	174.46	1.007s
Np-239	397.61	99.50	1223.	-29.	-0.016	172.15	1.008s
Gd-153	412.40	103.20	1194.	-29.	-0.016	169.59	1.012s
Np-239	414.40	103.70	1165.	-29.	-0.016	167.46	1.012s
EU-155	420.85	105.31	1178.	-31.	-0.017	111.00	1.014s
Np-239	424.11	106.13	1166.	-29.	-0.016	168.40	1.014s
EU-152	486.69	121.78	224.	-23.	-0.013	93.68	1.029s
CO-57	487.81	122.06	247.	-14.	-0.008	163.01	1.029s
EU-154	491.96	123.10	240.	-12.	-0.007	177.36	1.030s
PA-234	524.73	131.29	569.	-23.	-0.013	149.40	1.038s
HF-181	531.64	133.02	581.	-23.	-0.013	150.73	1.039s
CO-57	545.43	136.47	527.	22.	0.012	150.94	1.042s
Tc-99m	561.57	140.51	505.	22.	0.012	147.31	1.046s
U-235	574.67	143.79	541.	-24.	-0.013	139.10	1.049s
CE-141	581.29	145.44	534.	-11.	-0.006	308.90	1.050
Ba-140	650.14	162.66	242.	-24.	-0.013	144.68	1.066s
U-235	653.01	163.38	233.	-2.	-0.001	878.83	1.067s
CE-139	662.90	165.85	218.	14.	0.007	156.87	1.069
Cf-251	705.88	176.60	161.	-23.	-0.013	103.92	1.079s
U-235	742.34	185.72	95.	68.	0.038	29.61	1.087s
TH-229	773.49	193.51	99.	4.	0.002	468.04	1.094
U-235	820.76	205.33	88.	0.	0.000	1000.00	1.105
TH-229	842.82	210.85	99.	2.	0.001	933.41	1.110s
Cf-251	907.40	227.00	117.	-22.	-0.012	94.06	1.125s
PB-212	953.91	238.63	73.	233.	0.130	8.36	1.135D
PB-214	967.37	242.00	53.	37.	0.020	32.70	1.139D
EU-152	978.14	244.69	460.	5.	0.003	629.31	1.141
TH-227	1024.32	256.24	48.	14.	0.008	101.45	1.152s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cd-113m	1054.15	263.70	122.	-6.	-0.004	243.98	1.158s
BI-210M	1062.67	265.83	116.	4.	0.002	342.47	1.160s
TL-208	1108.46	277.28	71.	14.	0.008	87.61	1.171
Hg-203	1116.13	279.20	95.	15.	0.008	95.12	1.173s
PB-214	1178.72	294.85	48.	98.	0.054	18.42	2.018s
TL-210	1183.31	296.00	499.	-17.	-0.009	187.22	1.188s
PB-212	1199.42	300.03	457.	-18.	-0.010	64.20	1.191s
PA-231	1199.58	300.07	438.	-17.	-0.009	175.10	1.192s
PA-233	1200.02	300.18	421.	-17.	-0.009	171.72	1.192s
PA-231	1209.90	302.65	404.	-8.	-0.005	346.03	1.194s
BA-133	1210.70	302.85	396.	0.	0.000	1000.00	1.194s
Ba-140	1218.69	304.85	396.	0.	0.000	1000.00	1.196s
BI-210M	1218.88	304.90	396.	0.	0.000	1000.00	1.196s
Ir-192	1233.05	308.44	396.	0.	0.000	1000.00	1.199s
PA-233	1247.34	312.01	396.	0.	0.000	1000.00	1.202s
Ir-192	1265.24	316.49	396.	0.	0.000	1000.00	1.206s
CR-51	1279.62	320.08	396.	0.	0.000	1000.00	1.210s
La-140	1314.31	328.76	85.	20.	0.011	70.10	1.217s
Cf-249	1333.02	333.44	113.	-2.	-0.001	743.95	1.222s
AC-228	1352.54	338.32	161.	13.	0.007	135.98	1.226
Cs-136	1361.54	340.57	199.	15.	0.008	137.50	1.228s
EU-152	1376.40	344.29	218.	15.	0.008	143.25	1.231s
HF-181	1382.56	345.83	278.	4.	0.002	580.09	1.233
PB-214	1406.94	351.92	23.	157.	0.087	9.87	1.508s
BA-133	1423.24	356.00	273.	-17.	-0.009	141.90	1.242s
I-131	1457.16	364.48	20.	25.	0.014	40.33	1.250s
BA-133	1534.57	383.84	97.	13.	0.007	107.54	1.267s
Cf-249	1551.01	387.95	111.	6.	0.004	235.48	1.271s
SN-113	1565.96	391.69	94.	13.	0.007	112.87	1.274s
SB-125	1710.67	427.88	35.	6.	0.003	195.40	1.307s
AG-108M	1734.91	433.94	35.	12.	0.007	101.52	1.312s
PM-146	1814.67	453.88	26.	3.	0.002	351.72	1.330s
SB-125	1852.61	463.37	107.	-17.	-0.010	87.53	1.338s
Ir-192	1871.38	468.06	91.	15.	0.008	94.95	1.342s
BE-7	1909.51	477.60	61.	5.	0.003	233.31	1.351s
HF-181	1927.12	482.00	59.	7.	0.004	159.72	1.355s
RH-106	2046.57	511.86	55.	83.	0.046	16.70	2.631s
Kr-85	2055.03	513.98	132.	6.	0.003	281.77	1.383s
Nd-147	2123.10	531.00	17.	10.	0.005	93.12	1.398s
Ba-140	2148.14	537.26	22.	3.	0.002	290.26	1.404s
CS-134	2276.36	569.32	22.	8.	0.005	86.26	1.432s
PA-234	2276.96	569.47	40.	-7.	-0.004	136.11	1.432s
BI-207	2277.89	569.70	56.	-19.	-0.010	67.16	1.432s
TL-208	2329.97	582.72	27.	75.	0.041	18.14	1.582
SB-125	2401.07	600.50	248.	-12.	-0.007	181.31	1.460s
SB-124	2409.99	602.73	235.	-11.	-0.006	195.30	1.462s
CS-134	2417.91	604.71	224.	0.	0.000	1000.00	1.463s
BI-214	2435.21	609.04	16.	126.	0.070	10.72	1.785s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RU-103	2440.26	610.30	224.	0.	0.000	1000.00	1.468s
AG-108M	2456.19	614.28	224.	0.	0.000	1000.00	1.472s
PM-144	2471.31	618.06	236.	-14.	-0.008	94.32	1.475s
RH-106	2486.73	621.92	194.	11.	0.006	175.72	1.479s
SB-125	2542.62	635.89	23.	9.	0.005	85.83	1.491s
I-131	2546.96	636.97	35.	2.	0.001	510.29	1.492s
AG-110M	2630.10	657.76	12.	4.	0.002	124.10	1.510s
CS-137	2645.69	661.66	41.	-2.	-0.001	469.07	1.513s
PM-144	2785.22	696.54	43.	-2.	-0.001	469.04	1.544s
NB-94	2809.57	702.63	29.	9.	0.005	89.81	1.549s
SB-124	2890.19	722.79	77.	-8.	-0.004	159.10	1.567s
AG-108M	2890.80	722.94	69.	0.	0.000	1000.00	1.567s
EU-154	2892.49	723.36	76.	-7.	-0.004	176.22	1.567s
ZR-95	2895.84	724.20	69.	0.	0.000	1000.00	1.568s
BI-212	2907.66	727.15	4.	45.	0.025	17.92	1.818
PM-146	2941.93	735.72	29.	-9.	-0.005	93.85	1.578s
PM-146	2987.69	747.16	9.	3.	0.001	250.62	1.588s
ZR-95	3025.97	756.73	33.	-7.	-0.004	120.12	1.596s
AG-110M	3054.82	763.94	68.	-18.	-0.010	69.47	1.602s
NB-95	3062.21	765.79	86.	0.	0.000	1000.00	1.604s
PA-234M	3064.70	766.41	50.	12.	0.007	84.64	1.605s
EU-152	3114.73	778.92	14.	4.	0.002	204.63	1.615s
BI-212	3142.36	785.83	0.	23.	0.013	21.17	1.812
CS-134	3182.54	795.87	9.	20.	0.011	31.07	1.630s
TL-210	3197.46	799.60	56.	-13.	-0.007	88.19	1.633s
CS-134	3206.86	801.95	34.	9.	0.005	97.16	1.635s
CO-58	3242.16	810.78	20.	8.	0.004	86.44	1.643
La-140	3262.14	815.77	28.	8.	0.004	99.49	1.647s
Cs-136	3273.06	818.50	37.	8.	0.005	111.06	1.649s
MN-54	3338.46	834.85	15.	7.	0.004	129.65	1.663s
Co-56	3386.15	846.77	31.	-7.	-0.004	133.75	1.674s
TL-208	3441.33	860.56	21.	5.	0.003	197.71	1.685s
NB-94	3483.47	871.10	7.	6.	0.003	74.42	1.695s
EU-154	3492.00	873.23	12.	6.	0.003	93.91	1.696s
PA-234	3521.21	880.53	11.	6.	0.003	88.18	1.703s
PA-234	3532.05	883.24	17.	6.	0.003	105.48	1.705s
AG-110M	3537.82	884.68	23.	6.	0.003	120.33	1.706s
Sc-46	3556.21	889.28	29.	3.	0.002	229.98	1.710s
Y-88	3591.26	898.04	10.	4.	0.002	203.79	1.718s
AC-228	3643.38	911.07	30.	31.	0.017	42.80	1.729s
AG-110M	3749.09	937.49	10.	3.	0.002	238.82	1.751s
PA-234	3783.21	946.02	0.	5.	0.003	44.72	1.759s
EU-152	3855.58	964.11	65.	-22.	-0.012	82.46	1.774s
AC-228	3875.02	968.97	55.	12.	0.007	89.39	1.778
EU-154	3984.48	996.33	11.	6.	0.003	87.72	1.801s
PA-234M	4003.15	1001.00	19.	5.	0.003	132.93	1.805s
EU-154	4018.27	1004.77	57.	-13.	-0.007	89.22	1.808s
Co-56	4150.56	1037.84	6.	6.	0.003	105.61	1.836s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cs-136	4191.49	1048.07	6.	6.	0.004	68.68	1.845s
RH-106	4200.65	1050.36	41.	-14.	-0.008	68.64	1.847s
BI-207	4253.86	1063.66	16.	-5.	-0.003	187.26	1.858s
Ga-68	4308.84	1077.40	11.	9.	0.005	87.21	1.870s
FE-59	4396.27	1099.25	11.	2.	0.001	357.81	1.888s
EU-152	4447.58	1112.07	62.	-13.	-0.007	88.50	1.899s
ZN-65	4461.46	1115.55	48.	-1.	-0.001	664.64	1.901s
BI-214	4480.43	1120.29	39.	6.	0.003	155.05	1.906s
Sc-46	4481.49	1120.55	27.	9.	0.005	84.48	1.906s
Ta-182	4484.49	1121.30	38.	11.	0.006	81.49	1.906s
CO-60	4692.30	1173.24	12.	3.	0.002	269.62	1.950s
Ta-182	4755.57	1189.05	23.	-8.	-0.004	150.05	1.963s
Ta-182	4885.06	1221.41	0.	14.	0.008	26.73	1.990s
NA-22	5097.62	1274.53	6.	7.	0.004	60.65	2.034s
EU-154	5097.66	1274.54	13.	2.	0.001	233.07	2.034s
FE-59	5165.91	1291.60	6.	7.	0.004	89.33	2.048s
TL-210	5251.57	1313.00	11.	2.	0.001	480.00	2.066s
CO-60	5329.61	1332.50	0.	10.	0.006	31.62	2.081s
AG-110M	5536.89	1384.30	18.	-8.	-0.004	132.88	2.124s
EU-152	5631.75	1408.00	24.	-10.	-0.006	122.47	2.143s
K-40	5842.06	1460.55	10.	106.	0.059	10.58	2.713s
La-140	6385.02	1596.21	13.	-4.	-0.002	246.63	2.294s
SB-124	6764.37	1690.98	0.	0.	0.000	1000.00	2.369s
BI-214	7058.61	1764.49	15.	22.	0.012	32.41	2.427s
Co-56	7086.08	1771.35	27.	0.	0.000	1000.00	2.433s
Y-88	7345.12	1836.06	7.	-2.	-0.001	432.89	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	1.3074E+00				5.31E+01	
			477.60	1.307E+00	(	1.059E+01 2.33E+02 1.05E+01	G
NA-22	C	4.1792E-01				9.50E+02	
			1274.53	4.179E-01	?(	8.155E-01 6.07E+01 9.99E+01	G
K-40	N	6.5251E+01				4.66E+11	
			1460.83	6.525E+01	(P	1.057E+01 1.06E+01 1.07E+01	G
Sc-46	F	3.2733E-01				8.38E+01	
			889.28	1.525E-01	?(	1.245E+00 2.30E+02 1.00E+02	G
			1120.55	5.022E-01	?(	1.434E+00 8.45E+01 1.00E+02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C 2.9599E-01					3.12E+02	
		834.85	2.960E-01	?(P	8.948E-01	1.30E+02	1.00E+02 G
FE-59	F 5.2839E-01					4.45E+01	
		1099.25	1.986E-01	?(P	1.689E+00	3.58E+02	5.65E+01 G
		1291.60	9.597E-01	?(P	1.929E+00	8.93E+01	4.32E+01 G
Co-56	C -9.4343E-03					7.73E+01	
		846.77	-2.938E-01	?(P	1.241E+00	1.34E+02	9.99E+01 G
		1238.28	7.938E-02	% P	1.922E+00	1.07E+03	6.61E+01 G
		1037.84	2.001E+00	?(P	5.097E+00	1.06E+02	1.41E+01 G
		1771.35	0.000E+00	+	1.313E+01	1.00E+03	1.55E+01 A
CO-57	C 1.0541E-01					2.72E+02	
		122.06	-1.898E-01	?(	1.043E+00	1.63E+02	8.56E+01 G
		136.47	2.472E+00	?(	1.248E+01	1.51E+02	1.07E+01 G
CO-58	C 3.4136E-01					7.09E+01	
		810.78	3.414E-01	?(	1.003E+00	8.64E+01	9.95E+01 G
CO-60	F 6.1085E-01					1.93E+03	
		1332.50	6.109E-01	?(	4.502E-01	3.16E+01	1.00E+02 G
		1173.24	1.683E-01	- P	1.045E+00	2.70E+02	9.99E+01 G
ZN-65	F -1.5754E-01					2.44E+02	
		1115.55	-1.575E-01	?(	3.710E+00	6.65E+02	5.06E+01 G
NB-94	I 3.0595E-01					7.41E+06	
		702.63	3.512E-01	&(P	1.069E+00	8.98E+01	9.79E+01 G
		871.10	2.616E-01	&(	6.545E-01	7.44E+01	9.99E+01 G
ZR-95	I -5.0936E-01					6.40E+01	
		756.73	-5.094E-01	?(P	2.160E+00	1.20E+02	5.45E+01 G
		724.20	0.000E+00	+	3.626E+00	1.00E+03	4.42E+01 G
RU-103	I 2.9719E-02					3.93E+01	
		497.05	2.972E-02	%(P	9.895E-01	1.32E+03	9.09E+01 G
		610.30	0.000E+00	-	4.292E+01	1.00E+03	5.75E+00 GA
RH-106	I 3.9537E+00					3.74E+02	
		621.92	3.954E+00	?(P	2.350E+01	1.76E+02	9.93E+00 G
		1050.36	-4.697E+01	+	1.069E+02	6.86E+01	1.56E+00 G
		511.86	1.245E+01	?	5.570E+00	1.67E+01	2.00E+01 GA
AG-108M	C 3.6173E-01					1.53E+05	
		433.94	3.617E-01	&(	8.842E-01	1.02E+02	9.05E+01 G
		722.94	0.000E+00	-	1.760E+00	1.00E+03	9.08E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		614.28	0.000E+00	-	2.760E+00	1.00E+03	8.98E+01 G
AG-110M F	2.7814E-01					2.50E+02	
		884.68	3.662E-01	?(	1.532E+00	1.20E+02	7.27E+01 G
		657.76	1.630E-01	?(	7.170E-01	1.24E+02	9.46E+01 G
		937.49	4.090E-01	?(	2.379E+00	2.39E+02	3.44E+01 G
		1384.30	-2.071E+00	+	5.819E+00	1.33E+02	2.43E+01 G
		763.94	-3.219E+00	+	7.417E+00	6.95E+01	2.23E+01 G
SN-113 F	4.8216E-01					1.15E+02	
		391.69	4.822E-01	?(	1.841E+00	1.13E+02	6.40E+01 G
SB-124 F	-3.8598E-01					6.02E+01	
		602.73	-3.860E-01	&(	2.548E+00	1.95E+02	9.83E+01 G
		1690.98	0.000E+00	+	1.130E+00	1.00E+03	4.78E+01 G
		722.79	-2.856E+00	+	1.557E+01	1.59E+02	1.08E+01 G
SB-125 I	1.1476E+00					1.01E+03	
		427.88	5.583E-01	?(P	2.677E+00	1.95E+02	2.96E+01 G
		600.50	-2.342E+00	+	1.433E+01	1.81E+02	1.79E+01 G
		635.89	2.690E+00	?(	7.828E+00	8.58E+01	1.13E+01 G
		463.37	-4.627E+00	&	1.356E+01	8.75E+01	1.05E+01 G
I-131 I	7.2388E-01					8.02E+00	
		364.48	7.157E-01	*(	6.742E-01	4.03E+01	8.17E+01 G
		284.30	2.429E-01	% P	1.277E+01	2.06E+03	6.14E+00 G
		636.97	8.171E-01	&(	1.491E+01	5.10E+02	7.17E+00 G
Gd-153 F	-1.1347E+00					2.42E+02	
		97.50	-1.135E+00	?(	6.593E+00	1.74E+02	3.00E+01 G
		103.20	-1.553E+00	+	8.774E+00	1.70E+02	2.18E+01 G
Ga-68 C	1.6926E+01					4.71E-02	
		1077.40	1.693E+01	?(	3.300E+01	8.72E+01	3.30E+00 G
Tc-99m I	3.0954E-01					2.51E-01	
		140.51	3.095E-01	&(	1.525E+00	1.47E+02	8.93E+01 G
BA-133 F	-6.1950E-01					3.85E+03	
		356.00	-6.195E-01	&(	2.954E+00	1.42E+02	6.20E+01 G
		302.85	0.000E+00	+	1.066E+01	1.00E+03	1.83E+01 G
		383.84	3.643E+00	? P	1.321E+01	1.08E+02	8.94E+00 GA
		80.99	-1.016E+00	+ P	4.855E+00	8.07E+01	3.41E+01 GA
CS-134 I	1.0752E+00					7.54E+02	
		795.87	9.532E-01	&(	8.027E-01	3.11E+01	8.55E+01 G
		604.71	0.000E+00	-	2.511E+00	1.00E+03	9.76E+01 G
		569.32	1.753E+00	?(	5.134E+00	8.63E+01	1.54E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			801.95	4.332E+00	+	1.433E+01	9.72E+01	8.69E+00 G
			563.24	2.563E-01	%	1.284E+01	2.02E+03	8.35E+00 G
CS-137	I	-8.2825E-02					1.10E+04	
			661.66	-8.283E-02	?(	1.380E+00	4.69E+02	8.52E+01 G
CE-139	F	2.2588E-01					1.38E+02	
			165.85	2.259E-01	?(	1.195E+00	1.57E+02	7.99E+01 G
Ba-140	I	4.2387E-01					1.28E+01	
			537.26	4.239E-01	?(	3.103E+00	2.90E+02	2.44E+01 G
			162.66	-5.129E+00	+ P	1.623E+01	1.45E+02	6.22E+00 G
			304.85	0.000E+00	-	4.576E+01	1.00E+03	4.29E+00 G
La-140	I	3.6891E-01					1.28E+01	
			1596.21	-2.694E-01	?(	1.417E+00	2.47E+02	9.54E+01 G
			487.02	4.229E-02	%	2.543E+00	1.71E+03	4.55E+01 G
			328.76	2.107E+00	*(P	4.894E+00	7.01E+01	2.03E+01 G
			815.77	1.469E+00	?(	4.997E+00	9.95E+01	2.33E+01 G
CE-141	I	-2.7611E-01					3.25E+01	
			145.44	-2.761E-01	?(	2.867E+00	3.09E+02	4.82E+01 G
CE-144	I	-3.2355E-01					2.85E+02	
			133.54	-3.236E-01	%(	1.273E+01	1.17E+03	1.11E+01 G
PM-144	C	-7.5861E-02					3.63E+02	
			696.54	-7.586E-02	&(	1.262E+00	4.69E+02	9.90E+01 G
			618.06	-5.005E-01	+ P	2.579E+00	9.43E+01	9.91E+01 G
EU-152	F	4.0853E-01					4.94E+03	
			121.78	-9.521E-01	?(	2.977E+00	9.37E+01	2.86E+01 G
			344.29	1.256E+00	(	6.059E+00	1.43E+02	2.65E+01 G
			1112.07	-5.156E+00	+	1.535E+01	8.85E+01	1.36E+01 G
			778.92	1.261E+00	?(	6.352E+00	2.05E+02	1.29E+01 G
			964.11	-7.286E+00	+	1.319E+01	8.25E+01	1.46E+01 G
			244.69	1.121E+00	&(	2.382E+01	6.29E+02	7.58E+00 G
			1408.00	-3.032E+00	+	7.743E+00	1.22E+02	2.10E+01 GA
EU-154	I	5.5323E-01					3.14E+03	
			123.10	-3.606E-01	?(	2.159E+00	1.77E+02	4.08E+01 G
			1274.54	3.792E-01	?(	3.246E+00	2.33E+02	3.52E+01 G
			723.36	-1.369E+00	&	8.285E+00	1.76E+02	2.02E+01 G
			873.23	2.136E+00	&(	6.921E+00	9.39E+01	1.23E+01 G
			1004.77	-3.446E+00	&	1.035E+01	8.92E+01	1.80E+01 G
			996.33	2.816E+00	?(P	8.449E+00	8.77E+01	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	-1.6997E+00					1.81E+03	
			105.31	-1.700E+00	*(P	8.944E+00	1.11E+02	2.12E+01 G
			86.54	-4.876E-01	+	4.748E+00	2.90E+02	3.07E+01 G
HF-181	F	3.0594E-01					4.24E+01	
			482.00	2.491E-01	?(	1.370E+00	1.60E+02	8.05E+01 G
			133.02	-6.345E-01	&	3.196E+00	1.51E+02	4.33E+01 G
			345.83	6.095E-01	(	1.201E+01	5.80E+02	1.51E+01 G
			136.30	3.368E-01	%	2.442E+01	2.15E+03	5.85E+00 G
Ta-182	F	2.2874E+00					1.14E+02	
			1121.30	1.764E+00	?(	4.830E+00	8.15E+01	3.49E+01 G
			1221.41	2.965E+00	&(	1.561E+00	2.67E+01	2.70E+01 G
			1189.05	-2.651E+00	-	8.610E+00	1.50E+02	1.62E+01 G
Hg-203	F	3.5687E-01					4.66E+01	
			279.20	3.569E-01	&(	1.141E+00	9.51E+01	8.15E+01 G
TL-208	N	3.0064E+00					6.98E+02	
			583.02	2.907E+00	(P	1.057E+00	1.81E+01	8.45E+01 G
			277.28	4.342E+00	(P	1.276E+01	8.76E+01	6.31E+00 G
			860.56	1.823E+00	- P	8.487E+00	1.98E+02	1.24E+01 G
PM-146	C	1.8964E-01					2.02E+03	
			453.88	1.265E-01	?(	1.117E+00	3.52E+02	6.50E+01 G
			747.16	3.102E-01	?(	1.972E+00	2.51E+02	3.40E+01 G
			735.72	-1.536E+00	+ P	4.820E+00	9.39E+01	2.25E+01 G
Y-88	F	1.6400E-02					1.07E+02	
			1836.06	-1.315E-01	?(P	1.160E+00	4.33E+02	9.92E+01 G
			898.04	1.730E-01	?(P	8.598E-01	2.04E+02	9.37E+01 G
Cd-113m		-2.0089E+03					5.33E+03	
			263.70	-2.009E+03	?(	1.678E+04	2.44E+02	6.00E-03 K
Cf-251	T	-1.9174E+00					3.28E+05	
			176.60	-1.917E+00	(	5.086E+00	1.04E+02	1.70E+01 G
			227.00	-5.853E+00	+	1.408E+01	9.41E+01	6.30E+00 GA
Cf-249	T	2.3750E-01					1.28E+05	
			387.95	2.375E-01	?(	1.917E+00	2.35E+02	6.60E+01 G
			333.44	-2.871E-01	+	7.390E+00	7.44E+02	1.55E+01 G
Sn-126		3.7561E+00					3.65E+07	
			87.57	2.010E+00	}	3.609E+00	2.75E+01	3.75E+01 GA
			64.28	3.756E+00	(	1.409E+01	1.12E+02	9.70E+00 G
			86.94	0.000E+00	}	1.479E+01	1.85E+03	9.04E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	-1.0352E+01					8.14E+03	
			46.54	-1.035E+01	?(P	4.835E+01	1.36E+02	4.25E+00 G
PB-212	N	9.3113E+00					6.98E+02	
			238.63	9.311E+00	(P	1.692E+00	8.36E+00	4.33E+01 G
			300.03	-1.131E+01	- P	6.342E+01	6.42E+01	3.28E+00 GA
PB-214	N	9.7561E+00					5.84E+05	
			351.93	9.524E+00	@(P	1.519E+00	9.87E+00	3.76E+01 G
			295.09	1.021E+01	*(P	3.642E+00	1.84E+01	1.93E+01 G
			242.00	8.597E+00		8.631E+00	3.27E+01	7.43E+00 GA
BI-207	C	-3.4569E-01					1.18E+04	
			1063.66	-3.457E-01	(	1.476E+00	1.87E+02	7.45E+01 G
			569.70	-6.142E-01	+ P	1.240E+00	6.72E+01	9.77E+01 G
BI-212	N	2.3107E+01					6.98E+02	
			727.17	2.311E+01	(	6.177E+00	1.79E+01	7.55E+00 G
			785.42	7.319E+01	+ P	2.364E+01	2.12E+01	1.28E+00 GA
U-235	N	-2.7133E+00					2.57E+11	
			143.79	-2.713E+00	?(	1.261E+01	1.39E+02	1.10E+01 G
			205.33	0.000E+00	+	1.439E+01	1.00E+03	5.01E+00 G
			163.38	-6.527E-01	+	1.957E+01	8.79E+02	5.08E+00 G
			185.72	1.813E+00	*	1.292E+00	2.96E+01	5.40E+01 GA
BI-214	N	9.7247E+00					5.84E+05	
			609.31	9.312E+00	(P	1.569E+00	1.07E+01	4.61E+01 G
			1120.29	2.109E+00	- P	1.130E+01	1.55E+02	1.51E+01 G
			1764.49	1.096E+01	?(P	1.011E+01	3.24E+01	1.54E+01 G
BI-210M	T	1.6786E-01					1.10E+09	
			265.83	1.679E-01	&(	1.977E+00	3.42E+02	5.00E+01 G
			304.90	0.000E+00	-	7.012E+00	1.00E+03	2.80E+01 G
AC-228	N	3.9578E+00					2.10E+03	
			911.07	4.902E+00	?(	4.465E+00	4.28E+01	2.90E+01 G
			968.97	3.401E+00	(	1.024E+01	8.94E+01	1.75E+01 G
			338.32	2.487E+00	(	1.142E+01	1.36E+02	1.20E+01 G
			93.35	-6.171E+00	-	3.640E+01	1.77E+02	5.56E+00 XA
TH-227	N	4.5291E+00					7.95E+03	
			256.24	3.599E+00	&(	9.083E+00	1.01E+02	7.00E+00 G
			235.97	-2.239E-01	%	1.505E+01	1.99E+03	1.23E+01 G
			50.14	5.343E+00	?(	1.933E+01	1.08E+02	8.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	1.2345E+00					2.68E+06	
			193.51	1.354E+00	?(	1.661E+01	4.68E+02	4.40E+00 G
			210.85	1.058E+00	?(	2.597E+01	9.33E+02	2.99E+00 G
TH-234	N	-3.0590E+00					1.63E+12	
			92.59	-3.059E+00	*(P	2.488E+01	2.40E+02	5.58E+00 G
			63.29	-2.145E+01	+ P	4.103E+01	5.11E+01	3.81E+00 G
PA-231	N	-5.8680E+00					1.20E+07	
			302.65	-5.868E+00	?(	6.849E+01	3.46E+02	2.88E+00 G
			300.07	-1.412E+01	+	8.290E+01	1.75E+02	2.46E+00 G
PA-234	N	5.5702E-01					1.63E+12	
			131.29	-1.517E+00	?(	7.575E+00	1.49E+02	1.80E+01 G
			946.02	1.760E+00	?(	2.594E+00	4.47E+01	1.34E+01 G
			569.47	-2.697E+00	+	1.268E+01	1.36E+02	8.20E+00 G
			883.24	2.767E+00	?(	1.012E+01	1.05E+02	9.60E+00 G
			880.53	4.411E+00	&	1.336E+01	8.82E+01	6.00E+00 GA
PA-234M	N	6.5746E+01					1.63E+12	
			1001.00	2.877E+01	&(P	1.341E+02	1.33E+02	8.37E-01 G
			766.41	1.710E+02	?(	4.867E+02	8.46E+01	2.94E-01 G
AM-241	T	2.4358E-01					1.58E+05	
			59.54	2.436E-01	?(P	4.055E+00	4.92E+02	3.59E+01 G
Ir-192	F	2.9808E-01					7.40E+01	
			316.49	0.000E+00	&(	2.317E+00	1.00E+03	8.70E+01 G
			468.06	7.994E-01	?(	2.552E+00	9.49E+01	5.18E+01 G
			308.44	0.000E+00	-	6.235E+00	1.00E+03	3.18E+01 G
Cs-136	F	4.4049E-01					1.30E+01	
			818.50	3.433E-01	?(	1.307E+00	1.11E+02	1.00E+02 G
			1048.07	4.085E-01	?(	9.291E-01	6.87E+01	8.00E+01 G
			340.57	7.022E-01	?(	3.253E+00	1.38E+02	4.69E+01 G
Np-239	T	-1.4809E+00					2.36E+00	
			103.70	-1.411E+00	+	7.870E+00	1.67E+02	2.40E+01 X
			106.13	-1.481E+00	*(	8.306E+00	1.68E+02	2.27E+01 G
			99.50	-2.264E+00	&	1.298E+01	1.72E+02	1.50E+01 X
Nd-147		1.5026E+00					1.11E+01	
			531.00	2.299E+00	?(	5.230E+00	9.31E+01	1.30E+01 G
			91.10	1.137E+00	?(	4.819E+00	1.27E+02	2.83E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TL-210   N  -5.3371E-01                                      5.84E+05
                          799.60-5.337E-01 ?(  1.584E+00 8.82E+01 9.90E+01 G
                          296.00-4.339E-01 +   2.723E+00 1.87E+02 7.90E+01 G
                         1313.00 4.793E-01 +   5.291E+00 4.80E+02 2.10E+01 GA

Kr-85    I   4.0730E+01                                      3.92E+03
                          513.98 4.073E+01 ?(  3.930E+02 2.82E+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	327.	-19.	-0.010	135.74	-1.035E+01	P
TH-227	50.14	232.	20.	0.011	108.06	5.343E+00	
TH-234	63.29	438.	-52.	-0.029	51.13	-2.145E+01	P
BA-133	80.99	744.	-27.	-0.015	80.71	-1.016E+00	P
EU-155	86.54	617.	-12.	-0.007	290.18	-4.876E-01	
Nd-147	91.10	562.	27.	0.015	127.07	1.137E+00	
TH-234	92.59	591.	-14.	-0.008	240.08	-3.059E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Gd-153	97.50	1252.	-29.	-0.016	174.46	-1.135E+00		
Np-239	99.50	1223.	-29.	-0.016	172.15	-2.264E+00		
Gd-153	103.20	1194.	-29.	-0.016	169.59	-1.553E+00		
Np-239	103.70	1165.	-29.	-0.016	167.46	-1.411E+00		
EU-155	105.31	1178.	-31.	-0.017	111.00	-1.700E+00		P
Np-239	106.13	1166.	-29.	-0.016	168.40	-1.481E+00		
EU-152	121.78	224.	-23.	-0.013	93.68	-9.521E-01		
CO-57	122.06	247.	-14.	-0.008	163.01	-1.898E-01		
EU-154	123.10	240.	-12.	-0.007	177.36	-3.606E-01		
PA-234	131.29	569.	-23.	-0.013	149.40	-1.517E+00		
CO-57	136.47	527.	22.	0.012	150.94	2.472E+00		
Tc-99m	140.51	505.	22.	0.012	147.31	3.095E-01		
U-235	143.79	541.	-24.	-0.013	139.10	-2.713E+00		
CE-141	145.44	534.	-11.	-0.006	308.90	-2.761E-01		
Ba-140	162.66	242.	-24.	-0.013	144.68	-5.129E+00		P
U-235	163.38	233.	-2.	-0.001	878.83	-6.527E-01		
CE-139	165.85	218.	14.	0.007	156.87	2.259E-01		
Cf-251	176.60	161.	-23.	-0.013	103.92	-1.917E+00		
U-235	185.72	95.	68.	0.038	29.61	1.813E+00		
TH-229	193.51	99.	4.	0.002	468.04	1.354E+00		
TH-229	210.85	99.	2.	0.001	933.41	1.058E+00		
Cf-251	227.00	117.	-22.	-0.012	94.06	-5.853E+00		
EU-152	244.69	460.	5.	0.003	629.31	1.121E+00		
TH-227	256.24	48.	14.	0.008	101.45	3.599E+00		
Cd-113m	263.70	122.	-6.	-0.004	243.98	-2.009E+03		
BI-210M	265.83	116.	4.	0.002	342.47	1.679E-01		
Hg-203	279.20	95.	15.	0.008	95.12	3.569E-01		
TL-210	296.00	499.	-17.	-0.009	187.22	-4.339E-01		
PA-231	300.07	438.	-17.	-0.009	175.10	-1.412E+01		
PA-233	300.18	421.	-17.	-0.009	171.72	-5.602E+00		
PA-231	302.65	404.	-8.	-0.005	346.03	-5.868E+00		
La-140	328.76	85.	20.	0.011	70.10	2.107E+00		P
Cf-249	333.44	113.	-2.	-0.001	743.95	-2.871E-01		
Cs-136	340.57	199.	15.	0.008	137.50	7.022E-01		
EU-152	344.29	218.	15.	0.008	143.25	1.256E+00		
BA-133	356.00	273.	-17.	-0.009	141.90	-6.195E-01		
BA-133	383.84	97.	13.	0.007	107.54	3.643E+00		P
Cf-249	387.95	111.	6.	0.004	235.48	2.375E-01		
SN-113	391.69	94.	13.	0.007	112.87	4.822E-01		
SB-125	427.88	35.	6.	0.003	195.40	5.583E-01		P
AG-108M	433.94	35.	12.	0.007	101.52	3.617E-01		
PM-146	453.88	26.	3.	0.002	351.72	1.265E-01		
SB-125	463.37	107.	-17.	-0.010	87.53	-4.627E+00		
Ir-192	468.06	91.	15.	0.008	94.95	7.994E-01		
BE-7	477.60	61.	5.	0.003	233.31	1.307E+00		
RH-106	511.86	55.	83.	0.046	16.70	1.245E+01		
Nd-147	531.00	17.	10.	0.005	93.12	2.299E+00		
Ba-140	537.26	22.	3.	0.002	290.26	4.239E-01		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	569.47	40.	-7.	-0.004	136.11	-2.697E+00	
BI-207	569.70	56.	-19.	-0.010	67.16	-6.142E-01	P
SB-125	600.50	248.	-12.	-0.007	181.31	-2.342E+00	
SB-124	602.73	235.	-11.	-0.006	195.30	-3.860E-01	
PM-144	618.06	236.	-14.	-0.008	94.32	-5.005E-01	P
RH-106	621.92	194.	11.	0.006	175.72	3.954E+00	P
SB-125	635.89	23.	9.	0.005	85.83	2.690E+00	
AG-110M	657.76	12.	4.	0.002	124.10	1.630E-01	
CS-137	661.66	41.	-2.	-0.001	469.07	-8.283E-02	
PM-144	696.54	43.	-2.	-0.001	469.04	-7.586E-02	
NB-94	702.63	29.	9.	0.005	89.81	3.512E-01	P
SB-124	722.79	77.	-8.	-0.004	159.10	-2.856E+00	
EU-154	723.36	76.	-7.	-0.004	176.22	-1.369E+00	
PM-146	735.72	29.	-9.	-0.005	93.85	-1.536E+00	P
PM-146	747.16	9.	3.	0.001	250.62	3.102E-01	
ZR-95	756.73	33.	-7.	-0.004	120.12	-5.094E-01	P
AG-110M	763.94	68.	-18.	-0.010	69.47	-3.219E+00	
PA-234M	766.41	50.	12.	0.007	84.64	1.710E+02	
EU-152	778.92	14.	4.	0.002	204.63	1.261E+00	
TL-210	799.60	56.	-13.	-0.007	88.19	-5.337E-01	
CO-58	810.78	20.	8.	0.004	86.44	3.414E-01	
La-140	815.77	28.	8.	0.004	99.49	1.469E+00	
Cs-136	818.50	37.	8.	0.005	111.06	3.433E-01	
MN-54	834.85	15.	7.	0.004	129.65	2.960E-01	P
Co-56	846.77	31.	-7.	-0.004	133.75	-2.938E-01	P
NB-94	871.10	7.	6.	0.003	74.42	2.616E-01	
EU-154	873.23	12.	6.	0.003	93.91	2.136E+00	
PA-234	880.53	11.	6.	0.003	88.18	4.411E+00	
PA-234	883.24	17.	6.	0.003	105.48	2.767E+00	
AG-110M	884.68	23.	6.	0.003	120.33	3.662E-01	
Sc-46	889.28	29.	3.	0.002	229.98	1.525E-01	
Y-88	898.04	10.	4.	0.002	203.79	1.730E-01	P
AG-110M	937.49	10.	3.	0.002	238.82	4.090E-01	
PA-234	946.02	0.	5.	0.003	44.72	1.760E+00	
EU-152	964.11	65.	-22.	-0.012	82.46	-7.286E+00	
EU-154	996.33	11.	6.	0.003	87.72	2.816E+00	P
PA-234M	1001.00	19.	5.	0.003	132.93	2.877E+01	P
EU-154	1004.77	57.	-13.	-0.007	89.22	-3.446E+00	
Co-56	1037.84	6.	6.	0.003	105.61	2.001E+00	P
Cs-136	1048.07	6.	6.	0.004	68.68	4.085E-01	
RH-106	1050.36	41.	-14.	-0.008	68.64	-4.697E+01	
BI-207	1063.66	16.	-5.	-0.003	187.26	-3.457E-01	
Ga-68	1077.40	11.	9.	0.005	87.21	1.693E+01	
FE-59	1099.25	11.	2.	0.001	357.81	1.986E-01	P
EU-152	1112.07	62.	-13.	-0.007	88.50	-5.156E+00	
ZN-65	1115.55	48.	-1.	-0.001	664.64	-1.575E-01	
Sc-46	1120.55	27.	9.	0.005	84.48	5.022E-01	
NA-22	1274.53	6.	7.	0.004	60.65	4.179E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-154	1274.54	13.	2.	0.001	233.07	3.792E-01		
FE-59	1291.60	6.	7.	0.004	89.33	9.597E-01		P
TL-210	1313.00	11.	2.	0.001	480.00	4.793E-01		
AG-110M	1384.30	18.	-8.	-0.004	132.88	-2.071E+00		
EU-152	1408.00	24.	-10.	-0.006	122.47	-3.032E+00		
La-140	1596.21	13.	-4.	-0.002	246.63	-2.694E-01		
Y-88	1836.06	7.	-2.	-0.001	432.89	-1.315E-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 *****

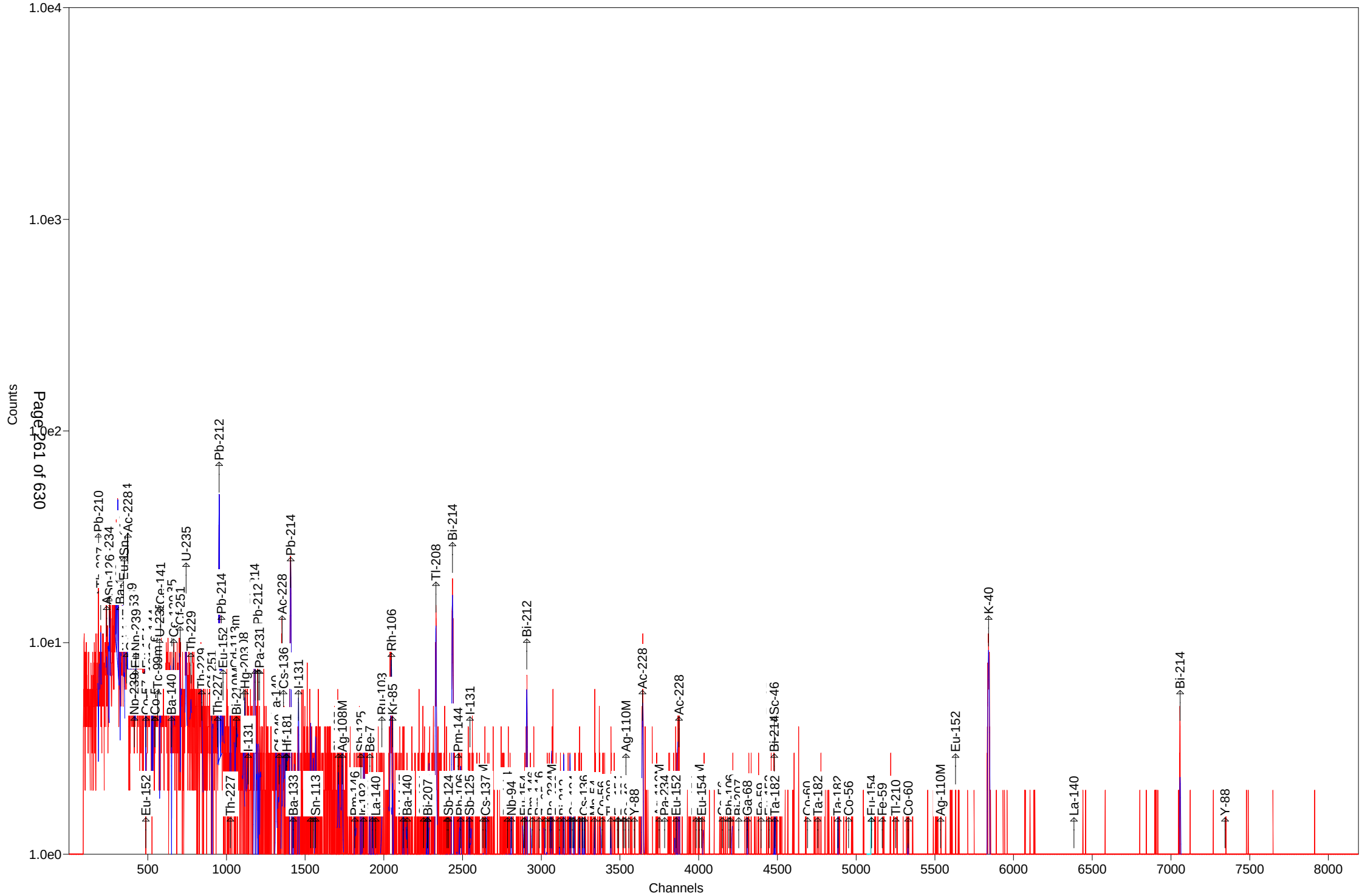
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	1.3074E+00	1.3074E+00	2.333E+02%	1.06E+01
NA-22	#A	4.1792E-01	4.1792E-01	6.065E+01%	8.16E-01
K-40		6.5251E+01	6.5251E+01	1.058E+01%	1.06E+01
Sc-46	#A	3.2733E-01	3.2733E-01	8.448E+01%	1.24E+00
CR-51	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.05E+01
MN-54	#A	2.9599E-01	2.9599E-01	1.297E+02%	8.95E-01
FE-59	#A	5.2839E-01	5.2839E-01	8.933E+01%	1.69E+00
Co-56	#A	-9.4342E-03	-9.4343E-03	8.521E+01%	1.24E+00
CO-57	#A	1.0541E-01	1.0541E-01	1.111E+02%	1.04E+00
CO-58	#A	3.4136E-01	3.4136E-01	8.644E+01%	1.00E+00
CO-60	#	6.1085E-01	6.1085E-01	3.162E+01%	4.50E-01
ZN-65	#A	-1.5754E-01	-1.5754E-01	6.646E+02%	3.71E+00
NB-94	#A	3.0595E-01	3.0595E-01	5.832E+01%	1.07E+00
ZR-95	#A	-5.0936E-01	-5.0936E-01	1.201E+02%	2.16E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.85E+00
RU-103	#A	2.9719E-02	2.9719E-02	1.321E+03%	9.90E-01
RH-106	#A	3.9537E+00	3.9537E+00	1.757E+02%	2.35E+01
AG-108M	#A	3.6173E-01	3.6173E-01	1.015E+02%	8.84E-01
AG-110M	#A	2.7814E-01	2.7814E-01	9.827E+01%	1.53E+00
SN-113	#A	4.8216E-01	4.8216E-01	1.129E+02%	1.84E+00
SB-124	#A	-3.8598E-01	-3.8598E-01	1.953E+02%	2.55E+00
SB-125	#A	1.1476E+00	1.1476E+00	8.583E+01%	2.68E+00
I-131	#	7.2386E-01	7.2388E-01	4.033E+01%	6.74E-01
Gd-153	#A	-1.1347E+00	-1.1347E+00	1.745E+02%	6.59E+00
Ga-68	#A	1.6831E+01	1.6926E+01	8.721E+01%	3.30E+01
Tc-99m	#A	3.0922E-01	3.0954E-01	1.473E+02%	1.53E+00
BA-133	#A	-6.1950E-01	-6.1950E-01	1.419E+02%	2.95E+00
CS-134	#	1.0752E+00	1.0752E+00	3.107E+01%	8.03E-01
CS-137	#A	-8.2825E-02	-8.2825E-02	4.691E+02%	1.38E+00
CE-139	#A	2.2588E-01	2.2588E-01	1.569E+02%	1.20E+00
Ba-140	#A	4.2386E-01	4.2387E-01	2.903E+02%	3.10E+00
La-140	#A	3.6890E-01	3.6891E-01	7.010E+01%	1.42E+00
CE-141	#A	-2.7611E-01	-2.7611E-01	3.089E+02%	2.87E+00

CE-144	#A	-3.2355E-01	-3.2355E-01	1.168E+03%	1.27E+01
PM-144	#A	-7.5861E-02	-7.5861E-02	4.690E+02%	1.26E+00
EU-152	#A	4.0853E-01	4.0853E-01	9.368E+01%	2.98E+00
EU-154	#A	5.5323E-01	5.5323E-01	7.996E+01%	2.16E+00
EU-155	#A	-1.6997E+00	-1.6997E+00	1.110E+02%	8.94E+00
HF-181	A	3.0594E-01	3.0594E-01	1.597E+02%	1.37E+00
Ta-182	#A	2.2874E+00	2.2874E+00	2.673E+01%	4.83E+00
Hg-203	#A	3.5686E-01	3.5687E-01	9.512E+01%	1.14E+00
TL-208		3.0064E+00	3.0064E+00	1.814E+01%	1.06E+00
PM-146	#A	1.8964E-01	1.8964E-01	2.159E+02%	1.12E+00
Y-88	#A	1.6400E-02	1.6400E-02	2.038E+02%	1.16E+00
Cd-113m	#A	-2.0089E+03	-2.0089E+03	2.440E+02%	1.68E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.60E+01
Cf-251	#A	-1.9174E+00	-1.9174E+00	1.039E+02%	5.09E+00
Cf-249	#A	2.3750E-01	2.3750E-01	2.355E+02%	1.92E+00
Sn-126	A	3.7561E+00	3.7561E+00	1.123E+02%	1.41E+01
PB-210	#A	-1.0352E+01	-1.0352E+01	1.357E+02%	4.83E+01
PB-212		9.3113E+00	9.3113E+00	8.359E+00%	1.69E+00
PB-214		9.7561E+00	9.7561E+00	9.870E+00%	1.52E+00
BI-207	#A	-3.4569E-01	-3.4569E-01	1.873E+02%	1.48E+00
BI-212		2.3107E+01	2.3107E+01	1.792E+01%	6.18E+00
U-235	#A	-2.7133E+00	-2.7133E+00	1.391E+02%	1.26E+01
BI-214		9.7247E+00	9.7247E+00	1.072E+01%	1.57E+00
BI-210M	#A	1.6786E-01	1.6786E-01	3.425E+02%	1.98E+00
AC-228	A	3.9578E+00	3.9578E+00	4.280E+01%	4.46E+00
TH-227	#A	4.5291E+00	4.5291E+00	7.411E+01%	9.08E+00
TH-229	#A	1.2345E+00	1.2345E+00	4.680E+02%	1.66E+01
TH-234	#A	-3.0590E+00	-3.0590E+00	2.401E+02%	2.49E+01
PA-231	#A	-5.8680E+00	-5.8680E+00	3.460E+02%	6.85E+01
PA-233	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.54E+00
PA-234	#A	5.5702E-01	5.5702E-01	4.472E+01%	7.58E+00
PA-234M	#A	6.5746E+01	6.5746E+01	7.880E+01%	1.34E+02
AM-241	#A	2.4358E-01	2.4358E-01	4.920E+02%	4.05E+00
Np-237	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.40E+01
Ir-192	#A	2.9808E-01	2.9808E-01	9.495E+01%	2.32E+00
Cs-136	#A	4.4048E-01	4.4049E-01	6.321E+01%	1.31E+00
Np-239	#A	-1.4808E+00	-1.4809E+00	1.684E+02%	8.31E+00
Nd-147	#A	1.5026E+00	1.5026E+00	7.877E+01%	5.23E+00
TL-210	#A	-5.3371E-01	-5.3371E-01	8.819E+01%	1.58E+00
Kr-85	#A	4.0730E+01	4.0730E+01	2.818E+02%	3.93E+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)     1.241E+02  Bq/Sample
Total Decayed Activity (   25.1 to  1999.6 keV) 1.2411410E+02  Bq/Sample
```

405451_Gamma_490-164491-A-7-A. 16_Gamma_20190007.spc.



Test America St. Louis Spectrum ID: 9_Gamma_20190008

Sample Description: 405451_Gamma_490-164491-A-8-A
Detector: Detector # 9
Batch ID: 405451
Work Order Number: Gamma
Lot Number: 490-164491-A-8-A

Decay to Time: 1/2/2019 14:11 Live Time: 1800 sec
Acquisition Time: 1/2/2019 14:11:42 Real Time: 1802 sec
Analysis Time: 1/2/2019 14:42 Dead Time: 0.13 %
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_2018-12-22_1357.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	-3.684E+00	100.8	3.712E+00	3.717E+00	1.247E+01
NA-22	-8.740E-01	53.9	4.712E-01	4.732E-01	1.526E+00
K-40	5.979E+01	10.1	6.067E+00	6.795E+00	8.509E+00
Sc-46	3.835E-01	75.5	2.897E-01	2.903E-01	1.453E+00
CR-51	-1.694E-01	1400.0	2.371E+00	2.371E+00	1.752E+01
MN-54	9.684E-03	3262.4	3.159E-01	3.159E-01	7.763E-01
FE-59	6.900E-02	427.6	2.950E-01	2.950E-01	5.919E-01
Co-56	4.171E-01	100.8	4.204E-01	4.209E-01	7.690E-01
CO-57	1.821E-01	100.8	1.836E-01	1.838E-01	6.178E-01
CO-58	-5.525E-01	81.2	4.487E-01	4.496E-01	1.501E+00
CO-60	5.739E-01	23.0	1.321E-01	1.352E-01	3.900E-01
ZN-65	2.791E-01	292.4	8.161E-01	8.163E-01	2.884E+00
NB-94	3.124E-01	95.9	2.997E-01	3.001E-01	1.018E+00
ZR-95	-4.576E-03	11590.8	5.304E-01	5.304E-01	1.625E+00
NB-95	8.016E-02	499.2	4.001E-01	4.001E-01	1.400E+00
RU-103	1.987E-01	169.6	3.371E-01	3.372E-01	8.248E-01
RH-106	0.000E+00	1.#INF	1.252E+00	1.252E+00	2.202E+01
AG-108M	2.990E-01	98.4	2.941E-01	2.945E-01	7.113E-01
AG-110M	0.000E+00	1.#INF	5.269E-02	5.269E-02	2.221E+00
SN-113	-2.441E-01	201.7	4.924E-01	4.925E-01	1.684E+00
SB-124	-4.018E-01	167.6	6.735E-01	6.738E-01	2.269E+00
SB-125	1.337E-01	191.3	2.559E-01	2.560E-01	2.397E+00
I-131	5.367E-01	76.1	4.085E-01	4.094E-01	6.223E-01
Gd-153	-1.004E+00	170.6	1.714E+00	1.715E+00	5.708E+00
Ga-68	2.639E+00	634.7	1.675E+01	1.675E+01	3.837E+01
Tc-99m	-2.856E-01	141.9	4.052E-01	4.056E-01	1.355E+00
BA-133	8.415E-02	775.2	6.523E-01	6.523E-01	2.228E+00
CS-134	8.827E-01	58.5	5.160E-01	5.180E-01	1.111E+00
CS-137	3.077E-01	123.0	3.783E-01	3.787E-01	1.295E+00
CE-139	2.237E-01	114.9	2.572E-01	2.580E-01	8.654E-01
Ba-140	-8.137E-01	163.8	1.333E+00	1.334E+00	3.070E+00
La-140	-7.310E-02	97.6	7.131E-02	7.142E-02	1.219E+00
CE-141	-5.311E-01	138.5	7.357E-01	7.362E-01	2.459E+00

CE-144	8.963E-01	318.2	2.852E+00	2.852E+00	9.610E+00
PM-144	3.533E-01	82.4	2.912E-01	2.917E-01	9.800E-01
EU-152	1.244E+00	69.9	8.700E-01	8.725E-01	1.677E+00
EU-154	2.206E-01	91.6	2.022E-01	2.025E-01	1.610E+00
EU-155	1.132E+00	193.4	2.188E+00	2.189E+00	7.302E+00
HF-181	8.370E-02	75.5	6.317E-02	6.332E-02	1.740E+00
Ta-182	1.038E+00	109.5	1.137E+00	1.138E+00	3.967E+00
Hg-203	-1.930E-01	146.8	2.834E-01	2.836E-01	9.658E-01
TL-208	3.372E+00	11.0	3.720E-01	4.111E-01	4.973E-01
PM-146	1.854E-01	118.0	2.187E-01	2.190E-01	1.018E+00
Y-88	4.810E-01	38.5	1.850E-01	1.870E-01	5.109E-01
Cd-113m	2.211E+02	1253.8	2.773E+03	2.773E+03	9.820E+03
Cd-109	0.000E+00	1.#INF	1.370E+01	1.370E+01	4.564E+01
Cf-251	-1.609E+00	94.3	1.517E+00	1.524E+00	3.877E+00
Cf-249	3.219E-01	119.9	3.861E-01	3.864E-01	1.313E+00
Sn-126	1.712E+00	183.5	3.141E+00	3.143E+00	1.061E+01
PB-210	8.972E+00	110.5	9.911E+00	9.925E+00	3.327E+01
PB-212	7.422E+00	7.9	5.856E-01	7.573E-01	1.069E+00
PB-214	7.833E+00	9.8	7.687E-01	8.698E-01	1.278E+00
BI-207	3.038E-01	113.7	3.455E-01	3.459E-01	8.315E-01
BI-212	4.861E+00	92.5	4.494E+00	4.502E+00	1.519E+01
U-235	-4.685E-01	84.7	3.968E-01	3.975E-01	1.058E+01
BI-214	8.370E+00	10.8	9.078E-01	1.007E+00	1.385E+00
BI-210M	1.024E-01	450.9	4.616E-01	4.617E-01	1.181E+00
AC-228	9.456E+00	12.0	1.130E+00	1.229E+00	9.956E-01
TH-227	-1.785E+00	204.9	3.657E+00	3.658E+00	9.177E+00
TH-229	3.829E+00	150.1	5.749E+00	5.758E+00	1.425E+01
TH-234	1.663E+01	18.2	3.033E+00	3.171E+00	9.340E+00
PA-231	0.000E+00	1.#INF	1.718E+00	1.718E+00	5.811E+01
PA-233	0.000E+00	1.#INF	1.215E-01	1.215E-01	4.748E+00
PA-234	1.174E+00	142.9	1.678E+00	1.679E+00	5.620E+00
PA-234M	1.607E+01	187.6	3.015E+01	3.016E+01	1.556E+02
AM-241	-6.657E-02	1650.5	1.099E+00	1.099E+00	3.731E+00
Np-237	-2.241E+00	178.2	3.994E+00	3.996E+00	1.331E+01
Ir-192	0.000E+00	1.#INF	1.015E-01	1.015E-01	1.983E+00
Cs-136	4.837E-01	83.6	4.046E-01	4.056E-01	1.494E+00
Np-239	1.262E+00	176.1	2.222E+00	2.224E+00	7.405E+00
Nd-147	1.737E+00	91.5	1.590E+00	1.593E+00	3.914E+00
TL-210	2.921E-01	93.4	2.729E-01	2.734E-01	9.308E-01
Kr-85	0.000E+00	1.#INF	2.369E+01	2.369E+01	3.042E+02
Total	3.884E+02				

Analyst: Joey Sausto

Sample description
405451_Gamma_490-164491-A-8-A

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20190008.An1

Acquisition information
Start time: 1/2/2019 2:11:42 PM
Live time: 1800
Real time: 1802
Dead time: 0.13 %
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	1/2/2019 2:11:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2018-12-22_1357.PBC 12/22/2018 1:57:02 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1161

***** 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	18.	110.47	1.00	2.577E-02	46.54	4.250	PBC<MDA	PB210
63.35	61.	26.65	1.01	3.921E-02	63.29	3.810	2.280E+01	TH234
64.34	12.	183.51	1.02	3.987E-02	64.28	9.700	PBC<MDA	Sn126
74.80	114.	15.08	1.03	4.573E-02				
77.19	194.	9.98	1.03	4.680E-02				
87.62	49.	33.43	1.04	5.038E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	1.419E+01	Cd109
93.03	104.	19.48	1.45	5.165E-02	92.59	5.584	2.000E+01	TH234
					93.35	5.561	2.003E+01	AC228
105.31	23.	193.39	1.05	5.318E-02	105.31	21.200	PBC<MDA	EU155
106.13	27.	176.13	1.05	5.323E-02	106.13	22.700	PBC<MDA	Np239
121.78	20.	69.92	1.07	5.305E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.415E-01	CO57
122.06	15.	100.82	1.07	5.303E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.821E-01	CO57
131.29	20.	142.88	1.08	5.216E-02	131.29	18.000	PBC<MDA	PA234
133.02	20.	146.15	1.08	5.195E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	1.919E+00	CE144
133.54	9.	318.22	1.08	5.189E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	8.963E-01	CE144
163.38	15.	97.77	1.11	4.676E-02	163.38	5.080	PBC<MDA	U235
165.65	15.	114.95	1.11	4.736E-02	165.85	79.900	PBC<MDA	CE139

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
185.72	47.	42.21	1.13	4.403E-02	185.72	54.000	PBC<MDA	U235
193.51	13.	150.15	1.14	4.287E-02	193.51	4.400	PBC<MDA	TH229
227.00	15.	101.03	1.17	3.858E-02	227.00	6.300	PBC<MDA	Cf251
238.38	228.	9.49	1.02	3.735E-02	238.63	43.300	7.827E+00	PB212
241.87	45.	27.75	1.18	3.697E-02	242.00	7.430	9.135E+00	PB214
244.69	5.	560.83	1.18	3.670E-02	244.69	7.580	PBC<MDA	EU152
265.83	3.	450.86	1.20	3.470E-02	265.83	50.000	PBC<MDA	BI210M
277.76	28.	43.98	2.68	3.372E-02	277.28	6.310	PBC<MDA	TL208
284.30	10.	133.67	1.22	3.315E-02	284.30	6.140	PBC<MDA	I131
294.99	126.	13.73	1.13	3.232E-02	295.09	19.300	1.125E+01	PB214
					296.00	79.000	2.754E+00	TL210
299.98	28.	32.11	1.24	3.195E-02	300.03	3.280	1.462E+01	PB212
					300.07	2.460	1.950E+01	PA231
					300.18	6.200	7.738E+00	PA233
338.22	15.	135.30	1.27	2.940E-02	338.32	12.010	PBC<MDA	AC228
340.57	15.	130.17	1.27	2.927E-02	340.57	46.900	PBC<MDA	Cs136
344.29	15.	131.53	1.28	2.905E-02	344.29	26.500	PBC<MDA	EU152
345.83	15.	136.25	1.28	2.896E-02	345.83	15.070	PBC<MDA	HF181
351.80	152.	9.81	1.30	2.861E-02	351.93	37.600	7.833E+00	PB214
356.00	3.	775.20	1.29	2.837E-02	356.00	62.050	PBC<MDA	BA133
364.48	11.	92.26	1.29	2.791E-02	364.48	81.700	PBC<MDA	I131
383.84	23.	46.45	1.31	2.691E-02	383.84	8.940	PBC<MDA	BA133
387.95	10.	119.93	1.31	2.671E-02	387.95	66.000	PBC<MDA	Cf249
433.94	12.	98.37	1.35	2.466E-02	433.94	90.480	PBC<MDA	AG108M
487.02	14.	113.91	1.40	2.269E-02	487.02	45.500	PBC<MDA	La140
497.05	7.	169.59	1.41	2.236E-02	497.05	90.900	PBC<MDA	RU103
511.86	53.	24.24	2.67	2.188E-02	511.86	20.000	6.728E+00	RH106
531.00	9.	91.52	1.44	2.130E-02	531.00	13.000	PBC<MDA	Nd147
563.24	10.	110.78	1.47	2.040E-02	563.24	8.350	PBC<MDA	CS134
583.13	102.	11.03	1.38	1.989E-02	583.02	84.500	3.372E+00	TL208
609.25	134.	10.85	1.21	1.925E-02	609.31	46.090	8.370E+00	BI214
					610.30	5.750	6.717E+01	RU103
635.89	3.	191.31	1.53	1.864E-02	635.89	11.310	PBC<MDA	SB125
636.97	4.	160.47	1.53	1.862E-02	636.97	7.170	PBC<MDA	I131
661.66	9.	122.96	1.55	1.810E-02	661.66	85.210	PBC<MDA	CS137
696.54	11.	82.42	1.58	1.741E-02	696.54	99.000	PBC<MDA	PM144
702.63	10.	95.92	1.58	1.730E-02	702.63	97.900	PBC<MDA	NB94
727.44	11.	92.46	1.60	1.686E-02	727.17	7.550	PBC<MDA	BI212
747.16	7.	117.96	1.62	1.651E-02	747.16	34.000	PBC<MDA	PM146
765.79	2.	499.18	1.63	1.621E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.722E+01	PA234M
766.41	6.	187.58	1.63	1.620E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	7.000E+01	PA234M
795.87	10.	80.19	1.66	1.574E-02	795.87	85.530	PBC<MDA	CS134
799.60	8.	93.43	1.66	1.568E-02	799.60	98.960	PBC<MDA	TL210
801.95	8.	109.81	1.66	1.565E-02	801.95	8.690	PBC<MDA	CS134
818.50	12.	105.08	1.67	1.540E-02	818.50	100.000	PBC<MDA	Cs136
846.77	7.	127.38	1.70	1.501E-02	846.77	99.935	PBC<MDA	Co56

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
861.63	5.	239.03	1.71	1.482E-02	860.56	12.420	PBC<MDA	TL208
873.23	5.	156.15	1.72	1.465E-02	873.23	12.270	PBC<MDA	EU154
889.28	12.	93.10	1.73	1.445E-02	889.28	99.984	PBC<MDA	Sc46
911.23	70.	11.95	1.08	1.418E-02	911.07	29.000	9.456E+00	AC228
964.11	6.	161.13	1.79	1.357E-02	964.11	14.605	PBC<MDA	EU152
968.95	9.	84.93	1.79	1.352E-02	968.97	17.460	PBC<MDA	AC228
996.33	4.	206.16	1.81	1.323E-02	996.33	10.600	PBC<MDA	EU154
1037.84	5.	156.23	1.84	1.281E-02	1037.84	14.130	PBC<MDA	Co56
1063.66	5.	113.72	1.86	1.257E-02	1063.66	74.500	PBC<MDA	BI207
1077.40	2.	634.67	1.87	1.244E-02	1077.40	3.300	PBC<MDA	Ga68
1112.07	7.	128.09	1.89	1.213E-02	1112.07	13.644	PBC<MDA	EU152
1115.55	3.	292.40	1.90	1.210E-02	1115.55	50.600	PBC<MDA	ZN65
1120.41	4.	160.64	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1120.55	7.	118.94	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	3.046E-01	Sc46
					1121.30	34.900	8.732E-01	Ta182
1121.30	7.	131.29	1.90	1.205E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	3.047E-01	Sc46
					1121.30	34.900	8.734E-01	Ta182
1173.24	15.	26.38	1.94	1.163E-02	1173.24	99.900	7.088E-01	CO60
1189.05	5.	175.40	1.95	1.150E-02	1189.05	16.200	PBC<MDA	Ta182
1291.60	1.	427.57	2.02	1.077E-02	1291.60	43.200	PBC<MDA	FE59
1332.50	8.	37.71	2.05	1.050E-02	1332.50	99.980	4.392E-01	CO60
1408.00	5.	117.11	2.10	1.004E-02	1408.00	21.005	PBC<MDA	EU152
1460.77	112.	10.15	1.47	9.749E-03	1460.83	10.670	5.979E+01	K40
1764.09	15.	31.94	2.31	8.350E-03	1764.49	15.400	6.304E+00	BI214
1836.06	7.	38.45	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	
298.81	74.81	91.	114.	2.497E+03	15.08	1.025	-	sD
308.37	77.20	91.	194.	4.152E+03	9.98	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	182.	18.	0.010	110.47	0.998s
TH-227	200.20	50.14	198.	-3.	-0.001	743.12	1.001s
TH-234	252.77	63.29	103.	61.	0.034	26.65	1.014D
Sn-126	256.74	64.28	233.	12.	0.007	183.51	1.015s
BA-133	323.56	80.99	706.	-26.	-0.014	145.36	1.031s
Np-237	345.55	86.49	1099.	-26.	-0.015	178.22	1.036s
EU-155	345.76	86.54	1156.	-28.	-0.016	171.95	1.036s
Sn-126	347.35	86.94	1128.	-28.	-0.016	169.83	1.037
Sn-126	349.87	87.57	1052.	49.	0.027	33.43	1.037D
Cd-109	351.75	88.04	1100.	0.	0.000	167.54	1.038A
Nd-147	363.99	91.10	1080.	-28.	-0.016	165.62	1.041s
TH-234	369.94	92.59	96.	64.	0.036	24.90	1.042D
AC-228	372.98	93.35	1133.	-28.	-0.016	169.21	1.043s
Gd-153	389.58	97.50	1161.	-28.	-0.016	170.62	1.047s
Np-239	397.58	99.50	1190.	-28.	-0.016	172.36	1.049s
Gd-153	412.37	103.20	1218.	-29.	-0.016	173.84	1.052s
Np-239	414.37	103.70	1254.	-29.	-0.016	176.25	1.053s
EU-155	420.82	105.31	974.	23.	0.013	193.39	1.054
Np-239	424.09	106.13	1154.	27.	0.015	176.13	1.055
EU-152	486.67	121.78	85.	20.	0.011	69.92	1.070s
CO-57	487.80	122.06	105.	15.	0.008	100.82	1.070s
EU-154	491.95	123.10	165.	-20.	-0.011	93.35	1.071s
PA-234	524.72	131.29	392.	20.	0.011	142.88	1.079s
HF-181	531.64	133.02	412.	20.	0.011	146.15	1.081s
CE-144	533.69	133.54	432.	9.	0.005	318.22	1.081s
HF-181	544.74	136.30	441.	0.	0.000	1000.00	1.084s
CO-57	545.43	136.47	529.	-23.	-0.013	145.46	1.084s
Tc-99m	561.57	140.51	506.	-23.	-0.013	141.87	1.088
U-235	574.67	143.79	484.	-23.	-0.013	138.34	1.091s
CE-141	581.29	145.44	500.	-23.	-0.013	138.53	1.092s
Ba-140	650.15	162.66	224.	-22.	-0.012	99.57	1.108s
U-235	653.03	163.38	97.	15.	0.008	97.77	1.109s
CE-139	662.92	165.85	146.	15.	0.008	114.95	1.111s
Cf-251	705.90	176.60	121.	-22.	-0.012	94.30	1.122s
U-235	742.37	185.72	99.	47.	0.026	42.21	1.130s
TH-229	773.52	193.51	96.	13.	0.007	150.15	1.137s
U-235	820.80	205.33	92.	-2.	-0.001	872.10	1.148s
TH-229	842.87	210.85	112.	-4.	-0.002	520.42	1.153s
Cf-251	907.45	227.00	56.	15.	0.008	101.03	1.168s
TH-227	943.33	235.97	479.	-14.	-0.008	220.73	1.176s
PB-212	953.97	238.63	37.	216.	0.120	7.89	1.179D
PB-214	967.43	242.00	56.	45.	0.025	27.75	1.182D
EU-152	978.21	244.69	445.	5.	0.003	560.83	1.185s
TH-227	1024.39	256.24	68.	-8.	-0.004	204.89	1.195s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	1062.75	265.83	54.	3.	0.002	450.86	1.204s
TL-208	1110.47	277.76	28.	28.	0.015	43.98	2.683s
Hg-203	1116.22	279.20	92.	-10.	-0.005	146.80	1.216s
I-131	1136.61	284.30	44.	10.	0.006	133.67	1.221s
PB-214	1179.77	295.09	26.	112.	0.062	11.46	1.231D
TL-210	1183.41	296.00	405.	-7.	-0.004	394.01	1.231s
PB-212	1199.52	300.03	25.	28.	0.015	32.11	1.235D
PA-231	1199.68	300.07	398.	0.	0.000	1000.00	1.235s
PA-233	1200.12	300.18	398.	0.	0.000	1000.00	1.235s
PA-231	1210.00	302.65	398.	0.	0.000	1000.00	1.237s
BA-133	1210.81	302.85	398.	0.	0.000	1000.00	1.238s
Ba-140	1218.80	304.85	398.	0.	0.000	1000.00	1.240s
BI-210M	1218.99	304.90	398.	0.	0.000	1000.00	1.240s
Ir-192	1233.16	308.44	398.	0.	0.000	1000.00	1.243s
PA-233	1247.44	312.01	398.	0.	0.000	1000.00	1.246s
Ir-192	1265.35	316.49	398.	0.	0.000	1000.00	1.250
La-140	1314.43	328.76	256.	-16.	-0.009	81.24	1.261s
Cf-249	1333.15	333.44	240.	-5.	-0.003	427.89	1.265
AC-228	1352.66	338.32	206.	15.	0.008	135.30	1.270
Cs-136	1361.66	340.57	191.	15.	0.009	130.17	1.272s
EU-152	1376.53	344.29	196.	15.	0.009	131.53	1.275
HF-181	1382.70	345.83	212.	15.	0.009	136.25	1.276s
PB-214	1406.57	351.80	22.	152.	0.084	9.81	1.302
BA-133	1423.37	356.00	212.	3.	0.001	775.20	1.285s
I-131	1457.31	364.48	24.	11.	0.006	92.26	1.293s
BA-133	1534.73	383.84	47.	23.	0.013	46.45	1.310s
Cf-249	1551.17	387.95	70.	10.	0.006	119.93	1.314s
SN-113	1566.12	391.69	109.	-7.	-0.004	201.74	1.317s
SB-125	1710.86	427.88	39.	-2.	-0.001	641.29	1.349
AG-108M	1735.10	433.94	31.	12.	0.007	98.37	1.354s
PM-146	1814.87	453.88	31.	-3.	-0.001	472.51	1.372s
SB-125	1852.82	463.37	62.	-2.	-0.001	743.86	1.380s
BE-7	1909.73	477.60	123.	-16.	-0.009	100.76	1.392s
HF-181	1927.34	482.00	139.	-16.	-0.009	106.49	1.396s
La-140	1947.43	487.02	116.	14.	0.008	113.91	1.400s
RU-103	1987.56	497.05	35.	7.	0.004	169.59	1.409s
RH-106	2046.81	511.86	56.	53.	0.029	24.24	2.672s
Kr-85	2055.27	513.98	109.	0.	0.000	1000.00	1.424
Nd-147	2123.35	531.00	13.	9.	0.005	91.52	1.438s
Ba-140	2148.39	537.26	31.	-8.	-0.004	163.81	1.444s
CS-134	2252.30	563.24	23.	10.	0.005	110.78	1.466s
CS-134	2276.64	569.32	33.	-8.	-0.004	111.44	1.471s
PA-234	2277.24	569.47	40.	0.	0.000	1000.00	1.471s
TL-208	2331.90	583.13	7.	102.	0.057	11.03	1.378
SB-125	2401.36	600.50	274.	-14.	-0.008	172.13	1.497
SB-124	2410.29	602.73	260.	-14.	-0.008	167.65	1.499s
CS-134	2418.21	604.71	246.	-8.	-0.005	265.20	1.500s
BI-214	2436.37	609.25	17.	134.	0.074	10.85	1.214

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RU-103	2440.56	610.30	238.	0.	0.000	1000.00	1.505s
AG-108M	2456.49	614.28	238.	0.	0.000	1000.00	1.508s
PM-144	2471.62	618.06	238.	0.	0.000	1000.00	1.512
RH-106	2487.04	621.92	238.	0.	0.000	1000.00	1.515s
SB-125	2542.94	635.89	19.	3.	0.002	191.31	1.526s
I-131	2547.28	636.97	20.	4.	0.002	160.47	1.527s
AG-110M	2630.43	657.76	53.	-15.	-0.008	45.56	1.544s
CS-137	2646.03	661.66	51.	9.	0.005	122.96	1.548s
PM-144	2785.58	696.54	35.	11.	0.006	82.42	1.576s
NB-94	2809.93	702.63	37.	10.	0.005	95.92	1.581
SB-124	2890.57	722.79	51.	-5.	-0.003	206.88	1.598s
AG-108M	2891.17	722.94	46.	0.	0.000	1000.00	1.598s
EU-154	2892.86	723.36	46.	0.	0.000	1000.00	1.598s
ZR-95	2896.22	724.20	61.	-12.	-0.007	93.28	1.599s
BI-212	2908.11	727.17	47.	11.	0.006	92.46	1.601
PM-146	2942.31	735.72	33.	-15.	-0.008	86.69	1.608s
PM-146	2988.08	747.16	15.	7.	0.004	117.96	1.617s
AG-110M	3055.23	763.94	48.	-16.	-0.009	66.14	1.631s
NB-95	3062.61	765.79	67.	2.	0.001	499.18	1.632s
PA-234M	3065.10	766.41	60.	6.	0.003	187.58	1.633s
EU-152	3115.14	778.92	35.	-15.	-0.008	89.83	1.643s
BI-212	3141.15	785.42	71.	-8.	-0.004	155.32	1.648s
CS-134	3182.96	795.87	27.	10.	0.006	80.19	1.656s
TL-210	3197.88	799.60	25.	8.	0.005	93.43	1.659s
CS-134	3207.29	801.95	36.	8.	0.005	109.81	1.661s
CO-58	3242.59	810.78	70.	-15.	-0.009	81.22	1.668s
La-140	3262.58	815.77	85.	-14.	-0.008	99.43	1.672s
Cs-136	3273.50	818.50	69.	12.	0.006	105.08	1.674s
Co-56	3386.61	846.77	15.	7.	0.004	127.38	1.696s
TL-208	3441.80	860.56	25.	5.	0.003	239.03	1.707s
NB-94	3483.94	871.10	25.	-6.	-0.004	119.21	1.715s
EU-154	3492.47	873.23	26.	5.	0.003	156.15	1.717s
PA-234	3521.68	880.53	58.	-13.	-0.007	85.51	1.722s
PA-234	3532.53	883.24	72.	0.	0.000	1000.00	1.724s
AG-110M	3538.30	884.68	72.	0.	0.000	1000.00	1.725s
Sc-46	3556.69	889.28	57.	12.	0.007	93.10	1.729s
AC-228	3644.53	911.23	0.	70.	0.039	11.95	1.083s
AG-110M	3749.60	937.49	30.	-15.	-0.008	84.10	1.766s
PA-234	3783.72	946.02	15.	-1.	-0.001	857.32	1.772s
EU-152	3856.11	964.11	45.	6.	0.003	161.13	1.786
AC-228	3875.56	968.97	24.	9.	0.005	84.93	1.790s
EU-154	3985.03	996.33	32.	4.	0.002	206.16	1.810s
EU-154	4018.82	1004.77	16.	-5.	-0.003	187.26	1.816s
Co-56	4151.13	1037.84	11.	5.	0.003	156.23	1.841s
Cs-136	4192.07	1048.07	30.	-5.	-0.003	161.25	1.848
RH-106	4201.23	1050.36	39.	-1.	-0.001	764.25	1.850s
BI-207	4254.46	1063.66	6.	5.	0.003	113.72	1.860s
Ga-68	4309.44	1077.40	21.	2.	0.001	634.67	1.870s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
FE-59	4396.88	1099.25	0.	0.	0.000	1000.00	1.886s
EU-152	4448.20	1112.07	32.	7.	0.004	128.09	1.895s
ZN-65	4462.09	1115.55	39.	3.	0.002	292.40	1.897s
BI-214	4481.06	1120.29	23.	4.	0.002	160.64	1.901
Sc-46	4482.12	1120.55	28.	7.	0.004	118.94	1.901
Ta-182	4485.12	1121.30	34.	7.	0.004	131.29	1.901
CO-60	4692.96	1173.24	0.	15.	0.008	26.38	1.938s
Ta-182	4756.25	1189.05	11.	5.	0.003	175.40	1.949s
Ta-182	4885.75	1221.41	23.	-3.	-0.002	124.15	1.972s
Co-56	4953.27	1238.28	29.	-2.	-0.001	202.40	1.984s
NA-22	5098.35	1274.53	34.	-17.	-0.010	53.91	2.008s
EU-154	5098.39	1274.54	51.	-2.	-0.001	540.51	2.008s
FE-59	5166.65	1291.60	6.	1.	0.001	427.57	2.020s
TL-210	5252.32	1313.00	23.	-8.	-0.004	150.05	2.034s
CO-60	5330.37	1332.50	1.	8.	0.005	37.71	2.047s
AG-110M	5537.69	1384.30	11.	-1.	-0.001	598.44	2.082s
EU-152	5632.56	1408.00	6.	5.	0.003	117.11	2.097s
K-40	5843.80	1460.77	8.	112.	0.062	10.15	1.466s
La-140	6385.95	1596.21	12.	-7.	-0.004	158.41	2.215s
BI-214	7059.65	1764.49	3.	15.	0.008	31.94	2.314
Co-56	7087.11	1771.35	18.	0.	0.000	1000.00	2.318s
Y-88	7346.20	1836.06	0.	7.	0.004	38.45	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	Peak Code	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	-3.6843E+00				5.31E+01	
			477.60	-3.684E+00	?(	1.247E+01 1.01E+02 1.05E+01	G
NA-22	C	-8.7404E-01				9.50E+02	
			1274.53	-8.740E-01	?(	1.526E+00 5.39E+01 9.99E+01	G
K-40	N	5.9792E+01				4.66E+11	
			1460.83	5.979E+01	(P	8.509E+00 1.01E+01 1.07E+01	G
Sc-46	F	3.8353E-01				8.38E+01	
			889.28	4.624E-01	?(	1.453E+00 9.31E+01 1.00E+02	G
			1120.55	3.046E-01	?(	1.253E+00 1.19E+02 1.00E+02	G
CR-51	F	-1.6939E-01				2.77E+01	
			320.08	-1.694E-01	%(P	1.752E+01 1.40E+03 9.94E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C 9.6843E-03					3.12E+02	
		834.85	9.684E-03	%(P	7.763E-01	3.26E+03	1.00E+02 G
FE-59	F 6.8999E-02					4.45E+01	
		1099.25	0.000E+00	?(	5.919E-01	1.00E+03	5.65E+01 G
		1291.60	1.592E-01	?(	1.649E+00	4.28E+02	4.32E+01 G
Co-56	C 4.1711E-01					7.73E+01	
		846.77	2.593E-01	?(	7.690E-01	1.27E+02	9.99E+01 G
		1238.28	-1.606E-01	- P	2.103E+00	2.02E+02	6.61E+01 G
		1037.84	1.533E+00	?(P	5.576E+00	1.56E+02	1.41E+01 G
		1771.35	0.000E+00	-	9.693E+00	1.00E+03	1.55E+01 A
CO-57	C 1.8208E-01					2.72E+02	
		122.06	1.821E-01	&(	6.178E-01	1.01E+02	8.56E+01 G
		136.47	-2.283E+00	&	1.110E+01	1.45E+02	1.07E+01 G
CO-58	C -5.5247E-01					7.09E+01	
		810.78	-5.525E-01	?(	1.501E+00	8.12E+01	9.95E+01 G
CO-60	F 5.7393E-01					1.93E+03	
		1332.50	4.392E-01	?(P	3.900E-01	3.77E+01	1.00E+02 G
		1173.24	7.088E-01	?(P	3.525E-01	2.64E+01	9.99E+01 G
ZN-65	F 2.7912E-01					2.44E+02	
		1115.55	2.791E-01	&(	2.884E+00	2.92E+02	5.06E+01 G
NB-94	I 3.1240E-01					7.41E+06	
		702.63	3.124E-01	?(	1.018E+00	9.59E+01	9.79E+01 G
		871.10	-2.399E-01	-	9.911E-01	1.19E+02	9.99E+01 G
ZR-95	I -4.5763E-03					6.40E+01	
		756.73	-4.576E-03	%(P	1.625E+00	1.16E+04	5.45E+01 G
		724.20	-9.251E-01	&	2.910E+00	9.33E+01	4.42E+01 G
NB-95	I 8.0156E-02					6.40E+01	
		765.79	8.016E-02	?(	1.400E+00	4.99E+02	9.98E+01 G
RU-103	I 1.9875E-01					3.93E+01	
		497.05	1.987E-01	?(P	8.248E-01	1.70E+02	9.09E+01 G
		610.30	0.000E+00	-	3.749E+01	1.00E+03	5.75E+00 GA
AG-108M	C 2.9900E-01					1.53E+05	
		433.94	2.990E-01	&(P	7.113E-01	9.84E+01	9.05E+01 G
		722.94	0.000E+00	-	1.240E+00	1.00E+03	9.08E+01 G
		614.28	0.000E+00	-	2.411E+00	1.00E+03	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	-2.4406E-01					1.15E+02	
			391.69	-2.441E-01	&(	1.684E+00	2.02E+02	6.40E+01 G
SB-124	F	-4.0175E-01					6.02E+01	
			602.73	-4.018E-01	?(	2.269E+00	1.68E+02	9.83E+01 G
			1690.98	-3.245E-02	% P	9.906E-01	4.72E+03	4.78E+01 G
			722.79	-1.518E+00	+	1.092E+01	2.07E+02	1.08E+01 G
SB-125	I	1.3375E-01					1.01E+03	
			427.88	-1.507E-01	&(	2.397E+00	6.41E+02	2.96E+01 G
			600.50	-2.201E+00	+	1.277E+01	1.72E+02	1.79E+01 G
			635.89	8.782E-01	?(	6.018E+00	1.91E+02	1.13E+01 G
			463.37	-3.384E-01	+	8.855E+00	7.44E+02	1.05E+01 G
I-131	I	5.3671E-01					8.02E+00	
			364.48	2.680E-01	?(	6.223E-01	9.23E+01	8.17E+01 G
			284.30	2.729E+00	&(	9.177E+00	1.34E+02	6.14E+00 G
			636.97	1.721E+00	?(P	9.770E+00	1.60E+02	7.17E+00 G
Gd-153	F	-1.0043E+00					2.42E+02	
			97.50	-1.004E+00	?(	5.708E+00	1.71E+02	3.00E+01 G
			103.20	-1.372E+00	+	7.946E+00	1.74E+02	2.18E+01 G
Ga-68	C	2.6386E+00					4.71E-02	
			1077.40	2.639E+00	?(	3.837E+01	6.35E+02	3.30E+00 G
Tc-99m	I	-2.8564E-01					2.51E-01	
			140.51	-2.856E-01	&(	1.355E+00	1.42E+02	8.93E+01 G
BA-133	F	8.4147E-02					3.85E+03	
			356.00	8.415E-02	?(	2.228E+00	7.75E+02	6.20E+01 G
			302.85	0.000E+00	-	9.135E+00	1.00E+03	1.83E+01 G
			383.84	5.368E+00	?	7.977E+00	4.64E+01	8.94E+00 GA
			80.99	-8.810E-01	+	4.273E+00	1.45E+02	3.41E+01 GA
CS-134	I	8.8270E-01					7.54E+02	
			795.87	4.117E-01	&(	1.111E+00	8.02E+01	8.55E+01 G
			604.71	-2.482E-01	-	2.231E+00	2.65E+02	9.76E+01 G
			569.32	-1.368E+00	+	5.237E+00	1.11E+02	1.54E+01 G
			801.95	3.337E+00	?(	1.255E+01	1.10E+02	8.69E+00 G
			563.24	3.153E+00	?(	8.225E+00	1.11E+02	8.35E+00 G
CS-137	I	3.0768E-01					1.10E+04	
			661.66	3.077E-01	?(	1.295E+00	1.23E+02	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	2.2372E-01					1.38E+02	
			165.85	2.237E-01	?(P	8.654E-01	1.15E+02	7.99E+01 G
Ba-140	I	-8.1368E-01					1.28E+01	
			537.26	-8.137E-01	?(P	3.070E+00	1.64E+02	2.44E+01 G
			162.66	-4.150E+00	+	1.381E+01	9.96E+01	6.22E+00 G
			304.85	0.000E+00	&	3.921E+01	1.00E+03	4.29E+00 G
La-140	I	-7.3097E-02					1.28E+01	
			1596.21	-4.614E-01	?(P	1.219E+00	1.58E+02	9.54E+01 G
			487.02	7.411E-01	?(	2.848E+00	1.14E+02	4.55E+01 G
			328.76	-1.467E+00	+ P	7.053E+00	8.12E+01	2.03E+01 G
			815.77	-2.110E+00	+	7.072E+00	9.94E+01	2.33E+01 G
CE-141	I	-5.3105E-01					3.25E+01	
			145.44	-5.311E-01	?(	2.459E+00	1.39E+02	4.82E+01 G
CE-144	I	8.9628E-01					2.85E+02	
			133.54	8.963E-01	(	9.610E+00	3.18E+02	1.11E+01 G
PM-144	C	3.5329E-01					3.63E+02	
			696.54	3.533E-01	?(	9.800E-01	8.24E+01	9.90E+01 G
			618.06	0.000E+00	-	2.196E+00	1.00E+03	9.91E+01 G
EU-152	F	1.2443E+00					4.94E+03	
			121.78	7.232E-01	?(	1.677E+00	6.99E+01	2.86E+01 G
			344.29	1.108E+00	?(	4.908E+00	1.32E+02	2.65E+01 G
			1112.07	2.212E+00	?(	9.803E+00	1.28E+02	1.36E+01 G
			778.92	-4.056E+00	&	8.126E+00	8.98E+01	1.29E+01 G
			964.11	1.700E+00	&(P	9.487E+00	1.61E+02	1.46E+01 G
			244.69	1.065E+00	?(	2.017E+01	5.61E+02	7.58E+00 G
			1408.00	1.363E+00	? P	3.675E+00	1.17E+02	2.10E+01 GA
EU-154	I	2.2059E-01					3.14E+03	
			123.10	-5.156E-01	(	1.610E+00	9.34E+01	4.08E+01 G
			1274.54	-2.738E-01	+	5.226E+00	5.41E+02	3.52E+01 G
			723.36	0.000E+00	+	5.571E+00	1.00E+03	2.02E+01 G
			873.23	1.489E+00	?(P	8.157E+00	1.56E+02	1.23E+01 G
			1004.77	-1.174E+00	+	5.012E+00	1.87E+02	1.80E+01 G
			996.33	1.585E+00	?(	1.152E+01	2.06E+02	1.06E+01 G
EU-155	I	1.1315E+00					1.81E+03	
			105.31	1.132E+00	?(P	7.302E+00	1.93E+02	2.12E+01 G
			86.54	-1.016E+00	&	5.821E+00	1.72E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	8.3701E-02					4.24E+01	
			482.00	-4.860E-01	?(	1.740E+00	1.06E+02	8.05E+01 G
			133.02	4.908E-01	(	2.402E+00	1.46E+02	4.33E+01 G
			345.83	1.957E+00	&(	8.976E+00	1.36E+02	1.51E+01 G
			136.30	0.000E+00	&	1.854E+01	1.00E+03	5.85E+00 G
Ta-182	F	1.0376E+00					1.14E+02	
			1121.30	8.734E-01	?(	3.967E+00	1.31E+02	3.49E+01 G
			1221.41	-6.014E-01	+ P	4.605E+00	1.24E+02	2.70E+01 G
			1189.05	1.391E+00	?(	5.484E+00	1.75E+02	1.62E+01 G
Hg-203	F	-1.9303E-01					4.66E+01	
			279.20	-1.930E-01	&(	9.658E-01	1.47E+02	8.15E+01 G
TL-208	N	3.3719E+00					6.98E+02	
			583.02	3.372E+00	(P	4.973E-01	1.10E+01	8.45E+01 G
			277.28	7.180E+00	+	7.203E+00	4.40E+01	6.31E+00 G
			860.56	1.419E+00	& P	7.892E+00	2.39E+02	1.24E+01 G
PM-146	C	1.8544E-01					2.02E+03	
			453.88	-8.972E-02	?(P	1.018E+00	4.73E+02	6.50E+01 G
			747.16	7.115E-01	?(P	2.043E+00	1.18E+02	3.40E+01 G
			735.72	-2.168E+00	+	4.337E+00	8.67E+01	2.25E+01 G
Y-88	F	4.8104E-01					1.07E+02	
			1836.06	4.810E-01	?(P	5.109E-01	3.85E+01	9.92E+01 G
			898.04	-1.184E-02	% P	8.653E-01	2.65E+03	9.37E+01 G
Cd-113m		2.2114E+02					5.33E+03	
			263.70	2.211E+02	%(	9.820E+03	1.25E+03	6.00E-03 K
Cf-251	T	-1.6088E+00					3.28E+05	
			176.60	-1.609E+00	?(	3.877E+00	9.43E+01	1.70E+01 G
			227.00	3.428E+00	?	8.589E+00	1.01E+02	6.30E+00 GA
Cf-249	T	3.2189E-01					1.28E+05	
			387.95	3.219E-01	?(	1.313E+00	1.20E+02	6.60E+01 G
			333.44	-6.210E-01	+	9.036E+00	4.28E+02	1.55E+01 G
Sn-126		1.7117E+00					3.65E+07	
			87.57	1.438E+00	}	4.525E+00	3.34E+01	3.75E+01 GA
			64.28	1.712E+00	?(	1.061E+01	1.84E+02	9.70E+00 G
			86.94	-3.444E+00	+	1.949E+01	1.70E+02	9.04E+00 GA
PB-210	N	8.9719E+00					8.14E+03	
			46.54	8.972E+00	&(	3.327E+01	1.10E+02	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	7.4221E+00					6.98E+02	
			238.63	7.422E+00	(	1.069E+00	7.89E+00	4.33E+01 G
			300.03	1.462E+01	+	1.389E+01	3.21E+01	3.28E+00 GA
PB-214	N	7.8333E+00					5.84E+05	
			351.93	7.833E+00	(P	1.278E+00	9.81E+00	3.76E+01 G
			295.09	1.000E+01	+ P	2.345E+00	1.15E+01	1.93E+01 G
			242.00	9.135E+00	P	7.590E+00	2.78E+01	7.43E+00 GA
BI-207	C	3.0383E-01					1.18E+04	
			1063.66	3.038E-01	?(P	8.315E-01	1.14E+02	7.45E+01 G
			569.70	-4.683E-03	%	9.196E-01	5.47E+03	9.77E+01 G
BI-212	N	4.8608E+00					6.98E+02	
			727.17	4.861E+00	?(	1.519E+01	9.25E+01	7.55E+00 G
			785.42	-2.154E+01	+	1.147E+02	1.55E+02	1.28E+00 GA
U-235	N	-4.6850E-01					2.57E+11	
			143.79	-2.288E+00	(	1.058E+01	1.38E+02	1.10E+01 G
			205.33	-5.407E-01	+ P	1.275E+01	8.72E+02	5.01E+00 G
			163.38	3.457E+00	&(P	1.136E+01	9.78E+01	5.08E+00 G
			185.72	1.098E+00		1.147E+00	4.22E+01	5.40E+01 GA
BI-214	N	8.3696E+00					5.84E+05	
			609.31	8.370E+00	(P	1.385E+00	1.08E+01	4.61E+01 G
			1120.29	1.358E+00	- P	7.667E+00	1.61E+02	1.51E+01 G
			1764.49	6.304E+00	- P	4.888E+00	3.19E+01	1.54E+01 G
BI-210M	T	1.0239E-01					1.10E+09	
			265.83	1.024E-01	?(P	1.181E+00	4.51E+02	5.00E+01 G
			304.90	0.000E+00	&	6.008E+00	1.00E+03	2.80E+01 G
AC-228	N	9.4560E+00					2.10E+03	
			911.07	9.456E+00	(	9.956E-01	1.20E+01	2.90E+01 G
			968.97	2.072E+00	-	5.960E+00	8.49E+01	1.75E+01 G
			338.32	2.406E+00	-	1.096E+01	1.35E+02	1.20E+01 G
			93.35	-5.469E+00	-	3.083E+01	1.69E+02	5.56E+00 XA
TH-227	N	-1.7847E+00					7.95E+03	
			256.24	-1.785E+00	?(	9.177E+00	2.05E+02	7.00E+00 G
			235.97	-1.697E+00	+	1.258E+01	2.21E+02	1.23E+01 G
			50.14	-6.430E-01	+	1.634E+01	7.43E+02	8.00E+00 G
TH-229	N	3.8292E+00					2.68E+06	
			193.51	3.829E+00	?(	1.425E+01	1.50E+02	4.40E+00 G
			210.85	-1.834E+00	-	2.386E+01	5.20E+02	2.99E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	1.6628E+01					1.63E+12	
			92.59	1.241E+01	(	9.340E+00	2.49E+01	5.58E+00 G
			63.29	2.280E+01	(	1.859E+01	2.67E+01	3.81E+00 G
PA-234	N	1.1741E+00					1.63E+12	
			131.29	1.174E+00	&(	5.620E+00	1.43E+02	1.80E+01 G
			946.02	-3.010E-01	-	6.249E+00	8.57E+02	1.34E+01 G
			569.47	0.000E+00	-	1.082E+01	1.00E+03	8.20E+00 G
			883.24	0.000E+00	-	1.680E+01	1.00E+03	9.60E+00 G
			880.53	-8.479E+00	+	2.436E+01	8.55E+01	6.00E+00 GA
PA-234M	N	1.6074E+01					1.63E+12	
			1001.00	-2.869E+00	%(P	1.556E+02	1.73E+03	8.37E-01 G
			766.41	7.000E+01	?(	4.539E+02	1.88E+02	2.94E-01 G
AM-241	T	-6.6566E-02					1.58E+05	
			59.54	-6.657E-02	%(	3.731E+00	1.65E+03	3.59E+01 G
Np-237	F	-2.2413E+00					2.14E+06	
			86.49	-2.241E+00	&(	1.331E+01	1.78E+02	1.31E+01 G
Cs-136	F	4.8373E-01					1.30E+01	
			818.50	4.199E-01	?(	1.494E+00	1.05E+02	1.00E+02 G
			1048.07	-2.731E-01	&	1.542E+00	1.61E+02	8.00E+01 G
			340.57	6.198E-01	?(	2.717E+00	1.30E+02	4.69E+01 G
Np-239	T	1.2618E+00					2.36E+00	
			103.70	-1.246E+00	&	7.316E+00	1.76E+02	2.40E+01 X
			106.13	1.262E+00	(	7.405E+00	1.76E+02	2.27E+01 G
			99.50	-2.003E+00	+	1.150E+01	1.72E+02	1.50E+01 X
Nd-147		1.7373E+00					1.11E+01	
			531.00	1.737E+00	?(	3.914E+00	9.15E+01	1.30E+01 G
			91.10	-1.082E+00	-	5.972E+00	1.66E+02	2.83E+01 G
TL-210	N	2.9210E-01					5.84E+05	
			799.60	2.921E-01	?(	9.308E-01	9.34E+01	9.90E+01 G
			296.00	-1.583E-01	-	2.105E+00	3.94E+02	7.90E+01 G
			1313.00	-1.909E+00	+	6.198E+00	1.50E+02	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

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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	182.	18.	0.010	110.47	8.972E+00	
TH-227	50.14	198.	-3.	-0.001	743.12	-6.430E-01	
BA-133	80.99	706.	-26.	-0.014	145.36	-8.810E-01	
Np-237	86.49	1099.	-26.	-0.015	178.22	-2.241E+00	
EU-155	86.54	1156.	-28.	-0.016	171.95	-1.016E+00	
Nd-147	91.10	1080.	-28.	-0.016	165.62	-1.082E+00	
Gd-153	97.50	1161.	-28.	-0.016	170.62	-1.004E+00	
Gd-153	103.20	1218.	-29.	-0.016	173.84	-1.372E+00	
EU-155	105.31	974.	23.	0.013	193.39	1.132E+00	P
EU-152	121.78	85.	20.	0.011	69.92	7.232E-01	
CO-57	122.06	105.	15.	0.008	100.82	1.821E-01	
EU-154	123.10	165.	-20.	-0.011	93.35	-5.156E-01	
PA-234	131.29	392.	20.	0.011	142.88	1.174E+00	
HF-181	133.02	412.	20.	0.011	146.15	4.908E-01	
CE-144	133.54	432.	9.	0.005	318.22	8.963E-01	
CO-57	136.47	529.	-23.	-0.013	145.46	-2.283E+00	
Tc-99m	140.51	506.	-23.	-0.013	141.87	-2.856E-01	
U-235	143.79	484.	-23.	-0.013	138.34	-2.288E+00	
CE-141	145.44	500.	-23.	-0.013	138.53	-5.311E-01	
Ba-140	162.66	224.	-22.	-0.012	99.57	-4.150E+00	
U-235	163.38	97.	15.	0.008	97.77	3.457E+00	P
Cf-251	176.60	121.	-22.	-0.012	94.30	-1.609E+00	
U-235	185.72	99.	47.	0.026	42.21	1.098E+00	
TH-229	193.51	96.	13.	0.007	150.15	3.829E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	205.33	92.	-2.	-0.001	872.10	-5.407E-01	P
TH-229	210.85	112.	-4.	-0.002	520.42	-1.834E+00	
Cf-251	227.00	56.	15.	0.008	101.03	3.428E+00	
TH-227	235.97	479.	-14.	-0.008	220.73	-1.697E+00	
EU-152	244.69	445.	5.	0.003	560.83	1.065E+00	
TH-227	256.24	68.	-8.	-0.004	204.89	-1.785E+00	
BI-210M	265.83	54.	3.	0.002	450.86	1.024E-01	P
Hg-203	279.20	92.	-10.	-0.005	146.80	-1.930E-01	
I-131	284.30	44.	10.	0.006	133.67	2.729E+00	
TL-210	296.00	405.	-7.	-0.004	394.01	-1.583E-01	
La-140	328.76	256.	-16.	-0.009	81.24	-1.467E+00	P
Cf-249	333.44	240.	-5.	-0.003	427.89	-6.210E-01	
Cs-136	340.57	191.	15.	0.009	130.17	6.198E-01	
EU-152	344.29	196.	15.	0.009	131.53	1.108E+00	
HF-181	345.83	212.	15.	0.009	136.25	1.957E+00	
BA-133	356.00	212.	3.	0.001	775.20	8.415E-02	
I-131	364.48	24.	11.	0.006	92.26	2.680E-01	
BA-133	383.84	47.	23.	0.013	46.45	5.368E+00	
Cf-249	387.95	70.	10.	0.006	119.93	3.219E-01	
SN-113	391.69	109.	-7.	-0.004	201.74	-2.441E-01	
SB-125	427.88	39.	-2.	-0.001	641.29	-1.507E-01	
AG-108M	433.94	31.	12.	0.007	98.37	2.990E-01	P
PM-146	453.88	31.	-3.	-0.001	472.51	-8.972E-02	P
SB-125	463.37	62.	-2.	-0.001	743.86	-3.384E-01	
BE-7	477.60	123.	-16.	-0.009	100.76	-3.684E+00	
HF-181	482.00	139.	-16.	-0.009	106.49	-4.860E-01	
La-140	487.02	116.	14.	0.008	113.91	7.411E-01	
RU-103	497.05	35.	7.	0.004	169.59	1.987E-01	P
RH-106	511.86	56.	53.	0.029	24.24	6.728E+00	
Nd-147	531.00	13.	9.	0.005	91.52	1.737E+00	
Ba-140	537.26	31.	-8.	-0.004	163.81	-8.137E-01	P
CS-134	563.24	23.	10.	0.005	110.78	3.153E+00	
CS-134	569.32	33.	-8.	-0.004	111.44	-1.368E+00	
SB-125	600.50	274.	-14.	-0.008	172.13	-2.201E+00	
SB-124	602.73	260.	-14.	-0.008	167.65	-4.018E-01	
CS-134	604.71	246.	-8.	-0.005	265.20	-2.482E-01	
SB-125	635.89	19.	3.	0.002	191.31	8.782E-01	
I-131	636.97	20.	4.	0.002	160.47	1.721E+00	P
AG-110M	657.76	53.	-15.	-0.008	45.56	-4.784E-01	P
CS-137	661.66	51.	9.	0.005	122.96	3.077E-01	
PM-144	696.54	35.	11.	0.006	82.42	3.533E-01	
NB-94	702.63	37.	10.	0.005	95.92	3.124E-01	
SB-124	722.79	51.	-5.	-0.003	206.88	-1.518E+00	
ZR-95	724.20	61.	-12.	-0.007	93.28	-9.251E-01	
PM-146	735.72	33.	-15.	-0.008	86.69	-2.168E+00	
PM-146	747.16	15.	7.	0.004	117.96	7.115E-01	P
AG-110M	763.94	48.	-16.	-0.009	66.14	-2.457E+00	
NB-95	765.79	67.	2.	0.001	499.18	8.016E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PA-234M	766.41	60.	6.	0.003	187.58	7.000E+01		
EU-152	778.92	35.	-15.	-0.008	89.83	-4.056E+00		
CS-134	795.87	27.	10.	0.006	80.19	4.117E-01		
TL-210	799.60	25.	8.	0.005	93.43	2.921E-01		
CS-134	801.95	36.	8.	0.005	109.81	3.337E+00		
CO-58	810.78	70.	-15.	-0.009	81.22	-5.525E-01		
La-140	815.77	85.	-14.	-0.008	99.43	-2.110E+00		
Cs-136	818.50	69.	12.	0.006	105.08	4.199E-01		
Co-56	846.77	15.	7.	0.004	127.38	2.593E-01		
NB-94	871.10	25.	-6.	-0.004	119.21	-2.399E-01		
EU-154	873.23	26.	5.	0.003	156.15	1.489E+00		P
PA-234	880.53	58.	-13.	-0.007	85.51	-8.479E+00		
Sc-46	889.28	57.	12.	0.007	93.10	4.624E-01		
AG-110M	937.49	30.	-15.	-0.008	84.10	-1.754E+00		
PA-234	946.02	15.	-1.	-0.001	857.32	-3.010E-01		
EU-152	964.11	45.	6.	0.003	161.13	1.700E+00		P
EU-154	996.33	32.	4.	0.002	206.16	1.585E+00		
EU-154	1004.77	16.	-5.	-0.003	187.26	-1.174E+00		
Co-56	1037.84	11.	5.	0.003	156.23	1.533E+00		P
Cs-136	1048.07	30.	-5.	-0.003	161.25	-2.731E-01		
RH-106	1050.36	39.	-1.	-0.001	764.25	-3.274E+00		
BI-207	1063.66	6.	5.	0.003	113.72	3.038E-01		P
Ga-68	1077.40	21.	2.	0.001	634.67	2.639E+00		
EU-152	1112.07	32.	7.	0.004	128.09	2.212E+00		
ZN-65	1115.55	39.	3.	0.002	292.40	2.791E-01		
Sc-46	1120.55	28.	7.	0.004	118.94	3.046E-01		
Ta-182	1121.30	34.	7.	0.004	131.29	8.734E-01		
Ta-182	1189.05	11.	5.	0.003	175.40	1.391E+00		
Ta-182	1221.41	23.	-3.	-0.002	124.15	-6.014E-01		P
Co-56	1238.28	29.	-2.	-0.001	202.40	-1.606E-01		P
NA-22	1274.53	34.	-17.	-0.010	53.91	-8.740E-01		
EU-154	1274.54	51.	-2.	-0.001	540.51	-2.738E-01		
FE-59	1291.60	6.	1.	0.001	427.57	1.592E-01		
TL-210	1313.00	23.	-8.	-0.004	150.05	-1.909E+00		
AG-110M	1384.30	11.	-1.	-0.001	598.44	-2.995E-01		
EU-152	1408.00	6.	5.	0.003	117.11	1.363E+00		P
La-140	1596.21	12.	-7.	-0.004	158.41	-4.614E-01		P
Y-88	1836.06	0.	7.	0.004	38.45	4.810E-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	-3.6842E+00	-3.6843E+00	1.008E+02%	1.25E+01
NA-22	#A	-8.7404E-01	-8.7404E-01	5.391E+01%	1.53E+00
K-40		5.9792E+01	5.9792E+01	1.015E+01%	8.51E+00
Sc-46	#A	3.8353E-01	3.8353E-01	7.552E+01%	1.45E+00
CR-51	#A	-1.6939E-01	-1.6939E-01	1.400E+03%	1.75E+01
MN-54	#A	9.6843E-03	9.6843E-03	3.262E+03%	7.76E-01
FE-59	#A	6.8998E-02	6.8999E-02	4.276E+02%	5.92E-01
Co-56	#A	4.1711E-01	4.1711E-01	1.008E+02%	7.69E-01
CO-57	#A	1.8208E-01	1.8208E-01	1.008E+02%	6.18E-01
CO-58	#A	-5.5246E-01	-5.5247E-01	8.122E+01%	1.50E+00
CO-60	#	5.7393E-01	5.7393E-01	2.301E+01%	3.90E-01
ZN-65	#A	2.7912E-01	2.7912E-01	2.924E+02%	2.88E+00
NB-94	#A	3.1240E-01	3.1240E-01	9.592E+01%	1.02E+00
ZR-95	#A	-4.5763E-03	-4.5763E-03	1.159E+04%	1.62E+00
NB-95	#A	8.0156E-02	8.0156E-02	4.992E+02%	1.40E+00
RU-103	#A	1.9875E-01	1.9875E-01	1.696E+02%	8.25E-01
RH-106	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.20E+01
AG-108M	#A	2.9900E-01	2.9900E-01	9.837E+01%	7.11E-01
AG-110M	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.22E+00
SN-113	#A	-2.4406E-01	-2.4406E-01	2.017E+02%	1.68E+00
SB-124	#A	-4.0175E-01	-4.0175E-01	1.676E+02%	2.27E+00
SB-125	#A	1.3375E-01	1.3375E-01	1.913E+02%	2.40E+00
I-131	#A	5.3669E-01	5.3671E-01	7.611E+01%	6.22E-01
Gd-153	#A	-1.0043E+00	-1.0043E+00	1.706E+02%	5.71E+00
Ga-68	#A	2.6198E+00	2.6386E+00	6.347E+02%	3.84E+01
Tc-99m	#A	-2.8526E-01	-2.8564E-01	1.419E+02%	1.35E+00
BA-133	#A	8.4147E-02	8.4147E-02	7.752E+02%	2.23E+00
CS-134	#A	8.8270E-01	8.8270E-01	5.846E+01%	1.11E+00
CS-137	#A	3.0768E-01	3.0768E-01	1.230E+02%	1.29E+00
CE-139	#A	2.2372E-01	2.2372E-01	1.149E+02%	8.65E-01
Ba-140	#A	-8.1366E-01	-8.1368E-01	1.638E+02%	3.07E+00
La-140	#A	-7.3096E-02	-7.3097E-02	9.756E+01%	1.22E+00
CE-141	#A	-5.3105E-01	-5.3105E-01	1.385E+02%	2.46E+00
CE-144	#A	8.9628E-01	8.9628E-01	3.182E+02%	9.61E+00
PM-144	#A	3.5329E-01	3.5329E-01	8.242E+01%	9.80E-01
EU-152	#A	1.2443E+00	1.2443E+00	6.992E+01%	1.68E+00
EU-154	#A	2.2059E-01	2.2059E-01	9.165E+01%	1.61E+00
EU-155	#A	1.1315E+00	1.1315E+00	1.934E+02%	7.30E+00
HF-181	#A	8.3701E-02	8.3701E-02	7.547E+01%	1.74E+00
Ta-182	#A	1.0376E+00	1.0376E+00	1.095E+02%	3.97E+00
Hg-203	#A	-1.9303E-01	-1.9303E-01	1.468E+02%	9.66E-01
TL-208		3.3719E+00	3.3719E+00	1.103E+01%	4.97E-01
PM-146	#A	1.8544E-01	1.8544E-01	1.180E+02%	1.02E+00

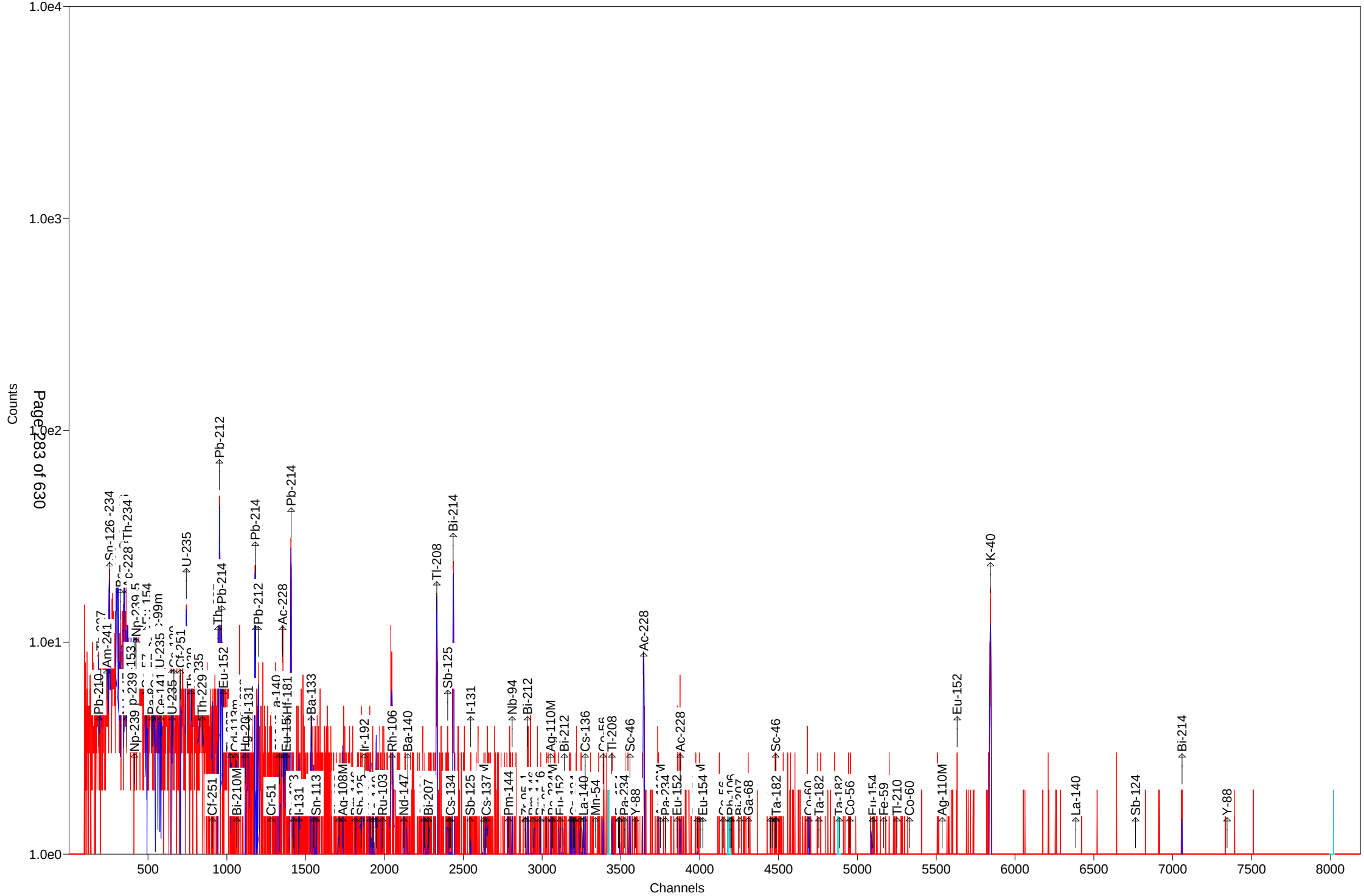
Y-88 #A	4.8104E-01	4.8104E-01	3.845E+01%		5.11E-01
Cd-113m#B	2.2114E+02	2.2114E+02	1.254E+03%		9.82E+03
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		4.56E+01
Cf-251 #A	-1.6088E+00	-1.6088E+00	9.430E+01%		3.88E+00
Cf-249 #A	3.2189E-01	3.2189E-01	1.199E+02%		1.31E+00
Sn-126 #A	1.7117E+00	1.7117E+00	1.835E+02%		1.06E+01
PB-210 #A	8.9719E+00	8.9719E+00	1.105E+02%		3.33E+01
PB-212	7.4221E+00	7.4221E+00	7.890E+00%		1.07E+00
PB-214	7.8333E+00	7.8333E+00	9.813E+00%		1.28E+00
BI-207 #A	3.0383E-01	3.0383E-01	1.137E+02%		8.31E-01
BI-212 #A	4.8608E+00	4.8608E+00	9.246E+01%		1.52E+01
U-235 #A	-4.6850E-01	-4.6850E-01	8.470E+01%		1.06E+01
BI-214	8.3696E+00	8.3696E+00	1.085E+01%		1.39E+00
BI-210M#A	1.0239E-01	1.0239E-01	4.509E+02%		1.18E+00
AC-228	9.4560E+00	9.4560E+00	1.195E+01%		9.96E-01
TH-227 #A	-1.7847E+00	-1.7847E+00	2.049E+02%		9.18E+00
TH-229 #A	3.8292E+00	3.8292E+00	1.501E+02%		1.42E+01
TH-234	1.6628E+01	1.6628E+01	1.824E+01%		9.34E+00
PA-231 #A	0.0000E+00	0.0000E+00	7.071E+02%		5.81E+01
PA-233 #A	0.0000E+00	0.0000E+00	7.071E+02%		4.75E+00
PA-234 #A	1.1741E+00	1.1741E+00	1.429E+02%		5.62E+00
PA-234M#A	1.6074E+01	1.6074E+01	1.876E+02%		1.56E+02
AM-241 #A	-6.6566E-02	-6.6566E-02	1.651E+03%		3.73E+00
Np-237 #A	-2.2413E+00	-2.2413E+00	1.782E+02%		1.33E+01
Ir-192 #A	0.0000E+00	0.0000E+00	7.071E+02%		1.98E+00
Cs-136 #A	4.8372E-01	4.8373E-01	8.365E+01%		1.49E+00
Np-239 A	1.2616E+00	1.2618E+00	1.761E+02%		7.40E+00
Nd-147 #A	1.7373E+00	1.7373E+00	9.152E+01%		3.91E+00
TL-210 #A	2.9210E-01	2.9210E-01	9.343E+01%		9.31E-01
Kr-85 #A	0.0000E+00	0.0000E+00	1.000E+03%		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) 1.129E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.3 keV) 1.1287238E+02 Bq/Sample

405451_Gamma_490-164491-A-8-A. 9_Gamma_20190008.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20190009

Sample Description: 405451_Gamma_490-164491-A-8-B DU
Detector: Detector #12
Batch ID: 405451
Work Order Number: Gamma
Lot Number: 490-164491-A-8-B DU

Decay to Time: 1/2/2019 14:52 Live Time: 1800 sec
Acquisition Time: 1/2/2019 14:53:22 Real Time: 1801 sec
Analysis Time: 1/2/2019 15:23 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_2018-12-22_1532.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	3.226E+00	107.0	3.452E+00	3.456E+00	1.174E+01
NA-22	-1.639E-01	214.3	3.512E-01	3.513E-01	1.292E+00
K-40	7.467E+01	9.9	7.394E+00	8.300E+00	5.395E+00
Sc-46	-1.102E-01	764.5	8.428E-01	8.428E-01	2.911E+00
CR-51	-3.283E+00	194.8	6.397E+00	6.399E+00	2.155E+01
MN-54	1.028E-01	403.1	4.145E-01	4.145E-01	1.036E+00
FE-59	6.524E-01	105.5	6.880E-01	6.888E-01	1.993E+00
Co-56	5.654E-01	67.3	3.807E-01	3.818E-01	1.079E+00
CO-57	2.811E-01	98.2	2.760E-01	2.764E-01	9.269E-01
CO-58	-6.268E-01	85.0	5.324E-01	5.334E-01	1.791E+00
CO-60	9.965E-02	31.6	3.151E-02	3.190E-02	1.337E+00
ZN-65	0.000E+00	1.#INF	3.074E-01	3.074E-01	4.793E+00
NB-94	6.945E-02	73.5	5.103E-02	5.115E-02	1.360E+00
ZR-95	5.696E-01	92.1	5.246E-01	5.255E-01	2.008E+00
NB-95	-6.292E-01	80.3	5.053E-01	5.063E-01	1.694E+00
RU-103	3.024E-01	93.8	2.838E-01	2.842E-01	7.292E-01
RH-106	-5.400E-01	131.1	7.080E-01	7.086E-01	1.263E+01
AG-108M	-3.507E-01	127.8	4.482E-01	4.485E-01	1.129E+00
AG-110M	-1.127E+00	97.8	1.102E+00	1.104E+00	3.705E+00
SN-113	5.253E-01	118.5	6.225E-01	6.231E-01	2.111E+00
SB-124	-1.362E-01	127.1	1.731E-01	1.733E-01	3.246E+00
SB-125	1.240E+00	135.3	1.678E+00	1.679E+00	2.708E+00
I-131	3.385E-01	101.4	3.432E-01	3.436E-01	8.681E-01
Gd-153	-1.070E+00	139.3	1.492E+00	1.493E+00	4.992E+00
Ga-68	1.031E+01	121.6	1.254E+01	1.255E+01	2.975E+01
Tc-99m	-3.593E-01	161.9	5.815E-01	5.819E-01	1.946E+00
BA-133	-1.172E-01	744.4	8.724E-01	8.724E-01	2.984E+00
CS-134	1.355E-01	41.5	5.629E-02	5.671E-02	1.921E+00
CS-137	-1.392E-01	416.4	5.796E-01	5.797E-01	2.028E+00
CE-139	1.555E-01	227.0	3.530E-01	3.531E-01	1.204E+00
Ba-140	1.834E+00	73.1	1.341E+00	1.344E+00	2.981E+00
La-140	-6.406E-01	65.1	4.167E-01	4.181E-01	1.979E+00
CE-141	-6.724E-01	164.6	1.106E+00	1.107E+00	3.701E+00

CE-144	-2.748E+00	161.7	4.444E+00	4.446E+00	1.487E+01
PM-144	1.974E-01	216.9	4.281E-01	4.282E-01	1.040E+00
EU-152	1.099E+00	109.7	1.206E+00	1.207E+00	3.217E+00
EU-154	6.498E-01	147.2	9.567E-01	9.573E-01	1.965E+00
EU-155	-1.527E+00	147.4	2.250E+00	2.251E+00	7.524E+00
HF-181	4.194E-01	127.3	5.340E-01	5.344E-01	1.677E+00
Ta-182	1.887E+00	75.9	1.431E+00	1.434E+00	6.456E+00
Hg-203	-1.962E-01	186.7	3.664E-01	3.666E-01	1.258E+00
TL-208	3.507E+00	14.6	5.107E-01	5.409E-01	7.446E-01
PM-146	4.799E-01	96.2	4.616E-01	4.622E-01	1.189E+00
Y-88	0.000E+00	1.#INF	9.547E-02	9.547E-02	7.036E-01
Cd-113m	-4.713E+03	108.5	5.114E+03	5.121E+03	1.727E+04
Cd-109	7.625E+00	155.2	1.183E+01	1.184E+01	3.966E+01
Cf-251	-1.821E+00	107.4	1.956E+00	1.958E+00	5.023E+00
Cf-249	5.489E-01	110.6	6.071E-01	6.077E-01	2.053E+00
Sn-126	-4.098E+00	133.0	5.451E+00	5.456E+00	1.824E+01
PB-210	2.926E+01	44.9	1.312E+01	1.325E+01	3.408E+01
PB-212	9.030E+00	9.4	8.471E-01	9.693E-01	1.904E+00
PB-214	1.036E+01	10.3	1.072E+00	1.194E+00	1.797E+00
BI-207	5.210E-01	91.9	4.790E-01	4.797E-01	1.108E+00
BI-212	-8.276E+00	91.2	7.544E+00	7.556E+00	2.539E+01
U-235	-2.867E+00	164.3	4.710E+00	4.712E+00	1.576E+01
BI-214	9.349E+00	11.7	1.096E+00	1.195E+00	2.391E+00
BI-210M	2.188E-01	283.5	6.204E-01	6.205E-01	2.137E+00
AC-228	1.167E+01	13.4	1.570E+00	1.678E+00	2.158E+00
TH-227	1.097E+00	188.6	2.069E+00	2.070E+00	1.023E+01
TH-229	7.224E+00	82.4	5.951E+00	5.963E+00	1.713E+01
TH-234	1.440E+01	30.1	4.342E+00	4.415E+00	1.576E+01
PA-231	0.000E+00	1.#INF	4.099E+00	4.099E+00	6.912E+01
PA-233	0.000E+00	1.#INF	1.678E-01	1.678E-01	5.658E+00
PA-234	8.917E-01	165.6	1.477E+00	1.478E+00	5.010E+00
PA-234M	-1.958E+01	59.9	1.173E+01	1.177E+01	2.812E+02
AM-241	4.120E-01	303.0	1.248E+00	1.249E+00	4.233E+00
Np-237	2.105E+00	173.0	3.642E+00	3.644E+00	1.221E+01
Ir-192	2.391E-01	96.2	2.300E-01	2.304E-01	2.366E+00
Cs-136	0.000E+00	1.#INF	2.150E-01	2.150E-01	2.089E+00
Np-239	-1.302E+00	167.2	2.176E+00	2.177E+00	7.282E+00
Nd-147	6.648E-01	158.1	1.051E+00	1.051E+00	8.064E+00
TL-210	1.846E-01	262.1	4.838E-01	4.839E-01	1.699E+00
Kr-85	8.569E+01	131.4	1.126E+02	1.127E+02	3.830E+02
Total	2.948E+02				

Analyst: Joey Sausto

Sample description
405451_Gamma_490-164491-A-8-B DU

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20190009.An1

Acquisition information
Start time: 1/2/2019 2:53:22 PM
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	1/2/2019 2:52:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2018-12-22_1532.PBC 12/22/2018 3:32:10 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 24 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1678

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.72	40.	44.86	0.96	1.822E-02	46.54	4.250	PBC<MDA	PB210
50.14	3.	656.35	0.85	2.193E-02	50.14	8.000	PBC<MDA	TH227
59.54	8.	303.02	0.86	2.817E-02	59.54	35.900	PBC<MDA	AM241
63.44	40.	39.54	1.24	2.978E-02	63.29	3.810	PBC<MDA	TH234
74.72	92.	18.76	0.88	3.328E-02				
77.29	152.	11.72	0.88	3.388E-02				
80.99	17.	207.39	0.89	3.466E-02	80.99	34.060	PBC<MDA	BA133
86.49	18.	173.01	0.89	3.559E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	8.981E-01	EU155
86.54	7.	412.86	0.89	3.560E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	3.728E-01	EU155
					86.94	9.040	1.264E+00	Sn126
88.04	19.	155.18	0.89	3.582E-02	88.04	3.790	PBC<MDA	Cd109
91.10	19.	158.07	0.90	3.621E-02	91.10	28.300	PBC<MDA	Nd147
92.93	112.	17.14	1.59	3.641E-02	92.59	5.584	2.230E+01	TH234
					93.35	5.561	3.056E+01	AC228
122.06	16.	98.20	0.93	3.724E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.811E-01	CO57
131.29	11.	165.64	0.94	3.683E-02	131.29	18.000	PBC<MDA	PA234
133.02	15.	164.97	0.94	3.673E-02	133.02	43.300	PBC<MDA	HF181
162.66	16.	108.57	0.97	3.435E-02	162.66	6.220	PBC<MDA	Ba140
165.85	8.	227.03	0.97	3.405E-02	165.85	79.900	PBC<MDA	CE139
186.28	80.	23.27	0.46	3.209E-02	185.72	54.000	PBC<MDA	U235
193.51	14.	120.31	1.00	3.140E-02	193.51	4.400	PBC<MDA	TH229
210.85	16.	112.53	1.02	2.980E-02	210.85	2.990	PBC<MDA	TH229
227.00	6.	197.48	1.03	2.839E-02	227.00	6.300	PBC<MDA	Cf251
235.97	15.	188.63	1.04	2.764E-02	235.97	12.300	PBC<MDA	TH227

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
238.65	220.	8.83	1.04	2.743E-02	238.63	43.300	9.826E+00	PB212
242.06	19.	60.43	1.05	2.716E-02	242.00	7.430	PBC<MDA	PB214
244.69	14.	196.58	1.05	2.695E-02	244.69	7.580	PBC<MDA	EU152
265.83	5.	283.55	1.07	2.539E-02	265.83	50.000	PBC<MDA	BI210M
277.28	13.	81.49	1.08	2.462E-02	277.28	6.310	PBC<MDA	TL208
294.83	68.	20.07	1.04	2.350E-02	295.09	19.300	8.363E+00	PB214
299.82	22.	42.66	1.90	2.321E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	2.173E+01	PA231
					300.18	6.200	8.626E+00	PA233
328.76	14.	99.74	1.13	2.165E-02	328.76	20.300	PBC<MDA	La140
338.09	58.	22.61	1.43	2.118E-02	338.32	12.010	1.274E+01	AC228
345.83	13.	127.33	1.15	2.083E-02	345.83	15.070	PBC<MDA	HF181
351.81	144.	10.35	0.95	2.056E-02	351.93	37.600	1.036E+01	PB214
364.48	10.	101.39	1.17	2.001E-02	364.48	81.700	PBC<MDA	I131
387.95	12.	110.60	1.19	1.907E-02	387.95	66.000	PBC<MDA	Cf249
391.69	11.	118.50	1.20	1.893E-02	391.69	64.000	PBC<MDA	SN113
427.88	6.	164.99	1.23	1.770E-02	427.88	29.600	PBC<MDA	SB125
453.88	1.	881.29	1.26	1.692E-02	453.88	65.000	PBC<MDA	PM146
468.06	10.	96.18	1.27	1.653E-02	468.06	51.750	PBC<MDA	Ir192
477.60	10.	107.01	1.28	1.628E-02	477.60	10.520	PBC<MDA	BE7
497.03	8.	93.84	1.30	1.580E-02	497.05	90.900	PBC<MDA	RU103
511.86	50.	26.08	2.56	1.546E-02	511.86	20.000	8.986E+00	RH106
513.98	10.	131.36	1.31	1.541E-02	513.98	0.430	PBC<MDA	Kr85
537.26	8.	97.98	1.34	1.491E-02	537.26	24.390	PBC<MDA	Ba140
564.47	1.	717.85	1.36	1.439E-02	563.24	8.350	PBC<MDA	CS134
568.92	13.	41.53	1.37	1.428E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.327E+00	PA234
583.13	73.	14.56	1.28	1.403E-02	583.02	84.500	3.420E+00	TL208
600.50	10.	214.41	1.40	1.373E-02	600.50	17.860	PBC<MDA	SB125
609.33	109.	11.72	1.41	1.358E-02	609.31	46.090	9.662E+00	BI214
610.32	6.	327.87	1.41	1.357E-02	610.30	5.750	PBC<MDA	RU103
635.89	1.	891.63	1.43	1.317E-02	635.89	11.310	PBC<MDA	SB125
696.54	4.	216.89	1.49	1.232E-02	696.54	99.000	PBC<MDA	PM144
724.20	12.	92.11	1.51	1.198E-02	724.20	44.150	PBC<MDA	ZR95
735.72	6.	150.07	1.52	1.184E-02	735.72	22.500	PBC<MDA	PM146
747.16	5.	96.18	1.53	1.171E-02	747.16	34.000	PBC<MDA	PM146
763.94	1.	466.37	1.55	1.152E-02	763.94	22.280	PBC<MDA	AG110M
766.41	12.	82.33	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.984E+02	PA234M
785.42	4.	204.63	1.57	1.129E-02	785.42	1.280	PBC<MDA	BI212
799.60	4.	262.06	1.58	1.115E-02	799.60	98.960	PBC<MDA	TL210
834.85	2.	403.11	1.61	1.081E-02	834.85	99.980	PBC<MDA	MN54
846.77	9.	100.31	1.63	1.070E-02	846.77	99.935	PBC<MDA	Co56
860.24	27.	19.25	2.00	1.057E-02	860.56	12.420	1.142E+01	TL208
871.10	6.	73.48	1.65	1.048E-02	871.10	99.890	PBC<MDA	NB94
911.22	60.	14.58	1.32	1.015E-02	911.07	29.000	1.123E+01	AC228
968.46	20.	45.93	1.74	9.703E-03	968.97	17.460	PBC<MDA	AC228
1004.77	6.	147.24	1.77	9.450E-03	1004.77	18.010	PBC<MDA	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1050.36	4.	209.39	1.81	9.147E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	6.	91.94	1.82	9.063E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	5.	121.64	1.83	8.978E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	4.	177.92	1.85	8.846E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	6.	170.23	1.86	8.770E-03	1112.07	13.644	PBC<MDA	EU152
1120.27	20.	44.44	1.87	8.722E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	1.268E+00	Sc46
1121.29	9.	112.55	1.87	8.716E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.681E+00	Ta182
1173.24	10.	31.62	1.92	8.426E-03	1173.24	99.900	6.600E-01	CO60
1189.25	6.	101.72	1.93	8.342E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	7.	89.88	1.97	8.090E-03	1238.28	66.070	PBC<MDA	Co56
1291.60	5.	113.28	2.02	7.834E-03	1291.60	43.200	PBC<MDA	FE59
1313.00	5.	113.28	2.04	7.735E-03	1313.00	21.000	PBC<MDA	TL210
1460.75	102.	9.90	2.31	7.112E-03	1460.83	10.670	7.467E+01	K40
1690.98	4.	178.26	2.35	6.302E-03	1690.98	47.790	PBC<MDA	SB124
1764.43	8.	64.04	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	
298.45	74.66	104.	92.	2.778E+03	18.76	0.880	-	D
308.70	77.23	83.	152.	4.497E+03	11.72	0.883	-	D
744.41	186.28	63.	80.	2.482E+03	23.27	0.458	-	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	186.50	46.72	91.	40.	0.022	44.86	0.958s
TH-227	200.18	50.14	238.	3.	0.002	656.35	0.855s
AM-241	237.74	59.54	254.	8.	0.004	303.02	0.865s
TH-234	253.33	63.44	78.	40.	0.022	39.54	1.235s
Sn-126	256.71	64.28	401.	-22.	-0.012	133.03	0.869
BA-133	323.50	80.99	609.	17.	0.009	207.39	0.887s
Np-237	345.49	86.49	458.	18.	0.010	173.01	0.892s
EU-155	345.70	86.54	455.	7.	0.004	412.86	0.892

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Sn-126	347.29	86.94	462.	0.	0.000	1000.00	0.892
Sn-126	349.81	87.57	462.	0.	0.000	1000.00	0.893
Cd-109	351.68	88.04	409.	19.	0.010	155.18	0.894s
Nd-147	363.92	91.10	427.	19.	0.010	158.07	0.897s
TH-234	369.87	92.59	139.	39.	0.022	45.52	0.898D
AC-228	372.91	93.35	500.	-21.	-0.012	150.78	0.899s
Gd-153	389.50	97.50	429.	-21.	-0.012	139.35	0.903s
Np-239	397.50	99.50	451.	-21.	-0.012	142.40	0.905s
Gd-153	412.29	103.20	472.	-21.	-0.012	145.05	0.909s
Np-239	414.29	103.70	493.	-21.	-0.012	148.15	0.909s
EU-155	420.73	105.31	501.	-22.	-0.012	147.35	0.911s
Np-239	424.00	106.13	539.	-20.	-0.011	167.16	0.912s
EU-152	486.56	121.78	160.	-9.	-0.005	201.54	0.928s
CO-57	487.69	122.06	117.	16.	0.009	98.20	0.928s
PA-234	524.60	131.29	150.	11.	0.006	165.64	0.938s
HF-181	531.51	133.02	311.	15.	0.009	164.97	0.939s
CE-144	533.57	133.54	520.	-20.	-0.011	161.72	0.940
HF-181	544.61	136.30	500.	-20.	-0.011	158.16	0.943s
CO-57	545.30	136.47	508.	-20.	-0.011	159.48	0.943s
Tc-99m	561.44	140.51	529.	-20.	-0.011	161.86	0.947s
U-235	574.53	143.79	549.	-20.	-0.011	164.27	0.950s
CE-141	581.15	145.44	582.	-21.	-0.012	164.55	0.952s
Ba-140	649.99	162.66	146.	16.	0.009	108.57	0.969s
U-235	652.87	163.38	156.	-19.	-0.010	96.81	0.970s
CE-139	662.76	165.85	146.	8.	0.004	227.03	0.973s
Cf-251	705.72	176.60	106.	-18.	-0.010	107.40	0.983
U-235	742.18	185.72	214.	-34.	-0.019	56.10	0.992s
TH-229	773.32	193.51	73.	14.	0.008	120.31	1.000s
TH-229	842.65	210.85	84.	16.	0.009	112.53	1.018s
Cf-251	907.22	227.00	37.	6.	0.003	197.48	1.034s
TH-227	943.09	235.97	390.	15.	0.008	188.63	1.043
PB-212	953.73	238.63	66.	193.	0.107	9.38	1.046D
PB-214	967.18	242.00	60.	19.	0.011	60.43	1.049D
EU-152	977.96	244.69	380.	14.	0.008	196.58	1.051s
TH-227	1024.13	256.24	44.	-4.	-0.002	314.25	1.063s
Cd-113m	1053.96	263.70	93.	-13.	-0.007	108.51	1.070s
BI-210M	1062.48	265.83	98.	5.	0.003	283.55	1.072
TL-208	1108.27	277.28	50.	13.	0.007	81.49	1.084
Hg-203	1115.93	279.20	83.	-7.	-0.004	186.72	1.086s
I-131	1136.32	284.30	51.	-5.	-0.003	255.03	1.091s
PB-214	1178.44	294.83	32.	68.	0.038	20.07	1.042s
TL-210	1183.11	296.00	309.	-12.	-0.007	207.09	1.102s
PB-212	1198.39	299.82	19.	22.	0.012	42.66	1.903s
PA-231	1199.38	300.07	297.	-3.	-0.001	956.45	1.106s
PA-233	1199.82	300.18	294.	0.	0.000	1000.00	1.107s
PA-231	1209.70	302.65	294.	0.	0.000	1000.00	1.109
BA-133	1210.50	302.85	294.	0.	0.000	1000.00	1.109s
Ba-140	1218.49	304.85	294.	0.	0.000	1000.00	1.111s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	1218.68	304.90	294.	0.	0.000	1000.00	1.111s
Ir-192	1232.85	308.44	294.	0.	0.000	1000.00	1.115s
PA-233	1247.13	312.01	294.	0.	0.000	1000.00	1.118s
Ir-192	1265.04	316.49	294.	0.	0.000	1000.00	1.123s
CR-51	1279.41	320.08	313.	-13.	-0.007	194.85	1.126s
La-140	1314.10	328.76	86.	14.	0.008	99.74	1.135s
Cf-249	1332.81	333.44	133.	-16.	-0.009	102.79	1.139s
AC-228	1351.43	338.09	27.	58.	0.032	22.61	1.430s
Cs-136	1361.32	340.57	171.	-15.	-0.009	122.47	1.146s
EU-152	1376.18	344.29	145.	-8.	-0.004	222.82	1.150s
HF-181	1382.35	345.83	124.	13.	0.007	127.33	1.151s
PB-214	1406.28	351.81	23.	144.	0.080	10.35	0.946s
BA-133	1423.02	356.00	196.	-3.	-0.001	744.35	1.162s
I-131	1456.95	364.48	24.	10.	0.006	101.39	1.170s
BA-133	1534.35	383.84	121.	-15.	-0.008	107.74	1.189s
Cf-249	1550.79	387.95	88.	12.	0.007	110.60	1.193s
SN-113	1565.74	391.69	86.	11.	0.006	118.50	1.196s
SB-125	1710.45	427.88	24.	6.	0.003	164.99	1.232s
AG-108M	1734.69	433.94	40.	-10.	-0.006	127.80	1.238s
PM-146	1814.45	453.88	20.	1.	0.001	881.29	1.257
SB-125	1852.39	463.37	61.	-4.	-0.002	260.06	1.266s
Ir-192	1871.16	468.06	40.	10.	0.005	96.18	1.271s
BE-7	1909.29	477.60	52.	10.	0.006	107.01	1.280s
La-140	1946.98	487.02	40.	-13.	-0.007	96.88	1.289s
RU-103	1987.11	497.05	12.	8.	0.004	93.84	1.298s
RH-106	2046.35	511.86	60.	50.	0.028	26.08	2.563s
Kr-85	2054.81	513.98	85.	10.	0.006	131.36	1.315s
Ba-140	2147.92	537.26	13.	8.	0.004	97.98	1.337s
CS-134	2251.82	563.24	22.	1.	0.001	717.85	1.362s
CS-134	2276.15	569.32	9.	13.	0.007	41.53	1.367s
PA-234	2276.75	569.47	27.	-4.	-0.002	197.81	1.368s
TL-208	2331.38	583.13	8.	73.	0.041	14.56	1.276s
SB-125	2400.87	600.50	220.	10.	0.005	214.41	1.397
SB-124	2409.79	602.73	265.	-13.	-0.007	181.14	1.399s
CS-134	2417.71	604.71	247.	-13.	-0.007	174.83	1.401s
BI-214	2436.11	609.31	27.	109.	0.060	11.72	1.406D
RU-103	2440.06	610.30	223.	6.	0.004	327.87	1.406s
AG-108M	2455.99	614.28	229.	0.	0.000	1000.00	1.410s
RH-106	2486.54	621.92	35.	-8.	-0.004	157.89	1.417s
SB-125	2542.43	635.89	17.	1.	0.000	891.63	1.430s
I-131	2546.77	636.97	1.	0.	0.000	1000.00	1.432s
AG-110M	2629.92	657.76	47.	-14.	-0.008	72.69	1.451s
CS-137	2645.51	661.66	63.	-3.	-0.002	416.43	1.455s
PM-144	2785.05	696.54	19.	4.	0.002	216.89	1.487s
NB-94	2809.41	702.63	33.	-4.	-0.002	334.76	1.493s
SB-124	2890.04	722.79	59.	-15.	-0.008	77.34	1.512s
AG-108M	2890.65	722.94	74.	-4.	-0.002	323.31	1.512s
EU-154	2892.34	723.36	77.	0.	0.000	1000.00	1.512s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZR-95	2895.69	724.20	53.	12.	0.007	92.11	1.513
BI-212	2907.58	727.17	68.	-13.	-0.007	91.16	1.516s
PM-146	2941.78	735.72	19.	6.	0.004	150.07	1.524
PM-146	2987.55	747.16	5.	5.	0.003	96.18	1.535
AG-110M	3054.69	763.94	19.	1.	0.001	466.37	1.550s
NB-95	3062.08	765.79	48.	-13.	-0.007	80.31	1.552s
PA-234M	3064.57	766.41	43.	12.	0.007	82.33	1.552s
EU-152	3114.61	778.92	28.	-12.	-0.007	97.89	1.564s
BI-212	3140.62	785.42	14.	4.	0.002	204.63	1.570s
CS-134	3182.43	795.87	42.	-8.	-0.005	113.76	1.579
TL-210	3197.35	799.60	44.	4.	0.002	262.06	1.583s
CS-134	3206.76	801.95	58.	-12.	-0.007	92.93	1.585
CO-58	3242.06	810.78	49.	-12.	-0.007	84.95	1.593s
La-140	3262.05	815.77	62.	-7.	-0.004	168.09	1.598s
Cs-136	3272.97	818.50	68.	0.	0.000	1000.00	1.600s
MN-54	3338.38	834.85	14.	2.	0.001	403.11	1.615s
Co-56	3386.08	846.77	15.	9.	0.005	100.31	1.626s
TL-208	3439.96	860.24	0.	27.	0.015	19.25	1.999s
NB-94	3483.41	871.10	6.	6.	0.003	73.48	1.648s
EU-154	3491.95	873.23	32.	-11.	-0.006	80.27	1.650s
PA-234	3521.16	880.53	74.	-15.	-0.008	83.57	1.657s
PA-234	3532.00	883.24	89.	-15.	-0.008	90.95	1.659s
AG-110M	3537.78	884.68	104.	-15.	-0.008	97.81	1.660s
Sc-46	3556.17	889.28	122.	-2.	-0.001	764.46	1.664s
Y-88	3591.22	898.04	20.	-3.	-0.002	332.78	1.672s
AC-228	3643.95	911.22	4.	60.	0.033	14.58	1.317
AG-110M	3749.09	937.49	25.	-9.	-0.005	126.60	1.708s
PA-234	3783.21	946.02	10.	-3.	-0.002	238.82	1.716s
EU-152	3855.60	964.11	62.	-15.	-0.008	79.53	1.732s
AC-228	3875.05	968.97	31.	20.	0.011	45.93	1.736s
EU-154	3984.54	996.33	51.	-14.	-0.008	78.43	1.761s
PA-234M	4003.22	1001.00	65.	-14.	-0.008	87.06	1.765s
EU-154	4018.33	1004.77	38.	6.	0.003	147.24	1.768s
Co-56	4150.66	1037.84	16.	0.	0.000	1000.00	1.798s
Cs-136	4191.60	1048.07	32.	-12.	-0.006	74.23	1.807s
RH-106	4200.76	1050.36	39.	4.	0.002	209.39	1.809s
BI-207	4253.99	1063.66	5.	6.	0.004	91.94	1.820s
Ga-68	4308.98	1077.40	5.	5.	0.003	121.64	1.833s
FE-59	4396.44	1099.25	11.	4.	0.002	177.92	1.852s
EU-152	4447.76	1112.07	52.	6.	0.003	170.23	1.863s
ZN-65	4461.66	1115.55	58.	0.	0.000	1000.00	1.866s
BI-214	4480.63	1120.29	29.	20.	0.011	44.44	1.870D
Sc-46	4481.68	1120.55	58.	0.	0.000	1000.00	1.870s
Ta-182	4484.69	1121.30	49.	9.	0.005	112.55	1.871s
CO-60	4692.57	1173.24	0.	10.	0.006	31.62	1.916s
Ta-182	4755.86	1189.05	5.	6.	0.003	101.72	1.930s
Co-56	4952.92	1238.28	6.	7.	0.004	89.88	1.972s
NA-22	5098.03	1274.53	11.	-2.	-0.001	214.29	2.003s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	5098.08	1274.54	14.	0.	0.000	1000.00	2.003s
FE-59	5166.35	1291.60	6.	5.	0.003	113.28	2.017s
TL-210	5252.04	1313.00	6.	5.	0.003	113.28	2.036s
CO-60	5330.11	1332.50	11.	-6.	-0.004	130.84	2.052s
AG-110M	5537.48	1384.30	17.	-7.	-0.004	143.21	2.096s
EU-152	5632.39	1408.00	6.	0.	0.000	1000.00	2.115s
K-40	5843.58	1460.75	0.	102.	0.057	9.90	2.310
La-140	6386.02	1596.21	18.	-13.	-0.007	83.56	2.269s
SB-124	6765.58	1690.98	6.	4.	0.002	178.26	2.345s
BI-214	7060.00	1764.49	10.	8.	0.005	64.04	2.403s
Co-56	7087.48	1771.35	8.	0.	0.000	1000.00	2.408s
Y-88	7346.69	1836.06	0.	0.	0.000	1000.00	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	3.2260E+00					5.31E+01	
			477.60	3.226E+00	?(	1.174E+01	1.07E+02	1.05E+01 G
NA-22	C	-1.6390E-01					9.50E+02	
			1274.53	-1.639E-01	?(	1.292E+00	2.14E+02	9.99E+01 G
K-40	N	7.4672E+01					4.66E+11	
			1460.83	7.467E+01	(	5.395E+00	9.90E+00	1.07E+01 G
Sc-46	F	-1.1024E-01					8.38E+01	
			889.28	-1.102E-01	?(	2.911E+00	7.64E+02	1.00E+02 G
			1120.55	0.000E+00	+	2.434E+00	1.00E+03	1.00E+02 G
CR-51	F	-3.2831E+00					2.77E+01	
			320.08	-3.283E+00	?(	2.155E+01	1.95E+02	9.94E+00 G
MN-54	C	1.0282E-01					3.12E+02	
			834.85	1.028E-01	?(	1.036E+00	4.03E+02	1.00E+02 G
FE-59	F	6.5237E-01					4.45E+01	
			1099.25	4.817E-01	?(	1.993E+00	1.78E+02	5.65E+01 G
			1291.60	8.756E-01	?(	2.266E+00	1.13E+02	4.32E+01 G
Co-56	C	5.6536E-01					7.73E+01	
			846.77	4.677E-01	&(	1.079E+00	1.00E+02	9.99E+01 G
			1238.28	7.131E-01	&(	1.435E+00	8.99E+01	6.61E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1037.84	0.000E+00	-	9.096E+00	1.00E+03	1.41E+01 G
			1771.35	0.000E+00	-	9.596E+00	1.00E+03	1.55E+01 A
CO-57	C	2.8105E-01						2.72E+02
			122.06	2.811E-01	*(	9.269E-01	9.82E+01	8.56E+01 G
			136.47	-2.877E+00	+	1.535E+01	1.59E+02	1.07E+01 G
CO-58	C	-6.2677E-01						7.09E+01
			810.78	-6.268E-01	?(	1.791E+00	8.50E+01	9.95E+01 G
CO-60	F	9.9650E-02						1.93E+03
			1332.50	-4.602E-01	?(	1.337E+00	1.31E+02	1.00E+02 G
			1173.24	6.600E-01	?(	4.864E-01	3.16E+01	9.99E+01 G
NB-94	I	6.9454E-02						7.41E+06
			702.63	-1.700E-01	(	1.360E+00	3.35E+02	9.79E+01 G
			871.10	3.041E-01	?(	7.495E-01	7.35E+01	9.99E+01 G
ZR-95	I	5.6958E-01						6.40E+01
			756.73	2.931E-02	%(	2.008E+00	2.75E+03	5.45E+01 G
			724.20	1.236E+00	?(	3.843E+00	9.21E+01	4.42E+01 G
NB-95	I	-6.2917E-01						6.40E+01
			765.79	-6.292E-01	?(	1.694E+00	8.03E+01	9.98E+01 G
RU-103	I	3.0239E-01						3.93E+01
			497.05	3.024E-01	?(	7.292E-01	9.38E+01	9.09E+01 G
			610.30	4.615E+00	?	5.143E+01	3.28E+02	5.75E+00 GA
RH-106	I	-5.3997E-01						3.74E+02
			621.92	-3.275E+00	?(	1.263E+01	1.58E+02	9.93E+00 G
			1050.36	1.687E+01	?(	1.238E+02	2.09E+02	1.56E+00 G
			511.86	8.986E+00		6.974E+00	2.61E+01	2.00E+01 GA
AG-108M	C	-3.5068E-01						1.53E+05
			433.94	-3.507E-01	?(	1.129E+00	1.28E+02	9.05E+01 G
			722.94	-1.937E-01	+	2.176E+00	3.23E+02	9.08E+01 G
			614.28	0.000E+00	+	3.353E+00	1.00E+03	8.98E+01 G
AG-110M	F	-1.1267E+00						2.50E+02
			884.68	-1.127E+00	?(	3.705E+00	9.78E+01	7.27E+01 G
			657.76	-6.522E-01	+	1.579E+00	7.27E+01	9.46E+01 G
			937.49	-1.464E+00	+	4.231E+00	1.27E+02	3.44E+01 G
			1384.30	-2.157E+00	+	6.756E+00	1.43E+02	2.43E+01 G
			763.94	2.885E-01	&	4.943E+00	4.66E+02	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	5.2534E-01					1.15E+02	
			391.69	5.253E-01	?(	2.111E+00	1.19E+02	6.40E+01 G
SB-124	F	-1.3625E-01					6.02E+01	
			602.73	-5.315E-01	?(	3.246E+00	1.81E+02	9.83E+01 G
			1690.98	6.763E-01	?(	2.663E+00	1.78E+02	4.78E+01 G
			722.79	-6.371E+00	+	1.646E+01	7.73E+01	1.08E+01 G
SB-125	I	1.2405E+00					1.01E+03	
			427.88	6.363E-01	?(	2.708E+00	1.65E+02	2.96E+01 G
			600.50	2.242E+00	&(	1.628E+01	2.14E+02	1.79E+01 G
			635.89	2.487E-01	-	8.250E+00	8.92E+02	1.13E+01 G
			463.37	-1.380E+00	+	1.249E+01	2.60E+02	1.05E+01 G
I-131	I	3.3851E-01					8.02E+00	
			364.48	3.385E-01	?(	8.681E-01	1.01E+02	8.17E+01 G
			284.30	-1.997E+00	+	1.352E+01	2.55E+02	6.14E+00 G
			636.97	0.000E+00	&	4.343E+00	1.00E+03	7.17E+00 G
Gd-153	F	-1.0705E+00					2.42E+02	
			97.50	-1.070E+00	?(	4.992E+00	1.39E+02	3.00E+01 G
			103.20	-1.468E+00	+	7.126E+00	1.45E+02	2.18E+01 G
Ga-68	C	1.0305E+01					4.71E-02	
			1077.40	1.031E+01	?(	2.975E+01	1.22E+02	3.30E+00 G
Tc-99m	I	-3.5926E-01					2.51E-01	
			140.51	-3.593E-01	?(	1.946E+00	1.62E+02	8.93E+01 G
BA-133	F	-1.1720E-01					3.85E+03	
			356.00	-1.172E-01	&(	2.984E+00	7.44E+02	6.20E+01 G
			302.85	0.000E+00	+	1.087E+01	1.00E+03	1.83E+01 G
			383.84	-4.814E+00	+	1.746E+01	1.08E+02	8.94E+00 GA
			80.99	7.975E-01	&	5.540E+00	2.07E+02	3.41E+01 GA
CS-134	I	1.3553E-01					7.54E+02	
			795.87	-4.935E-01	?(	1.921E+00	1.14E+02	8.55E+01 G
			604.71	-5.370E-01	+	3.167E+00	1.75E+02	9.76E+01 G
			569.32	3.373E+00	?(	4.156E+00	4.15E+01	1.54E+01 G
			801.95	-6.991E+00	+	2.192E+01	9.29E+01	8.69E+00 G
			563.24	6.163E-01	&(	1.128E+01	7.18E+02	8.35E+00 G
CS-137	I	-1.3919E-01					1.10E+04	
			661.66	-1.392E-01	?(	2.028E+00	4.16E+02	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	1.5548E-01					1.38E+02	
			165.85	1.555E-01	?(	1.204E+00	2.27E+02	7.99E+01 G
Ba-140	I	1.8335E+00					1.28E+01	
			537.26	1.230E+00	?(	2.981E+00	9.80E+01	2.44E+01 G
			162.66	4.200E+00	?(	1.533E+01	1.09E+02	6.22E+00 G
			304.85	0.000E+00	-	4.666E+01	1.00E+03	4.29E+00 G
La-140	I	-6.4056E-01					1.28E+01	
			1596.21	-1.144E+00	?(	1.979E+00	8.36E+01	9.54E+01 G
			487.02	-1.019E+00	+	2.460E+00	9.69E+01	4.55E+01 G
			328.76	1.727E+00	?(	5.805E+00	9.97E+01	2.03E+01 G
			815.77	-1.472E+00	+	8.528E+00	1.68E+02	2.33E+01 G
CE-141	I	-6.7239E-01					3.25E+01	
			145.44	-6.724E-01	?(	3.701E+00	1.65E+02	4.82E+01 G
CE-144	I	-2.7481E+00					2.85E+02	
			133.54	-2.748E+00	&(	1.487E+01	1.62E+02	1.11E+01 G
PM-144	C	1.9738E-01					3.63E+02	
			696.54	1.974E-01	?(	1.040E+00	2.17E+02	9.90E+01 G
			618.06	6.951E-03	%	3.001E+00	1.26E+04	9.91E+01 G
EU-152	F	1.0993E+00					4.94E+03	
			121.78	-4.697E-01	?(	3.217E+00	2.02E+02	2.86E+01 G
			344.29	-7.761E-01	+	5.895E+00	2.23E+02	2.65E+01 G
			1112.07	2.858E+00	?(	1.684E+01	1.70E+02	1.36E+01 G
			778.92	-4.534E+00	+	1.034E+01	9.79E+01	1.29E+01 G
			964.11	-5.794E+00	+	1.541E+01	7.95E+01	1.46E+01 G
			244.69	3.849E+00	?(	2.544E+01	1.97E+02	7.58E+00 G
			1408.00	0.000E+00	-	5.101E+00	1.00E+03	2.10E+01 GA
EU-154	I	6.4976E-01					3.14E+03	
			123.10	5.028E-02	&(	1.965E+00	1.13E+03	4.08E+01 G
			1274.54	0.000E+00	-	3.977E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	1.001E+01	1.00E+03	2.02E+01 G
			873.23	-4.644E+00	+	1.253E+01	8.03E+01	1.23E+01 G
			1004.77	2.007E+00	?(	1.025E+01	1.47E+02	1.80E+01 G
			996.33	-7.549E+00	+	1.981E+01	7.84E+01	1.06E+01 G
EU-155	I	-1.5266E+00					1.81E+03	
			105.31	-1.527E+00	?(	7.524E+00	1.47E+02	2.12E+01 G
			86.54	3.728E-01	+	5.189E+00	4.13E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	4.1938E-01					4.24E+01	
			482.00	1.651E-02	&(	1.677E+00	2.87E+03	8.05E+01 G
			133.02	5.348E-01	*(	2.967E+00	1.65E+02	4.33E+01 G
			345.83	2.240E+00	?(	9.645E+00	1.27E+02	1.51E+01 G
			136.30	-5.250E+00	+	2.779E+01	1.58E+02	5.85E+00 G
Ta-182	F	1.8866E+00					1.14E+02	
			1121.30	1.681E+00	?(	6.456E+00	1.13E+02	3.49E+01 G
			1221.41	-8.390E-02	%	4.631E+00	2.37E+03	2.70E+01 G
			1189.05	2.330E+00	?(	5.538E+00	1.02E+02	1.62E+01 G
Hg-203	F	-1.9624E-01					4.66E+01	
			279.20	-1.962E-01	?(	1.258E+00	1.87E+02	8.15E+01 G
TL-208	N	3.5070E+00					6.98E+02	
			583.02	3.420E+00	@(	7.446E-01	1.46E+01	8.45E+01 G
			277.28	4.666E+00	(	1.275E+01	8.15E+01	6.31E+00 G
			860.56	1.142E+01	+	3.118E+00	1.92E+01	1.24E+01 G
PM-146	C	4.7993E-01					2.02E+03	
			453.88	5.051E-02	&(	1.189E+00	8.81E+02	6.50E+01 G
			747.16	7.445E-01	?(	1.783E+00	9.62E+01	3.40E+01 G
			735.72	1.321E+00	?(	4.763E+00	1.50E+02	2.25E+01 G
Cd-113m		-4.7126E+03					5.33E+03	
			263.70	-4.713E+03	?(	1.727E+04	1.09E+02	6.00E-03 K
Cd-109	F	7.6250E+00					4.53E+02	
			88.04	7.625E+00	?(	3.966E+01	1.55E+02	3.79E+00 G
Cf-251	T	-1.8208E+00					3.28E+05	
			176.60	-1.821E+00	?(	5.023E+00	1.07E+02	1.70E+01 G
			227.00	1.822E+00	?	9.608E+00	1.97E+02	6.30E+00 GA
Cf-249	T	5.4890E-01					1.28E+05	
			387.95	5.489E-01	?(	2.053E+00	1.11E+02	6.60E+01 G
			333.44	-2.730E+00	+	9.429E+00	1.03E+02	1.55E+01 G
Sn-126		-4.0977E+00					3.65E+07	
			87.57	0.000E+00	+	4.263E+00	1.00E+03	3.75E+01 GA
			64.28	-4.098E+00	(	1.824E+01	1.33E+02	9.70E+00 G
			86.94	0.000E+00	+	1.773E+01	1.00E+03	9.04E+00 GA
PB-210	N	2.9256E+01					8.14E+03	
			46.54	2.926E+01	(P	3.408E+01	4.49E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	9.0302E+00					6.98E+02	
			238.63	9.030E+00	(P	1.904E+00	9.38E+00	4.33E+01 G
			300.03	1.630E+01	+	1.667E+01	4.27E+01	3.28E+00 GA
PB-214	N	1.0361E+01					5.84E+05	
			351.93	1.036E+01	*(P	1.797E+00	1.03E+01	3.76E+01 G
			295.09	8.363E+00	- P	3.547E+00	2.01E+01	1.93E+01 G
			242.00	5.361E+00	-	1.064E+01	6.04E+01	7.43E+00 GA
BI-207	C	5.2097E-01					1.18E+04	
			1063.66	5.210E-01	?(	1.108E+00	9.19E+01	7.45E+01 G
			569.70	1.991E-02	%	1.008E+00	1.38E+03	9.77E+01 G
BI-212	N	-8.2762E+00					6.98E+02	
			727.17	-8.276E+00	?(	2.539E+01	9.12E+01	7.55E+00 G
			785.42	1.537E+01	?	7.742E+01	2.05E+02	1.28E+00 GA
U-235	N	-2.8671E+00					2.57E+11	
			143.79	-2.867E+00	?(	1.576E+01	1.64E+02	1.10E+01 G
			205.33	-1.220E-01	%	1.560E+01	4.81E+03	5.01E+00 G
			163.38	-5.986E+00	&	1.941E+01	9.68E+01	5.08E+00 G
			185.72	-1.084E+00	+ P	2.268E+00	5.61E+01	5.40E+01 GA
BI-214	N	9.3488E+00					5.84E+05	
			609.31	9.662E+00	(	2.391E+00	1.17E+01	4.61E+01 G
			1120.29	8.393E+00	(	1.176E+01	4.44E+01	1.51E+01 G
			1764.49	4.968E+00	-	1.043E+01	6.40E+01	1.54E+01 G
BI-210M	T	2.1879E-01					1.10E+09	
			265.83	2.188E-01	(	2.137E+00	2.84E+02	5.00E+01 G
			304.90	0.000E+00	-	7.149E+00	1.00E+03	2.80E+01 G
AC-228	N	1.1674E+01					2.10E+03	
			911.07	1.123E+01	(	2.158E+00	1.46E+01	2.90E+01 G
			968.97	6.467E+00	-	9.420E+00	4.59E+01	1.75E+01 G
			338.32	1.274E+01	(	5.847E+00	2.26E+01	1.20E+01 G
			93.35	-5.806E+00	-	2.929E+01	1.51E+02	5.56E+00 XA
TH-227	N	1.0970E+00					7.95E+03	
			256.24	-1.217E+00	(	1.023E+01	3.14E+02	7.00E+00 G
			235.97	2.441E+00	?(	1.547E+01	1.89E+02	1.23E+01 G
			50.14	1.055E+00	*(	2.360E+01	6.56E+02	8.00E+00 G
TH-229	N	7.2245E+00					2.68E+06	
			193.51	5.495E+00	?(	1.713E+01	1.20E+02	4.40E+00 G
			210.85	9.770E+00	?(	2.838E+01	1.13E+02	2.99E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-234   N   1.4401E+01                                      1.63E+12
                          92.59 1.075E+01  (P 1.576E+01 4.55E+01 5.58E+00 G
                          63.29 1.976E+01  (P 2.144E+01 3.95E+01 3.81E+00 G

PA-234   N   8.9169E-01                                      1.63E+12
                         131.29 8.917E-01 ?(  5.010E+00 1.66E+02 1.80E+01 G
                         946.02-1.260E+00 +   7.326E+00 2.39E+02 1.34E+01 G
                         569.47-1.819E+00 +   1.274E+01 1.98E+02 8.20E+00 G
                         883.24-8.513E+00 +   2.599E+01 9.09E+01 9.60E+00 G
                         880.53-1.357E+01 +   3.798E+01 8.36E+01 6.00E+00 GA

PA-234M  N  -1.9581E+01                                      1.63E+12
                        1001.00-9.614E+01 ?(  2.812E+02 8.71E+01 8.37E-01 G
                         766.41 1.984E+02 ?(  5.488E+02 8.23E+01 2.94E-01 G

AM-241   T   4.1200E-01                                      1.58E+05
                          59.54 4.120E-01 &(  4.233E+00 3.03E+02 3.59E+01 G

Np-237   F   2.1051E+00                                      2.14E+06
                          86.49 2.105E+00 &(  1.221E+01 1.73E+02 1.31E+01 G

Ir-192   F   2.3910E-01                                      7.40E+01
                         316.49 0.000E+00 ?(  2.366E+00 1.00E+03 8.70E+01 G
                         468.06 6.412E-01  (  2.094E+00 9.62E+01 5.18E+01 G
                         308.44 0.000E+00 -   6.360E+00 1.00E+03 3.18E+01 G

Np-239   T  -1.3016E+00                                      2.36E+00
                         103.70-1.334E+00 +   6.612E+00 1.48E+02 2.40E+01 X
                         106.13-1.302E+00  (  7.282E+00 1.67E+02 2.27E+01 G
                          99.50-2.137E+00 &   1.018E+01 1.42E+02 1.50E+01 X

Nd-147       6.6476E-01                                      1.11E+01
                         531.00-9.473E-02 %(  8.064E+00 3.38E+03 1.30E+01 G
                          91.10 1.014E+00 ?(  5.370E+00 1.58E+02 2.83E+01 G

TL-210   N   1.8462E-01                                      5.84E+05
                         799.60 1.846E-01 ?(  1.699E+00 2.62E+02 9.90E+01 G
                         296.00-3.634E-01 +   2.537E+00 2.07E+02 7.90E+01 G
                        1313.00 1.824E+00 ?   4.721E+00 1.13E+02 2.10E+01 GA

Kr-85    I   8.5688E+01                                      3.92E+03
                         513.98 8.569E+01 &(  3.830E+02 1.31E+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
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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:
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	238.	3.	0.002	656.35	1.055E+00
AM-241	59.54	254.	8.	0.004	303.02	4.120E-01
Sn-126	64.28	401.	-22.	-0.012	133.03	-4.098E+00
BA-133	80.99	609.	17.	0.009	207.39	7.975E-01
EU-155	86.54	455.	7.	0.004	412.86	3.728E-01
Nd-147	91.10	427.	19.	0.010	158.07	1.014E+00
Gd-153	97.50	429.	-21.	-0.012	139.35	-1.070E+00
Np-239	99.50	451.	-21.	-0.012	142.40	-2.137E+00
Gd-153	103.20	472.	-21.	-0.012	145.05	-1.468E+00
Np-239	103.70	493.	-21.	-0.012	148.15	-1.334E+00
EU-155	105.31	501.	-22.	-0.012	147.35	-1.527E+00
Np-239	106.13	539.	-20.	-0.011	167.16	-1.302E+00
EU-152	121.78	160.	-9.	-0.005	201.54	-4.697E-01
CO-57	122.06	117.	16.	0.009	98.20	2.811E-01
PA-234	131.29	150.	11.	0.006	165.64	8.917E-01
HF-181	133.02	311.	15.	0.009	164.97	5.348E-01
CE-144	133.54	520.	-20.	-0.011	161.72	-2.748E+00
HF-181	136.30	500.	-20.	-0.011	158.16	-5.250E+00
CO-57	136.47	508.	-20.	-0.011	159.48	-2.877E+00
Tc-99m	140.51	529.	-20.	-0.011	161.86	-3.593E-01
U-235	143.79	549.	-20.	-0.011	164.27	-2.867E+00

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CE-141	145.44	582.	-21.	-0.012	164.55	-6.724E-01	
Ba-140	162.66	146.	16.	0.009	108.57	4.200E+00	
U-235	163.38	156.	-19.	-0.010	96.81	-5.986E+00	
CE-139	165.85	146.	8.	0.004	227.03	1.555E-01	
Cf-251	176.60	106.	-18.	-0.010	107.40	-1.821E+00	
U-235	185.72	214.	-34.	-0.019	56.10	-1.084E+00	P
TH-229	193.51	73.	14.	0.008	120.31	5.495E+00	
TH-229	210.85	84.	16.	0.009	112.53	9.770E+00	
Cf-251	227.00	37.	6.	0.003	197.48	1.822E+00	
TH-227	235.97	390.	15.	0.008	188.63	2.441E+00	
EU-152	244.69	380.	14.	0.008	196.58	3.849E+00	
TH-227	256.24	44.	-4.	-0.002	314.25	-1.217E+00	
Cd-113m	263.70	93.	-13.	-0.007	108.51	-4.713E+03	
BI-210M	265.83	98.	5.	0.003	283.55	2.188E-01	
Hg-203	279.20	83.	-7.	-0.004	186.72	-1.962E-01	
I-131	284.30	51.	-5.	-0.003	255.03	-1.997E+00	
TL-210	296.00	309.	-12.	-0.007	207.09	-3.634E-01	
PA-231	300.07	297.	-3.	-0.001	956.45	-2.483E+00	
CR-51	320.08	313.	-13.	-0.007	194.85	-3.283E+00	
La-140	328.76	86.	14.	0.008	99.74	1.727E+00	
Cf-249	333.44	133.	-16.	-0.009	102.79	-2.730E+00	
Cs-136	340.57	171.	-15.	-0.009	122.47	-8.673E-01	
EU-152	344.29	145.	-8.	-0.004	222.82	-7.761E-01	
HF-181	345.83	124.	13.	0.007	127.33	2.240E+00	
BA-133	356.00	196.	-3.	-0.001	744.35	-1.172E-01	
I-131	364.48	24.	10.	0.006	101.39	3.385E-01	
BA-133	383.84	121.	-15.	-0.008	107.74	-4.814E+00	
Cf-249	387.95	88.	12.	0.007	110.60	5.489E-01	
SN-113	391.69	86.	11.	0.006	118.50	5.253E-01	
SB-125	427.88	24.	6.	0.003	164.99	6.363E-01	
AG-108M	433.94	40.	-10.	-0.006	127.80	-3.507E-01	
PM-146	453.88	20.	1.	0.001	881.29	5.051E-02	
SB-125	463.37	61.	-4.	-0.002	260.06	-1.380E+00	
Ir-192	468.06	40.	10.	0.005	96.18	6.412E-01	
BE-7	477.60	52.	10.	0.006	107.01	3.226E+00	
La-140	487.02	40.	-13.	-0.007	96.88	-1.019E+00	
RH-106	511.86	60.	50.	0.028	26.08	8.986E+00	
Kr-85	513.98	85.	10.	0.006	131.36	8.569E+01	
Ba-140	537.26	13.	8.	0.004	97.98	1.230E+00	
PA-234	569.47	27.	-4.	-0.002	197.81	-1.819E+00	
SB-125	600.50	220.	10.	0.005	214.41	2.242E+00	
SB-124	602.73	265.	-13.	-0.007	181.14	-5.315E-01	
RH-106	621.92	35.	-8.	-0.004	157.89	-3.275E+00	
SB-125	635.89	17.	1.	0.000	891.63	2.487E-01	
AG-110M	657.76	47.	-14.	-0.008	72.69	-6.522E-01	
CS-137	661.66	63.	-3.	-0.002	416.43	-1.392E-01	
PM-144	696.54	19.	4.	0.002	216.89	1.974E-01	
NB-94	702.63	33.	-4.	-0.002	334.76	-1.700E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-124	722.79	59.	-15.	-0.008	77.34	-6.371E+00	
AG-108M	722.94	74.	-4.	-0.002	323.31	-1.937E-01	
ZR-95	724.20	53.	12.	0.007	92.11	1.236E+00	
BI-212	727.17	68.	-13.	-0.007	91.16	-8.276E+00	
PM-146	735.72	19.	6.	0.004	150.07	1.321E+00	
PM-146	747.16	5.	5.	0.003	96.18	7.445E-01	
AG-110M	763.94	19.	1.	0.001	466.37	2.885E-01	
NB-95	765.79	48.	-13.	-0.007	80.31	-6.292E-01	
PA-234M	766.41	43.	12.	0.007	82.33	1.984E+02	
EU-152	778.92	28.	-12.	-0.007	97.89	-4.534E+00	
BI-212	785.42	14.	4.	0.002	204.63	1.537E+01	
TL-210	799.60	44.	4.	0.002	262.06	1.846E-01	
CO-58	810.78	49.	-12.	-0.007	84.95	-6.268E-01	
La-140	815.77	62.	-7.	-0.004	168.09	-1.472E+00	
MN-54	834.85	14.	2.	0.001	403.11	1.028E-01	
Co-56	846.77	15.	9.	0.005	100.31	4.677E-01	
NB-94	871.10	6.	6.	0.003	73.48	3.041E-01	
EU-154	873.23	32.	-11.	-0.006	80.27	-4.644E+00	
PA-234	880.53	74.	-15.	-0.008	83.57	-1.357E+01	
PA-234	883.24	89.	-15.	-0.008	90.95	-8.513E+00	
AG-110M	884.68	104.	-15.	-0.008	97.81	-1.127E+00	
Sc-46	889.28	122.	-2.	-0.001	764.46	-1.102E-01	
Y-88	898.04	20.	-3.	-0.002	332.78	-1.735E-01	
AG-110M	937.49	25.	-9.	-0.005	126.60	-1.464E+00	
PA-234	946.02	10.	-3.	-0.002	238.82	-1.260E+00	
EU-152	964.11	62.	-15.	-0.008	79.53	-5.794E+00	
EU-154	996.33	51.	-14.	-0.008	78.43	-7.549E+00	
PA-234M	1001.00	65.	-14.	-0.008	87.06	-9.614E+01	
EU-154	1004.77	38.	6.	0.003	147.24	2.007E+00	
Cs-136	1048.07	32.	-12.	-0.006	74.23	-8.843E-01	
RH-106	1050.36	39.	4.	0.002	209.39	1.687E+01	
BI-207	1063.66	5.	6.	0.004	91.94	5.210E-01	
Ga-68	1077.40	5.	5.	0.003	121.64	1.031E+01	
FE-59	1099.25	11.	4.	0.002	177.92	4.817E-01	
EU-152	1112.07	52.	6.	0.003	170.23	2.858E+00	
CO-60	1173.24	0.	10.	0.006	31.62	6.600E-01	
Co-56	1238.28	6.	7.	0.004	89.88	7.131E-01	
NA-22	1274.53	11.	-2.	-0.001	214.29	-1.639E-01	
FE-59	1291.60	6.	5.	0.003	113.28	8.756E-01	
TL-210	1313.00	6.	5.	0.003	113.28	1.824E+00	
CO-60	1332.50	11.	-6.	-0.004	130.84	-4.602E-01	
AG-110M	1384.30	17.	-7.	-0.004	143.21	-2.157E+00	
La-140	1596.21	18.	-13.	-0.007	83.56	-1.144E+00	
SB-124	1690.98	6.	4.	0.002	178.26	6.763E-01	

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	3.2259E+00	3.2260E+00	1.070E+02%	1.17E+01
NA-22	#A	-1.6390E-01	-1.6390E-01	2.143E+02%	1.29E+00
K-40		7.4672E+01	7.4672E+01	9.901E+00%	5.40E+00
Sc-46	#A	-1.1024E-01	-1.1024E-01	7.645E+02%	2.91E+00
CR-51	#A	-3.2830E+00	-3.2831E+00	1.948E+02%	2.15E+01
MN-54	#A	1.0282E-01	1.0282E-01	4.031E+02%	1.04E+00
FE-59	#A	6.5236E-01	6.5237E-01	1.055E+02%	1.99E+00
Co-56	#A	5.6535E-01	5.6536E-01	6.734E+01%	1.08E+00
CO-57	#A	2.8105E-01	2.8105E-01	9.820E+01%	9.27E-01
CO-58	#A	-6.2677E-01	-6.2677E-01	8.495E+01%	1.79E+00
CO-60	#A	9.9650E-02	9.9650E-02	3.162E+01%	1.34E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.79E+00
NB-94	#A	6.9454E-02	6.9454E-02	7.348E+01%	1.36E+00
ZR-95	#A	5.6957E-01	5.6958E-01	9.211E+01%	2.01E+00
NB-95	#A	-6.2916E-01	-6.2917E-01	8.031E+01%	1.69E+00
RU-103	#A	3.0239E-01	3.0239E-01	9.384E+01%	7.29E-01
RH-106	#A	-5.3997E-01	-5.3997E-01	1.311E+02%	1.26E+01
AG-108M	#A	-3.5068E-01	-3.5068E-01	1.278E+02%	1.13E+00
AG-110M	#A	-1.1267E+00	-1.1267E+00	9.781E+01%	3.70E+00
SN-113	#A	5.2534E-01	5.2534E-01	1.185E+02%	2.11E+00
SB-124	#A	-1.3625E-01	-1.3625E-01	1.271E+02%	3.25E+00
SB-125	#A	1.2405E+00	1.2405E+00	1.353E+02%	2.71E+00
I-131	#A	3.3848E-01	3.3851E-01	1.014E+02%	8.68E-01
Gd-153	#A	-1.0705E+00	-1.0705E+00	1.393E+02%	4.99E+00
Ga-68	#A	1.0162E+01	1.0305E+01	1.216E+02%	2.97E+01
Tc-99m	#A	-3.5832E-01	-3.5926E-01	1.619E+02%	1.95E+00
BA-133	#A	-1.1720E-01	-1.1720E-01	7.444E+02%	2.98E+00
CS-134	#A	1.3553E-01	1.3553E-01	4.153E+01%	1.92E+00
CS-137	#A	-1.3919E-01	-1.3919E-01	4.164E+02%	2.03E+00
CE-139	#A	1.5548E-01	1.5548E-01	2.270E+02%	1.20E+00
Ba-140	#A	1.8334E+00	1.8335E+00	7.312E+01%	2.98E+00
La-140	#A	-6.4053E-01	-6.4056E-01	6.506E+01%	1.98E+00
CE-141	#A	-6.7238E-01	-6.7239E-01	1.646E+02%	3.70E+00
CE-144	#A	-2.7481E+00	-2.7481E+00	1.617E+02%	1.49E+01
PM-144	#A	1.9738E-01	1.9738E-01	2.169E+02%	1.04E+00
EU-152	#A	1.0993E+00	1.0993E+00	1.097E+02%	3.22E+00
EU-154	#A	6.4976E-01	6.4976E-01	1.472E+02%	1.97E+00
EU-155	#A	-1.5266E+00	-1.5266E+00	1.474E+02%	7.52E+00
HF-181	#A	4.1938E-01	4.1938E-01	1.273E+02%	1.68E+00
Ta-182	#A	1.8865E+00	1.8866E+00	7.585E+01%	6.46E+00
Hg-203	#A	-1.9624E-01	-1.9624E-01	1.867E+02%	1.26E+00
TL-208		3.5070E+00	3.5070E+00	1.456E+01%	7.45E-01
PM-146	#A	4.7993E-01	4.7993E-01	9.618E+01%	1.19E+00

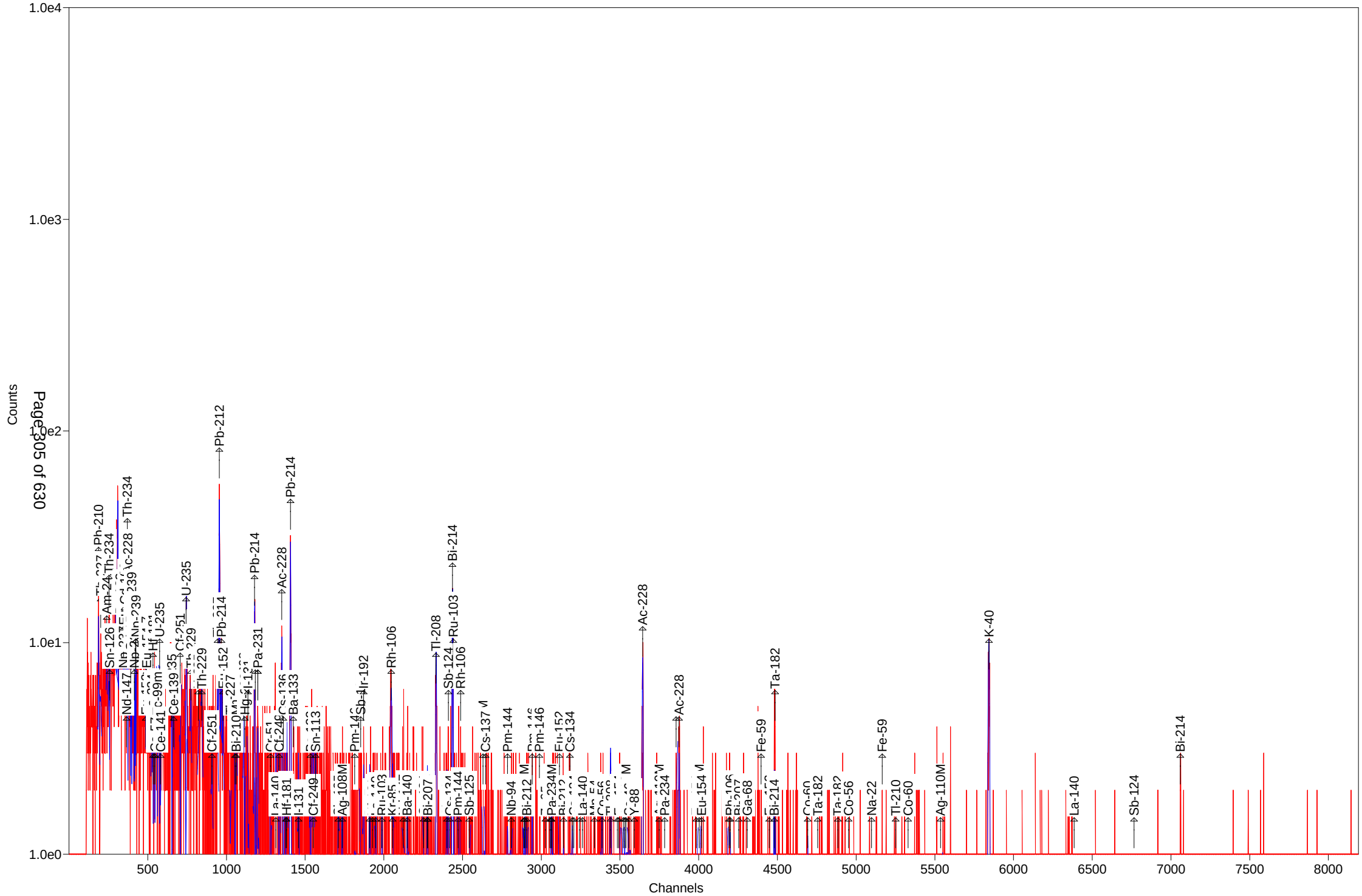
Y-88 #A	0.0000E+00	0.0000E+00	1.000E+03%		7.04E-01
Cd-113m#A	-4.7126E+03	-4.7126E+03	1.085E+02%		1.73E+04
Cd-109 #A	7.6250E+00	7.6250E+00	1.552E+02%		3.97E+01
Cf-251 #A	-1.8208E+00	-1.8208E+00	1.074E+02%		5.02E+00
Cf-249 #A	5.4890E-01	5.4890E-01	1.106E+02%		2.05E+00
Sn-126 #A	-4.0977E+00	-4.0977E+00	1.330E+02%		1.82E+01
PB-210 #A	2.9256E+01	2.9256E+01	4.486E+01%		3.41E+01
PB-212	9.0302E+00	9.0302E+00	9.381E+00%		1.90E+00
PB-214 #	1.0361E+01	1.0361E+01	1.035E+01%		1.80E+00
BI-207 #A	5.2097E-01	5.2097E-01	9.194E+01%		1.11E+00
BI-212 #A	-8.2762E+00	-8.2762E+00	9.116E+01%		2.54E+01
U-235 #A	-2.8671E+00	-2.8671E+00	1.643E+02%		1.58E+01
BI-214	9.3488E+00	9.3488E+00	1.172E+01%		2.39E+00
BI-210M#A	2.1879E-01	2.1879E-01	2.835E+02%		2.14E+00
AC-228	1.1674E+01	1.1674E+01	1.345E+01%		2.16E+00
TH-227 #A	1.0970E+00	1.0970E+00	1.886E+02%		1.02E+01
TH-229 #A	7.2245E+00	7.2245E+00	8.237E+01%		1.71E+01
TH-234 A	1.4401E+01	1.4401E+01	3.015E+01%		1.58E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%		6.91E+01
PA-233 #A	0.0000E+00	0.0000E+00	7.071E+02%		5.66E+00
PA-234 #A	8.9169E-01	8.9169E-01	1.656E+02%		5.01E+00
PA-234M#A	-1.9581E+01	-1.9581E+01	5.991E+01%		2.81E+02
AM-241 #A	4.1200E-01	4.1200E-01	3.030E+02%		4.23E+00
Np-237 #A	2.1051E+00	2.1051E+00	1.730E+02%		1.22E+01
Ir-192 #A	2.3910E-01	2.3910E-01	9.618E+01%		2.37E+00
Cs-136 #A	0.0000E+00	0.0000E+00	1.000E+03%		2.09E+00
Np-239 #A	-1.3012E+00	-1.3016E+00	1.672E+02%		7.28E+00
Nd-147 #A	6.6472E-01	6.6476E-01	1.581E+02%		8.06E+00
TL-210 #A	1.8462E-01	1.8462E-01	2.621E+02%		1.70E+00
Kr-85 #A	8.5688E+01	8.5688E+01	1.314E+02%		3.83E+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) 1.623E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 1.6225122E+02 Bq/Sample

405451_Gamma_490-164491-A-8-B DU. 12_Gamma_20190009.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20190008

Sample Description: 405451_Gamma_490-164491-A-9-B
Detector: Detector #12
Batch ID: 405451
Work Order Number: Gamma
Lot Number: 490-164491-A-9-B

Decay to Time: 1/2/2019 14:12 Live Time: 1800 sec
Acquisition Time: 1/2/2019 14:12:23 Real Time: 1801 sec
Analysis Time: 1/2/2019 14:42 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_2018-12-22_1532.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	2.885E+00	101.9	2.941E+00	2.945E+00	1.003E+01
NA-22	2.341E-01	114.9	2.690E-01	2.693E-01	9.696E-01
K-40	9.297E+01	8.9	8.250E+00	9.493E+00	5.395E+00
Sc-46	3.021E-01	85.3	2.577E-01	2.581E-01	1.512E+00
CR-51	3.283E+00	189.7	6.226E+00	6.229E+00	2.098E+01
MN-54	8.397E-01	37.4	3.141E-01	3.170E-01	6.569E-01
FE-59	8.746E-01	28.9	2.525E-01	2.562E-01	1.993E+00
Co-56	9.312E-01	26.7	2.489E-01	2.534E-01	9.066E-01
CO-57	0.000E+00	1.#INF	2.427E-01	2.427E-01	1.045E+00
CO-58	1.265E-01	308.5	3.903E-01	3.904E-01	1.396E+00
CO-60	-7.751E-01	109.1	8.453E-01	8.462E-01	1.809E+00
ZN-65	0.000E+00	1.#INF	5.324E-01	5.324E-01	4.084E+00
NB-94	-7.609E-01	91.7	6.975E-01	6.985E-01	1.601E+00
ZR-95	2.345E-01	250.6	5.876E-01	5.877E-01	1.490E+00
NB-95	3.693E-01	89.8	3.317E-01	3.322E-01	1.131E+00
RU-103	-5.790E-01	90.5	5.242E-01	5.250E-01	1.300E+00
RH-106	-1.710E+00	528.1	9.028E+00	9.029E+00	3.075E+01
AG-108M	3.583E-01	68.5	2.455E-01	2.462E-01	8.258E-01
AG-110M	7.844E-01	70.1	5.498E-01	5.512E-01	1.812E+00
SN-113	-5.720E-01	119.2	6.816E-01	6.822E-01	2.306E+00
SB-124	3.157E-01	82.3	2.598E-01	2.603E-01	3.017E+00
SB-125	-5.463E-02	148.1	8.091E-02	8.095E-02	3.566E+00
I-131	6.280E-01	77.2	4.848E-01	4.859E-01	9.302E-01
Gd-153	-5.531E-01	237.6	1.314E+00	1.315E+00	4.432E+00
Ga-68	1.166E+01	145.8	1.700E+01	1.701E+01	3.920E+01
Tc-99m	-3.633E-01	166.0	6.030E-01	6.033E-01	2.017E+00
BA-133	-2.637E-01	362.1	9.548E-01	9.549E-01	3.245E+00
CS-134	-9.018E-01	79.3	7.147E-01	7.162E-01	2.388E+00
CS-137	1.182E+00	30.8	3.634E-01	3.684E-01	1.021E+00
CE-139	3.585E-01	113.2	4.060E-01	4.065E-01	1.363E+00
Ba-140	2.037E-01	717.9	1.462E+00	1.462E+00	3.728E+00
La-140	4.401E-01	44.7	1.968E-01	1.981E-01	6.487E-01
CE-141	-6.554E-01	163.7	1.073E+00	1.073E+00	3.590E+00

CE-144	-2.784E+00	158.1	4.402E+00	4.404E+00	1.473E+01
PM-144	-2.581E-01	259.2	6.689E-01	6.690E-01	1.573E+00
EU-152	7.485E-01	131.5	9.842E-01	9.850E-01	3.222E+00
EU-154	5.991E-01	130.7	7.827E-01	7.834E-01	1.996E+00
EU-155	0.000E+00	1.#INF	1.043E+00	1.043E+00	6.296E+00
HF-181	3.810E-01	112.1	4.269E-01	4.273E-01	1.458E+00
Ta-182	-2.658E+00	85.9	2.284E+00	2.287E+00	7.661E+00
Hg-203	-4.203E-01	93.5	3.929E-01	3.935E-01	1.320E+00
TL-208	3.350E+00	15.0	5.020E-01	5.301E-01	7.446E-01
PM-146	3.641E-01	93.3	3.397E-01	3.402E-01	1.625E+00
Y-88	-6.365E-02	995.0	6.333E-01	6.333E-01	1.407E+00
Cd-113m	-1.208E+02	3782.9	4.571E+03	4.571E+03	1.603E+04
Cd-109	8.896E+00	151.5	1.348E+01	1.348E+01	4.507E+01
Cf-251	-1.649E-01	1140.0	1.880E+00	1.880E+00	4.940E+00
Cf-249	4.482E-01	116.7	5.229E-01	5.234E-01	1.779E+00
Sn-126	-4.138E+00	130.9	5.418E+00	5.423E+00	1.813E+01
PB-210	4.398E+01	27.0	1.187E+01	1.219E+01	3.163E+01
PB-212	7.294E+00	10.3	7.513E-01	8.422E-01	1.669E+00
PB-214	1.184E+01	8.9	1.056E+00	1.215E+00	1.937E+00
BI-207	5.210E-01	91.9	4.790E-01	4.797E-01	1.108E+00
BI-212	-7.956E+00	91.3	7.262E+00	7.274E+00	2.446E+01
U-235	2.712E+00	162.7	4.414E+00	4.416E+00	1.478E+01
BI-214	1.134E+01	9.3	1.058E+00	1.205E+00	1.350E+00
BI-210M	4.376E-02	1348.5	5.900E-01	5.900E-01	1.584E+00
AC-228	1.096E+01	11.0	1.204E+00	1.326E+00	2.446E+00
TH-227	3.728E+00	101.1	3.769E+00	3.774E+00	9.831E+00
TH-229	-7.623E-01	74.2	5.653E-01	5.667E-01	2.201E+01
TH-234	1.133E+01	39.6	4.485E+00	4.529E+00	1.666E+01
PA-231	0.000E+00	1.#INF	3.550E+00	3.550E+00	7.583E+01
PA-233	-9.959E-01	189.8	1.891E+00	1.891E+00	6.356E+00
PA-234	1.338E+00	121.5	1.625E+00	1.626E+00	5.466E+00
PA-234M	2.306E+01	129.2	2.980E+01	2.983E+01	2.065E+02
AM-241	-1.190E+00	135.5	1.612E+00	1.614E+00	5.394E+00
Np-237	0.000E+00	1.#INF	4.077E+00	4.077E+00	1.365E+01
Ir-192	-4.061E-01	190.9	7.751E-01	7.754E-01	2.607E+00
Cs-136	0.000E+00	1.#INF	5.067E-02	5.067E-02	1.473E+00
Np-239	1.195E+00	138.3	1.653E+00	1.655E+00	5.546E+00
Nd-147	2.273E+00	98.6	2.241E+00	2.244E+00	5.545E+00
TL-210	-9.590E-02	124.4	1.193E-01	1.194E-01	2.281E+00
Kr-85	-5.310E+01	270.3	1.435E+02	1.436E+02	4.905E+02
Total	2.654E+02				

Analyst: Joey Sausto

Sample description
405451_Gamma_490-164491-A-9-B

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20190008.An1

Acquisition information
Start time: 1/2/2019 2:12:23 PM
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	1/2/2019 2:12:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2018-12-22_1532.PBC 12/22/2018 3:32:10 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 24 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1228

***** 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
46.47	61.	26.99	0.86	1.800E-02	46.54	4.250	4.398E+01	PB210
63.33	34.	45.24	0.87	2.978E-02	63.29	3.810	PBC<MDA	TH234
65.29	25.	46.22	0.87	3.051E-02				
74.77	88.	18.98	0.88	3.330E-02				
77.24	131.	13.14	0.88	3.387E-02				
86.90	19.	84.31	0.89	3.566E-02	86.54	30.700	PBC<MDA	EU155
					86.94	9.040	3.338E+00	Sn126
87.53	22.	75.40	0.89	3.575E-02	87.57	37.500	PBC<MDA	Sn126
88.00	22.	151.48	0.89	3.582E-02	88.04	3.790	PBC<MDA	Cd109
91.10	7.	471.98	0.90	3.621E-02	91.10	28.300	PBC<MDA	Nd147
92.63	28.	65.05	0.90	3.637E-02	92.59	5.584	PBC<MDA	TH234
106.13	18.	138.34	0.91	3.729E-02	106.13	22.700	PBC<MDA	Np239
120.96	15.	55.06	0.41	3.727E-02	121.78	28.580	7.654E-01	EU152
123.10	12.	130.66	0.93	3.721E-02	123.10	40.790	PBC<MDA	EU154
131.29	16.	121.48	0.94	3.683E-02	131.29	18.000	PBC<MDA	PA234
143.79	19.	162.75	0.95	3.599E-02	143.79	10.960	PBC<MDA	U235
165.85	18.	113.25	0.97	3.405E-02	165.85	79.900	PBC<MDA	CE139
185.72	54.	35.32	0.99	3.215E-02	185.72	54.000	1.722E+00	U235
210.85	16.	104.30	1.02	2.980E-02	210.85	2.990	PBC<MDA	TH229
238.47	163.	12.28	1.08	2.744E-02	238.63	43.300	7.628E+00	PB212
241.97	36.	28.73	1.05	2.716E-02	242.00	7.430	9.952E+00	PB214
244.66	14.	182.80	1.05	2.695E-02	244.69	7.580	PBC<MDA	EU152
256.24	12.	101.10	1.06	2.608E-02	256.24	7.000	PBC<MDA	TH227
277.28	12.	89.75	1.08	2.462E-02	277.28	6.310	PBC<MDA	TL208
284.30	11.	116.77	1.09	2.416E-02	284.30	6.140	PBC<MDA	I131
295.17	103.	13.90	1.19	2.350E-02	295.09	19.300	1.179E+01	PB214
					296.00	79.000	3.079E+00	TL210

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
299.27	10.	275.29	1.11	2.321E-02	300.03	3.280	PBC<MDA	PB212
320.08	13.	189.65	1.13	2.210E-02	320.08	9.940	PBC<MDA	CR51
337.97	55.	20.49	0.62	2.118E-02	338.32	12.010	1.201E+01	AC228
344.29	12.	131.49	1.15	2.090E-02	344.29	26.500	PBC<MDA	EU152
351.84	165.	9.52	1.30	2.056E-02	351.93	37.600	1.186E+01	PB214
364.48	11.	101.02	1.17	2.001E-02	364.48	81.700	PBC<MDA	I131
383.84	10.	108.30	1.19	1.923E-02	383.84	8.940	PBC<MDA	BA133
387.95	10.	116.68	1.19	1.907E-02	387.95	66.000	PBC<MDA	Cf249
434.14	10.	96.57	1.24	1.751E-02	433.94	90.480	PBC<MDA	AG108M
468.06	2.	812.40	1.27	1.653E-02	468.06	51.750	PBC<MDA	Ir192
477.60	9.	101.93	1.28	1.628E-02	477.60	10.520	PBC<MDA	BE7
482.00	9.	112.06	1.28	1.617E-02	482.00	80.500	PBC<MDA	HF181
511.86	108.	11.74	2.56	1.546E-02	511.86	20.000	1.947E+01	RH106
531.00	8.	98.56	1.33	1.504E-02	531.00	13.000	PBC<MDA	Nd147
537.26	1.	717.85	1.34	1.491E-02	537.26	24.390	PBC<MDA	Ba140
563.24	3.	351.72	1.36	1.439E-02	563.24	8.350	PBC<MDA	CS134
583.29	70.	14.98	1.06	1.403E-02	583.02	84.500	3.280E+00	TL208
600.50	4.	541.14	1.40	1.373E-02	600.50	17.860	PBC<MDA	SB125
609.24	128.	9.33	1.41	1.358E-02	609.31	46.090	1.134E+01	BI214
635.89	2.	338.64	1.43	1.317E-02	635.89	11.310	PBC<MDA	SB125
661.42	23.	30.75	1.45	1.279E-02	661.66	85.210	1.182E+00	CS137
722.79	7.	82.30	1.51	1.199E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.791E-01	AG108M
					723.36	20.220	1.704E+00	EU154
722.94	7.	97.27	1.51	1.199E-02	722.79	10.810	3.186E+00	SB124
					722.94	90.840	3.792E-01	AG108M
					723.36	20.220	1.704E+00	EU154
723.36	2.	369.06	1.51	1.199E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.087E-01	AG108M
					723.36	20.220	4.885E-01	EU154
735.72	5.	96.79	1.52	1.184E-02	735.72	22.500	PBC<MDA	PM146
747.16	8.	93.28	1.53	1.171E-02	747.16	34.000	PBC<MDA	PM146
756.73	3.	250.62	1.54	1.160E-02	756.73	54.460	PBC<MDA	ZR95
763.52	8.	96.14	1.55	1.152E-02	763.94	22.280	PBC<MDA	AG110M
765.79	8.	89.82	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.254E+02	PA234M
766.41	5.	129.23	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	8.872E+01	PA234M
810.78	2.	308.54	1.59	1.104E-02	810.78	99.460	PBC<MDA	CO58
834.85	16.	37.41	1.61	1.081E-02	834.85	99.980	8.397E-01	MN54
846.77	7.	106.27	1.63	1.070E-02	846.77	99.935	PBC<MDA	Co56
860.05	24.	35.44	1.64	1.057E-02	860.56	12.420	1.015E+01	TL208
871.10	3.	208.17	1.65	1.048E-02	871.10	99.890	PBC<MDA	NB94
880.53	1.	754.98	1.66	1.040E-02	880.53	6.000	PBC<MDA	PA234
884.49	7.	102.02	1.66	1.036E-02	884.68	72.680	PBC<MDA	AG110M
911.48	50.	17.65	1.82	1.015E-02	911.07	29.000	9.472E+00	AC228
937.43	1.	857.32	1.71	9.939E-03	937.49	34.360	PBC<MDA	AG110M
963.91	2.	554.28	1.73	9.739E-03	964.11	14.605	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
968.77	39.	18.83	1.74	9.703E-03	968.97	17.460	1.271E+01	AC228
996.33	2.	318.75	1.76	9.508E-03	996.33	10.600	PBC<MDA	EU154
1037.84	14.	26.73	1.80	9.228E-03	1037.84	14.130	5.965E+00	Co56
1063.66	6.	91.94	1.82	9.063E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	5.	145.77	1.83	8.978E-03	1077.40	3.300	PBC<MDA	Ga68
1120.10	9.	86.41	1.87	8.722E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	5.862E-01	Sc46
1120.55	9.	85.30	1.87	8.721E-03	1120.29	15.100	3.881E+00	BI214
					1120.55	99.987	5.862E-01	Sc46
					1121.30	34.900	1.680E+00	Ta182
1173.24	4.	177.92	1.92	8.426E-03	1173.24	99.900	PBC<MDA	CO60
1189.05	5.	145.77	1.93	8.342E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	7.	89.88	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
1291.60	12.	28.87	2.02	7.834E-03	1291.60	43.200	1.970E+00	FE59
1407.66	8.	35.36	2.12	7.324E-03	1408.00	21.005	2.889E+00	EU152
1460.81	127.	8.87	0.75	7.112E-03	1460.83	10.670	9.297E+01	K40
1596.21	5.	44.72	2.27	6.616E-03	1596.21	95.400	PBC<MDA	La140
1763.89	24.	20.41	2.40	6.075E-03	1764.49	15.400	1.425E+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
260.78	65.27	53.	24.	7.934E+02	47.12	0.870	- sD
298.63	74.72	94.	88.	2.637E+03	18.98	0.880	- D
308.50	77.19	82.	131.	3.867E+03	13.14	0.883	- D
483.20	120.96	31.	20.	5.488E+02	44.38	0.927	- 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	185.50	46.47	77.	61.	0.034	26.99	0.863s
TH-227	200.18	50.14	299.	-18.	-0.010	141.17	0.855s
AM-241	237.74	59.54	420.	-22.	-0.012	135.50	0.865s
TH-234	252.74	63.29	98.	34.	0.019	45.14	0.868D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Sn-126	256.71	64.28	396.	-22.	-0.012	130.95	0.869s
BA-133	323.50	80.99	691.	-24.	-0.013	157.15	0.887
Np-237	345.49	86.49	576.	0.	0.000	180.87	0.892A
EU-155	345.70	86.54	557.	0.	0.000	1000.00	0.892s
Sn-126	347.29	86.94	538.	19.	0.011	84.31	0.892D
Sn-126	349.81	87.57	514.	22.	0.012	75.40	0.893D
Cd-109	351.68	88.04	531.	22.	0.012	151.48	0.894A
Nd-147	363.92	91.10	504.	7.	0.004	471.98	0.897s
TH-234	369.87	92.59	156.	28.	0.016	65.05	0.898D
AC-228	372.91	93.35	525.	-9.	-0.005	356.82	0.899s
Gd-153	389.50	97.50	336.	-11.	-0.006	237.58	0.903s
Np-239	397.50	99.50	347.	0.	0.000	1000.00	0.905s
Gd-153	412.29	103.20	347.	0.	0.000	1000.00	0.909s
Np-239	414.29	103.70	347.	0.	0.000	1000.00	0.909s
EU-155	420.73	105.31	347.	0.	0.000	1000.00	0.911s
Np-239	424.00	106.13	308.	18.	0.010	138.34	0.912
EU-152	486.56	121.78	160.	-9.	-0.005	192.20	0.928s
CO-57	487.69	122.06	151.	0.	0.000	1000.00	0.928s
EU-154	491.84	123.10	124.	12.	0.007	130.66	0.929s
PA-234	524.60	131.29	180.	16.	0.009	121.48	0.938s
HF-181	531.51	133.02	467.	-19.	-0.010	164.61	0.939
CE-144	533.57	133.54	510.	-20.	-0.011	158.12	0.940
HF-181	544.61	136.30	530.	-20.	-0.011	160.72	0.943s
CO-57	545.30	136.47	551.	-20.	-0.011	163.73	0.943s
Tc-99m	561.44	140.51	571.	-21.	-0.011	165.98	0.947s
U-235	574.53	143.79	481.	19.	0.011	162.75	0.950s
CE-141	581.15	145.44	547.	-20.	-0.011	163.70	0.952s
Ba-140	649.99	162.66	228.	-20.	-0.011	107.99	0.969s
U-235	652.87	163.38	248.	-20.	-0.011	112.40	0.970s
CE-139	662.76	165.85	189.	18.	0.010	113.25	0.973s
U-235	742.18	185.72	94.	54.	0.030	35.32	0.992s
TH-229	773.32	193.51	125.	-20.	-0.011	105.44	1.000s
U-235	820.59	205.33	95.	-6.	-0.004	291.14	1.012s
TH-229	842.65	210.85	77.	16.	0.009	104.30	1.018s
Cf-251	907.22	227.00	77.	-11.	-0.006	152.26	1.034s
TH-227	943.09	235.97	388.	-17.	-0.009	165.59	1.043s
PB-212	953.73	238.63	50.	156.	0.087	10.30	1.045D
PB-214	967.18	242.00	36.	36.	0.020	28.73	1.049D
EU-152	977.96	244.69	328.	14.	0.008	182.80	1.051s
TH-227	1024.13	256.24	40.	12.	0.007	101.10	1.063s
TL-208	1108.27	277.28	52.	12.	0.007	89.75	1.084
Hg-203	1115.93	279.20	92.	-15.	-0.008	93.49	1.086s
I-131	1136.32	284.30	44.	11.	0.006	116.77	1.091s
PB-214	1179.78	295.17	30.	96.	0.053	15.10	1.190
TL-210	1183.11	296.00	334.	13.	0.007	205.44	1.102s
PB-212	1199.22	300.03	346.	10.	0.005	275.29	1.106s
PA-231	1199.38	300.07	356.	0.	0.000	1000.00	1.106s
PA-233	1199.82	300.18	356.	0.	0.000	1000.00	1.107s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-231	1209.70	302.65	356.	0.	0.000	1000.00	1.109s
BA-133	1210.50	302.85	356.	0.	0.000	1000.00	1.109s
Ba-140	1218.49	304.85	356.	0.	0.000	1000.00	1.111s
BI-210M	1218.68	304.90	403.	-14.	-0.008	198.14	1.111s
Ir-192	1232.85	308.44	388.	-14.	-0.008	194.01	1.115s
PA-233	1247.13	312.01	374.	-15.	-0.008	189.84	1.118s
Ir-192	1265.04	316.49	359.	-14.	-0.008	190.87	1.123s
CR-51	1279.41	320.08	296.	13.	0.007	189.65	1.126s
La-140	1314.10	328.76	109.	-16.	-0.009	97.07	1.135s
Cf-249	1332.81	333.44	128.	-7.	-0.004	224.35	1.139
AC-228	1350.93	337.97	18.	55.	0.031	20.49	0.618s
Cs-136	1361.32	340.57	121.	-13.	-0.007	120.91	1.146s
EU-152	1376.18	344.29	118.	12.	0.007	131.49	1.150
HF-181	1382.35	345.83	149.	-4.	-0.002	459.58	1.151
PB-214	1406.39	351.84	27.	165.	0.092	9.52	1.302
BA-133	1423.02	356.00	233.	-6.	-0.003	362.09	1.162
I-131	1456.95	364.48	28.	11.	0.006	101.02	1.170s
BA-133	1534.35	383.84	55.	10.	0.006	108.30	1.189s
Cf-249	1550.79	387.95	65.	10.	0.006	116.68	1.193s
SN-113	1565.74	391.69	104.	-12.	-0.007	119.17	1.196s
SB-125	1710.45	427.88	44.	-9.	-0.005	148.10	1.232
AG-108M	1734.69	433.94	20.	10.	0.005	96.57	1.238s
PM-146	1814.45	453.88	40.	-5.	-0.003	251.66	1.257s
SB-125	1852.39	463.37	66.	-9.	-0.005	131.94	1.266s
Ir-192	1871.16	468.06	74.	2.	0.001	812.40	1.271
BE-7	1909.29	477.60	37.	9.	0.005	101.93	1.280s
HF-181	1926.90	482.00	46.	9.	0.005	112.06	1.284s
La-140	1946.98	487.02	59.	-1.	-0.001	945.39	1.289s
RU-103	1987.11	497.05	44.	-15.	-0.008	90.53	1.298s
RH-106	2046.35	511.86	27.	108.	0.060	11.74	2.563s
Kr-85	2054.81	513.98	143.	-6.	-0.004	270.27	1.315s
Nd-147	2122.88	531.00	13.	8.	0.004	98.56	1.331s
Ba-140	2147.92	537.26	22.	1.	0.001	717.85	1.337s
CS-134	2251.82	563.24	26.	3.	0.002	351.72	1.362s
CS-134	2276.15	569.32	35.	-7.	-0.004	130.77	1.367s
TL-208	2332.04	583.29	8.	70.	0.039	14.98	1.056s
SB-125	2400.87	600.50	224.	4.	0.002	541.14	1.397s
SB-124	2409.79	602.73	228.	0.	0.000	1000.00	1.399s
CS-134	2417.71	604.71	263.	-13.	-0.007	180.23	1.401s
BI-214	2436.11	609.31	7.	128.	0.071	9.33	1.405D
RU-103	2440.06	610.30	250.	-13.	-0.007	175.23	1.406s
AG-108M	2455.99	614.28	235.	-9.	-0.005	232.88	1.410s
PM-144	2471.12	618.06	251.	-15.	-0.008	154.17	1.414s
RH-106	2486.54	621.92	231.	-4.	-0.002	528.10	1.417s
SB-125	2542.43	635.89	26.	2.	0.001	338.64	1.430s
I-131	2546.77	636.97	33.	-6.	-0.003	138.08	1.432s
AG-110M	2629.92	657.76	73.	-13.	-0.007	94.78	1.451
CS-137	2645.51	661.66	14.	23.	0.013	30.75	1.455D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-144	2785.05	696.54	47.	-6.	-0.003	259.16	1.487s
NB-94	2809.41	702.63	47.	-16.	-0.009	91.67	1.493s
SB-124	2890.04	722.79	15.	7.	0.004	82.30	1.512
AG-108M	2890.65	722.94	22.	7.	0.004	97.27	1.512
EU-154	2892.34	723.36	30.	2.	0.001	369.06	1.512
ZR-95	2895.69	724.20	32.	0.	0.000	1000.00	1.513s
BI-212	2907.58	727.17	63.	-13.	-0.007	91.28	1.516
PM-146	2941.78	735.72	5.	5.	0.003	96.79	1.524s
PM-146	2987.55	747.16	9.	8.	0.004	93.28	1.535s
ZR-95	3025.83	756.73	9.	3.	0.001	250.62	1.543
AG-110M	3054.69	763.94	23.	8.	0.004	96.14	1.550s
NB-95	3062.08	765.79	20.	8.	0.004	89.82	1.552
PA-234M	3064.57	766.41	22.	5.	0.003	129.23	1.552s
EU-152	3114.61	778.92	37.	-12.	-0.007	108.88	1.564
BI-212	3140.62	785.42	28.	-10.	-0.006	116.62	1.570s
CS-134	3182.43	795.87	68.	-16.	-0.009	79.25	1.579s
TL-210	3197.35	799.60	84.	-9.	-0.005	140.33	1.583s
CO-58	3242.06	810.78	28.	2.	0.001	308.54	1.593s
La-140	3262.05	815.77	31.	0.	0.000	1000.00	1.598s
Cs-136	3272.97	818.50	32.	0.	0.000	1000.00	1.600s
MN-54	3338.38	834.85	5.	16.	0.009	37.41	1.615s
Co-56	3386.08	846.77	10.	7.	0.004	106.27	1.626s
TL-208	3441.27	860.56	10.	24.	0.013	35.44	1.638s
NB-94	3483.41	871.10	18.	3.	0.002	208.17	1.648s
PA-234	3521.16	880.53	28.	1.	0.001	754.98	1.657s
PA-234	3532.00	883.24	29.	0.	0.000	1000.00	1.659s
AG-110M	3537.78	884.68	22.	7.	0.004	102.02	1.660s
Y-88	3591.22	898.04	20.	-5.	-0.003	201.66	1.672s
AC-228	3645.01	911.48	5.	50.	0.028	17.65	1.816
AG-110M	3749.09	937.49	15.	1.	0.001	857.32	1.708
PA-234	3783.21	946.02	15.	-3.	-0.002	289.64	1.716s
EU-152	3855.60	964.11	55.	2.	0.001	554.28	1.732s
AC-228	3875.05	968.97	7.	39.	0.022	18.83	1.736D
EU-154	3984.54	996.33	30.	2.	0.001	318.75	1.761s
PA-234M	4003.22	1001.00	33.	0.	0.000	1000.00	1.765s
EU-154	4018.33	1004.77	44.	-10.	-0.006	95.00	1.768
Co-56	4150.66	1037.84	0.	14.	0.008	26.73	1.798s
Cs-136	4191.60	1048.07	19.	-7.	-0.004	95.83	1.807s
BI-207	4253.99	1063.66	5.	6.	0.004	91.94	1.820s
Ga-68	4308.98	1077.40	11.	5.	0.003	145.77	1.833s
EU-152	4447.76	1112.07	46.	-5.	-0.003	196.98	1.863
ZN-65	4461.66	1115.55	41.	0.	0.000	1000.00	1.866s
BI-214	4480.63	1120.29	27.	9.	0.005	86.41	1.870s
Sc-46	4481.68	1120.55	26.	9.	0.005	85.30	1.870s
Ta-182	4484.69	1121.30	71.	-15.	-0.008	85.92	1.871s
CO-60	4692.57	1173.24	11.	4.	0.002	177.92	1.916s
Ta-182	4755.86	1189.05	11.	5.	0.003	145.77	1.930s
Ta-182	4885.39	1221.41	28.	-12.	-0.007	105.15	1.957s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Co-56	4952.92	1238.28	6.	7.	0.004	89.88	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	0.	12.	0.007	28.87	2.017
CO-60	5330.11	1332.50	23.	-11.	-0.006	109.06	2.052s
AG-110M	5537.48	1384.30	17.	-2.	-0.001	488.62	2.096
EU-152	5632.39	1408.00	0.	8.	0.004	35.36	2.115s
K-40	5843.83	1460.81	0.	127.	0.071	8.87	0.745s
La-140	6386.02	1596.21	0.	5.	0.003	44.72	2.269s
SB-124	6765.58	1690.98	13.	-5.	-0.003	194.96	2.345s
BI-214	7060.00	1764.49	0.	24.	0.013	20.41	2.403s
Co-56	7087.48	1771.35	24.	0.	0.000	1000.00	2.408s
Y-88	7346.69	1836.06	7.	-1.	0.000	994.99	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	2.8854E+00					5.31E+01	
			477.60	2.885E+00	&(	1.003E+01	1.02E+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	9.2974E+01					4.66E+11	
			1460.83	9.297E+01	(	5.395E+00	8.87E+00	1.07E+01 G
Sc-46	F	3.0209E-01					8.38E+01	
			889.28	1.794E-02	%(	1.512E+00	2.32E+03	1.00E+02 G
			1120.55	5.862E-01	?(	1.692E+00	8.53E+01	1.00E+02 G
CR-51	F	3.2830E+00					2.77E+01	
			320.08	3.283E+00	&(	2.098E+01	1.90E+02	9.94E+00 G
MN-54	C	8.3973E-01					3.12E+02	
			834.85	8.397E-01	&(	6.569E-01	3.74E+01	1.00E+02 G
FE-59	F	8.7461E-01					4.45E+01	
			1099.25	3.705E-02	%(	1.993E+00	2.23E+03	5.65E+01 G
			1291.60	1.970E+00	?(	1.210E+00	2.89E+01	4.32E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C 9.3123E-01					7.73E+01	
		846.77	3.638E-01	?(	9.066E-01	1.06E+02	9.99E+01 G
		1238.28	7.131E-01	?(	1.435E+00	8.99E+01	6.61E+01 G
		1037.84	5.965E+00	?(	3.140E+00	2.67E+01	1.41E+01 G
		1771.35	0.000E+00	-	1.514E+01	1.00E+03	1.55E+01 A
CO-58	C 1.2650E-01					7.09E+01	
		810.78	1.265E-01	?(	1.396E+00	3.09E+02	9.95E+01 G
CO-60	F -7.7509E-01					1.93E+03	
		1332.50	-7.751E-01	?(	1.809E+00	1.09E+02	1.00E+02 G
		1173.24	2.860E-01	+	1.183E+00	1.78E+02	9.99E+01 G
NB-94	I -7.6087E-01					7.41E+06	
		702.63	-7.609E-01	?(	1.601E+00	9.17E+01	9.79E+01 G
		871.10	1.592E-01	+	1.193E+00	2.08E+02	9.99E+01 G
ZR-95	I 2.3446E-01					6.40E+01	
		756.73	2.345E-01	?(	1.490E+00	2.51E+02	5.45E+01 G
		724.20	0.000E+00	-	3.054E+00	1.00E+03	4.42E+01 G
NB-95	I 3.6927E-01					6.40E+01	
		765.79	3.693E-01	?(	1.131E+00	8.98E+01	9.98E+01 G
RU-103	I -5.7903E-01					3.93E+01	
		497.05	-5.790E-01	?(	1.300E+00	9.05E+01	9.09E+01 G
		610.30	-9.212E+00	+	5.445E+01	1.75E+02	5.75E+00 GA
RH-106	I -1.7096E+00					3.74E+02	
		621.92	-1.710E+00	?(	3.075E+01	5.28E+02	9.93E+00 G
		1050.36	-1.947E+00	%	1.057E+02	1.49E+03	1.56E+00 G
		511.86	1.947E+01	?	4.812E+00	1.17E+01	2.00E+01 GA
AG-108M	C 3.5828E-01					1.53E+05	
		433.94	3.373E-01	?(	8.258E-01	9.66E+01	9.05E+01 G
		722.94	3.792E-01	(	1.264E+00	9.73E+01	9.08E+01 G
		614.28	-4.309E-01	+	3.398E+00	2.33E+02	8.98E+01 G
AG-110M	F 7.8436E-01					2.50E+02	
		884.68	5.162E-01	?(	1.812E+00	1.02E+02	7.27E+01 G
		657.76	-6.100E-01	&	1.948E+00	9.48E+01	9.46E+01 G
		937.49	1.627E-01	-	3.377E+00	8.57E+02	3.44E+01 G
		1384.30	-6.163E-01	+	6.756E+00	4.89E+02	2.43E+01 G
		763.94	1.659E+00	?(	5.457E+00	9.61E+01	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	-5.7198E-01					1.15E+02	
			391.69	-5.720E-01	?(	2.306E+00	1.19E+02	6.40E+01 G
SB-124	F	3.1569E-01					6.02E+01	
			602.73	0.000E+00	?(	3.017E+00	1.00E+03	9.83E+01 G
			1690.98	-8.608E-01	+	3.559E+00	1.95E+02	4.78E+01 G
			722.79	3.185E+00	&(	8.894E+00	8.23E+01	1.08E+01 G
SB-125	I	-5.4629E-02					1.01E+03	
			427.88	-9.545E-01	?(	3.566E+00	1.48E+02	2.96E+01 G
			600.50	8.902E-01	?(	1.642E+01	5.41E+02	1.79E+01 G
			635.89	8.084E-01	?(	9.848E+00	3.39E+02	1.13E+01 G
			463.37	-2.867E+00	+	1.292E+01	1.32E+02	1.05E+01 G
I-131	I	6.2797E-01					8.02E+00	
			364.48	3.656E-01	?(	9.302E-01	1.01E+02	8.17E+01 G
			284.30	4.119E+00	?(	1.259E+01	1.17E+02	6.14E+00 G
			636.97	-3.634E+00	+	1.741E+01	1.38E+02	7.17E+00 G
Gd-153	F	-5.5314E-01					2.42E+02	
			97.50	-5.531E-01	&(	4.432E+00	2.38E+02	3.00E+01 G
			103.20	0.000E+00	&	6.137E+00	1.00E+03	2.18E+01 G
Ga-68	C	1.1660E+01					4.71E-02	
			1077.40	1.166E+01	?(	3.920E+01	1.46E+02	3.30E+00 G
Tc-99m	I	-3.6327E-01					2.51E-01	
			140.51	-3.633E-01	&(	2.017E+00	1.66E+02	8.93E+01 G
BA-133	F	-2.6369E-01					3.85E+03	
			356.00	-2.637E-01	(	3.245E+00	3.62E+02	6.20E+01 G
			302.85	0.000E+00	+	1.192E+01	1.00E+03	1.83E+01 G
			383.84	3.270E+00	?	1.204E+01	1.08E+02	8.94E+00 GA
			80.99	-1.123E+00	+	5.893E+00	1.57E+02	3.41E+01 GA
CS-134	I	-9.0179E-01					7.54E+02	
			795.87	-9.018E-01	?(	2.388E+00	7.93E+01	8.55E+01 G
			604.71	-5.370E-01	+	3.263E+00	1.80E+02	9.76E+01 G
			569.32	-1.686E+00	+	7.626E+00	1.31E+02	1.54E+01 G
			801.95	-3.831E-01	%	2.775E+01	2.08E+03	8.69E+00 G
			563.24	1.387E+00	+	1.224E+01	3.52E+02	8.35E+00 G
CS-137	I	1.1817E+00					1.10E+04	
			661.66	1.182E+00	(	1.021E+00	3.08E+01	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	3.5854E-01					1.38E+02	
			165.85	3.585E-01	?(	1.363E+00	1.13E+02	7.99E+01 G
Ba-140	I	2.0373E-01					1.28E+01	
			537.26	2.037E-01	?(	3.728E+00	7.18E+02	2.44E+01 G
			162.66	-5.254E+00	+	1.900E+01	1.08E+02	6.22E+00 G
			304.85	0.000E+00	-	5.119E+01	1.00E+03	4.29E+00 G
La-140	I	4.4011E-01					1.28E+01	
			1596.21	4.401E-01	?(	6.487E-01	4.47E+01	9.54E+01 G
			487.02	-8.798E-02	-	2.934E+00	9.45E+02	4.55E+01 G
			328.76	-1.994E+00	&	6.502E+00	9.71E+01	2.03E+01 G
			815.77	0.000E+00	&	6.223E+00	1.00E+03	2.33E+01 G
CE-141	I	-6.5536E-01					3.25E+01	
			145.44	-6.554E-01	?(	3.590E+00	1.64E+02	4.82E+01 G
CE-144	I	-2.7840E+00					2.85E+02	
			133.54	-2.784E+00	&(	1.473E+01	1.58E+02	1.11E+01 G
PM-144	C	-2.5811E-01					3.63E+02	
			696.54	-2.581E-01	?(	1.573E+00	2.59E+02	9.90E+01 G
			618.06	-6.149E-01	+	3.192E+00	1.54E+02	9.91E+01 G
EU-152	F	7.4851E-01					4.94E+03	
			121.78	-4.935E-01	&(	3.222E+00	1.92E+02	2.86E+01 G
			344.29	1.203E+00	(	5.355E+00	1.31E+02	2.65E+01 G
			1112.07	-2.321E+00	+	1.593E+01	1.97E+02	1.36E+01 G
			778.92	-4.660E+00	+	1.178E+01	1.09E+02	1.29E+01 G
			964.11	7.461E-01	?(	1.457E+01	5.54E+02	1.46E+01 G
			244.69	3.849E+00	&(	2.367E+01	1.83E+02	7.58E+00 G
			1408.00	2.889E+00	?	2.662E+00	3.54E+01	2.10E+01 GA
EU-154	I	5.9909E-01					3.14E+03	
			123.10	4.515E-01	*(	1.996E+00	1.31E+02	4.08E+01 G
			1274.54	0.000E+00	-	3.329E+00	1.00E+03	3.52E+01 G
			723.36	4.885E-01	&(	6.459E+00	3.69E+02	2.02E+01 G
			873.23	-2.164E-01	&	1.074E+01	1.35E+03	1.23E+01 G
			1004.77	-3.428E+00	+	1.103E+01	9.50E+01	1.80E+01 G
			996.33	1.378E+00	?(	1.568E+01	3.19E+02	1.06E+01 G
HF-181	F	3.8097E-01					4.24E+01	
			482.00	3.810E-01	&(	1.458E+00	1.12E+02	8.05E+01 G
			133.02	-6.550E-01	&	3.612E+00	1.65E+02	4.33E+01 G
			345.83	-6.685E-01	+	1.054E+01	4.60E+02	1.51E+01 G
			136.30	-5.319E+00	+	2.860E+01	1.61E+02	5.85E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ta-182	F -2.6578E+00					1.14E+02	
		1121.30	-2.658E+00	?(	7.661E+00	8.59E+01	3.49E+01 G
		1221.41	-3.104E+00	&	6.926E+00	1.05E+02	2.70E+01 G
		1189.05	2.192E+00	+	7.371E+00	1.46E+02	1.62E+01 G
Hg-203	F -4.2029E-01					4.66E+01	
		279.20	-4.203E-01	?(	1.320E+00	9.35E+01	8.15E+01 G
TL-208	N 3.3502E+00					6.98E+02	
		583.02	3.280E+00	@(	7.446E-01	1.50E+01	8.45E+01 G
		277.28	4.292E+00	(	1.299E+01	8.98E+01	6.31E+00 G
		860.56	1.015E+01	+	7.380E+00	3.54E+01	1.24E+01 G
PM-146	C 3.6414E-01					2.02E+03	
		453.88	-2.525E-01	?(	1.625E+00	2.52E+02	6.50E+01 G
		747.16	1.053E+00	?(	2.365E+00	9.33E+01	3.40E+01 G
		735.72	1.105E+00	?(	2.664E+00	9.68E+01	2.25E+01 G
Y-88	F -6.3646E-02					1.07E+02	
		1836.06	-6.365E-02	?(	1.407E+00	9.95E+02	9.92E+01 G
		898.04	-2.891E-01	+	1.362E+00	2.02E+02	9.37E+01 G
Cd-113m	-1.2083E+02					5.33E+03	
		263.70	-1.208E+02	%(	1.603E+04	3.78E+03	6.00E-03 K
Cd-109	F 8.8958E+00					4.53E+02	
						Derived Ave Activity	
		88.04	8.896E+00	}(	4.507E+01	1.51E+02	3.79E+00 G
Cf-251	T -1.6492E-01					3.28E+05	
		176.60	-1.649E-01	&(	4.940E+00	1.14E+03	1.70E+01 G
		227.00	-3.417E+00	+	1.355E+01	1.52E+02	6.30E+00 GA
Cf-249	T 4.4818E-01					1.28E+05	
		387.95	4.482E-01	?(	1.779E+00	1.17E+02	6.60E+01 G
		333.44	-1.208E+00	&	9.262E+00	2.24E+02	1.55E+01 G
Sn-126	-4.1377E+00					3.65E+07	
		87.57	9.002E-01	}	4.490E+00	7.54E+01	3.75E+01 GA
		64.28	-4.138E+00	?(	1.813E+01	1.31E+02	9.70E+00 G
		86.94	3.338E+00	}	1.909E+01	8.43E+01	9.04E+00 GA
PB-210	N 4.3981E+01					8.14E+03	
		46.54	4.398E+01	(P	3.163E+01	2.70E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	7.2943E+00					6.98E+02	
			238.63	7.294E+00	(P	1.669E+00	1.03E+01	4.33E+01 G
			300.03	7.026E+00	&	6.527E+01	2.75E+02	3.28E+00 GA
PB-214	N	1.1836E+01					5.84E+05	
			351.93	1.186E+01	(P	1.937E+00	9.52E+00	3.76E+01 G
			295.09	1.179E+01	(P	3.444E+00	1.51E+01	1.93E+01 G
			242.00	9.952E+00		8.427E+00	2.87E+01	7.43E+00 GA
BI-207	C	5.2097E-01					1.18E+04	
			1063.66	5.210E-01	?(	1.108E+00	9.19E+01	7.45E+01 G
			569.70	2.655E-02	%	1.344E+00	1.42E+03	9.77E+01 G
BI-212	N	-7.9558E+00					6.98E+02	
			727.17	-7.956E+00	?(	2.446E+01	9.13E+01	7.55E+00 G
			785.42	-3.843E+01	+	1.052E+02	1.17E+02	1.28E+00 GA
U-235	N	2.7120E+00					2.57E+11	
			143.79	2.712E+00	?(	1.478E+01	1.63E+02	1.10E+01 G
			205.33	-2.318E+00	+	1.764E+01	2.91E+02	5.01E+00 G
			163.38	-6.451E+00	&	2.428E+01	1.12E+02	5.08E+00 G
			185.72	1.722E+00	* P	1.534E+00	3.53E+01	5.40E+01 GA
BI-214	N	1.1341E+01					5.84E+05	
			609.31	1.134E+01	(	1.350E+00	9.33E+00	4.61E+01 G
			1120.29	3.881E+00	-	1.136E+01	8.64E+01	1.51E+01 G
			1764.49	1.425E+01	+	4.376E+00	2.04E+01	1.54E+01 G
BI-210M	T	4.3757E-02					1.10E+09	
			265.83	4.376E-02	%(	1.584E+00	1.35E+03	5.00E+01 G
			304.90	-1.251E+00	+	8.327E+00	1.98E+02	2.80E+01 G
AC-228	N	1.0960E+01					2.10E+03	
			911.07	9.472E+00	(	2.446E+00	1.76E+01	2.90E+01 G
			968.97	1.271E+01	(	5.001E+00	1.88E+01	1.75E+01 G
			338.32	1.201E+01	(	4.909E+00	2.05E+01	1.20E+01 G
			93.35	-2.500E+00	-	3.001E+01	3.57E+02	5.56E+00 XA
TH-227	N	3.7283E+00					7.95E+03	
			256.24	3.728E+00	*(	9.831E+00	1.01E+02	7.00E+00 G
			235.97	-2.777E+00	-	1.543E+01	1.66E+02	1.23E+01 G
			50.14	-5.563E+00	+	2.636E+01	1.41E+02	8.00E+00 G
TH-229	N	-7.6234E-01					2.68E+06	
			193.51	-8.148E+00	?(	2.201E+01	1.05E+02	4.40E+00 G
			210.85	1.011E+01	?(	2.719E+01	1.04E+02	2.99E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	1.1329E+01					1.63E+12	
			92.59	7.792E+00	(P	1.666E+01	6.50E+01	5.58E+00 G
			63.29	1.651E+01	(P	2.387E+01	4.51E+01	3.81E+00 G
PA-233	C	-9.9594E-01					7.82E+08	
			312.01	-9.959E-01	(	6.356E+00	1.90E+02	3.60E+01 G
			300.18	0.000E+00	&	3.501E+01	1.00E+03	6.20E+00 G
PA-234	N	1.3375E+00					1.63E+12	
			131.29	1.338E+00	?(	5.466E+00	1.21E+02	1.80E+01 G
			946.02	-1.260E+00	+	8.716E+00	2.90E+02	1.34E+01 G
			569.47	-1.582E-01	%	1.573E+01	2.78E+03	8.20E+00 G
			883.24	0.000E+00	-	1.551E+01	1.00E+03	9.60E+00 G
			880.53	8.903E-01	?	2.437E+01	7.55E+02	6.00E+00 GA
PA-234M	N	2.3062E+01					1.63E+12	
			1001.00	0.000E+00	?(	2.065E+02	1.00E+03	8.37E-01 G
			766.41	8.872E+01	?(	4.008E+02	1.29E+02	2.94E-01 G
AM-241	T	-1.1899E+00					1.58E+05	
			59.54	-1.190E+00	&(	5.394E+00	1.36E+02	3.59E+01 G
Ir-192	F	-4.0609E-01					7.40E+01	
			316.49	-4.061E-01	&(	2.607E+00	1.91E+02	8.70E+01 G
			468.06	9.740E-02	+	2.770E+00	8.12E+02	5.18E+01 G
			308.44	-1.116E+00	&	7.277E+00	1.94E+02	3.18E+01 G
Np-239	T	1.1949E+00					2.36E+00	
			103.70	0.000E+00	-	5.571E+00	1.00E+03	2.40E+01 X
			106.13	1.195E+00	?(	5.546E+00	1.38E+02	2.27E+01 G
			99.50	0.000E+00	-	8.969E+00	1.00E+03	1.50E+01 X
Nd-147		2.2734E+00					1.11E+01	
			531.00	2.273E+00	?(	5.545E+00	9.86E+01	1.30E+01 G
			91.10	3.660E-01	-	5.821E+00	4.72E+02	2.83E+01 G
TL-210	N	-9.5900E-02					5.84E+05	
			799.60	-4.767E-01	?(	2.281E+00	1.40E+02	9.90E+01 G
			296.00	3.811E-01	?(	2.637E+00	2.05E+02	7.90E+01 G
			1313.00	2.280E-01	%	6.293E+00	1.19E+03	2.10E+01 GA
Kr-85	I	-5.3103E+01					3.92E+03	
			513.98	-5.310E+01	?(	4.905E+02	2.70E+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	299.	-18.	-0.010	141.17	-5.563E+00	
AM-241	59.54	420.	-22.	-0.012	135.50	-1.190E+00	
BA-133	80.99	691.	-24.	-0.013	157.15	-1.123E+00	
Nd-147	91.10	504.	7.	0.004	471.98	3.660E-01	
Gd-153	97.50	336.	-11.	-0.006	237.58	-5.531E-01	
Np-239	106.13	308.	18.	0.010	138.34	1.195E+00	
EU-154	123.10	124.	12.	0.007	130.66	4.515E-01	
PA-234	131.29	180.	16.	0.009	121.48	1.338E+00	
HF-181	133.02	467.	-19.	-0.010	164.61	-6.550E-01	
CE-144	133.54	510.	-20.	-0.011	158.12	-2.784E+00	
HF-181	136.30	530.	-20.	-0.011	160.72	-5.319E+00	
CO-57	136.47	551.	-20.	-0.011	163.73	-2.914E+00	
Tc-99m	140.51	571.	-21.	-0.011	165.98	-3.633E-01	
U-235	143.79	481.	19.	0.011	162.75	2.712E+00	
CE-141	145.44	547.	-20.	-0.011	163.70	-6.554E-01	
Ba-140	162.66	228.	-20.	-0.011	107.99	-5.254E+00	
U-235	163.38	248.	-20.	-0.011	112.40	-6.451E+00	
CE-139	165.85	189.	18.	0.010	113.25	3.585E-01	
U-235	185.72	94.	54.	0.030	35.32	1.722E+00	P
TH-229	193.51	125.	-20.	-0.011	105.44	-8.148E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	205.33	95.	-6.	-0.004	291.14	-2.318E+00	
TH-229	210.85	77.	16.	0.009	104.30	1.011E+01	
Cf-251	227.00	77.	-11.	-0.006	152.26	-3.417E+00	
TH-227	235.97	388.	-17.	-0.009	165.59	-2.777E+00	
TH-227	256.24	40.	12.	0.007	101.10	3.728E+00	
Hg-203	279.20	92.	-15.	-0.008	93.49	-4.203E-01	
I-131	284.30	44.	11.	0.006	116.77	4.119E+00	
TL-210	296.00	334.	13.	0.007	205.44	3.811E-01	
BI-210M	304.90	403.	-14.	-0.008	198.14	-1.251E+00	
Ir-192	308.44	388.	-14.	-0.008	194.01	-1.116E+00	
PA-233	312.01	374.	-15.	-0.008	189.84	-9.959E-01	
Ir-192	316.49	359.	-14.	-0.008	190.87	-4.061E-01	
CR-51	320.08	296.	13.	0.007	189.65	3.283E+00	
La-140	328.76	109.	-16.	-0.009	97.07	-1.994E+00	
Cf-249	333.44	128.	-7.	-0.004	224.35	-1.208E+00	
Cs-136	340.57	121.	-13.	-0.007	120.91	-7.427E-01	
HF-181	345.83	149.	-4.	-0.002	459.58	-6.685E-01	
BA-133	356.00	233.	-6.	-0.003	362.09	-2.637E-01	
I-131	364.48	28.	11.	0.006	101.02	3.656E-01	
BA-133	383.84	55.	10.	0.006	108.30	3.270E+00	
Cf-249	387.95	65.	10.	0.006	116.68	4.482E-01	
SN-113	391.69	104.	-12.	-0.007	119.17	-5.720E-01	
SB-125	427.88	44.	-9.	-0.005	148.10	-9.545E-01	
PM-146	453.88	40.	-5.	-0.003	251.66	-2.525E-01	
SB-125	463.37	66.	-9.	-0.005	131.94	-2.867E+00	
Ir-192	468.06	74.	2.	0.001	812.40	9.740E-02	
BE-7	477.60	37.	9.	0.005	101.93	2.885E+00	
HF-181	482.00	46.	9.	0.005	112.06	3.810E-01	
La-140	487.02	59.	-1.	-0.001	945.39	-8.798E-02	
RU-103	497.05	44.	-15.	-0.008	90.53	-5.790E-01	
RH-106	511.86	27.	108.	0.060	11.74	1.947E+01	
Kr-85	513.98	143.	-6.	-0.004	270.27	-5.310E+01	
Nd-147	531.00	13.	8.	0.004	98.56	2.273E+00	
Ba-140	537.26	22.	1.	0.001	717.85	2.037E-01	
CS-134	563.24	26.	3.	0.002	351.72	1.387E+00	
CS-134	569.32	35.	-7.	-0.004	130.77	-1.686E+00	
SB-125	600.50	224.	4.	0.002	541.14	8.902E-01	
CS-134	604.71	263.	-13.	-0.007	180.23	-5.370E-01	
RU-103	610.30	250.	-13.	-0.007	175.23	-9.212E+00	
PM-144	618.06	251.	-15.	-0.008	154.17	-6.149E-01	
RH-106	621.92	231.	-4.	-0.002	528.10	-1.710E+00	
SB-125	635.89	26.	2.	0.001	338.64	8.084E-01	
I-131	636.97	33.	-6.	-0.003	138.08	-3.634E+00	
PM-144	696.54	47.	-6.	-0.003	259.16	-2.581E-01	
NB-94	702.63	47.	-16.	-0.009	91.67	-7.609E-01	
SB-124	722.79	15.	7.	0.004	82.30	3.185E+00	
EU-154	723.36	30.	2.	0.001	369.06	4.885E-01	
BI-212	727.17	63.	-13.	-0.007	91.28	-7.956E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-146	735.72	5.	5.	0.003	96.79	1.105E+00	
PM-146	747.16	9.	8.	0.004	93.28	1.053E+00	
ZR-95	756.73	9.	3.	0.001	250.62	2.345E-01	
NB-95	765.79	20.	8.	0.004	89.82	3.693E-01	
PA-234M	766.41	22.	5.	0.003	129.23	8.872E+01	
BI-212	785.42	28.	-10.	-0.006	116.62	-3.843E+01	
CS-134	795.87	68.	-16.	-0.009	79.25	-9.018E-01	
TL-210	799.60	84.	-9.	-0.005	140.33	-4.767E-01	
CO-58	810.78	28.	2.	0.001	308.54	1.265E-01	
NB-94	871.10	18.	3.	0.002	208.17	1.592E-01	
PA-234	880.53	28.	1.	0.001	754.98	8.903E-01	
Y-88	898.04	20.	-5.	-0.003	201.66	-2.891E-01	
PA-234	946.02	15.	-3.	-0.002	289.64	-1.260E+00	
EU-154	996.33	30.	2.	0.001	318.75	1.378E+00	
EU-154	1004.77	44.	-10.	-0.006	95.00	-3.428E+00	
Cs-136	1048.07	19.	-7.	-0.004	95.83	-5.306E-01	
BI-207	1063.66	5.	6.	0.004	91.94	5.210E-01	
Ga-68	1077.40	11.	5.	0.003	145.77	1.166E+01	
Sc-46	1120.55	26.	9.	0.005	85.30	5.862E-01	
Ta-182	1121.30	71.	-15.	-0.008	85.92	-2.658E+00	
CO-60	1173.24	11.	4.	0.002	177.92	2.860E-01	
Ta-182	1189.05	11.	5.	0.003	145.77	2.192E+00	
Ta-182	1221.41	28.	-12.	-0.007	105.15	-3.104E+00	
NA-22	1274.53	6.	3.	0.002	114.89	2.341E-01	
FE-59	1291.60	0.	12.	0.007	28.87	1.970E+00	
CO-60	1332.50	23.	-11.	-0.006	109.06	-7.751E-01	
La-140	1596.21	0.	5.	0.003	44.72	4.401E-01	
SB-124	1690.98	13.	-5.	-0.003	194.96	-8.608E-01	
Y-88	1836.06	7.	-1.	0.000	994.99	-6.365E-02	

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	2.8853E+00	2.8854E+00	1.019E+02%	1.00E+01
NA-22	#A	2.3414E-01	2.3414E-01	1.149E+02%	9.70E-01
K-40		9.2974E+01	9.2974E+01	8.874E+00%	5.40E+00
Sc-46	#A	3.0209E-01	3.0209E-01	8.530E+01%	1.51E+00
CR-51	#A	3.2830E+00	3.2830E+00	1.897E+02%	2.10E+01
MN-54	#	8.3973E-01	8.3973E-01	3.741E+01%	6.57E-01
FE-59	#A	8.7460E-01	8.7461E-01	2.887E+01%	1.99E+00
Co-56	#C	9.3123E-01	9.3123E-01	2.673E+01%	9.07E-01
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.05E+00
CO-58	#A	1.2650E-01	1.2650E-01	3.085E+02%	1.40E+00
CO-60	#A	-7.7509E-01	-7.7509E-01	1.091E+02%	1.81E+00

ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.08E+00
NB-94	#A	-7.6087E-01	-7.6087E-01	9.167E+01%	1.60E+00
ZR-95	#A	2.3446E-01	2.3446E-01	2.506E+02%	1.49E+00
NB-95	#A	3.6927E-01	3.6927E-01	8.982E+01%	1.13E+00
RU-103	#A	-5.7903E-01	-5.7903E-01	9.053E+01%	1.30E+00
RH-106	#A	-1.7096E+00	-1.7096E+00	5.281E+02%	3.08E+01
AG-108M	A	3.5828E-01	3.5828E-01	6.853E+01%	8.26E-01
AG-110M	#A	7.8436E-01	7.8436E-01	7.009E+01%	1.81E+00
SN-113	#A	-5.7198E-01	-5.7198E-01	1.192E+02%	2.31E+00
SB-124	#A	3.1569E-01	3.1569E-01	8.230E+01%	3.02E+00
SB-125	#A	-5.4629E-02	-5.4629E-02	1.481E+02%	3.57E+00
I-131	#A	6.2796E-01	6.2797E-01	7.720E+01%	9.30E-01
Gd-153	#A	-5.5314E-01	-5.5314E-01	2.376E+02%	4.43E+00
Ga-68	#A	1.1614E+01	1.1660E+01	1.458E+02%	3.92E+01
Tc-99m	#A	-3.6301E-01	-3.6327E-01	1.660E+02%	2.02E+00
BA-133	#A	-2.6369E-01	-2.6369E-01	3.621E+02%	3.25E+00
CS-134	#A	-9.0179E-01	-9.0179E-01	7.925E+01%	2.39E+00
CS-137		1.1817E+00	1.1817E+00	3.075E+01%	1.02E+00
CE-139	#A	3.5854E-01	3.5854E-01	1.132E+02%	1.36E+00
Ba-140	#A	2.0372E-01	2.0373E-01	7.179E+02%	3.73E+00
La-140	#A	4.4010E-01	4.4011E-01	4.472E+01%	6.49E-01
CE-141	#A	-6.5535E-01	-6.5536E-01	1.637E+02%	3.59E+00
CE-144	#A	-2.7840E+00	-2.7840E+00	1.581E+02%	1.47E+01
PM-144	#A	-2.5811E-01	-2.5811E-01	2.592E+02%	1.57E+00
EU-152	A	7.4851E-01	7.4851E-01	1.315E+02%	3.22E+00
EU-154	#A	5.9909E-01	5.9909E-01	1.307E+02%	2.00E+00
EU-155	#A	0.0000E+00	0.0000E+00	7.071E+02%	6.30E+00
HF-181	#A	3.8097E-01	3.8097E-01	1.121E+02%	1.46E+00
Ta-182	#A	-2.6578E+00	-2.6578E+00	8.592E+01%	7.66E+00
Hg-203	#A	-4.2029E-01	-4.2029E-01	9.349E+01%	1.32E+00
TL-208		3.3502E+00	3.3502E+00	1.498E+01%	7.45E-01
PM-146	#A	3.6414E-01	3.6414E-01	9.328E+01%	1.63E+00
Y-88	#A	-6.3646E-02	-6.3646E-02	9.950E+02%	1.41E+00
Cd-113m	#B	-1.2083E+02	-1.2083E+02	3.783E+03%	1.60E+04
Cd-109	#A	8.8958E+00	8.8958E+00	1.515E+02%	4.51E+01
Cf-251	#A	-1.6492E-01	-1.6492E-01	1.140E+03%	4.94E+00
Cf-249	#A	4.4818E-01	4.4818E-01	1.167E+02%	1.78E+00
Sn-126	A	-4.1377E+00	-4.1377E+00	1.309E+02%	1.81E+01
PB-210	#	4.3981E+01	4.3981E+01	2.699E+01%	3.16E+01
PB-212		7.2943E+00	7.2943E+00	1.030E+01%	1.67E+00
PB-214		1.1836E+01	1.1836E+01	8.924E+00%	1.94E+00
BI-207	#A	5.2097E-01	5.2097E-01	9.194E+01%	1.11E+00
BI-212	#A	-7.9558E+00	-7.9558E+00	9.128E+01%	2.45E+01
U-235	#A	2.7120E+00	2.7120E+00	1.627E+02%	1.48E+01
BI-214		1.1341E+01	1.1341E+01	9.330E+00%	1.35E+00
BI-210M	#A	4.3757E-02	4.3757E-02	1.348E+03%	1.58E+00
AC-228		1.0960E+01	1.0960E+01	1.098E+01%	2.45E+00
TH-227	#A	3.7283E+00	3.7283E+00	1.011E+02%	9.83E+00
TH-229	#A	-7.6234E-01	-7.6234E-01	7.415E+01%	2.20E+01

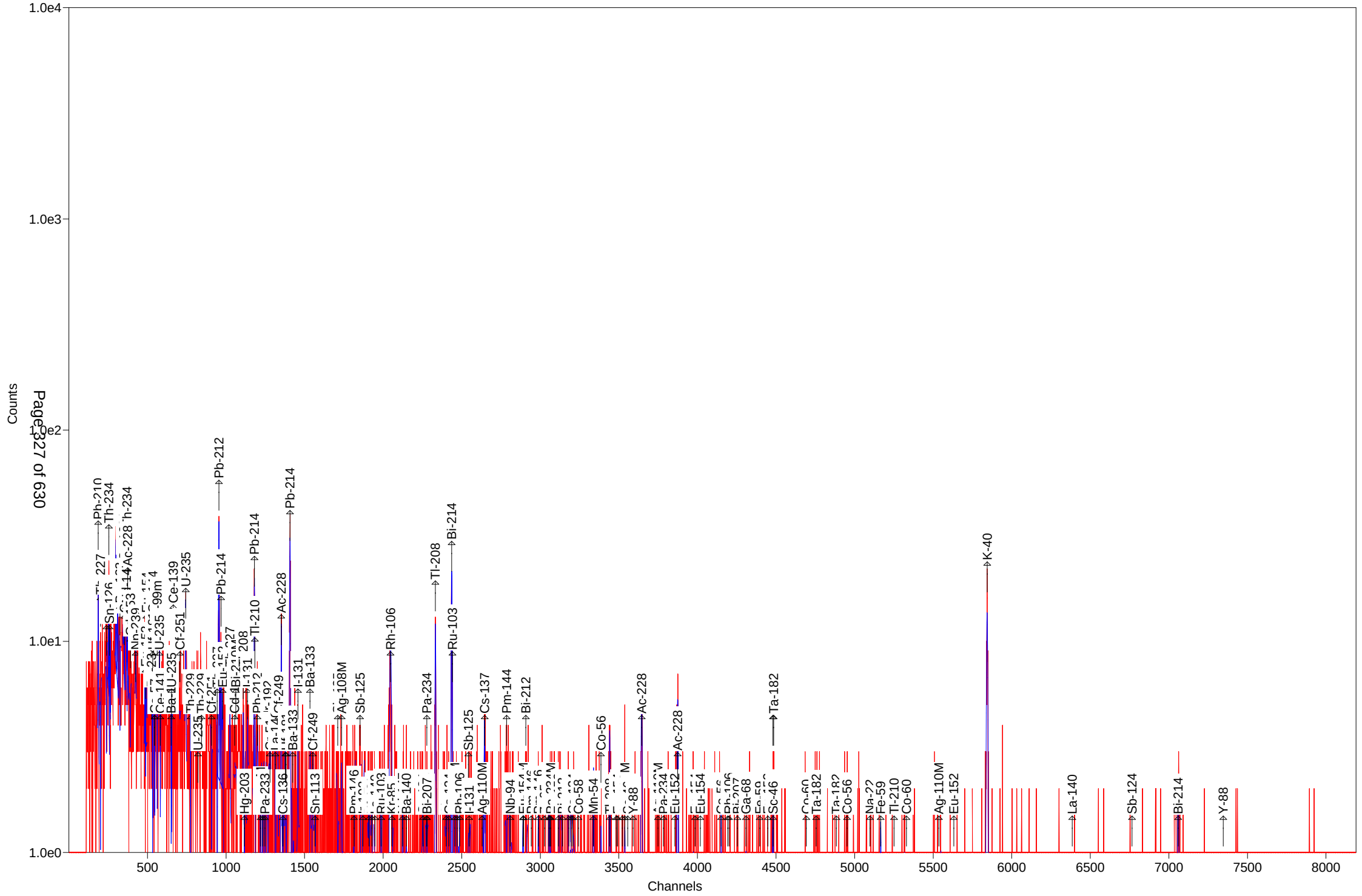
TH-234	A	1.1329E+01	1.1329E+01	3.959E+01%	1.67E+01
PA-231	#A	0.0000E+00	0.0000E+00	7.071E+02%	7.58E+01
PA-233	#A	-9.9594E-01	-9.9594E-01	1.898E+02%	6.36E+00
PA-234	#A	1.3375E+00	1.3375E+00	1.215E+02%	5.47E+00
PA-234M	#A	2.3062E+01	2.3062E+01	1.292E+02%	2.06E+02
AM-241	#A	-1.1899E+00	-1.1899E+00	1.355E+02%	5.39E+00
Np-237	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.36E+01
Ir-192	#A	-4.0609E-01	-4.0609E-01	1.909E+02%	2.61E+00
Cs-136	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.47E+00
Np-239	#A	1.1948E+00	1.1949E+00	1.383E+02%	5.55E+00
Nd-147	#A	2.2734E+00	2.2734E+00	9.856E+01%	5.54E+00
TL-210	#A	-9.5900E-02	-9.5900E-02	1.244E+02%	2.28E+00
Kr-85	#A	-5.3103E+01	-5.3103E+01	2.703E+02%	4.91E+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) 1.829E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 1.8291902E+02 Bq/Sample

405451_Gamma_490-164491-A-9-B. 12_Gamma_20190008.spc.



Prep Batch: 405454

Fill Geometry, 21-Day In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 405454

Lab Id: MB 160-405454/1-A | Analyzed: 01/03/19 02:00 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV14 | Decay Corrected: No | Ingrowth:

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	-6.406	21.1	21.2	U	pCi/L	50.0	36.0	408894
Radium-228	10.52	19.1	19.2	U	pCi/L	50.0	22.9	408894
Radium 226 and 228 (positive only)	10.52	19.1	19.2	U	pCi/L		36.0	408894

Lab Id: LCS 160-405454/2-A | Analyzed: 01/03/19 01:57 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV16 | Decay Corrected: No | Ingrowth:

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	130900	393	15100		pCi/L		273	408895
Cesium-137	44560	215	4460		pCi/L		80.1	408895
Cobalt-60	30070	149	2970		pCi/L		43.0	408895

Lab Id: 490-164491-1 | Analyzed: 01/03/19 01:56 | Ts: 120 | Sigma: 2
Client ID: CUF-BS-FB13-20181206 | Detector: GV17 | Decay Corrected: No | Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	-11.5	14.9	14.9	U	pCi/L	50.0	32.9	408896
Radium-228	5.35	8.94	8.96	U	pCi/L	50.0	28.5	408896
Radium 226 and 228 (positive only)	5.35	8.94	8.96	U	pCi/L		32.9	408896

Lab Id: 490-164491-1 DU | Analyzed: 01/03/19 08:46 | Ts: 120 | Sigma: 2
Client ID: CUF-BS-FB13-20181206 | Detector: GV16 | Decay Corrected: No | Ingrowth:

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	-15.68	15.4	15.5	U	pCi/L	50.0	36.2	408895
Radium-228	-1.962	4.03	4.03	U	pCi/L	50.0	35.1	408895
Radium 226 and 228 (positive only)	0.0000	0.00000	0.00000	U	pCi/L		36.2	408895

Lab Id: 490-164491-10 | Analyzed: 01/03/19 02:04 | Ts: 120 | Sigma: 2
Client ID: CUF-BS-EB04-20181206 | Detector: GV7 | Decay Corrected: No | Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	9.67	5.83	5.91	U	pCi/L	50.0	39.8	408900
Radium-228	2.77	3.98	3.99	U	pCi/L	50.0	43.1	408900
Radium 226 and 228 (positive only)	12.4	7.06	7.13	U	pCi/L		43.1	408900

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 405454

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 160-405454/1-A	Radium-226			-6.406	U	pCi/L							-.6056821 5
MB 160-405454/1-A	Radium-228			10.52	U	pCi/L							1.098895 35
MB 160-405454/1-A	Radium 226 and 228 (positive only)			10.52	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 160-405454/2-A	Americium-241		136000	130900		pCi/L	96	90 - 111					-.6507832 566
LCS 160-405454/2-A	Cesium-137		45000	44560		pCi/L	99	90 - 111					-.1967507 18
LCS 160-405454/2-A	Cobalt-60		31100	30070		pCi/L	97	89 - 110					-.6229497 109

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
490-164491-1	Radium-226	-11.5		-15.68	U	pCi/L			30	0.14	0.38	1	
490-164491-1	Radium-228	5.35		-1.962	U	pCi/L			432	0.56	1.49	1	
490-164491-1	Radium 226 and 228 (positive only)	5.35		0.0000	U	pCi/L			200	0.16	0.45		

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: Eurofins TestAmerica, St. Loui Job No.: 490-164491-1

SDG No.:

Batch Number: 405454 Batch Start Date: 12/13/18 01:29 Batch Analyst: Tucker, Michael P

Batch Method: Fill_Geo-21 Batch End Date: 12/13/18 01:50

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	IngDecDate1	IngDecDate3	Geometry	1L Marn LCS 00005	
MB 160-405454/1		Fill_Geo-21, 901.1		1000 mL	12/13/18	1/3/18	1L Marn		
LCS 160-405454/2		Fill_Geo-21, 901.1		1000 mL	12/13/18	1/3/18	1L Marn	# mL	
490-164491-A-1	CUF-BS-FB13-2018 1206	Fill_Geo-21, 901.1	T	1000 mL	12/13/18	1/3/18	1L Marn		
490-164491-A-1 DU	CUF-BS-FB13-2018 1206	Fill_Geo-21, 901.1	T	1000 mL	12/13/18	1/3/18	1L Marn		
490-164491-A-10	CUF-BS-EB04-2018 1206	Fill_Geo-21, 901.1	T	1000 mL	12/13/18	1/3/18	1L 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: 14_Gamma_20190015

Sample Description: 405454_Gamma_MB 160-405454~1-A
Detector: Detector #14
Batch ID: 405454
Work Order Number: Gamma
Lot Number: MB 160-405454~1-A

Decay to Time: 1/3/2019 01:59 Live Time: 7200 sec
Acquisition Time: 1/3/2019 02:00:17 Real Time: 7202 sec
Analysis Time: 1/3/2019 04:00 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_2018-12-22_1356.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	-1.011E+00	96.2	9.727E-01	9.740E-01	3.271E+00
NA-22	1.803E-01	30.2	5.435E-02	5.506E-02	1.208E-01
K-40	-5.671E-01	291.9	1.655E+00	1.656E+00	4.452E+00
Sc-46	-6.782E-02	200.4	1.359E-01	1.360E-01	4.704E-01
CR-51	-3.850E-01	239.3	9.214E-01	9.216E-01	3.144E+00
MN-54	2.465E-02	436.7	1.076E-01	1.076E-01	2.662E-01
FE-59	3.101E-02	145.8	4.521E-02	4.523E-02	6.615E-01
Co-56	5.831E-02	132.5	7.726E-02	7.731E-02	2.897E-01
CO-57	5.324E-02	105.5	5.616E-02	5.623E-02	1.889E-01
CO-58	-1.064E-01	100.0	1.064E-01	1.065E-01	4.303E-01
CO-60	2.216E-01	27.7	6.146E-02	6.243E-02	1.256E-01
ZN-65	5.531E-02	497.9	2.754E-01	2.754E-01	9.679E-01
NB-94	5.856E-02	83.1	4.864E-02	4.873E-02	3.241E-01
ZR-95	-7.182E-02	250.0	1.795E-01	1.796E-01	5.143E-01
NB-95	1.447E-02	688.0	9.954E-02	9.955E-02	3.541E-01
RU-103	4.914E-02	200.0	9.828E-02	9.831E-02	2.512E-01
RH-106	-1.244E+00	149.3	1.857E+00	1.858E+00	3.925E+00
AG-108M	5.679E-02	137.0	7.781E-02	7.786E-02	2.070E-01
AG-110M	6.580E-02	78.4	5.157E-02	5.168E-02	6.410E-01
SN-113	1.223E-01	131.7	1.611E-01	1.612E-01	5.448E-01
SB-124	1.769E-01	37.8	6.686E-02	6.745E-02	5.778E-01
SB-125	2.071E-01	162.0	3.355E-01	3.357E-01	8.086E-01
I-131	1.118E-01	80.1	8.953E-02	8.971E-02	2.690E-01
Gd-153	-1.799E-01	117.7	2.118E-01	2.121E-01	7.103E-01
Ga-68	-8.278E+00	122.0	1.010E+01	1.011E+01	2.279E+01
Tc-99m	-8.349E-02	130.7	1.091E-01	1.092E-01	3.651E-01
BA-133	-1.572E-01	103.5	1.627E-01	1.629E-01	5.462E-01
CS-134	-3.116E-03	95.8	2.984E-03	2.988E-03	5.577E-01
CS-137	-1.736E-02	1338.4	2.323E-01	2.323E-01	4.179E-01
CE-139	1.699E-02	525.6	8.929E-02	8.930E-02	3.044E-01
Ba-140	2.726E-01	122.6	3.343E-01	3.346E-01	8.602E-01
La-140	3.784E-02	103.5	3.915E-02	3.921E-02	3.874E-01
CE-141	-8.166E-02	215.9	1.763E-01	1.763E-01	5.936E-01

CE-144	0.000E+00	1.#INF	2.875E-01	2.875E-01	2.294E+00
PM-144	1.164E-01	88.0	1.024E-01	1.025E-01	3.135E-01
EU-152	2.827E-01	83.6	2.364E-01	2.369E-01	7.158E-01
EU-154	2.293E-01	120.1	2.753E-01	2.756E-01	4.573E-01
EU-155	-1.629E-01	194.9	3.175E-01	3.176E-01	9.564E-01
HF-181	-1.017E-01	128.3	1.304E-01	1.305E-01	4.425E-01
Ta-182	2.018E-01	27.7	5.596E-02	5.681E-02	1.609E+00
Hg-203	7.129E-02	121.2	8.639E-02	8.649E-02	2.251E-01
TL-208	-9.994E-03	1378.5	1.378E-01	1.378E-01	3.661E-01
PM-146	-2.679E-02	168.6	4.517E-02	4.519E-02	4.011E-01
Y-88	0.000E+00	1.#INF	2.306E-02	2.306E-02	1.699E-01
Cd-113m	-5.680E+02	226.5	1.287E+03	1.287E+03	4.393E+03
Cd-109	-8.942E-01	265.6	2.375E+00	2.375E+00	7.980E+00
Cf-251	-4.134E-01	108.3	4.476E-01	4.490E-01	1.203E+00
Cf-249	-1.621E-01	119.3	1.934E-01	1.936E-01	6.497E-01
Sn-126	7.269E-02	888.4	6.457E-01	6.457E-01	2.206E+00
PB-210	-2.335E-01	780.4	1.822E+00	1.822E+00	5.370E+00
PB-212	-1.598E-01	133.8	2.138E-01	2.140E-01	7.284E-01
PB-214	-2.025E-01	120.4	2.438E-01	2.440E-01	8.291E-01
BI-207	2.716E-01	55.8	1.516E-01	1.522E-01	3.339E-01
BI-212	1.597E+00	96.3	1.538E+00	1.540E+00	5.195E+00
U-235	-1.279E-01	67.9	8.691E-02	8.716E-02	2.773E+00
BI-214	-2.370E-01	165.0	3.911E-01	3.913E-01	1.333E+00
BI-210M	-1.371E-01	121.8	1.670E-01	1.672E-01	5.629E-01
AC-228	3.894E-01	90.9	3.538E-01	3.543E-01	8.486E-01
TH-227	3.209E-01	126.2	4.049E-01	4.054E-01	2.800E+00
TH-229	1.252E+00	107.2	1.342E+00	1.345E+00	3.638E+00
TH-234	1.010E+00	117.5	1.186E+00	1.187E+00	3.290E+00
PA-231	0.000E+00	1.#INF	9.751E-01	9.751E-01	1.610E+01
PA-233	0.000E+00	1.#INF	1.397E-01	1.397E-01	1.317E+00
PA-234	2.259E-01	194.6	4.396E-01	4.398E-01	1.386E+00
PA-234M	3.661E+00	161.1	5.898E+00	5.900E+00	6.231E+01
AM-241	9.561E-02	166.1	1.589E-01	1.589E-01	4.560E-01
Np-237	-4.434E-01	167.8	7.440E-01	7.444E-01	2.489E+00
Ir-192	-1.014E-02	991.4	1.005E-01	1.005E-01	3.468E-01
Cs-136	5.219E-02	291.0	1.519E-01	1.519E-01	5.244E-01
Np-239	3.820E-02	740.1	2.827E-01	2.827E-01	9.633E-01
Nd-147	-1.206E-01	653.2	7.880E-01	7.880E-01	2.028E+00
TL-210	1.376E-01	88.9	1.223E-01	1.226E-01	4.120E-01
Kr-85	2.797E+01	127.8	3.575E+01	3.579E+01	1.203E+02
Total	3.981E+01				

Analyst: Morgan Reichert

Sample description
405454_Gamma_MB 160-405454~1-A

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20190015.An1

Acquisition information
Start time: 1/3/2019 2:00:17 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	1/3/2019 1:59:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2018-12-22_1356.PBC 12/22/2018 1:56:07 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 7 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1280

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.49	-3.	780.38	0.75	3.849E-02	46.54	4.250	PBC<MDA	PB210
59.54	11.	166.14	0.76	4.451E-02	59.54	35.900	PBC<MDA	AM241
63.19	-7.	290.12	0.77	4.569E-02	63.29	3.810	PBC<MDA	TH234
64.28	2.	888.36	0.77	4.596E-02	64.28	9.700	PBC<MDA	Sn126
80.99	9.	215.02	0.78	4.877E-02	80.99	34.060	PBC<MDA	BA133
92.58	20.	117.45	1.16	4.919E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	1.014E+00	AC228
103.20	5.	401.56	0.81	4.884E-02	103.20	21.800	PBC<MDA	Gd153
106.13	3.	740.12	0.81	4.866E-02	106.13	22.700	PBC<MDA	Np239
122.06	15.	105.47	0.83	4.714E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	5.324E-02	CO57
123.10	6.	313.27	0.83	4.702E-02	123.10	40.790	PBC<MDA	EU154
131.29	8.	298.89	0.84	4.599E-02	131.29	18.000	PBC<MDA	PA234
165.85	4.	525.59	0.87	4.093E-02	165.85	79.900	PBC<MDA	CE139
185.58	14.	127.28	0.44	3.802E-02	185.72	54.000	PBC<MDA	U235
193.51	15.	107.16	0.90	3.697E-02	193.51	4.400	PBC<MDA	TH229
205.33	17.	105.32	0.91	3.553E-02	205.33	5.010	PBC<MDA	U235
227.00	4.	385.31	0.93	3.318E-02	227.00	6.300	PBC<MDA	Cf251
235.97	15.	126.17	0.94	3.230E-02	235.97	12.300	PBC<MDA	TH227
238.63	-16.	133.80	0.94	3.205E-02	238.63	43.300	PBC<MDA	PB212
241.69	14.	145.13	0.95	3.174E-02	242.00	7.430	PBC<MDA	PB214
244.69	14.	147.37	0.95	3.150E-02	244.69	7.580	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
279.20	12.	121.19	0.99	2.870E-02	279.20	81.460	PBC<MDA	Hg203
328.76	13.	103.48	1.03	2.551E-02	328.76	20.300	PBC<MDA	La140
338.32	8.	213.61	1.04	2.498E-02	338.32	12.010	PBC<MDA	AC228
351.59	-13.	120.40	1.06	2.426E-02	351.93	37.600	PBC<MDA	PB214
391.69	13.	131.71	1.09	2.240E-02	391.69	64.000	PBC<MDA	SN113
433.94	8.	137.01	1.13	2.072E-02	433.94	90.480	PBC<MDA	AG108M
497.05	6.	200.00	1.19	1.866E-02	497.05	90.900	PBC<MDA	RU103
511.86	101.	16.77	2.46	1.823E-02	511.86	20.000	3.853E+00	RH106
513.98	16.	127.85	1.21	1.817E-02	513.98	0.430	PBC<MDA	Kr85
537.26	8.	122.64	1.23	1.755E-02	537.26	24.390	PBC<MDA	Ba140
569.47	4.	249.22	1.26	1.676E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.211E-01	PA234
					569.70	97.740	3.534E-02	BI207
569.70	7.	137.67	1.26	1.675E-02	569.32	15.380	3.682E-01	CS134
					569.47	8.200	6.907E-01	PA234
					569.70	97.740	5.796E-02	BI207
600.50	12.	161.99	1.29	1.606E-02	600.50	17.860	PBC<MDA	SB125
602.73	13.	152.67	1.29	1.601E-02	602.73	98.260	PBC<MDA	SB124
					604.71	97.620	1.131E-01	CS134
603.23	13.	148.63	1.29	1.597E-02	602.73	98.260	PBC<MDA	SB124
					604.71	97.620	1.132E-01	CS134
609.31	-12.	165.03	1.30	1.587E-02	609.31	46.090	PBC<MDA	BI214
610.30	13.	158.28	1.30	1.585E-02	610.30	5.750	PBC<MDA	RU103
618.06	13.	137.21	1.30	1.569E-02	618.06	99.100	PBC<MDA	PM144
636.97	10.	80.05	1.32	1.531E-02	636.97	7.170	PBC<MDA	I131
696.54	12.	110.08	1.37	1.424E-02	696.54	99.000	PBC<MDA	PM144
702.63	2.	760.45	1.38	1.414E-02	702.63	97.900	PBC<MDA	NB94
727.17	12.	96.32	1.40	1.374E-02	727.17	7.550	PBC<MDA	BI212
735.72	3.	280.97	1.41	1.361E-02	735.72	22.500	PBC<MDA	PM146
763.94	11.	78.38	1.43	1.319E-02	763.94	22.280	PBC<MDA	AG110M
765.79	1.	688.01	1.43	1.316E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	4.914E+00	PA234M
766.41	6.	161.09	1.43	1.315E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.975E+01	PA234M
778.92	2.	470.33	1.44	1.298E-02	778.92	12.940	PBC<MDA	EU152
799.60	12.	88.86	1.46	1.270E-02	799.60	98.960	PBC<MDA	TL210
818.50	5.	291.04	1.48	1.245E-02	818.50	100.000	PBC<MDA	Cs136
834.85	2.	436.73	1.49	1.224E-02	834.85	99.980	PBC<MDA	MN54
871.10	8.	83.07	1.52	1.181E-02	871.10	99.890	PBC<MDA	NB94
911.07	9.	90.87	1.55	1.137E-02	911.07	29.000	PBC<MDA	AC228
1001.00	-1.	749.48	1.63	1.049E-02	1001.00	0.837	PBC<MDA	PA234M
1004.77	9.	120.07	1.63	1.045E-02	1004.77	18.010	PBC<MDA	EU154
1037.84	3.	293.43	1.65	1.016E-02	1037.84	14.130	PBC<MDA	Co56
1063.66	14.	55.82	1.67	9.948E-03	1063.66	74.500	PBC<MDA	BI207
1112.07	10.	83.60	1.71	9.569E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	2.	497.87	1.71	9.543E-03	1115.55	50.600	PBC<MDA	ZN65
1120.29	-2.	486.53	1.72	9.507E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1189.05	8.	93.82	1.77	9.021E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	13.	27.74	1.79	8.808E-03	1221.41	27.000	7.592E-01	Ta182
1238.28	5.	132.49	1.80	8.702E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	11.	30.15	1.83	8.481E-03	1274.53	99.940	1.803E-01	NA22
					1274.54	35.190	5.119E-01	EU154
1291.60	5.	145.77	1.84	8.380E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	13.	27.74	1.87	8.149E-03	1332.50	99.980	2.216E-01	CO60
1384.30	1.	563.47	1.91	7.874E-03	1384.30	24.290	PBC<MDA	AG110M
1460.83	-3.	291.90	1.96	7.499E-03	1460.83	10.670	PBC<MDA	K40
1690.98	7.	37.80	2.10	6.556E-03	1690.98	47.790	PBC<MDA	SB124
1764.49	-4.	191.46	2.14	6.302E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	7.	79.67	2.15	6.279E-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
741.59	185.58	58.	66.	1.723E+03	24.18	0.443	- 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	185.58	46.54	169.	-3.	0.000	780.38	0.750
TH-227	199.98	50.14	96.	-2.	0.000	827.65	0.751
AM-241	237.55	59.54	114.	11.	0.002	166.14	0.761
TH-234	252.55	63.29	210.	-7.	-0.001	290.12	0.765s
Sn-126	256.52	64.28	214.	2.	0.000	888.36	0.766s
BA-133	323.33	80.99	129.	9.	0.001	215.02	0.784s
Np-237	345.33	86.49	583.	-21.	-0.003	167.80	0.789s
EU-155	345.54	86.54	563.	-21.	-0.003	164.82	0.790s
Sn-126	347.13	86.94	542.	-21.	-0.003	161.79	0.790s
Sn-126	349.65	87.57	522.	-21.	-0.003	158.59	0.791
Cd-109	351.53	88.04	501.	-12.	-0.002	265.57	0.791
TH-234	369.70	92.58	179.	20.	0.003	117.45	1.162s
AC-228	372.76	93.35	352.	-21.	-0.003	126.68	0.797s
Gd-153	389.36	97.50	243.	-19.	-0.003	117.74	0.801s
Np-239	397.36	99.50	210.	-9.	-0.001	241.00	0.803s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Gd-153	412.15	103.20	227.	5.	0.001	401.56	0.807s
Np-239	414.15	103.70	184.	-14.	-0.002	144.87	0.807
EU-155	420.60	105.31	215.	-12.	-0.002	194.93	0.809s
Np-239	423.87	106.13	245.	3.	0.000	740.12	0.810s
EU-152	486.45	121.78	205.	-19.	-0.003	108.86	0.826s
CO-57	487.58	122.06	125.	15.	0.002	105.47	0.826s
EU-154	491.73	123.10	168.	6.	0.001	313.27	0.828
PA-234	524.50	131.29	294.	8.	0.001	298.89	0.836s
HF-181	531.42	133.02	302.	0.	0.000	1000.00	0.838s
CE-144	533.47	133.54	302.	0.	0.000	1000.00	0.838s
HF-181	544.52	136.30	302.	0.	0.000	1000.00	0.841s
CO-57	545.21	136.47	282.	-4.	-0.001	529.38	0.841s
Tc-99m	561.35	140.51	380.	-21.	-0.003	130.66	0.845
U-235	574.45	143.79	408.	-28.	-0.004	85.84	0.849s
CE-141	581.07	145.44	356.	-12.	-0.002	215.89	0.850s
Ba-140	649.93	162.66	228.	-10.	-0.001	215.87	0.868s
U-235	652.81	163.38	238.	0.	0.000	1000.00	0.869s
CE-139	662.70	165.85	219.	4.	0.001	525.59	0.871
Cf-251	705.68	176.60	140.	-20.	-0.003	108.28	0.882
U-235	742.15	185.72	253.	-71.	-0.010	38.88	0.892s
TH-229	773.30	193.51	73.	15.	0.002	107.16	0.899s
U-235	820.58	205.33	100.	17.	0.002	105.32	0.912s
TH-229	842.65	210.85	110.	-10.	-0.001	289.62	0.917s
Cf-251	907.23	227.00	87.	4.	0.001	385.31	0.933
TH-227	943.11	235.97	180.	15.	0.002	126.17	0.942s
PB-212	953.75	238.63	226.	-16.	-0.002	133.80	0.945s
PB-214	967.21	242.00	210.	14.	0.002	145.13	0.948s
EU-152	977.99	244.69	218.	14.	0.002	147.37	0.951s
Cd-113m	1054.01	263.70	134.	-7.	-0.001	226.54	0.970s
BI-210M	1062.53	265.83	152.	-15.	-0.002	121.84	0.972s
Hg-203	1115.99	279.20	57.	12.	0.002	121.19	0.985
I-131	1136.39	284.30	88.	-11.	-0.002	162.37	0.990s
TL-210	1183.18	296.00	345.	-17.	-0.002	159.14	1.002s
PB-212	1199.30	300.03	333.	-19.	-0.003	133.57	1.006s
PA-231	1199.46	300.07	348.	-6.	-0.001	416.16	1.006s
PA-233	1199.90	300.18	354.	0.	0.000	1000.00	1.006s
PA-231	1209.78	302.65	354.	0.	0.000	1000.00	1.008s
BA-133	1210.59	302.85	354.	0.	0.000	1000.00	1.009s
Ba-140	1218.57	304.85	354.	0.	0.000	1000.00	1.011s
BI-210M	1218.76	304.90	354.	0.	0.000	1000.00	1.011s
Ir-192	1232.94	308.44	354.	0.	0.000	1000.00	1.014s
PA-233	1247.22	312.01	354.	0.	0.000	1000.00	1.018s
Ir-192	1265.13	316.49	136.	-2.	0.000	991.36	1.022s
CR-51	1279.51	320.08	144.	-7.	-0.001	239.32	1.026s
La-140	1314.21	328.76	48.	13.	0.002	103.48	1.034s
Cf-249	1332.92	333.44	62.	-5.	-0.001	280.31	1.039s
AC-228	1352.44	338.32	146.	8.	0.001	213.61	1.043s
Cs-136	1361.44	340.57	154.	0.	0.000	1000.00	1.045s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	1376.30	344.29	158.	-4.	-0.001	419.10	1.049s
HF-181	1382.47	345.83	160.	-9.	-0.001	201.54	1.050s
PB-214	1406.88	351.93	123.	-13.	-0.002	120.40	1.056
BA-133	1423.15	356.00	144.	-17.	-0.002	103.49	1.060s
BA-133	1534.50	383.84	192.	-20.	-0.003	80.26	1.087s
Cf-249	1550.94	387.95	206.	-17.	-0.002	119.30	1.091s
SN-113	1565.90	391.69	132.	13.	0.002	131.71	1.095s
AG-108M	1734.87	433.94	29.	8.	0.001	137.01	1.135
PM-146	1814.64	453.88	56.	-8.	-0.001	186.53	1.154s
SB-125	1852.59	463.37	145.	-23.	-0.003	71.22	1.163s
Ir-192	1871.36	468.06	139.	-14.	-0.002	123.97	1.167s
BE-7	1909.50	477.60	93.	-15.	-0.002	96.21	1.176s
HF-181	1927.10	482.00	99.	-11.	-0.002	128.29	1.180s
RU-103	1987.33	497.05	36.	6.	0.001	200.00	1.194s
RH-106	2046.57	511.86	93.	101.	0.014	16.77	2.458s
Kr-85	2055.03	513.98	194.	16.	0.002	127.85	1.210s
Nd-147	2123.11	531.00	44.	-2.	0.000	653.20	1.225s
Ba-140	2148.15	537.26	26.	8.	0.001	122.64	1.231
CS-134	2252.06	563.24	40.	-3.	0.000	329.14	1.255s
CS-134	2276.40	569.32	48.	-6.	-0.001	168.33	1.260
PA-234	2276.99	569.47	52.	4.	0.001	249.22	1.261s
BI-207	2277.92	569.70	41.	7.	0.001	137.67	1.261s
SB-125	2401.12	600.50	170.	12.	0.002	161.99	1.289s
SB-124	2410.04	602.73	181.	13.	0.002	152.67	1.291s
CS-134	2417.96	604.71	172.	13.	0.002	148.63	1.292s
BI-214	2436.36	609.31	210.	-12.	-0.002	165.03	1.296s
RU-103	2440.31	610.30	197.	13.	0.002	158.28	1.297s
PM-144	2471.37	618.06	148.	13.	0.002	137.21	1.304s
RH-106	2486.79	621.92	78.	-14.	-0.002	149.26	1.308s
SB-125	2542.69	635.89	38.	-7.	-0.001	288.39	1.320s
I-131	2547.03	636.97	29.	10.	0.001	80.05	1.321s
AG-110M	2630.18	657.76	56.	0.	0.000	1000.00	1.339s
PM-144	2785.32	696.54	39.	12.	0.002	110.08	1.374s
NB-94	2809.67	702.63	40.	2.	0.000	760.45	1.379s
SB-124	2890.31	722.79	56.	-14.	-0.002	81.66	1.396s
AG-108M	2890.91	722.94	70.	-2.	0.000	524.87	1.397s
EU-154	2892.60	723.36	72.	0.	0.000	1000.00	1.397s
ZR-95	2895.96	724.20	72.	0.	0.000	1000.00	1.398s
BI-212	2907.84	727.17	60.	12.	0.002	96.32	1.400s
PM-146	2942.05	735.72	18.	3.	0.000	280.97	1.408s
PM-146	2987.81	747.16	40.	-9.	-0.001	102.86	1.417s
ZR-95	3026.09	756.73	27.	-4.	-0.001	250.01	1.426
AG-110M	3054.96	763.94	32.	11.	0.002	78.38	1.432s
NB-95	3062.34	765.79	44.	1.	0.000	688.01	1.433s
PA-234M	3064.83	766.41	36.	6.	0.001	161.09	1.434s
EU-152	3114.87	778.92	19.	2.	0.000	470.33	1.444s
BI-212	3140.88	785.42	26.	-2.	0.000	407.82	1.450s
CS-134	3182.68	795.87	78.	-11.	-0.001	120.79	1.459s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-210	3197.61	799.60	55.	12.	0.002	88.86	1.462s
CS-134	3207.01	801.95	95.	-17.	-0.002	85.31	1.464s
CO-58	3242.31	810.77	60.	-10.	-0.001	99.98	1.471s
La-140	3262.30	815.77	74.	-16.	-0.002	62.38	1.475s
Cs-136	3273.22	818.50	90.	5.	0.001	291.04	1.478s
MN-54	3338.63	834.85	20.	2.	0.000	436.73	1.492s
Co-56	3386.32	846.77	23.	-1.	0.000	773.39	1.501s
NB-94	3483.65	871.10	20.	8.	0.001	83.07	1.522s
EU-154	3492.19	873.23	39.	-8.	-0.001	111.93	1.523s
PA-234	3532.24	883.24	61.	0.	0.000	1000.00	1.531s
AG-110M	3538.01	884.68	61.	0.	0.000	1000.00	1.533s
Sc-46	3556.40	889.28	62.	-6.	-0.001	200.43	1.536s
AC-228	3643.58	911.07	14.	9.	0.001	90.87	1.554s
AG-110M	3749.30	937.49	28.	-6.	-0.001	191.49	1.576s
PA-234	3783.42	946.02	29.	-6.	-0.001	191.82	1.582s
AC-228	3875.25	968.97	35.	-11.	-0.001	85.81	1.601s
EU-154	3984.71	996.33	51.	-10.	-0.001	107.38	1.622s
PA-234M	4003.39	1001.00	62.	-1.	0.000	749.48	1.626s
EU-154	4018.51	1004.77	52.	9.	0.001	120.07	1.629s
Co-56	4150.81	1037.84	21.	3.	0.000	293.43	1.655s
Cs-136	4191.74	1048.07	24.	-3.	0.000	238.05	1.663s
RH-106	4200.91	1050.36	48.	-15.	-0.002	69.20	1.665s
BI-207	4254.12	1063.66	11.	14.	0.002	55.82	1.675s
Ga-68	4309.10	1077.40	35.	-11.	-0.002	122.02	1.685
FE-59	4396.54	1099.25	25.	-4.	-0.001	279.32	1.702s
EU-152	4447.85	1112.07	32.	10.	0.001	83.60	1.712s
ZN-65	4461.74	1115.55	44.	2.	0.000	497.87	1.714s
BI-214	4480.72	1120.29	48.	-2.	0.000	486.53	1.718
Sc-46	4481.77	1120.55	46.	0.	0.000	1000.00	1.718
Ta-182	4484.77	1121.30	59.	-12.	-0.002	97.35	1.719s
CO-60	4692.60	1173.24	21.	-2.	0.000	488.09	1.757
Ta-182	4755.88	1189.05	10.	8.	0.001	93.82	1.769s
Ta-182	4885.38	1221.41	0.	13.	0.002	27.74	1.792s
Co-56	4952.89	1238.28	7.	5.	0.001	132.49	1.805s
NA-22	5097.96	1274.53	0.	11.	0.002	30.15	1.831s
EU-154	5098.00	1274.54	11.	0.	0.000	1000.00	1.831s
FE-59	5166.25	1291.60	11.	5.	0.001	145.77	1.843s
TL-210	5251.92	1313.00	11.	-2.	0.000	452.11	1.858s
CO-60	5329.96	1332.50	0.	13.	0.002	27.74	1.871s
AG-110M	5537.26	1384.30	11.	1.	0.000	563.47	1.907
EU-152	5632.13	1408.00	17.	-8.	-0.001	83.70	1.923s
K-40	5843.58	1460.83	24.	-3.	0.000	291.90	1.958s
La-140	6385.44	1596.21	11.	-1.	0.000	598.44	2.044s
SB-124	6764.81	1690.98	0.	7.	0.001	37.80	2.102s
BI-214	7059.07	1764.49	27.	-4.	-0.001	191.46	2.145s
Co-56	7086.53	1771.35	14.	7.	0.001	79.67	2.149s
Y-88	7345.59	1836.06	0.	0.	0.000	1000.00	2.185s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.0110E+00				5.31E+01	
			477.60	-1.011E+00	?(	3.271E+00 9.62E+01	1.05E+01 G
NA-22	C	1.8026E-01				9.50E+02	
			1274.53	1.803E-01	?(	1.208E-01 3.02E+01	9.99E+01 G
K-40	N	-5.6707E-01				4.66E+11	
			1460.83	-5.671E-01	?(P	4.452E+00 2.92E+02	1.07E+01 G
Sc-46	F	-6.7818E-02				8.38E+01	
			889.28	-6.782E-02	?(	4.704E-01 2.00E+02	1.00E+02 G
			1120.55	0.000E+00	+	5.015E-01 1.00E+03	1.00E+02 G
CR-51	F	-3.8500E-01				2.77E+01	
			320.08	-3.850E-01	?(	3.144E+00 2.39E+02	9.94E+00 G
MN-54	C	2.4648E-02				3.12E+02	
			834.85	2.465E-02	?(P	2.662E-01 4.37E+02	1.00E+02 G
FE-59	F	3.1011E-02				4.45E+01	
			1099.25	-1.017E-01	?(	6.615E-01 2.79E+02	5.65E+01 G
			1291.60	2.046E-01	?(	6.879E-01 1.46E+02	4.32E+01 G
Co-56	C	5.8312E-02				7.73E+01	
			846.77	-1.532E-02	?(	2.897E-01 7.73E+02	9.99E+01 G
			1238.28	1.108E-01	?(P	3.638E-01 1.32E+02	6.61E+01 G
			1037.84	3.336E-01	?(P	2.305E+00 2.93E+02	1.41E+01 G
			1771.35	1.068E+00	?	2.879E+00 7.97E+01	1.55E+01 A
CO-57	C	5.3241E-02				2.72E+02	
			122.06	5.324E-02	?(	1.889E-01 1.05E+02	8.56E+01 G
			136.47	-1.292E-01	&	2.323E+00 5.29E+02	1.07E+01 G
CO-58	C	-1.0642E-01				7.09E+01	
			810.78	-1.064E-01	?(P	4.303E-01 1.00E+02	9.95E+01 G
CO-60	F	2.2160E-01				1.93E+03	
			1332.50	2.216E-01	?(	1.256E-01 2.77E+01	1.00E+02 G
			1173.24	-3.190E-02	- P	3.673E-01 4.88E+02	9.99E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F 5.5308E-02					2.44E+02	
		1115.55	5.531E-02	?(P	9.679E-01	4.98E+02	5.06E+01 G
NB-94	I 5.8562E-02					7.41E+06	
		702.63	1.715E-02	(P	3.241E-01	7.60E+02	9.79E+01 G
		871.10	9.915E-02	?(P	2.746E-01	8.31E+01	9.99E+01 G
ZR-95	I -7.1817E-02					6.40E+01	
		756.73	-7.182E-02	&(P	5.143E-01	2.50E+02	5.45E+01 G
		724.20	0.000E+00	&	9.640E-01	1.00E+03	4.42E+01 G
NB-95	I 1.4468E-02					6.40E+01	
		765.79	1.447E-02	?(	3.541E-01	6.88E+02	9.98E+01 G
RU-103	I 4.9139E-02					3.93E+01	
		497.05	4.914E-02	?(	2.512E-01	2.00E+02	9.09E+01 G
		610.30	1.944E+00	?	1.039E+01	1.58E+02	5.75E+00 GA
RH-106	I -1.2439E+00					3.74E+02	
		621.92	-1.244E+00	?(P	3.925E+00	1.49E+02	9.93E+00 G
		1050.36	-1.356E+01	+	3.113E+01	6.92E+01	1.56E+00 G
		511.86	3.853E+00	?	1.818E+00	1.68E+01	2.00E+01 GA
AG-108M	C 5.6792E-02					1.53E+05	
		433.94	5.679E-02	&(	2.070E-01	1.37E+02	9.05E+01 G
		722.94	-2.512E-02	-	4.609E-01	5.25E+02	9.08E+01 G
		614.28	1.723E-02	%	6.889E-01	1.17E+03	8.98E+01 G
AG-110M	F 6.5797E-02					2.50E+02	
		884.68	0.000E+00	?(	6.410E-01	1.00E+03	7.27E+01 G
		657.76	0.000E+00	?(	3.697E-01	1.00E+03	9.46E+01 G
		937.49	-2.186E-01	+	9.970E-01	1.91E+02	3.44E+01 G
		1384.30	9.682E-02	?(	1.302E+00	5.63E+02	2.43E+01 G
		763.94	5.261E-01	?(	1.384E+00	7.84E+01	2.23E+01 G
SN-113	F 1.2230E-01					1.15E+02	
		391.69	1.223E-01	?(	5.448E-01	1.32E+02	6.40E+01 G
SB-124	F 1.7690E-01					6.02E+01	
		602.73	1.120E-01	?(	5.778E-01	1.53E+02	9.83E+01 G
		1690.98	3.103E-01	?(	3.267E-01	3.78E+01	4.78E+01 G
		722.79	-1.278E+00	+	3.497E+00	8.17E+01	1.08E+01 G
SB-125	I 2.0711E-01					1.01E+03	
		427.88	-7.467E-03	%(	8.086E-01	4.02E+03	2.96E+01 G
		600.50	5.627E-01	*(P	3.071E+00	1.62E+02	1.79E+01 G
		635.89	-5.828E-01	+ P	2.526E+00	2.88E+02	1.13E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			463.37	-1.577E+00	+ P	3.959E+00	7.12E+01	1.05E+01 G
I-131	I	1.1184E-01					8.02E+00	
			364.48	7.219E-03	&(	2.690E-01	1.39E+03	8.17E+01 G
			284.30	-8.814E-01	+	3.720E+00	1.62E+02	6.14E+00 G
			636.97	1.304E+00	?(	3.512E+00	8.01E+01	7.17E+00 G
Gd-153	F	-1.7992E-01					2.42E+02	
			97.50	-1.799E-01	&(	7.103E-01	1.18E+02	3.00E+01 G
			103.20	6.957E-02	+	9.505E-01	4.02E+02	2.18E+01 G
Ga-68	C	-8.2779E+00					4.71E-02	
			1077.40	-8.278E+00	?(	2.279E+01	1.22E+02	3.30E+00 G
Tc-99m	I	-8.3487E-02					2.51E-01	
			140.51	-8.349E-02	&(	3.651E-01	1.31E+02	8.93E+01 G
BA-133	F	-1.5718E-01					3.85E+03	
			356.00	-1.572E-01	(	5.462E-01	1.03E+02	6.20E+01 G
			302.85	0.000E+00	+	2.531E+00	1.00E+03	1.83E+01 G
			383.84	-1.392E+00	+ P	4.597E+00	8.03E+01	8.94E+00 GA
			80.99	7.525E-02	+	4.652E-01	2.15E+02	3.41E+01 GA
CS-134	I	-3.1164E-03					7.54E+02	
			795.87	-1.359E-01	?(	5.577E-01	1.21E+02	8.55E+01 G
			604.71	1.132E-01	&(	5.686E-01	1.49E+02	9.76E+01 G
			569.32	-3.233E-01	+	1.885E+00	1.68E+02	1.54E+01 G
			801.95	-2.130E+00	+	6.082E+00	8.53E+01	8.69E+00 G
			563.24	-3.152E-01	+ P	3.174E+00	3.29E+02	8.35E+00 G
CS-137	I	-1.7355E-02					1.10E+04	
			661.66	-1.736E-02	%(P	4.179E-01	1.34E+03	8.52E+01 G
CE-139	F	1.6988E-02					1.38E+02	
			165.85	1.699E-02	?(	3.044E-01	5.26E+02	7.99E+01 G
Ba-140	I	2.7259E-01					1.28E+01	
			537.26	2.726E-01	&(P	8.602E-01	1.23E+02	2.44E+01 G
			162.66	-5.393E-01	&	3.941E+00	2.16E+02	6.22E+00 G
			304.85	0.000E+00	&	1.086E+01	1.00E+03	4.29E+00 G
La-140	I	3.7839E-02					1.28E+01	
			1596.21	-2.807E-02	?(	3.874E-01	5.98E+02	9.54E+01 G
			487.02	1.610E-02	&	5.414E-01	1.30E+03	4.55E+01 G
			328.76	3.476E-01	?(	9.357E-01	1.03E+02	2.03E+01 G
			815.77	-7.524E-01	+ P	2.039E+00	6.24E+01	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	-8.1658E-02					3.25E+01	
			145.44	-8.166E-02	?(	5.936E-01	2.16E+02	4.82E+01 G
PM-144	C	1.1640E-01					3.63E+02	
			696.54	1.183E-01	?(	3.135E-01	1.10E+02	9.90E+01 G
			618.06	1.145E-01	?(	5.312E-01	1.37E+02	9.91E+01 G
EU-152	F	2.8274E-01					4.94E+03	
			121.78	-1.962E-01	?(	7.158E-01	1.09E+02	2.86E+01 G
			344.29	-9.032E-02	+ P	1.304E+00	4.19E+02	2.65E+01 G
			1112.07	1.097E+00	?(	3.093E+00	8.36E+01	1.36E+01 G
			778.92	1.566E-01	&(P	1.909E+00	4.70E+02	1.29E+01 G
			964.11	-3.484E-03	% P	2.761E+00	2.22E+04	1.46E+01 G
			244.69	8.382E-01	?(	4.162E+00	1.47E+02	7.58E+00 G
			1408.00	-6.431E-01	+ P	1.847E+00	8.37E+01	2.10E+01 GA
EU-154	I	2.2928E-01					3.14E+03	
			123.10	4.277E-02	?(	4.573E-01	3.13E+02	4.08E+01 G
			1274.54	0.000E+00	-	8.454E-01	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	2.103E+00	1.00E+03	2.02E+01 G
			873.23	-8.002E-01	+	3.067E+00	1.12E+02	1.23E+01 G
			1004.77	6.517E-01	?(	2.675E+00	1.20E+02	1.80E+01 G
			996.33	-1.224E+00	+	4.472E+00	1.07E+02	1.06E+01 G
EU-155	I	-1.6286E-01					1.81E+03	
			105.31	-1.629E-01	&(P	9.564E-01	1.95E+02	2.12E+01 G
			86.54	-1.893E-01	+	1.044E+00	1.65E+02	3.07E+01 G
HF-181	F	-1.0168E-01					4.24E+01	
			482.00	-1.017E-01	?(	4.425E-01	1.28E+02	8.05E+01 G
			133.02	0.000E+00	+	5.866E-01	1.00E+03	4.33E+01 G
			345.83	-3.375E-01	+	2.312E+00	2.02E+02	1.51E+01 G
			136.30	0.000E+00	&	4.385E+00	1.00E+03	5.85E+00 G
Ta-182	F	2.0177E-01					1.14E+02	
			1121.30	-4.888E-01	?(	1.609E+00	9.74E+01	3.49E+01 G
			1221.41	7.592E-01	?(	4.304E-01	2.77E+01	2.70E+01 G
			1189.05	7.603E-01	?(	1.658E+00	9.38E+01	1.62E+01 G
Hg-203	F	7.1285E-02					4.66E+01	
			279.20	7.129E-02	?(	2.251E-01	1.21E+02	8.15E+01 G
TL-208	N	-9.9943E-03					6.98E+02	
			583.02	-9.994E-03	%(P	3.661E-01	1.38E+03	8.45E+01 G
			277.28	2.626E-02	% P	3.703E+00	4.08E+03	6.31E+00 G
			860.56	-8.286E-02	% P	2.249E+00	1.07E+03	1.24E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PM-146	C -2.6789E-02					2.02E+03	
		453.88	-8.539E-02	?(	4.011E-01	1.87E+02	6.50E+01 G
		747.16	-2.693E-01	+ P	9.769E-01	1.03E+02	3.40E+01 G
		735.72	1.425E-01	?(P	1.016E+00	2.81E+02	2.25E+01 G
Cd-113m	-5.6796E+02					5.33E+03	
		263.70	-5.680E+02	?(	4.393E+03	2.27E+02	6.00E-03 K
Cd-109	F -8.9417E-01					4.53E+02	
		88.04	-8.942E-01	(	7.980E+00	2.66E+02	3.79E+00 G
Cf-251	T -4.1338E-01					3.28E+05	
		176.60	-4.134E-01	&(	1.203E+00	1.08E+02	1.70E+01 G
		227.00	2.879E-01	+	3.063E+00	3.85E+02	6.30E+00 GA
Cf-249	T -1.6215E-01					1.28E+05	
		387.95	-1.621E-01	?(	6.497E-01	1.19E+02	6.60E+01 G
		333.44	-1.892E-01	+	1.401E+00	2.80E+02	1.55E+01 G
Sn-126	7.2686E-02					3.65E+07	
		87.57	-1.550E-01	+	8.227E-01	1.59E+02	3.75E+01 GA
		64.28	7.269E-02	?(	2.206E+00	8.88E+02	9.70E+00 G
		86.94	-6.427E-01	+	3.479E+00	1.62E+02	9.04E+00 GA
PB-210	N -2.3352E-01					8.14E+03	
		46.54	-2.335E-01	?(P	5.370E+00	7.80E+02	4.25E+00 G
PB-212	N -1.5978E-01					6.98E+02	
		238.63	-1.598E-01	*(P	7.284E-01	1.34E+02	4.33E+01 G
		300.03	-2.885E+00	+ P	1.363E+01	1.34E+02	3.28E+00 GA
PB-214	N -2.0251E-01					5.84E+05	
		351.93	-2.025E-01	?(P	8.291E-01	1.20E+02	3.76E+01 G
		295.09	3.654E-02	& P	2.161E+00	1.76E+03	1.93E+01 G
		242.00	8.461E-01	?	4.138E+00	1.45E+02	7.43E+00 GA
BI-207	C 2.7157E-01					1.18E+04	
		1063.66	2.716E-01	?(P	3.339E-01	5.58E+01	7.45E+01 G
		569.70	5.796E-02	-	2.756E-01	1.38E+02	9.77E+01 G
BI-212	N 1.5965E+00					6.98E+02	
		727.17	1.597E+00	?(	5.195E+00	9.63E+01	7.55E+00 G
		785.42	-1.883E+00	& P	2.238E+01	4.08E+02	1.28E+00 GA
U-235	N -1.2794E-01					2.57E+11	
		143.79	-8.054E-01	(P	2.773E+00	8.58E+01	1.10E+01 G
		205.33	1.354E+00	(	3.848E+00	1.05E+02	5.01E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			163.38	0.000E+00	+	4.939E+00	1.00E+03	5.08E+00 G
			185.72	-4.797E-01	+ P	5.203E-01	3.89E+01	5.40E+01 GA
BI-214	N	-2.3702E-01					5.84E+05	
			609.31	-2.370E-01	(P	1.333E+00	1.65E+02	4.61E+01 G
			1120.29	-1.986E-01	+ P	3.387E+00	4.87E+02	1.51E+01 G
			1764.49	-5.414E-01	+ P	3.839E+00	1.91E+02	1.54E+01 G
BI-210M	T	-1.3709E-01					1.10E+09	
			265.83	-1.371E-01	?(	5.629E-01	1.22E+02	5.00E+01 G
			304.90	0.000E+00	&	1.665E+00	1.00E+03	2.80E+01 G
AC-228	N	3.8938E-01					2.10E+03	
			911.07	3.943E-01	?(	8.486E-01	9.09E+01	2.90E+01 G
			968.97	-7.865E-01	+ P	2.223E+00	8.58E+01	1.75E+01 G
			338.32	3.775E-01	?(P	2.731E+00	2.14E+02	1.20E+01 G
			93.35	-1.080E+00	+	4.579E+00	1.27E+02	5.56E+00 XA
TH-227	N	3.2092E-01					7.95E+03	
			256.24	-5.962E-02	%(P	2.800E+00	1.68E+03	7.00E+00 G
			235.97	5.375E-01	&(	2.283E+00	1.26E+02	1.23E+01 G
			50.14	-8.575E-02	&	2.074E+00	8.28E+02	8.00E+00 G
TH-229	N	1.2519E+00					2.68E+06	
			193.51	1.252E+00	?(	3.638E+00	1.07E+02	4.40E+00 G
			210.85	-1.285E+00	+ P	6.857E+00	2.90E+02	2.99E+00 G
TH-234	N	1.0096E+00					1.63E+12	
			92.59	1.010E+00	*(P	3.290E+00	1.17E+02	5.58E+00 G
			63.29	-5.824E-01	- P	5.608E+00	2.90E+02	3.81E+00 G
PA-234	N	2.2593E-01					1.63E+12	
			131.29	1.370E-01	?(	1.386E+00	2.99E+02	1.80E+01 G
			946.02	-5.699E-01	& P	2.620E+00	1.92E+02	1.34E+01 G
			569.47	4.211E-01	?(	3.665E+00	2.49E+02	8.20E+00 G
			883.24	0.000E+00	-	4.846E+00	1.00E+03	9.60E+00 G
			880.53	1.978E-01	%	7.734E+00	1.11E+03	6.00E+00 GA
PA-234M	N	3.6610E+00					1.63E+12	
			1001.00	-1.991E+00	?(P	6.231E+01	7.49E+02	8.37E-01 G
			766.41	1.975E+01	&(	1.108E+02	1.61E+02	2.94E-01 G
AM-241	T	9.5611E-02					1.58E+05	
			59.54	9.561E-02	?(	4.560E-01	1.66E+02	3.59E+01 G
Np-237	F	-4.4338E-01					2.14E+06	
			86.49	-4.434E-01	?(	2.489E+00	1.68E+02	1.31E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ir-192	F -1.0141E-02					7.40E+01	
		316.49	-1.014E-02	&(	3.468E-01	9.91E+02	8.70E+01 G
		468.06	-1.893E-01	+	7.920E-01	1.24E+02	5.18E+01 G
		308.44	0.000E+00	+	1.480E+00	1.00E+03	3.18E+01 G
Cs-136	F 5.2188E-02					1.30E+01	
		818.50	5.219E-02	?(	5.244E-01	2.91E+02	1.00E+02 G
		1048.07	-5.169E-02	&	4.400E-01	2.38E+02	8.00E+01 G
		340.57	0.000E+00	&	7.213E-01	1.00E+03	4.69E+01 G
Np-239	T 3.8199E-02					2.36E+00	
		103.70	-1.621E-01	&	7.924E-01	1.45E+02	2.40E+01 X
		106.13	3.820E-02	&(	9.633E-01	7.40E+02	2.27E+01 G
		99.50	-1.642E-01	&	1.342E+00	2.41E+02	1.50E+01 X
Nd-147	-1.2063E-01					1.11E+01	
		531.00	-1.206E-01	?(	2.028E+00	6.53E+02	1.30E+01 G
		91.10	-1.663E-03	&	1.017E+00	1.81E+04	2.83E+01 G
TL-210	N 1.3765E-01					5.84E+05	
		799.60	1.376E-01	&(	4.120E-01	8.89E+01	9.90E+01 G
		296.00	-1.067E-01	-	5.700E-01	1.59E+02	7.90E+01 G
		1313.00	-1.335E-01	-	1.436E+00	4.52E+02	2.10E+01 GA
Kr-85	I 2.7967E+01					3.92E+03	
		513.98	2.797E+01	?(	1.203E+02	1.28E+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

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	
PB-210	46.54	169.	-3.	0.000	780.38	-2.335E-01	P
TH-227	50.14	96.	-2.	0.000	827.65	-8.575E-02	
AM-241	59.54	114.	11.	0.002	166.14	9.561E-02	
Sn-126	64.28	214.	2.	0.000	888.36	7.269E-02	
BA-133	80.99	129.	9.	0.001	215.02	7.525E-02	
Np-237	86.49	583.	-21.	-0.003	167.80	-4.434E-01	
EU-155	86.54	563.	-21.	-0.003	164.82	-1.893E-01	
Sn-126	86.94	542.	-21.	-0.003	161.79	-6.427E-01	
Sn-126	87.57	522.	-21.	-0.003	158.59	-1.550E-01	
Cd-109	88.04	501.	-12.	-0.002	265.57	-8.942E-01	
AC-228	93.35	352.	-21.	-0.003	126.68	-1.080E+00	
Gd-153	97.50	243.	-19.	-0.003	117.74	-1.799E-01	
Np-239	99.50	210.	-9.	-0.001	241.00	-1.642E-01	
Gd-153	103.20	227.	5.	0.001	401.56	6.957E-02	
Np-239	103.70	184.	-14.	-0.002	144.87	-1.621E-01	
EU-155	105.31	215.	-12.	-0.002	194.93	-1.629E-01	P
Np-239	106.13	245.	3.	0.000	740.12	3.820E-02	
EU-152	121.78	205.	-19.	-0.003	108.86	-1.962E-01	
CO-57	122.06	125.	15.	0.002	105.47	5.324E-02	
EU-154	123.10	168.	6.	0.001	313.27	4.277E-02	
PA-234	131.29	294.	8.	0.001	298.89	1.370E-01	
CO-57	136.47	282.	-4.	-0.001	529.38	-1.292E-01	
Tc-99m	140.51	380.	-21.	-0.003	130.66	-8.349E-02	
U-235	143.79	408.	-28.	-0.004	85.84	-8.054E-01	P
CE-141	145.44	356.	-12.	-0.002	215.89	-8.166E-02	
Ba-140	162.66	228.	-10.	-0.001	215.87	-5.393E-01	
CE-139	165.85	219.	4.	0.001	525.59	1.699E-02	
Cf-251	176.60	140.	-20.	-0.003	108.28	-4.134E-01	
U-235	185.72	253.	-71.	-0.010	38.88	-4.797E-01	P
TH-229	193.51	73.	15.	0.002	107.16	1.252E+00	
U-235	205.33	100.	17.	0.002	105.32	1.354E+00	
TH-229	210.85	110.	-10.	-0.001	289.62	-1.285E+00	P
Cf-251	227.00	87.	4.	0.001	385.31	2.879E-01	
TH-227	235.97	180.	15.	0.002	126.17	5.375E-01	
PB-212	238.63	226.	-16.	-0.002	133.80	-1.598E-01	P
EU-152	244.69	218.	14.	0.002	147.37	8.382E-01	
Cd-113m	263.70	134.	-7.	-0.001	226.54	-5.680E+02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	265.83	152.	-15.	-0.002	121.84	-1.371E-01	
Hg-203	279.20	57.	12.	0.002	121.19	7.129E-02	
I-131	284.30	88.	-11.	-0.002	162.37	-8.814E-01	
TL-210	296.00	345.	-17.	-0.002	159.14	-1.067E-01	
PB-212	300.03	333.	-19.	-0.003	133.57	-2.885E+00	P
PA-231	300.07	348.	-6.	-0.001	416.16	-1.319E+00	
Ir-192	316.49	136.	-2.	0.000	991.36	-1.014E-02	
CR-51	320.08	144.	-7.	-0.001	239.32	-3.850E-01	
La-140	328.76	48.	13.	0.002	103.48	3.476E-01	
Cf-249	333.44	62.	-5.	-0.001	280.31	-1.892E-01	
AC-228	338.32	146.	8.	0.001	213.61	3.775E-01	P
EU-152	344.29	158.	-4.	-0.001	419.10	-9.032E-02	P
HF-181	345.83	160.	-9.	-0.001	201.54	-3.375E-01	
BA-133	356.00	144.	-17.	-0.002	103.49	-1.572E-01	
BA-133	383.84	192.	-20.	-0.003	80.26	-1.392E+00	P
Cf-249	387.95	206.	-17.	-0.002	119.30	-1.621E-01	
SN-113	391.69	132.	13.	0.002	131.71	1.223E-01	
AG-108M	433.94	29.	8.	0.001	137.01	5.679E-02	
PM-146	453.88	56.	-8.	-0.001	186.53	-8.539E-02	
SB-125	463.37	145.	-23.	-0.003	71.22	-1.577E+00	P
Ir-192	468.06	139.	-14.	-0.002	123.97	-1.893E-01	
BE-7	477.60	93.	-15.	-0.002	96.21	-1.011E+00	
HF-181	482.00	99.	-11.	-0.002	128.29	-1.017E-01	
RU-103	497.05	36.	6.	0.001	200.00	4.914E-02	
RH-106	511.86	93.	101.	0.014	16.77	3.853E+00	
Kr-85	513.98	194.	16.	0.002	127.85	2.797E+01	
Nd-147	531.00	44.	-2.	0.000	653.20	-1.206E-01	
Ba-140	537.26	26.	8.	0.001	122.64	2.726E-01	P
PA-234	569.47	52.	4.	0.001	249.22	4.211E-01	
BI-207	569.70	41.	7.	0.001	137.67	5.796E-02	
SB-125	600.50	170.	12.	0.002	161.99	5.627E-01	P
SB-124	602.73	181.	13.	0.002	152.67	1.120E-01	
BI-214	609.31	210.	-12.	-0.002	165.03	-2.370E-01	P
RU-103	610.30	197.	13.	0.002	158.28	1.944E+00	
PM-144	618.06	148.	13.	0.002	137.21	1.145E-01	
RH-106	621.92	78.	-14.	-0.002	149.26	-1.244E+00	P
SB-125	635.89	38.	-7.	-0.001	288.39	-5.828E-01	P
I-131	636.97	29.	10.	0.001	80.05	1.304E+00	
PM-144	696.54	39.	12.	0.002	110.08	1.183E-01	
NB-94	702.63	40.	2.	0.000	760.45	1.715E-02	P
SB-124	722.79	56.	-14.	-0.002	81.66	-1.278E+00	
AG-108M	722.94	70.	-2.	0.000	524.87	-2.512E-02	
BI-212	727.17	60.	12.	0.002	96.32	1.597E+00	
PM-146	735.72	18.	3.	0.000	280.97	1.425E-01	P
PM-146	747.16	40.	-9.	-0.001	102.86	-2.693E-01	P
ZR-95	756.73	27.	-4.	-0.001	250.01	-7.182E-02	P
AG-110M	763.94	32.	11.	0.002	78.38	5.261E-01	
NB-95	765.79	44.	1.	0.000	688.01	1.447E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234M	766.41	36.	6.	0.001	161.09	1.975E+01	
EU-152	778.92	19.	2.	0.000	470.33	1.566E-01	P
BI-212	785.42	26.	-2.	0.000	407.82	-1.883E+00	P
TL-210	799.60	55.	12.	0.002	88.86	1.376E-01	
CO-58	810.77	60.	-10.	-0.001	99.98	-1.064E-01	P
La-140	815.77	74.	-16.	-0.002	62.38	-7.524E-01	P
Cs-136	818.50	90.	5.	0.001	291.04	5.219E-02	
MN-54	834.85	20.	2.	0.000	436.73	2.465E-02	P
Co-56	846.77	23.	-1.	0.000	773.39	-1.532E-02	
NB-94	871.10	20.	8.	0.001	83.07	9.915E-02	P
EU-154	873.23	39.	-8.	-0.001	111.93	-8.002E-01	
Sc-46	889.28	62.	-6.	-0.001	200.43	-6.782E-02	
AC-228	911.07	14.	9.	0.001	90.87	3.943E-01	
AG-110M	937.49	28.	-6.	-0.001	191.49	-2.186E-01	
PA-234	946.02	29.	-6.	-0.001	191.82	-5.699E-01	P
AC-228	968.97	35.	-11.	-0.001	85.81	-7.865E-01	P
EU-154	996.33	51.	-10.	-0.001	107.38	-1.224E+00	
PA-234M	1001.00	62.	-1.	0.000	749.48	-1.991E+00	P
EU-154	1004.77	52.	9.	0.001	120.07	6.517E-01	
Co-56	1037.84	21.	3.	0.000	293.43	3.336E-01	P
Cs-136	1048.07	24.	-3.	0.000	238.05	-5.169E-02	
RH-106	1050.36	48.	-15.	-0.002	69.20	-1.356E+01	
BI-207	1063.66	11.	14.	0.002	55.82	2.716E-01	P
Ga-68	1077.40	35.	-11.	-0.002	122.02	-8.278E+00	
FE-59	1099.25	25.	-4.	-0.001	279.32	-1.017E-01	
EU-152	1112.07	32.	10.	0.001	83.60	1.097E+00	
ZN-65	1115.55	44.	2.	0.000	497.87	5.531E-02	P
BI-214	1120.29	48.	-2.	0.000	486.53	-1.986E-01	P
Ta-182	1121.30	59.	-12.	-0.002	97.35	-4.888E-01	
Ta-182	1189.05	10.	8.	0.001	93.82	7.603E-01	
Ta-182	1221.41	0.	13.	0.002	27.74	7.592E-01	
Co-56	1238.28	7.	5.	0.001	132.49	1.108E-01	P
FE-59	1291.60	11.	5.	0.001	145.77	2.046E-01	
TL-210	1313.00	11.	-2.	0.000	452.11	-1.335E-01	
AG-110M	1384.30	11.	1.	0.000	563.47	9.682E-02	
EU-152	1408.00	17.	-8.	-0.001	83.70	-6.431E-01	P
K-40	1460.83	24.	-3.	0.000	291.90	-5.671E-01	P
La-140	1596.21	11.	-1.	0.000	598.44	-2.807E-02	
SB-124	1690.98	0.	7.	0.001	37.80	3.103E-01	
BI-214	1764.49	27.	-4.	-0.001	191.46	-5.414E-01	P
Co-56	1771.35	14.	7.	0.001	79.67	1.068E+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	-1.0110E+00	-1.0110E+00	9.621E+01%	3.27E+00
NA-22	#	1.8026E-01	1.8026E-01	3.015E+01%	1.21E-01
K-40	#A	-5.6707E-01	-5.6707E-01	2.919E+02%	4.45E+00
Sc-46	#A	-6.7817E-02	-6.7818E-02	2.004E+02%	4.70E-01
CR-51	#A	-3.8499E-01	-3.8500E-01	2.393E+02%	3.14E+00
MN-54	#A	2.4648E-02	2.4648E-02	4.367E+02%	2.66E-01
FE-59	#A	3.1010E-02	3.1011E-02	1.458E+02%	6.61E-01
Co-56	#A	5.8311E-02	5.8312E-02	1.325E+02%	2.90E-01
CO-57	#A	5.3241E-02	5.3241E-02	1.055E+02%	1.89E-01
CO-58	#A	-1.0642E-01	-1.0642E-01	9.998E+01%	4.30E-01
CO-60	#	2.2160E-01	2.2160E-01	2.774E+01%	1.26E-01
ZN-65	#A	5.5308E-02	5.5308E-02	4.979E+02%	9.68E-01
NB-94	#A	5.8562E-02	5.8562E-02	8.307E+01%	3.24E-01
ZR-95	#A	-7.1816E-02	-7.1817E-02	2.500E+02%	5.14E-01
NB-95	#A	1.4468E-02	1.4468E-02	6.880E+02%	3.54E-01
RU-103	#A	4.9138E-02	4.9139E-02	2.000E+02%	2.51E-01
RH-106	#A	-1.2439E+00	-1.2439E+00	1.493E+02%	3.93E+00
AG-108M	#A	5.6792E-02	5.6792E-02	1.370E+02%	2.07E-01
AG-110M	#A	6.5797E-02	6.5797E-02	7.838E+01%	6.41E-01
SN-113	#A	1.2230E-01	1.2230E-01	1.317E+02%	5.45E-01
SB-124	#A	1.7690E-01	1.7690E-01	3.780E+01%	5.78E-01
SB-125	#A	2.0711E-01	2.0711E-01	1.620E+02%	8.09E-01
I-131	#A	1.1183E-01	1.1184E-01	8.005E+01%	2.69E-01
Gd-153	#A	-1.7992E-01	-1.7992E-01	1.177E+02%	7.10E-01
Ga-68	#A	-8.1700E+00	-8.2779E+00	1.220E+02%	2.28E+01
Tc-99m	#A	-8.3282E-02	-8.3487E-02	1.307E+02%	3.65E-01
BA-133	#A	-1.5718E-01	-1.5718E-01	1.035E+02%	5.46E-01
CS-134	#A	-3.1164E-03	-3.1164E-03	9.576E+01%	5.58E-01
CS-137	#A	-1.7355E-02	-1.7355E-02	1.338E+03%	4.18E-01
CE-139	#A	1.6988E-02	1.6988E-02	5.256E+02%	3.04E-01
Ba-140	#A	2.7257E-01	2.7259E-01	1.226E+02%	8.60E-01
La-140	#A	3.7837E-02	3.7839E-02	1.035E+02%	3.87E-01
CE-141	#A	-8.1656E-02	-8.1658E-02	2.159E+02%	5.94E-01
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.29E+00
PM-144	#A	1.1640E-01	1.1640E-01	8.796E+01%	3.13E-01
EU-152	#A	2.8274E-01	2.8274E-01	8.360E+01%	7.16E-01
EU-154	#A	2.2928E-01	2.2928E-01	1.201E+02%	4.57E-01
EU-155	#A	-1.6286E-01	-1.6286E-01	1.949E+02%	9.56E-01
HF-181	#A	-1.0168E-01	-1.0168E-01	1.283E+02%	4.43E-01
Ta-182	#A	2.0177E-01	2.0177E-01	2.774E+01%	1.61E+00
Hg-203	#A	7.1284E-02	7.1285E-02	1.212E+02%	2.25E-01
TL-208	#A	-9.9943E-03	-9.9943E-03	1.379E+03%	3.66E-01
PM-146	#A	-2.6789E-02	-2.6789E-02	1.686E+02%	4.01E-01

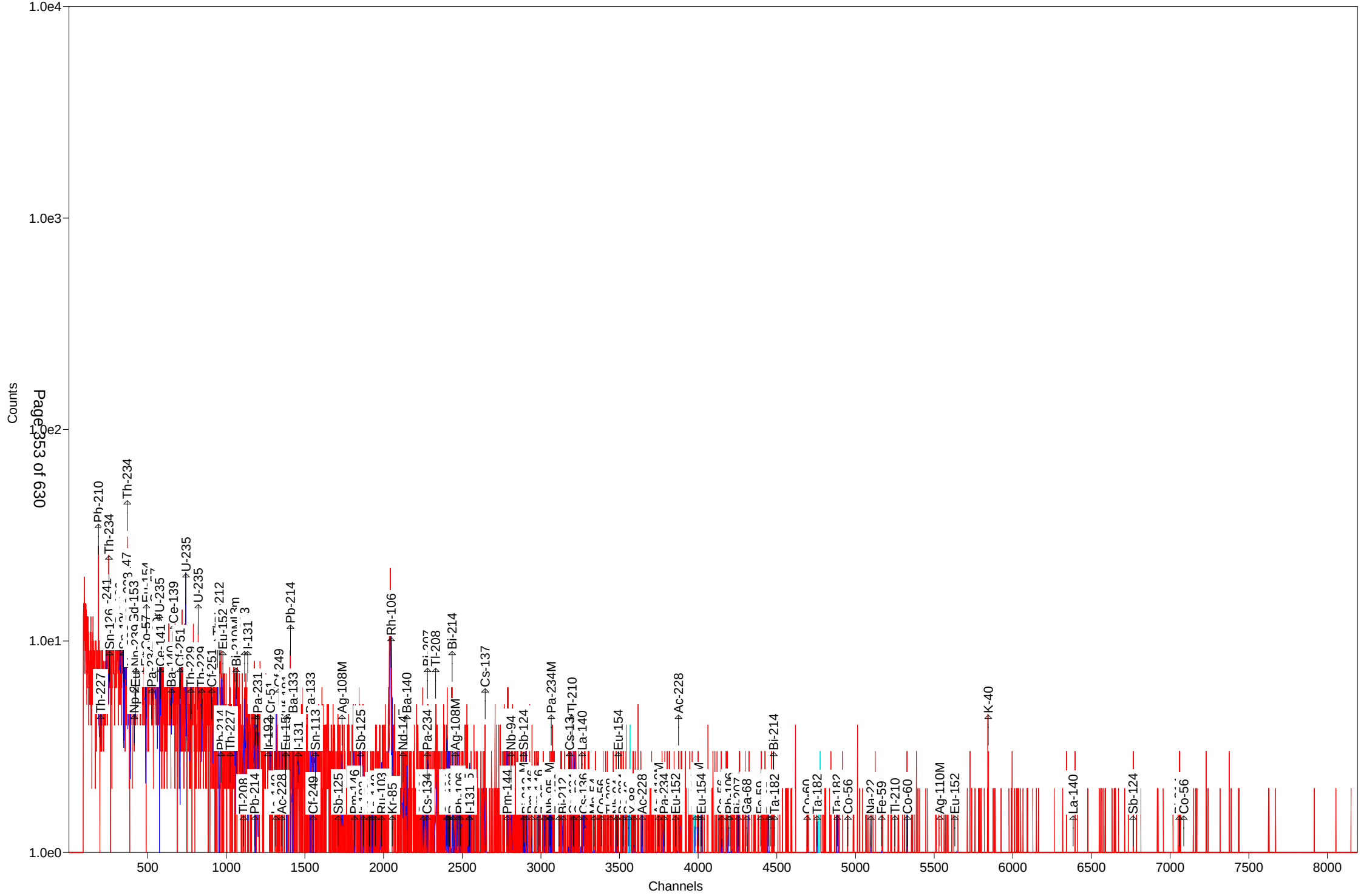
Y-88	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.70E-01
Cd-113m	#A	-5.6796E+02	-5.6796E+02	2.265E+02%	4.39E+03
Cd-109	#A	-8.9417E-01	-8.9417E-01	2.656E+02%	7.98E+00
Cf-251	#A	-4.1338E-01	-4.1338E-01	1.083E+02%	1.20E+00
Cf-249	#A	-1.6215E-01	-1.6215E-01	1.193E+02%	6.50E-01
Sn-126	#A	7.2686E-02	7.2686E-02	8.884E+02%	2.21E+00
PB-210	#A	-2.3352E-01	-2.3352E-01	7.804E+02%	5.37E+00
PB-212	#A	-1.5978E-01	-1.5978E-01	1.338E+02%	7.28E-01
PB-214	#A	-2.0251E-01	-2.0251E-01	1.204E+02%	8.29E-01
BI-207	#A	2.7157E-01	2.7157E-01	5.582E+01%	3.34E-01
BI-212	#A	1.5965E+00	1.5965E+00	9.632E+01%	5.20E+00
U-235	#A	-1.2794E-01	-1.2794E-01	6.793E+01%	2.77E+00
BI-214	#A	-2.3702E-01	-2.3702E-01	1.650E+02%	1.33E+00
BI-210M	#A	-1.3709E-01	-1.3709E-01	1.218E+02%	5.63E-01
AC-228	#A	3.8938E-01	3.8938E-01	9.087E+01%	8.49E-01
TH-227	#A	3.2092E-01	3.2092E-01	1.262E+02%	2.80E+00
TH-229	#A	1.2519E+00	1.2519E+00	1.072E+02%	3.64E+00
TH-234	#A	1.0096E+00	1.0096E+00	1.175E+02%	3.29E+00
PA-231	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.61E+01
PA-233	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.32E+00
PA-234	#A	2.2593E-01	2.2593E-01	1.946E+02%	1.39E+00
PA-234M	#A	3.6610E+00	3.6610E+00	1.611E+02%	6.23E+01
AM-241	#A	9.5611E-02	9.5611E-02	1.661E+02%	4.56E-01
Np-237	#A	-4.4338E-01	-4.4338E-01	1.678E+02%	2.49E+00
Ir-192	#A	-1.0141E-02	-1.0141E-02	9.914E+02%	3.47E-01
Cs-136	#A	5.2186E-02	5.2188E-02	2.910E+02%	5.24E-01
Np-239	#A	3.8189E-02	3.8199E-02	7.401E+02%	9.63E-01
Nd-147	#A	-1.2063E-01	-1.2063E-01	6.532E+02%	2.03E+00
TL-210	#A	1.3765E-01	1.3765E-01	8.886E+01%	4.12E-01
Kr-85	#A	2.7967E+01	2.7967E+01	1.278E+02%	1.20E+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 (25.1 to 1999.5 keV) 0.000E+00 Bq/Sample
Total Decayed Activity (25.1 to 1999.5 keV) 0.0000000E+00 Bq/Sample

405454_Gamma_MB 160-405454~1-A. 14_Gamma_20190015.spc.



Test America St. Louis Spectrum ID: 16_Gamma_20190013

Sample Description: 405454_Gamma_LCS 160-405454~2-A
Detector: Detector #16
Batch ID: 405454
Work Order Number: Gamma
Lot Number: LCS 160-405454~2-A

Decay to Time: 1/3/2019 01:57 Live Time: 7200 sec
Acquisition Time: 1/3/2019 01:57:33 Real Time: 7358 sec
Analysis Time: 1/3/2019 04:00 Dead Time: 2.14 %
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_2018-12-22_1359.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	-1.251E+01	99.3	1.242E+01	1.244E+01	4.099E+01
NA-22	2.525E-02	2442.4	6.166E-01	6.166E-01	2.063E+00
K-40	2.361E+00	263.5	6.220E+00	6.222E+00	1.261E+01
Sc-46	6.046E-01	140.4	8.488E-01	8.494E-01	4.867E+00
CR-51	-9.746E+00	133.4	1.301E+01	1.302E+01	4.292E+01
MN-54	5.391E+00	19.1	1.030E+00	1.064E+00	2.325E+00
FE-59	8.016E+00	37.1	2.970E+00	2.996E+00	5.902E+00
Co-56	1.616E+00	86.1	1.392E+00	1.394E+00	2.962E+00
CO-57	5.455E+00	143.0	7.800E+00	7.805E+00	2.574E+01
CO-58	-1.550E+00	79.8	1.238E+00	1.240E+00	4.083E+00
CO-60	1.113E+03	0.2	2.764E+00	5.497E+01	1.592E+00
ZN-65	3.107E+00	101.4	3.151E+00	3.155E+00	1.041E+01
NB-94	-6.664E-03	12171.7	8.111E-01	8.111E-01	3.251E+00
ZR-95	9.292E-01	220.1	2.045E+00	2.046E+00	4.524E+00
NB-95	7.578E-01	118.2	8.957E-01	8.964E-01	2.961E+00
RU-103	9.340E-01	127.0	1.186E+00	1.187E+00	2.719E+00
RH-106	1.156E+01	80.7	9.336E+00	9.354E+00	2.406E+01
AG-108M	-1.416E+00	97.5	1.381E+00	1.382E+00	4.555E+00
AG-110M	5.223E-01	90.3	4.714E-01	4.721E-01	6.124E+00
SN-113	1.733E-01	961.3	1.666E+00	1.666E+00	5.507E+00
SB-124	-3.063E-01	120.5	3.691E-01	3.694E-01	4.848E+00
SB-125	-4.243E+00	51.9	2.204E+00	2.214E+00	1.340E+01
I-131	5.401E-01	291.8	1.576E+00	1.576E+00	2.719E+00
Gd-153	1.699E+00	107.7	1.830E+00	1.833E+00	6.038E+00
Ga-68	2.136E+01	277.8	5.933E+01	5.934E+01	1.966E+02
Tc-99m	7.452E-01	142.6	1.063E+00	1.064E+00	3.507E+00
BA-133	-1.663E+00	85.3	1.419E+00	1.421E+00	4.680E+00
CS-134	3.014E+00	55.0	1.658E+00	1.665E+00	4.255E+00
CS-137	1.649E+03	0.2	3.972E+00	8.253E+01	2.964E+00
CE-139	8.081E-01	92.2	7.447E-01	7.483E-01	2.457E+00
Ba-140	-1.046E+00	399.3	4.175E+00	4.176E+00	9.590E+00
La-140	-1.037E+00	79.2	8.213E-01	8.231E-01	1.564E+00
CE-141	1.259E+00	140.8	1.773E+00	1.774E+00	5.850E+00

CE-144	0.000E+00	1.#INF	2.944E+00	2.944E+00	2.554E+01
PM-144	-7.530E-01	127.5	9.603E-01	9.611E-01	3.174E+00
EU-152	8.998E+00	26.5	2.383E+00	2.428E+00	6.656E+00
EU-154	7.645E+00	17.1	1.309E+00	1.375E+00	3.883E+00
EU-155	1.876E+00	184.3	3.457E+00	3.459E+00	1.141E+01
HF-181	-8.637E-01	87.1	7.521E-01	7.533E-01	5.414E+00
Ta-182	2.900E+00	81.2	2.355E+00	2.360E+00	1.512E+01
Hg-203	-7.625E-01	116.6	8.895E-01	8.906E-01	2.937E+00
TL-208	4.004E+00	45.1	1.805E+00	1.816E+00	2.680E+00
PM-146	1.479E+00	130.4	1.929E+00	1.931E+00	4.419E+00
Y-88	-7.886E-01	105.7	8.337E-01	8.350E-01	1.513E+00
Cd-113m	-5.586E+03	189.4	1.058E+04	1.059E+04	3.498E+04
Cd-109	6.892E+02	3.5	2.404E+01	4.618E+01	7.653E+01
Cf-251	1.874E+00	204.4	3.830E+00	3.834E+00	9.576E+00
Cf-249	1.642E+00	101.9	1.672E+00	1.675E+00	5.519E+00
Sn-126	-1.454E+01	230.6	3.354E+01	3.355E+01	1.106E+02
PB-210	-5.480E+01	43.9	2.403E+01	2.454E+01	1.864E+02
PB-212	-9.521E-01	262.6	2.501E+00	2.501E+00	6.164E+00
PB-214	-7.899E-01	110.5	8.726E-01	8.736E-01	7.977E+00
BI-207	1.059E+00	221.8	2.350E+00	2.351E+00	4.848E+00
BI-212	5.203E+00	235.0	1.222E+01	1.223E+01	4.048E+01
U-235	7.753E+00	82.1	6.364E+00	6.377E+00	2.538E+01
BI-214	-3.197E+00	69.4	2.218E+00	2.224E+00	1.040E+01
BI-210M	-1.682E+00	87.7	1.475E+00	1.478E+00	4.865E+00
AC-228	-7.057E+00	53.7	3.791E+00	3.806E+00	1.248E+01
TH-227	2.212E+00	160.1	3.540E+00	3.543E+00	2.933E+01
TH-229	1.410E+01	93.0	1.312E+01	1.317E+01	4.238E+01
TH-234	-1.576E+01	275.3	4.340E+01	4.341E+01	2.981E+01
PA-231	-1.518E+01	295.1	4.479E+01	4.480E+01	1.479E+02
PA-233	0.000E+00	1.#INF	1.292E+00	1.292E+00	1.208E+01
PA-234	1.286E+00	156.7	2.014E+00	2.015E+00	1.565E+01
PA-234M	2.357E+02	75.9	1.789E+02	1.793E+02	5.901E+02
AM-241	4.842E+03	0.2	7.275E+00	2.796E+02	1.009E+01
Np-237	-3.978E+00	185.5	7.380E+00	7.383E+00	2.435E+01
Ir-192	1.023E+00	82.8	8.466E-01	8.487E-01	5.042E+00
Cs-136	-4.110E-01	70.8	2.911E-01	2.920E-01	4.228E+00
Np-239	2.328E+00	143.2	3.332E+00	3.335E+00	1.100E+01
Nd-147	-5.718E+00	139.1	7.954E+00	7.961E+00	1.824E+01
TL-210	2.699E-01	285.8	7.712E-01	7.713E-01	3.724E+00
Kr-85	1.382E+01	1616.8	2.234E+02	2.234E+02	7.394E+02
Total	8.678E+03				

Analyst: Morgan Reichert

Sample description
405454_Gamma_LCS 160-405454~2-A

Spectrum Filename: C:\User\SPC\Det16\16_Gamma_20190013.An1

Acquisition information
Start time: 1/3/2019 1:57:33 AM
Live time: 7200
Real time: 7358
Dead time: 2.14 %
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	1/3/2019 1:57:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	16_2018-12-22_1359.PBC 12/22/2018 1:59:52 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 45 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1269

***** 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
26.29	3680.	7.43	0.69	3.012E-02				
32.05	22181.	1.78	1.10	3.737E-02				
36.52	5058.	6.47	1.13	4.219E-02				
42.65	562.	56.07	1.30	4.775E-02				
49.54	35969.	2.20	2.02	5.247E-02	50.14	8.000	1.182E+03	TH227
59.50	716764.	0.15	1.01	5.726E-02	59.54	35.900	4.842E+03	AM241
88.00	14035.	1.92	1.05	6.181E-02	87.57	37.500	8.410E+01	Sn126
					88.04	3.790	8.321E+02	Cd109
97.50	226.	107.69	1.01	6.152E-02	97.50	30.000	PBC<MDA	Gd153
103.07	403.	39.41	1.03	6.110E-02	103.20	21.800	4.203E+00	Gd153
					103.70	24.000	3.869E+00	Np239
105.31	174.	184.27	1.01	6.089E-02	105.31	21.200	PBC<MDA	EU155
105.96	228.	143.16	1.01	6.081E-02	106.13	22.700	PBC<MDA	Np239
122.54	1931.	11.15	2.27	5.865E-02	121.78	28.580	1.597E+01	EU152
					122.06	85.600	5.335E+00	CO57
					123.10	40.790	1.123E+01	EU154
136.30	236.	142.96	1.04	5.639E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	5.455E+00	CO57
136.47	236.	142.99	1.04	5.636E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	5.455E+00	CO57
140.51	237.	142.61	1.05	5.565E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	239.	139.82	1.05	5.505E-02	143.79	10.960	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
145.44	239.	140.83	1.05	5.475E-02	145.44	48.200	PBC<MDA	CE141
163.38	237.	86.03	1.07	5.140E-02	163.38	5.080	PBC<MDA	U235
165.85	236.	92.16	1.07	5.085E-02	165.85	79.900	PBC<MDA	CE139
176.60	113.	204.41	1.08	4.912E-02	176.60	17.000	PBC<MDA	Cf251
185.71	412.	49.01	0.34	4.776E-02	185.72	54.000	2.216E+00	U235
194.17	73.	341.63	1.09	4.666E-02	193.51	4.400	PBC<MDA	TH229
210.85	263.	93.04	1.11	4.441E-02	210.85	2.990	PBC<MDA	TH229
227.00	191.	127.94	1.13	4.251E-02	227.00	6.300	PBC<MDA	Cf251
235.97	155.	160.07	1.13	4.154E-02	235.97	12.300	PBC<MDA	TH227
244.69	260.	111.10	1.14	4.064E-02	244.69	7.580	PBC<MDA	EU152
277.28	84.	240.11	1.17	3.761E-02	277.28	6.310	PBC<MDA	TL208
284.30	46.	495.43	1.18	3.703E-02	284.30	6.140	PBC<MDA	I131
295.09	197.	180.62	1.19	3.616E-02	295.09	19.300	PBC<MDA	PB214
296.00	125.	285.76	1.19	3.609E-02	296.00	79.000	PBC<MDA	TL210
340.41	134.	90.01	1.23	3.294E-02	340.57	46.900	PBC<MDA	Cs136
344.27	620.	28.80	1.74	3.271E-02	344.29	26.500	9.940E+00	EU152
364.48	68.	308.57	1.25	3.149E-02	364.48	81.700	PBC<MDA	I131
383.84	233.	102.98	1.27	3.040E-02	383.84	8.940	PBC<MDA	BA133
388.34	182.	51.20	0.65	3.016E-02	387.95	66.000	1.269E+00	Cf249
391.69	24.	961.35	1.27	2.999E-02	391.69	64.000	PBC<MDA	SN113
424.13	795.	24.69	3.75	2.834E-02				
432.42	167.	58.38	0.45	2.800E-02				
453.88	187.	130.43	1.33	2.706E-02	453.88	65.000	PBC<MDA	PM146
468.06	271.	82.76	1.34	2.648E-02	468.06	51.750	PBC<MDA	Ir192
497.05	155.	126.99	1.37	2.536E-02	497.05	90.900	PBC<MDA	RU103
510.10	412.	41.20	2.63	2.482E-02	511.86	20.000	PBC<MDA	RH106
543.74	397.	43.12	0.44	2.377E-02				
552.60	192.	52.04	0.67	2.347E-02				
569.47	45.	262.89	1.43	2.295E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.297E+00	PA234
					569.70	97.740	PBC<MDA	BI207
569.70	25.	478.55	1.43	2.294E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	PBC<MDA	PA234
					569.70	97.740	PBC<MDA	BI207
583.02	99.	161.16	1.44	2.255E-02	583.02	84.500	PBC<MDA	TL208
628.68	140.	48.50	0.44	2.130E-02				
651.41	302.	39.87	0.51	2.073E-02				
661.58	207189.	0.24	1.67	2.049E-02	661.66	85.210	1.649E+03	CS137
722.79	33.	394.09	1.57	1.913E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.669E-01	AG108M
					723.36	20.220	1.200E+00	EU154
723.24	269.	31.32	1.57	1.912E-02	722.79	10.810	1.804E+01	SB124
					722.94	90.840	2.148E+00	AG108M
					723.36	20.220	9.652E+00	EU154
727.05	54.	234.98	1.57	1.904E-02	727.17	7.550	PBC<MDA	BI212
746.60	163.	44.58	0.32	1.865E-02	747.16	34.000	3.570E+00	PM146
756.73	67.	220.13	1.60	1.845E-02	756.73	54.460	PBC<MDA	ZR95
768.17	100.	118.19	1.60	1.828E-02	765.79	99.790	PBC<MDA	NB95

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
773.12	54.	96.51	0.54	1.814E-02				
779.08	132.	62.61	1.62	1.803E-02	778.92	12.940	PBC<MDA	EU152
785.42	46.	329.28	1.62	1.791E-02	785.42	1.280	PBC<MDA	BI212
795.87	176.	79.88	1.63	1.772E-02	795.87	85.530	PBC<MDA	CS134
801.95	185.	75.67	1.64	1.762E-02	801.95	8.690	PBC<MDA	CS134
834.91	662.	19.11	1.97	1.706E-02	834.85	99.980	5.391E+00	MN54
847.94	196.	86.10	1.67	1.686E-02	846.77	99.935	PBC<MDA	Co56
860.56	385.	45.07	1.69	1.664E-02	860.56	12.420	2.584E+01	TL208
873.23	96.	138.29	1.70	1.645E-02	873.23	12.270	PBC<MDA	EU154
887.50	86.	59.65	0.52	1.623E-02				
912.80	206.	50.50	0.60	1.586E-02	911.07	29.000	6.211E+00	AC228
932.19	168.	45.19	0.57	1.559E-02				
937.49	18.	889.53	1.75	1.551E-02	937.49	34.360	PBC<MDA	AG110M
946.02	66.	307.35	1.76	1.540E-02	946.02	13.400	PBC<MDA	PA234
996.33	216.	76.09	1.80	1.475E-02	996.33	10.600	PBC<MDA	EU154
1001.00	209.	75.90	1.81	1.469E-02	1001.00	0.837	PBC<MDA	PA234M
1003.92	568.	28.34	2.23	1.466E-02	1004.77	18.010	2.993E+01	EU154
1048.82	161.	80.75	1.85	1.411E-02	1048.07	80.000	PBC<MDA	Cs136
					1050.36	1.560	1.018E+02	RH106
1063.66	79.	221.82	1.86	1.396E-02	1063.66	74.500	PBC<MDA	BI207
1076.62	63.	93.87	0.31	1.382E-02				
1079.71	40.	277.83	1.87	1.381E-02	1077.40	3.300	PBC<MDA	Ga68
1098.77	443.	37.05	2.49	1.358E-02	1099.25	56.500	8.016E+00	FE59
1112.07	147.	104.86	1.90	1.344E-02	1112.07	13.644	PBC<MDA	EU152
1115.55	152.	101.44	1.90	1.341E-02	1115.55	50.600	PBC<MDA	ZN65
1120.55	110.	140.40	1.91	1.336E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1121.30	50.	308.60	1.91	1.335E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.481E+00	Ta182
1173.10	102283.	0.36	2.26	1.284E-02	1173.24	99.900	1.108E+03	CO60
1221.41	114.	81.21	1.99	1.240E-02	1221.41	27.000	PBC<MDA	Ta182
1274.25	231.	17.21	2.06	1.195E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.222E+01	EU154
1292.97	26.	286.21	2.05	1.181E-02	1291.60	43.200	PBC<MDA	FE59
1312.52	36.	61.71	1.12	1.164E-02	1313.00	21.000	2.046E+00	TL210
1332.35	92415.	0.34	2.39	1.149E-02	1332.50	99.980	1.117E+03	CO60
1384.30	57.	90.26	2.12	1.111E-02	1384.30	24.290	PBC<MDA	AG110M
1408.14	165.	29.41	3.03	1.094E-02	1408.00	21.005	9.972E+00	EU152
1461.24	19.	263.48	2.19	1.059E-02	1460.83	10.670	PBC<MDA	K40
1691.31	32.	143.42	2.37	9.267E-03	1690.98	47.790	PBC<MDA	SB124

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
104.89	26.29	28408.	3680.	1.222E+05	7.43	0.687	- sM
127.92	32.05	32056.	22181.	5.935E+05	1.78	1.104	- sM
145.79	36.52	30644.	5058.	1.199E+05	6.47	1.125	- sM
170.31	42.73	39428.	562.	1.176E+04	56.07	1.305	- sM
197.86	49.54	154275.	35969.	6.855E+05	2.20	2.020	- sM
411.21	103.07	7632.	390.	6.383E+03	32.08	1.011	- D
742.29	185.71	11502.	412.	8.616E+03	49.01	0.336	- s
1699.26	425.06	7688.	128.	4.501E+03	97.62	1.304	- sc
1728.69	432.42	6594.	167.	5.981E+03	69.01	1.310	- sc
2174.04	543.22	5976.	397.	1.670E+04	43.12	0.435	- s
2209.51	552.60	3103.	192.	8.196E+03	52.04	0.668	- s
2513.80	628.68	1788.	140.	6.572E+03	48.50	0.438	- sM
2604.71	651.41	3549.	302.	1.457E+04	39.87	0.508	- s
2985.44	746.60	1802.	163.	8.733E+03	44.58	0.320	- s
3092.19	773.12	2309.	62.	3.397E+03	111.04	1.610	- sc
3549.23	887.50	2815.	144.	8.890E+03	52.67	1.709	- sD
3650.30	912.80	3185.	206.	1.299E+04	50.50	0.603	- s
3727.89	932.19	2224.	168.	1.075E+04	45.19	0.565	- s
4014.85	1003.92	4912.	568.	3.879E+04	28.34	2.231	- sM
4305.37	1076.62	2580.	94.	6.799E+03	77.15	1.869	- sc
5249.64	1312.52	183.	36.	3.092E+03	61.71	1.125	- 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: 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	185.86	46.54	382330.	-848.	-0.118	43.85	0.959
TH-227	200.26	50.14	384911.	-685.	-0.095	128.22	0.963
AM-241	237.70	59.50	102293.	716764.	99.551	0.15	1.013
TH-234	252.82	63.29	928471.	-695.	-0.096	155.06	0.975s
Sn-126	256.79	64.28	949014.	-597.	-0.083	230.64	0.976s
Np-237	345.59	86.49	92410.	-232.	-0.032	185.52	0.996s
EU-155	345.80	86.54	89749.	-232.	-0.032	183.06	0.996s
Sn-126	347.39	86.94	89107.	-232.	-0.032	182.36	0.997s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Sn-126	349.91	87.57	23736.	338.	0.047	57.93	0.997D
Cd-109	351.79	88.04	76415.	11626.	1.615	3.49	0.998A
TH-234	369.98	92.59	25032.	-391.	-0.054	275.31	1.002s
AC-228	373.02	93.35	25095.	-49.	-0.007	455.73	1.003
Gd-153	389.61	97.50	29452.	226.	0.031	107.69	1.007s
Np-239	397.61	99.50	55687.	-228.	-0.032	146.29	1.008
Gd-153	412.40	103.20	55458.	-196.	-0.027	169.86	1.012
Np-239	414.40	103.70	55222.	62.	0.009	536.89	1.012
EU-155	420.85	105.31	51536.	174.	0.024	184.27	1.014s
Np-239	424.11	106.13	53359.	228.	0.032	143.16	1.014s
CO-57	487.81	122.06	20871.	767.	0.107	19.49	1.029D
EU-154	491.96	123.10	20384.	1196.	0.166	17.13	1.030s
PA-234	524.73	131.29	61815.	-147.	-0.020	239.39	1.038
HF-181	531.64	133.02	61668.	0.	0.000	1000.00	1.039s
CE-144	533.70	133.54	61668.	0.	0.000	1000.00	1.040s
HF-181	544.74	136.30	57007.	236.	0.033	142.96	1.042
CO-57	545.43	136.47	57029.	236.	0.033	142.99	1.042
Tc-99m	561.57	140.51	57153.	237.	0.033	142.61	1.046s
U-235	574.67	143.79	55708.	239.	0.033	139.82	1.049s
CE-141	581.29	145.44	56624.	239.	0.033	140.83	1.050s
Ba-140	650.14	162.66	27500.	-246.	-0.034	130.72	1.066s
U-235	653.01	163.38	20686.	237.	0.033	86.03	1.067
CE-139	662.90	165.85	23606.	236.	0.033	92.16	1.069
Cf-251	705.88	176.60	15121.	113.	0.016	204.41	1.079s
U-235	742.34	185.72	17707.	-260.	-0.036	72.78	1.087s
TH-229	773.49	193.51	17912.	73.	0.010	341.63	1.094
U-235	820.76	205.33	17142.	-27.	-0.004	918.75	1.105s
TH-229	842.82	210.85	17083.	263.	0.037	93.04	1.110
Cf-251	907.40	227.00	17006.	191.	0.027	127.94	1.125s
TH-227	943.27	235.97	30702.	155.	0.022	160.07	1.133
PB-212	953.91	238.63	28749.	-122.	-0.017	262.64	1.136s
PB-214	967.37	242.00	34419.	-43.	-0.006	610.35	1.139s
EU-152	978.14	244.69	41609.	260.	0.036	111.10	1.141
TH-227	1024.32	256.24	15560.	-26.	-0.004	939.54	1.152s
Cd-113m	1054.15	263.70	15692.	-94.	-0.013	189.41	1.158s
BI-210M	1062.67	265.83	20900.	-234.	-0.032	87.68	1.160s
TL-208	1108.46	277.28	20484.	84.	0.012	240.11	1.171s
Hg-203	1116.13	279.20	19004.	-168.	-0.023	116.65	1.173s
I-131	1136.52	284.30	13565.	46.	0.006	495.43	1.177s
PB-214	1179.67	295.09	63324.	197.	0.027	180.62	1.187s
TL-210	1183.31	296.00	63521.	125.	0.017	285.76	1.188s
PA-231	1209.90	302.65	54553.	-112.	-0.016	295.08	1.194
BA-133	1210.70	302.85	54665.	0.	0.000	1000.00	1.194
Ba-140	1218.69	304.85	54665.	0.	0.000	1000.00	1.196
BI-210M	1218.88	304.90	54665.	0.	0.000	1000.00	1.196
Ir-192	1233.05	308.44	54665.	0.	0.000	1000.00	1.199
PA-233	1247.34	312.01	54665.	0.	0.000	1000.00	1.202
Ir-192	1265.24	316.49	54665.	0.	0.000	1000.00	1.206

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CR-51	1279.62	320.08	50888.	-239.	-0.033	133.45	1.210
La-140	1314.31	328.76	12517.	-237.	-0.033	150.13	1.217s
Cf-249	1333.02	333.44	48131.	-233.	-0.032	133.22	1.222
AC-228	1352.54	338.32	44656.	-239.	-0.033	125.28	1.226s
Cs-136	1361.54	340.57	7245.	134.	0.019	90.01	1.228D
EU-152	1376.40	344.29	7842.	480.	0.067	26.48	1.231D
HF-181	1382.56	345.83	48330.	-239.	-0.033	130.22	1.233s
PB-214	1406.97	351.93	22139.	-280.	-0.039	127.26	1.238s
BA-133	1423.24	356.00	20436.	-238.	-0.033	85.34	1.242
I-131	1457.16	364.48	11468.	68.	0.009	308.57	1.250
BA-133	1534.57	383.84	28604.	233.	0.032	102.98	1.267
Cf-249	1551.01	387.95	28655.	235.	0.033	101.89	1.271s
SN-113	1565.96	391.69	26476.	24.	0.003	961.35	1.274s
SB-125	1710.67	427.88	29705.	-255.	-0.035	51.94	1.307s
AG-108M	1734.91	433.94	31428.	-258.	-0.036	97.52	1.312s
PM-146	1814.67	453.88	14283.	187.	0.026	130.43	1.330s
SB-125	1852.61	463.37	26419.	-273.	-0.038	84.40	1.338s
Ir-192	1871.38	468.06	24950.	271.	0.038	82.76	1.342s
BE-7	1909.51	477.60	30030.	-247.	-0.034	99.33	1.351s
HF-181	1927.12	482.00	30277.	-248.	-0.034	99.46	1.355s
La-140	1947.21	487.02	29307.	-247.	-0.034	98.03	1.359s
RU-103	1987.33	497.05	9266.	155.	0.022	126.99	1.368s
RH-106	2046.57	511.86	14231.	412.	0.057	41.20	2.631s
Nd-147	2123.10	531.00	7739.	-129.	-0.018	139.12	1.398s
Ba-140	2148.14	537.26	7397.	-44.	-0.006	399.28	1.404
CS-134	2252.03	563.24	6855.	-197.	-0.027	85.97	1.427
CS-134	2276.36	569.32	6509.	-167.	-0.023	68.89	1.432
PA-234	2276.96	569.47	6872.	45.	0.006	262.89	1.432s
BI-207	2277.89	569.70	7044.	25.	0.003	478.55	1.432s
TL-208	2331.16	583.02	6136.	99.	0.014	161.16	1.444
SB-125	2401.07	600.50	26302.	-189.	-0.026	121.33	1.460s
SB-124	2409.99	602.73	26014.	-190.	-0.026	120.50	1.462s
CS-134	2417.91	604.71	26181.	-190.	-0.026	120.74	1.463s
BI-214	2436.31	609.31	25922.	-231.	-0.032	69.38	1.467s
RU-103	2440.26	610.30	26069.	-118.	-0.016	193.89	1.468s
AG-108M	2456.19	614.28	26187.	0.	0.000	1000.00	1.472s
RH-106	2486.73	621.92	6193.	-40.	-0.006	278.25	1.479s
SB-125	2542.62	635.89	6520.	-65.	-0.009	176.12	1.491
I-131	2546.96	636.97	7110.	-79.	-0.011	150.73	1.492
AG-110M	2630.10	657.76	216848.	-69.	-0.010	959.28	1.510s
CS-137	2645.37	661.58	6296.	207189.	28.776	0.24	1.673
PM-144	2785.22	696.54	9028.	-106.	-0.015	127.54	1.544s
SB-124	2890.19	722.79	8638.	33.	0.005	394.09	1.567
AG-108M	2890.80	722.94	8671.	0.	0.000	1000.00	1.567s
EU-154	2892.49	723.36	3405.	269.	0.037	31.32	1.567D
ZR-95	2895.84	724.20	8554.	-32.	-0.004	411.26	1.568s
BI-212	2907.73	727.17	7975.	54.	0.007	234.98	1.570
PM-146	2987.69	747.16	5142.	-166.	-0.023	61.52	1.588s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZR-95	3025.97	756.73	4850.	67.	0.009	220.13	1.596s
AG-110M	3054.82	763.94	6870.	-94.	-0.013	124.47	1.602s
NB-95	3062.21	765.79	6866.	100.	0.014	118.19	1.604s
EU-152	3114.73	778.92	3329.	132.	0.018	62.61	1.615D
BI-212	3140.74	785.42	5078.	46.	0.006	329.28	1.621
CS-134	3182.54	795.87	9814.	176.	0.024	79.88	1.630s
TL-210	3197.46	799.60	9990.	0.	0.000	1000.00	1.633s
CS-134	3206.86	801.95	9716.	185.	0.026	75.67	1.635s
CO-58	3242.16	810.78	11876.	-194.	-0.027	79.83	1.643s
La-140	3262.14	815.77	9943.	-118.	-0.016	119.86	1.647
Cs-136	3273.06	818.50	12685.	-146.	-0.020	109.41	1.649s
MN-54	3338.70	834.91	3680.	662.	0.092	19.11	1.973
Co-56	3386.15	846.77	5858.	196.	0.027	86.10	1.674s
TL-208	3441.33	860.56	6138.	385.	0.053	45.07	1.685s
NB-94	3483.47	871.10	6765.	-179.	-0.025	101.30	1.695s
EU-154	3492.00	873.23	8856.	96.	0.013	138.29	1.696
PA-234	3521.21	880.53	14499.	-41.	-0.006	417.52	1.703s
PA-234	3532.05	883.24	14458.	0.	0.000	1000.00	1.705s
AG-110M	3537.82	884.68	12392.	-22.	-0.003	732.53	1.706s
AC-228	3643.38	911.07	7786.	-234.	-0.033	53.72	1.729s
AG-110M	3749.09	937.49	12108.	18.	0.002	889.53	1.751s
PA-234	3783.21	946.02	8500.	66.	0.009	307.35	1.759
EU-152	3855.58	964.11	12258.	-235.	-0.033	66.90	1.774s
AC-228	3875.02	968.97	12477.	-41.	-0.006	388.77	1.778
EU-154	3984.48	996.33	13412.	216.	0.030	76.09	1.801
PA-234M	4003.15	1001.00	12441.	209.	0.029	75.90	1.805s
EU-154	4018.27	1004.77	14024.	54.	0.007	310.98	1.808
Co-56	4150.56	1037.84	6425.	-83.	-0.011	65.07	1.836s
Cs-136	4191.49	1048.07	6840.	-222.	-0.031	53.03	1.845
RH-106	4200.65	1050.36	8405.	161.	0.022	80.75	1.847
BI-207	4253.86	1063.66	5979.	79.	0.011	221.82	1.858s
Ga-68	4308.84	1077.40	6067.	40.	0.006	277.83	1.870
FE-59	4394.34	1098.77	4811.	443.	0.061	37.05	2.494s
EU-152	4447.58	1112.07	11775.	147.	0.020	104.86	1.899
ZN-65	4461.46	1115.55	11770.	152.	0.021	101.44	1.901
Sc-46	4481.49	1120.55	11812.	110.	0.015	140.40	1.906s
Ta-182	4484.49	1121.30	11721.	50.	0.007	308.60	1.906s
CO-60	4691.76	1173.10	4097.	102283.	14.206	0.36	2.260
Ta-182	4755.57	1189.05	2697.	-42.	-0.006	288.13	1.963s
Ta-182	4885.06	1221.41	1541.	114.	0.016	81.21	1.990s
Co-56	4952.57	1238.28	1377.	-49.	-0.007	751.86	2.004
EU-154	5097.66	1274.54	798.	231.	0.032	17.21	2.059A
FE-59	5165.91	1291.60	975.	26.	0.004	286.21	2.048s
TL-210	5251.57	1313.00	858.	22.	0.003	186.65	2.066s
CO-60	5328.99	1332.35	765.	92415.	12.835	0.34	2.390
AG-110M	5536.89	1384.30	444.	57.	0.008	90.26	2.124s
EU-152	5632.29	1408.14	365.	165.	0.023	29.41	3.028s
K-40	5843.19	1460.83	459.	19.	0.003	263.48	2.186s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	6385.02	1596.21	481.	-70.	-0.010	79.21	2.294s
SB-124	6764.37	1690.98	329.	32.	0.004	143.42	2.369s
BI-214	7058.61	1764.49	340.	-35.	-0.005	144.15	2.427
Co-56	7086.08	1771.35	603.	-12.	-0.002	290.83	2.433
Y-88	7345.12	1836.06	373.	-48.	-0.007	105.73	2.483s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.2507E+01				5.31E+01	
			477.60	-1.251E+01	?(	4.099E+01 9.93E+01 1.05E+01	G
NA-22	C	2.5247E-02				9.50E+02	
						Derived Ave Activity	
			1274.53	2.525E-02	}(	2.063E+00 2.44E+03 9.99E+01	G
K-40	N	2.3609E+00				4.66E+11	
			1460.83	2.361E+00	?(P	1.261E+01 2.63E+02 1.07E+01	G
Sc-46	F	6.0456E-01				8.38E+01	
			889.28	6.754E-02	&(	4.867E+00 2.18E+03 1.00E+02	G
			1120.55	1.142E+00	&(P	5.296E+00 1.40E+02 1.00E+02	G
CR-51	F	-9.7461E+00				2.77E+01	
			320.08	-9.746E+00	?(	4.292E+01 1.33E+02 9.94E+00	G
MN-54	C	5.3911E+00				3.12E+02	
			834.85	5.391E+00	(P	2.325E+00 1.91E+01 1.00E+02	G
FE-59	F	8.0156E+00				4.45E+01	
			1099.25	8.016E+00	@(P	5.902E+00 3.71E+01 5.65E+01	G
			1291.60	6.983E-01	& P	4.036E+00 2.86E+02 4.32E+01	G
Co-56	C	1.6163E+00				7.73E+01	
			846.77	1.616E+00	&(P	2.962E+00 8.61E+01 9.99E+01	G
			1238.28	-8.470E-01	- P	3.014E+00 7.52E+02 6.61E+01	G
			1037.84	-5.690E+00	& P	2.595E+01 6.51E+01 1.41E+01	G
			1771.35	-1.213E+00	-	1.184E+01 2.91E+02 1.55E+01	A
CO-57	C	5.4552E+00				2.72E+02	
			122.06	2.118E+00	}	1.867E+00 1.95E+01 8.56E+01	G
			136.47	5.455E+00	&(	2.574E+01 1.43E+02 1.07E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-58	C	-1.5501E+00					7.09E+01	
			810.78	-1.550E+00	?(	4.083E+00	7.98E+01	9.95E+01 G
CO-60	F	1.1125E+03					1.93E+03	
			1332.50	1.117E+03	(	1.592E+00	3.39E-01	1.00E+02 G
			1173.24	1.108E+03	(P	3.259E+00	3.63E-01	9.99E+01 G
ZN-65	F	3.1067E+00					2.44E+02	
			1115.55	3.107E+00	&(	1.041E+01	1.01E+02	5.06E+01 G
NB-94	I	-6.6638E-03					7.41E+06	
			702.63	-6.664E-03	&(P	3.251E+00	1.22E+04	9.79E+01 G
			871.10	-1.510E+00	+	3.257E+00	1.01E+02	9.99E+01 G
ZR-95	I	9.2916E-01					6.40E+01	
			756.73	9.292E-01	&(P	4.524E+00	2.20E+02	5.45E+01 G
			724.20	-5.244E-01	+	7.144E+00	4.11E+02	4.42E+01 G
NB-95	I	7.5778E-01					6.40E+01	
			765.79	7.578E-01	&(	2.961E+00	1.18E+02	9.98E+01 G
RU-103	I	9.3404E-01					3.93E+01	
			497.05	9.340E-01	&(P	2.719E+00	1.27E+02	9.09E+01 G
			610.30	-1.307E+01	+	8.371E+01	1.94E+02	5.75E+00 GA
RH-106	I	1.1561E+01					3.74E+02	
			621.92	-2.616E+00	?(P	2.406E+01	2.78E+02	9.93E+00 G
			1050.36	1.018E+02	&(	2.713E+02	8.07E+01	1.56E+00 G
			511.86	1.154E+01	&	1.563E+01	4.12E+01	2.00E+01 GA
AG-108M	C	-1.4158E+00					1.53E+05	
			433.94	-1.416E+00	&(	4.555E+00	9.75E+01	9.05E+01 G
			722.94	0.000E+00	+	3.491E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	+	5.396E+00	1.00E+03	8.98E+01 G
AG-110M	F	5.2226E-01					2.50E+02	
			884.68	-2.525E-01	?(	6.124E+00	7.33E+02	7.27E+01 G
			657.76	-4.896E-01	&	1.549E+01	9.59E+02	9.46E+01 G
			937.49	4.559E-01	?(	1.343E+01	8.90E+02	3.44E+01 G
			1384.30	2.934E+00	&(	5.194E+00	9.03E+01	2.43E+01 G
			763.94	-3.217E+00	+	1.324E+01	1.24E+02	2.23E+01 G
SN-113	F	1.7327E-01					1.15E+02	
			391.69	1.733E-01	(	5.507E+00	9.61E+02	6.40E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-124	F	-3.0629E-01					6.02E+01	
			602.73	-1.219E+00	?(	4.848E+00	1.21E+02	9.83E+01 G
			1690.98	9.931E-01	?(	2.737E+00	1.43E+02	4.78E+01 G
			722.79	2.243E+00	(	2.927E+01	3.94E+02	1.08E+01 G
SB-125	I	-4.2430E+00					1.01E+03	
			427.88	-4.243E+00	&(P	1.340E+01	5.19E+01	2.96E+01 G
			600.50	-6.677E+00	&	2.674E+01	1.21E+02	1.79E+01 G
			635.89	-3.780E+00	+	2.204E+01	1.76E+02	1.13E+01 G
			463.37	-1.358E+01	+	3.781E+01	8.44E+01	1.05E+01 G
I-131	I	5.4011E-01					8.02E+00	
			364.48	3.685E-01	&(	2.719E+00	3.09E+02	8.17E+01 G
			284.30	2.824E+00	?(P	3.345E+01	4.95E+02	6.14E+00 G
			636.97	-7.313E+00	&	3.647E+01	1.51E+02	7.17E+00 G
Gd-153	F	1.6992E+00					2.42E+02	
			97.50	1.699E+00	?(	6.038E+00	1.08E+02	3.00E+01 G
			103.20	-2.047E+00	+	1.147E+01	1.70E+02	2.18E+01 G
Ga-68	C	2.1356E+01					4.71E-02	
			1077.40	2.136E+01	&(	1.966E+02	2.78E+02	3.30E+00 G
Tc-99m	I	7.4521E-01					2.51E-01	
			140.51	7.452E-01	&(	3.507E+00	1.43E+02	8.93E+01 G
BA-133	F	-1.6626E+00					3.85E+03	
			356.00	-1.663E+00	?(	4.680E+00	8.53E+01	6.20E+01 G
			302.85	0.000E+00	&	2.327E+01	1.00E+03	1.83E+01 G
			383.84	1.189E+01	? P	4.041E+01	1.03E+02	8.94E+00 GA
			80.99	-4.339E-01	% P	4.003E+00	1.64E+03	3.41E+01 GA
CS-134	I	3.0141E+00					7.54E+02	
			795.87	1.614E+00	&(	4.255E+00	7.99E+01	8.55E+01 G
			604.71	-1.231E+00	&	4.907E+00	1.21E+02	9.76E+01 G
			569.32	-6.557E+00	+	1.490E+01	6.89E+01	1.54E+01 G
			801.95	1.679E+01	?(	4.192E+01	7.57E+01	8.69E+00 G
			563.24	-1.418E+01	+	2.793E+01	8.60E+01	8.35E+00 G
CS-137	I	1.6485E+03					1.10E+04	
			661.66	1.649E+03	(	2.964E+00	2.41E-01	8.52E+01 G
CE-139	F	8.0806E-01					1.38E+02	
			165.85	8.081E-01	?(	2.457E+00	9.22E+01	7.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ba-140	I	-1.0457E+00					1.28E+01	
			537.26	-1.046E+00	?(	9.590E+00	3.99E+02	2.44E+01 G
			162.66	-1.065E+01	+ P	3.360E+01	1.31E+02	6.22E+00 G
			304.85	0.000E+00	&	9.985E+01	1.00E+03	4.29E+00 G
La-140	I	-1.0369E+00					1.28E+01	
			1596.21	-1.037E+00	?(	1.564E+00	7.92E+01	9.54E+01 G
			487.02	-2.935E+00	&	9.495E+00	9.80E+01	4.55E+01 G
			328.76	-4.816E+00	+ P	1.063E+01	1.50E+02	2.03E+01 G
			815.77	-4.052E+00	+	1.605E+01	1.20E+02	2.33E+01 G
CE-141	I	1.2589E+00					3.25E+01	
			145.44	1.259E+00	(	5.850E+00	1.41E+02	4.82E+01 G
PM-144	C	-7.5298E-01					3.63E+02	
			696.54	-7.530E-01	(	3.174E+00	1.28E+02	9.90E+01 G
			618.06	-2.236E-02	& P	4.915E+00	4.67E+03	9.91E+01 G
EU-152	F	8.9976E+00					4.94E+03	
			121.78	0.000E+00	}	5.559E+00	1.51E+04	2.86E+01 G
			344.29	7.693E+00	(	6.656E+00	2.65E+01	2.65E+01 G
			1112.07	1.112E+01	(	3.850E+01	1.05E+02	1.36E+01 G
			778.92	7.835E+00	(	1.617E+01	6.26E+01	1.29E+01 G
			964.11	-1.475E+01	-	3.254E+01	6.69E+01	1.46E+01 G
			244.69	1.173E+01	(	4.298E+01	1.11E+02	7.58E+00 G
			1408.00	9.972E+00		5.544E+00	2.94E+01	2.10E+01 GA
EU-154	I	7.6450E+00					3.14E+03	
			123.10	6.952E+00	?(	3.883E+00	1.71E+01	4.08E+01 G
			1274.54	7.645E+00	}	4.438E+00	1.72E+01	3.52E+01 G
			723.36	9.652E+00	(	9.869E+00	3.13E+01	2.02E+01 G
			873.23	6.642E+00	(	3.037E+01	1.38E+02	1.23E+01 G
			1004.77	2.838E+00	-	2.920E+01	3.11E+02	1.80E+01 G
			996.33	1.920E+01	+ P	4.818E+01	7.61E+01	1.06E+01 G
EU-155	I	1.8761E+00					1.81E+03	
			105.31	1.876E+00	&(P	1.141E+01	1.84E+02	2.12E+01 G
			86.54	-1.695E+00	+	1.024E+01	1.83E+02	3.07E+01 G
HF-181	F	-8.6368E-01					4.24E+01	
			482.00	-1.650E+00	?(	5.414E+00	9.95E+01	8.05E+01 G
			133.02	0.000E+00	+	6.532E+00	1.00E+03	4.33E+01 G
			345.83	-6.755E+00	+	2.903E+01	1.30E+02	1.51E+01 G
			136.30	9.954E+00	&(	4.696E+01	1.43E+02	5.85E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Ta-182   F   2.9003E+00                                      1.14E+02
                        1121.30 1.481E+00 &(  1.512E+01 3.09E+02 3.49E+01 G
                        1221.41 4.735E+00  (  7.702E+00 8.12E+01 2.70E+01 G
                        1189.05-2.860E+00 &   1.653E+01 2.88E+02 1.62E+01 G

Hg-203   F  -7.6254E-01                                      4.66E+01
                         279.20-7.625E-01 &(  2.937E+00 1.17E+02 8.15E+01 G

TL-208   N   4.0039E+00                                      6.98E+02
                         583.02 7.240E-01  (P 2.680E+00 1.61E+02 8.45E+01 G
                         277.28 4.938E+00 ?(P 3.919E+01 2.40E+02 6.31E+00 G
                         860.56 2.584E+01 &(P 2.472E+01 4.51E+01 1.24E+01 G

PM-146   C   1.4791E+00                                      2.02E+03
                         453.88 1.479E+00 &(  4.419E+00 1.30E+02 6.50E+01 G
                         747.16-3.643E+00 +   7.385E+00 6.15E+01 3.40E+01 G
                         735.72 8.705E-02 & P 1.063E+01 5.51E+03 2.25E+01 G

Y-88     F  -7.8858E-01                                      1.07E+02
                        1836.06-7.886E-01 ?(P 1.513E+00 1.06E+02 9.92E+01 G
                         898.04 2.670E-03 & P 3.664E+00 6.43E+04 9.37E+01 G

Cd-113m     -5.5864E+03                                      5.33E+03
                         263.70-5.586E+03 ?(  3.498E+04 1.89E+02 6.00E-03   K

Cd-109   F   6.8923E+02                                      4.53E+02
                                                           Derived Ave Activity
                          88.04 6.892E+02 }(  7.653E+01 3.49E+00 3.79E+00 G

Cf-251   T   1.8739E+00                                      3.28E+05
                         176.60 1.874E+00 *(  9.576E+00 2.04E+02 1.70E+01 G
                         227.00 9.904E+00     3.165E+01 1.28E+02 6.30E+00 GA

Cf-249   T   1.6415E+00                                      1.28E+05
                         387.95 1.642E+00 ?(  5.519E+00 1.02E+02 6.60E+01 G
                         333.44-6.250E+00 +   2.748E+01 1.33E+02 1.55E+01 G

Sn-126      -1.4542E+01                                      3.65E+07
                          87.57 2.028E+00 }   4.318E+00 5.79E+01 3.75E+01 GA
                          64.28-1.454E+01 &(  1.106E+02 2.31E+02 9.70E+00 G
                          86.94-5.758E+00 +   3.465E+01 1.82E+02 9.04E+00 GA

PB-210   N  -5.4804E+01                                      8.14E+03
                          46.54-5.480E+01 ?(P 1.864E+02 4.39E+01 4.25E+00 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	-9.5210E-01					6.98E+02	
			238.63	-9.521E-01	?(P	6.164E+00	2.63E+02	4.33E+01 G
			300.03	-5.539E-01	& P	1.395E+02	7.61E+03	3.28E+00 GA
PB-214	N	-7.8989E-01					5.84E+05	
			351.93	-3.210E+00	&(P	7.977E+00	1.27E+02	3.76E+01 G
			295.09	3.925E+00	&(P	2.339E+01	1.81E+02	1.93E+01 G
			242.00	-1.965E+00	+	3.963E+01	6.10E+02	7.43E+00 GA
BI-207	C	1.0594E+00					1.18E+04	
			1063.66	1.059E+00	?(	4.848E+00	2.22E+02	7.45E+01 G
			569.70	1.538E-01	- P	2.439E+00	4.79E+02	9.77E+01 G
BI-212	N	5.2026E+00					6.98E+02	
			727.17	5.203E+00	?(	4.048E+01	2.35E+02	7.55E+00 G
			785.42	2.784E+01	P	2.028E+02	3.29E+02	1.28E+00 GA
U-235	N	7.7532E+00					2.57E+11	
			143.79	5.501E+00	&(	2.538E+01	1.40E+02	1.10E+01 G
			205.33	-1.639E+00	-	3.767E+01	9.19E+02	5.01E+00 G
			163.38	1.261E+01	(	3.580E+01	8.60E+01	5.08E+00 G
			185.72	-1.398E+00	-	3.354E+00	7.28E+01	5.40E+01 GA
BI-214	N	-3.1967E+00					5.84E+05	
			609.31	-3.197E+00	(P	1.040E+01	6.94E+01	4.61E+01 G
			1120.29	-9.433E-01	% P	3.524E+01	1.20E+03	1.51E+01 G
			1764.49	-3.589E+00	+ P	8.979E+00	1.44E+02	1.54E+01 G
BI-210M	T	-1.6819E+00					1.10E+09	
			265.83	-1.682E+00	?(	4.865E+00	8.77E+01	5.00E+01 G
			304.90	0.000E+00	&	1.530E+01	1.00E+03	2.80E+01 G
AC-228	N	-7.0566E+00					2.10E+03	
			911.07	-7.057E+00	&(	1.248E+01	5.37E+01	2.90E+01 G
			968.97	-2.143E+00	+	2.757E+01	3.89E+02	1.75E+01 G
			338.32	-8.348E+00	+	3.451E+01	1.25E+02	1.20E+01 G
			93.35	-1.990E+00	+	2.998E+01	4.56E+02	5.56E+00 XA
TH-227	N	2.2117E+00					7.95E+03	
			256.24	-1.306E+00	?(	2.933E+01	9.40E+02	7.00E+00 G
			235.97	4.213E+00	(	2.227E+01	1.60E+02	1.23E+01 G
			50.14	-2.250E+01	+	9.510E+01	1.28E+02	8.00E+00 G
TH-229	N	1.4102E+01					2.68E+06	
			193.51	4.961E+00	&(	4.238E+01	3.42E+02	4.40E+00 G
			210.85	2.755E+01	(	6.400E+01	9.30E+01	2.99E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	-1.5763E+01					1.63E+12	
			92.59	-1.576E+01	?(P	2.981E+01	2.75E+02	5.58E+00 G
			63.29	-4.326E+01	+ P	2.798E+02	1.55E+02	3.81E+00 G
PA-231	N	-1.5180E+01					1.20E+07	
			302.65	-1.518E+01	&(	1.479E+02	2.95E+02	2.88E+00 G
			300.07	-7.386E-01	& P	1.860E+02	7.61E+03	2.46E+00 G
PA-234	N	1.2856E+00					1.63E+12	
			131.29	-1.981E+00	&(	1.565E+01	2.39E+02	1.80E+01 G
			946.02	4.442E+00	(	2.910E+01	3.07E+02	1.34E+01 G
			569.47	3.297E+00	?(	2.871E+01	2.63E+02	8.20E+00 G
			883.24	0.000E+00	&	5.000E+01	1.00E+03	9.60E+00 G
			880.53	-5.784E+00	+	7.990E+01	4.18E+02	6.00E+00 GA
PA-234M	N	2.3574E+02					1.63E+12	
			1001.00	2.357E+02	?(P	5.901E+02	7.59E+01	8.37E-01 G
			766.41	-1.983E+01	&	1.013E+03	1.54E+03	2.94E-01 G
AM-241	T	4.8418E+03					1.58E+05	
			59.54	4.842E+03	(P	1.009E+01	1.50E-01	3.59E+01 G
Np-237	F	-3.9779E+00					2.14E+06	
			86.49	-3.978E+00	?(	2.435E+01	1.86E+02	1.31E+01 G
Ir-192	F	1.0229E+00					7.40E+01	
			316.49	0.000E+00	&(	5.042E+00	1.00E+03	8.70E+01 G
			468.06	2.743E+00	?(	7.489E+00	8.28E+01	5.18E+01 G
			308.44	0.000E+00	&	1.359E+01	1.00E+03	3.18E+01 G
Cs-136	F	-4.1099E-01					1.30E+01	
			818.50	-1.170E+00	&(	4.228E+00	1.09E+02	1.00E+02 G
			1048.07	-2.731E+00	+	4.767E+00	5.30E+01	8.00E+01 G
			340.57	1.208E+00	(	3.590E+00	9.00E+01	4.69E+01 G
Np-239	T	2.3276E+00					2.36E+00	
			103.70	5.944E-01	&	1.054E+01	5.37E+02	2.40E+01 X
			106.13	2.328E+00	?(	1.100E+01	1.43E+02	2.27E+01 G
			99.50	-3.488E+00	+	1.684E+01	1.46E+02	1.50E+01 X
Nd-147		-5.7175E+00					1.11E+01	
			531.00	-5.718E+00	?(	1.824E+01	1.39E+02	1.30E+01 G
			91.10	-7.757E-06	&	1.096E+01	4.28E+07	2.83E+01 G
TL-210	N	2.6986E-01					5.84E+05	
			799.60	0.000E+00	?(	3.724E+00	1.00E+03	9.90E+01 G
			296.00	6.079E-01	?(	5.735E+00	2.86E+02	7.90E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          1313.00 1.269E+00 ?   7.909E+00 1.87E+02 2.10E+01 GA

Kr-85    I   1.3815E+01                                        3.92E+03
                          513.98 1.382E+01 &(  7.394E+02 1.62E+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	382330.	-848.	-0.118	43.85	-5.480E+01	P
TH-234	63.29	928471.	-695.	-0.096	155.06	-4.326E+01	P
Np-237	86.49	92410.	-232.	-0.032	185.52	-3.978E+00	
EU-155	86.54	89749.	-232.	-0.032	183.06	-1.695E+00	
TH-234	92.59	25032.	-391.	-0.054	275.31	-1.576E+01	P
AC-228	93.35	25095.	-49.	-0.007	455.73	-1.990E+00	
Gd-153	97.50	29452.	226.	0.031	107.69	1.699E+00	
Gd-153	103.20	55458.	-196.	-0.027	169.86	-2.047E+00	
EU-155	105.31	51536.	174.	0.024	184.27	1.876E+00	P
PA-234	131.29	61815.	-147.	-0.020	239.39	-1.981E+00	
HF-181	136.30	57007.	236.	0.033	142.96	9.954E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	143.79	55708.	239.	0.033	139.82	5.501E+00	
CE-141	145.44	56624.	239.	0.033	140.83	1.259E+00	
Ba-140	162.66	27500.	-246.	-0.034	130.72	-1.065E+01	P
U-235	163.38	20686.	237.	0.033	86.03	1.261E+01	
CE-139	165.85	23606.	236.	0.033	92.16	8.081E-01	
Cf-251	176.60	15121.	113.	0.016	204.41	1.874E+00	
U-235	185.72	17707.	-260.	-0.036	72.78	-1.398E+00	
U-235	205.33	17142.	-27.	-0.004	918.75	-1.639E+00	
Cf-251	227.00	17006.	191.	0.027	127.94	9.904E+00	
PB-212	238.63	28749.	-122.	-0.017	262.64	-9.521E-01	P
PB-214	242.00	34419.	-43.	-0.006	610.35	-1.965E+00	
Cd-113m	263.70	15692.	-94.	-0.013	189.41	-5.586E+03	
BI-210M	265.83	20900.	-234.	-0.032	87.68	-1.682E+00	
Hg-203	279.20	19004.	-168.	-0.023	116.65	-7.625E-01	
I-131	284.30	13565.	46.	0.006	495.43	2.824E+00	P
PB-214	295.09	63324.	197.	0.027	180.62	3.925E+00	P
TL-210	296.00	63521.	125.	0.017	285.76	6.079E-01	
PA-231	302.65	54553.	-112.	-0.016	295.08	-1.518E+01	
CR-51	320.08	50888.	-239.	-0.033	133.45	-9.746E+00	
La-140	328.76	12517.	-237.	-0.033	150.13	-4.816E+00	P
AC-228	338.32	44656.	-239.	-0.033	125.28	-8.348E+00	
HF-181	345.83	48330.	-239.	-0.033	130.22	-6.755E+00	
PB-214	351.93	22139.	-280.	-0.039	127.26	-3.210E+00	P
BA-133	356.00	20436.	-238.	-0.033	85.34	-1.663E+00	
I-131	364.48	11468.	68.	0.009	308.57	3.685E-01	
BA-133	383.84	28604.	233.	0.032	102.98	1.189E+01	P
SN-113	391.69	26476.	24.	0.003	961.35	1.733E-01	
SB-125	427.88	29705.	-255.	-0.035	51.94	-4.243E+00	P
AG-108M	433.94	31428.	-258.	-0.036	97.52	-1.416E+00	
PM-146	453.88	14283.	187.	0.026	130.43	1.479E+00	
SB-125	463.37	26419.	-273.	-0.038	84.40	-1.358E+01	
Ir-192	468.06	24950.	271.	0.038	82.76	2.743E+00	
BE-7	477.60	30030.	-247.	-0.034	99.33	-1.251E+01	
HF-181	482.00	30277.	-248.	-0.034	99.46	-1.650E+00	
La-140	487.02	29307.	-247.	-0.034	98.03	-2.935E+00	
RU-103	497.05	9266.	155.	0.022	126.99	9.340E-01	P
Nd-147	531.00	7739.	-129.	-0.018	139.12	-5.718E+00	
Ba-140	537.26	7397.	-44.	-0.006	399.28	-1.046E+00	
CS-134	563.24	6855.	-197.	-0.027	85.97	-1.418E+01	
CS-134	569.32	6509.	-167.	-0.023	68.89	-6.557E+00	
PA-234	569.47	6872.	45.	0.006	262.89	3.297E+00	
BI-207	569.70	7044.	25.	0.003	478.55	1.538E-01	P
SB-125	600.50	26302.	-189.	-0.026	121.33	-6.677E+00	
CS-134	604.71	26181.	-190.	-0.026	120.74	-1.231E+00	
BI-214	609.31	25922.	-231.	-0.032	69.38	-3.197E+00	P
RU-103	610.30	26069.	-118.	-0.016	193.89	-1.307E+01	
SB-125	635.89	6520.	-65.	-0.009	176.12	-3.780E+00	
I-131	636.97	7110.	-79.	-0.011	150.73	-7.313E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
AG-110M	657.76	216848.	-69.	-0.010	959.28	-4.896E-01		
PM-144	696.54	9028.	-106.	-0.015	127.54	-7.530E-01		
ZR-95	724.20	8554.	-32.	-0.004	411.26	-5.244E-01		
PM-146	747.16	5142.	-166.	-0.023	61.52	-3.643E+00		
ZR-95	756.73	4850.	67.	0.009	220.13	9.292E-01		P
AG-110M	763.94	6870.	-94.	-0.013	124.47	-3.217E+00		
CS-134	795.87	9814.	176.	0.024	79.88	1.614E+00		
CS-134	801.95	9716.	185.	0.026	75.67	1.679E+01		
CO-58	810.78	11876.	-194.	-0.027	79.83	-1.550E+00		
La-140	815.77	9943.	-118.	-0.016	119.86	-4.052E+00		
NB-94	871.10	6765.	-179.	-0.025	101.30	-1.510E+00		
PA-234	880.53	14499.	-41.	-0.006	417.52	-5.784E+00		
AG-110M	884.68	12392.	-22.	-0.003	732.53	-2.525E-01		
AC-228	911.07	7786.	-234.	-0.033	53.72	-7.057E+00		
AG-110M	937.49	12108.	18.	0.002	889.53	4.559E-01		
PA-234	946.02	8500.	66.	0.009	307.35	4.442E+00		
AC-228	968.97	12477.	-41.	-0.006	388.77	-2.143E+00		
PA-234M	1001.00	12441.	209.	0.029	75.90	2.357E+02		P
BI-207	1063.66	5979.	79.	0.011	221.82	1.059E+00		
Ta-182	1121.30	11721.	50.	0.007	308.60	1.481E+00		
Ta-182	1189.05	2697.	-42.	-0.006	288.13	-2.860E+00		
Ta-182	1221.41	1541.	114.	0.016	81.21	4.735E+00		
TL-210	1313.00	858.	22.	0.003	186.65	1.269E+00		
AG-110M	1384.30	444.	57.	0.008	90.26	2.934E+00		
La-140	1596.21	481.	-70.	-0.010	79.21	-1.037E+00		
BI-214	1764.49	340.	-35.	-0.005	144.15	-3.589E+00		P
Y-88	1836.06	373.	-48.	-0.007	105.73	-7.886E-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	-1.2507E+01	-1.2507E+01	9.933E+01%	4.10E+01
NA-22	#A	2.5247E-02	2.5247E-02	2.442E+03%	2.06E+00
K-40	#A	2.3609E+00	2.3609E+00	2.635E+02%	1.26E+01
Sc-46	#A	6.0456E-01	6.0456E-01	1.404E+02%	4.87E+00
CR-51	#A	-9.7460E+00	-9.7461E+00	1.334E+02%	4.29E+01
MN-54		5.3911E+00	5.3911E+00	1.911E+01%	2.32E+00
FE-59	#	8.0155E+00	8.0156E+00	3.705E+01%	5.90E+00
Co-56	#A	1.6163E+00	1.6163E+00	8.610E+01%	2.96E+00
CO-57	A	5.4552E+00	5.4552E+00	1.430E+02%	2.57E+01
CO-58	#A	-1.5501E+00	-1.5501E+00	7.983E+01%	4.08E+00
CO-60		1.1125E+03	1.1125E+03	2.485E-01%	1.59E+00
ZN-65	#A	3.1067E+00	3.1067E+00	1.014E+02%	1.04E+01
NB-94	#A	-6.6638E-03	-6.6638E-03	1.217E+04%	3.25E+00

ZR-95	#A	9.2915E-01	9.2916E-01	2.201E+02%	4.52E+00
NB-95	#A	7.5778E-01	7.5778E-01	1.182E+02%	2.96E+00
RU-103	#A	9.3404E-01	9.3404E-01	1.270E+02%	2.72E+00
RH-106	#A	1.1561E+01	1.1561E+01	8.075E+01%	2.41E+01
AG-108M	#A	-1.4158E+00	-1.4158E+00	9.752E+01%	4.55E+00
AG-110M	#A	5.2226E-01	5.2226E-01	9.026E+01%	6.12E+00
SN-113	#A	1.7327E-01	1.7327E-01	9.613E+02%	5.51E+00
SB-124	A	-3.0629E-01	-3.0629E-01	1.205E+02%	4.85E+00
SB-125	#A	-4.2430E+00	-4.2430E+00	5.194E+01%	1.34E+01
I-131	#A	5.4010E-01	5.4011E-01	2.918E+02%	2.72E+00
Gd-153	#A	1.6992E+00	1.6992E+00	1.077E+02%	6.04E+00
Ga-68	#A	2.1236E+01	2.1356E+01	2.778E+02%	1.97E+02
Tc-99m	A	7.4442E-01	7.4521E-01	1.426E+02%	3.51E+00
BA-133	#A	-1.6626E+00	-1.6626E+00	8.534E+01%	4.68E+00
CS-134	#A	3.0141E+00	3.0141E+00	5.502E+01%	4.25E+00
CS-137		1.6485E+03	1.6485E+03	2.409E-01%	2.96E+00
CE-139	#A	8.0805E-01	8.0806E-01	9.216E+01%	2.46E+00
Ba-140	#A	-1.0457E+00	-1.0457E+00	3.993E+02%	9.59E+00
La-140	#A	-1.0369E+00	-1.0369E+00	7.921E+01%	1.56E+00
CE-141	#A	1.2589E+00	1.2589E+00	1.408E+02%	5.85E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.55E+01
PM-144	#A	-7.5298E-01	-7.5298E-01	1.275E+02%	3.17E+00
EU-152	C	8.9976E+00	8.9976E+00	2.648E+01%	6.66E+00
EU-154		7.6450E+00	7.6450E+00	1.713E+01%	3.88E+00
EU-155	#A	1.8761E+00	1.8761E+00	1.843E+02%	1.14E+01
HF-181	#A	-8.6368E-01	-8.6368E-01	8.708E+01%	5.41E+00
Ta-182	#A	2.9003E+00	2.9003E+00	8.121E+01%	1.51E+01
Hg-203	#A	-7.6254E-01	-7.6254E-01	1.166E+02%	2.94E+00
TL-208	#C	4.0039E+00	4.0039E+00	4.507E+01%	2.68E+00
PM-146	#A	1.4791E+00	1.4791E+00	1.304E+02%	4.42E+00
Y-88	#A	-7.8858E-01	-7.8858E-01	1.057E+02%	1.51E+00
Cd-113m	#A	-5.5864E+03	-5.5864E+03	1.894E+02%	3.50E+04
Cd-109	#	6.8923E+02	6.8923E+02	3.488E+00%	7.65E+01
Cf-251	#A	1.8739E+00	1.8739E+00	2.044E+02%	9.58E+00
Cf-249	#A	1.6415E+00	1.6415E+00	1.019E+02%	5.52E+00
Sn-126	A	-1.4542E+01	-1.4542E+01	2.306E+02%	1.11E+02
PB-210	#A	-5.4804E+01	-5.4804E+01	4.385E+01%	1.86E+02
PB-212	#A	-9.5210E-01	-9.5210E-01	2.626E+02%	6.16E+00
PB-214	#A	-7.8989E-01	-7.8989E-01	1.105E+02%	7.98E+00
BI-207	#A	1.0594E+00	1.0594E+00	2.218E+02%	4.85E+00
BI-212	A	5.2026E+00	5.2026E+00	2.350E+02%	4.05E+01
U-235	#A	7.7532E+00	7.7532E+00	8.209E+01%	2.54E+01
BI-214	#A	-3.1967E+00	-3.1967E+00	6.938E+01%	1.04E+01
BI-210M	#A	-1.6819E+00	-1.6819E+00	8.768E+01%	4.87E+00
AC-228	#A	-7.0566E+00	-7.0566E+00	5.372E+01%	1.25E+01
TH-227	A	2.2117E+00	2.2117E+00	1.601E+02%	2.93E+01
TH-229	A	1.4102E+01	1.4102E+01	9.304E+01%	4.24E+01
TH-234	#A	-1.5763E+01	-1.5763E+01	2.753E+02%	2.98E+01
PA-231	#A	-1.5180E+01	-1.5180E+01	2.951E+02%	1.48E+02

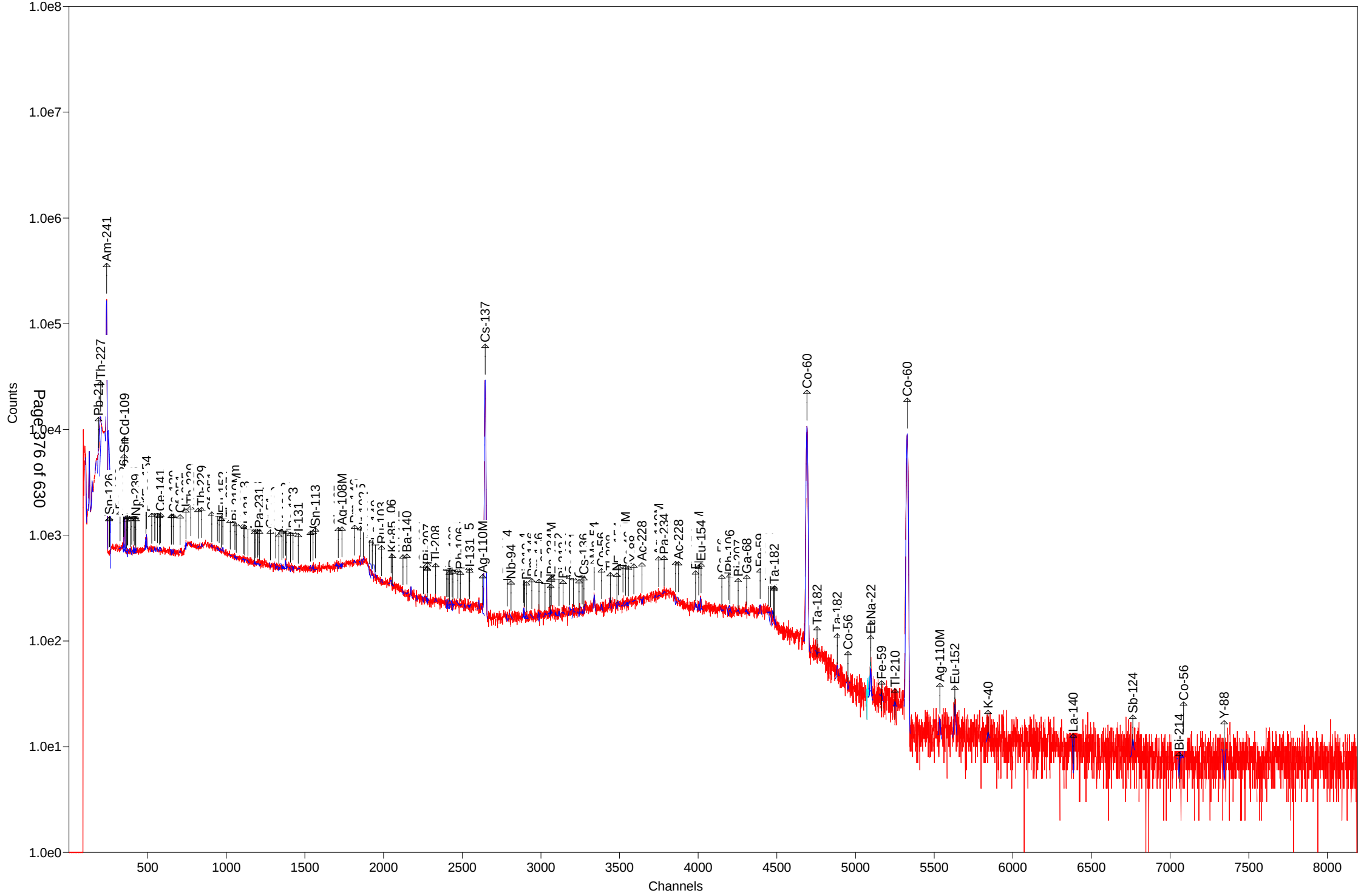
PA-233 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.21E+01
PA-234 #A	1.2856E+00	1.2856E+00	1.567E+02%		1.57E+01
PA-234M#A	2.3574E+02	2.3574E+02	7.590E+01%		5.90E+02
AM-241	4.8418E+03	4.8418E+03	1.503E-01%		1.01E+01
Np-237 #A	-3.9779E+00	-3.9779E+00	1.855E+02%		2.43E+01
Ir-192 #A	1.0229E+00	1.0229E+00	8.276E+01%		5.04E+00
Cs-136 #A	-4.1098E-01	-4.1099E-01	7.084E+01%		4.23E+00
Np-239 A	2.3274E+00	2.3276E+00	1.432E+02%		1.10E+01
Nd-147 #A	-5.7174E+00	-5.7175E+00	1.391E+02%		1.82E+01
TL-210 #A	2.6986E-01	2.6986E-01	2.858E+02%		3.72E+00
Kr-85 #A	1.3815E+01	1.3815E+01	1.617E+03%		7.39E+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 (25.1 to 1999.6 keV) 8.324E+03 Bq/Sample
Total Decayed Activity (25.1 to 1999.6 keV) 8.3237139E+03 Bq/Sample

405454_Gamma_LCS 160-405454~2-A. 16_Gamma_20190013.spc.



Test America St. Louis Spectrum ID: 17_Gamma_20190012

Sample Description: 405454_Gamma_490-164491-A-1-A
Detector: Detector #17
Batch ID: 405454
Work Order Number: Gamma
Lot Number: 490-164491-A-1-A

Decay to Time: 1/3/2019 01:56 Live Time: 7200 sec
Acquisition Time: 1/3/2019 01:56:41 Real Time: 7237 sec
Analysis Time: 1/3/2019 03:57 Dead Time: 0.51 %
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_2018-12-22_1406.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	7.585E-01	102.0	7.735E-01	7.744E-01	2.593E+00
NA-22	2.320E-01	30.8	7.146E-02	7.235E-02	1.858E-01
K-40	-1.673E+00	97.2	1.626E+00	1.629E+00	4.475E+00
Sc-46	0.000E+00	1.#INF	5.932E-02	5.932E-02	5.491E-01
CR-51	5.272E-01	135.4	7.138E-01	7.144E-01	2.401E+00
MN-54	-9.146E-02	141.1	1.290E-01	1.291E-01	3.010E-01
FE-59	1.623E-01	127.9	2.076E-01	2.077E-01	4.778E-01
Co-56	-3.827E-02	67.0	2.563E-02	2.569E-02	3.341E-01
CO-57	1.840E-02	378.2	6.960E-02	6.961E-02	2.365E-01
CO-58	-1.645E-01	88.2	1.451E-01	1.453E-01	4.854E-01
CO-60	1.640E-01	53.5	8.772E-02	8.809E-02	1.892E-01
ZN-65	0.000E+00	1.#INF	3.244E-02	3.244E-02	9.690E-01
NB-94	-8.900E-02	91.4	8.139E-02	8.151E-02	3.186E-01
ZR-95	1.242E-01	134.8	1.675E-01	1.676E-01	4.111E-01
NB-95	5.947E-02	140.3	8.341E-02	8.347E-02	2.878E-01
RU-103	4.063E-02	247.6	1.006E-01	1.006E-01	2.545E-01
RH-106	-1.597E+00	36.6	5.853E-01	5.907E-01	6.149E+00
AG-108M	7.044E-02	105.2	7.414E-02	7.422E-02	1.934E-01
AG-110M	8.567E-02	69.7	5.975E-02	5.990E-02	7.522E-01
SN-113	-1.220E-01	129.0	1.573E-01	1.575E-01	5.300E-01
SB-124	2.836E-01	26.0	7.384E-02	7.519E-02	5.265E-01
SB-125	1.775E-01	77.1	1.369E-01	1.372E-01	7.904E-01
I-131	9.576E-02	139.9	1.340E-01	1.340E-01	2.591E-01
Gd-153	1.712E-01	97.3	1.666E-01	1.670E-01	5.577E-01
Ga-68	1.795E+00	332.8	5.975E+00	5.976E+00	1.409E+01
Tc-99m	7.314E-02	129.5	9.475E-02	9.484E-02	3.172E-01
BA-133	8.768E-02	245.5	2.153E-01	2.153E-01	4.661E-01
CS-134	1.736E-01	93.3	1.619E-01	1.622E-01	3.905E-01
CS-137	-1.440E-01	57.1	8.227E-02	8.259E-02	3.796E-01
CE-139	-1.896E-03	4221.4	8.005E-02	8.005E-02	2.739E-01
Ba-140	3.410E-01	96.2	3.280E-01	3.285E-01	8.193E-01
La-140	7.253E-02	71.6	5.193E-02	5.207E-02	1.666E-01
CE-141	1.231E-01	130.5	1.607E-01	1.608E-01	5.381E-01

CE-144	0.000E+00	1.#INF	1.646E-01	1.646E-01	2.325E+00
PM-144	-1.024E-01	75.5	7.727E-02	7.743E-02	2.928E-01
EU-152	6.174E-03	84.2	5.196E-03	5.207E-03	7.923E-01
EU-154	1.621E-01	157.7	2.557E-01	2.558E-01	5.217E-01
EU-155	-1.342E-01	334.8	4.493E-01	4.494E-01	1.244E+00
HF-181	-3.740E-02	78.9	2.951E-02	2.957E-02	4.228E-01
Ta-182	6.801E-01	47.5	3.234E-01	3.251E-01	1.209E+00
Hg-203	-3.396E-02	330.3	1.122E-01	1.122E-01	2.913E-01
TL-208	-2.803E-02	427.7	1.199E-01	1.199E-01	3.228E-01
PM-146	-2.073E-02	206.8	4.288E-02	4.289E-02	3.699E-01
Y-88	5.440E-02	284.8	1.549E-01	1.550E-01	3.419E-01
Cd-113m	8.892E+01	1215.5	1.081E+03	1.081E+03	3.733E+03
Cd-109	0.000E+00	1.#INF	5.689E-01	5.689E-01	8.271E+00
Cf-251	1.601E-01	256.5	4.107E-01	4.110E-01	1.116E+00
Cf-249	1.149E-01	115.8	1.331E-01	1.333E-01	4.486E-01
Sn-126	-3.205E-01	256.0	8.205E-01	8.207E-01	2.762E+00
PB-210	-3.110E+00	68.2	2.122E+00	2.141E+00	6.436E+00
PB-212	3.862E-01	40.2	1.554E-01	1.573E-01	4.084E-01
PB-214	5.459E-02	357.7	1.952E-01	1.953E-01	6.367E-01
BI-207	9.406E-02	82.0	7.710E-02	7.724E-02	3.616E-01
BI-212	-7.239E-02	1407.1	1.019E+00	1.019E+00	3.638E+00
U-235	1.171E+00	47.3	5.539E-01	5.572E-01	2.182E+00
BI-214	-4.273E-01	64.4	2.751E-01	2.760E-01	1.219E+00
BI-210M	-1.221E-02	1202.8	1.468E-01	1.469E-01	3.881E-01
AC-228	1.980E-01	83.5	1.654E-01	1.657E-01	1.055E+00
TH-227	9.335E-01	105.6	9.853E-01	9.870E-01	2.646E+00
TH-229	-6.022E-01	283.6	1.708E+00	1.708E+00	4.641E+00
TH-234	-6.753E+00	24.9	1.678E+00	1.723E+00	5.807E+00
PA-231	1.448E-07	3006324198.5	4.353E+00	4.353E+00	1.475E+01
PA-233	1.772E-01	110.8	1.964E-01	1.966E-01	5.059E-01
PA-234	1.704E-01	80.2	1.366E-01	1.369E-01	1.498E+00
PA-234M	-7.210E+00	69.9	5.041E+00	5.053E+00	6.002E+01
AM-241	1.099E-01	158.1	1.738E-01	1.739E-01	4.954E-01
Np-237	1.141E-02	5158.6	5.887E-01	5.887E-01	1.993E+00
Ir-192	1.003E-01	74.5	7.469E-02	7.492E-02	2.853E-01
Cs-136	-1.779E-01	99.3	1.767E-01	1.769E-01	5.914E-01
Np-239	6.214E-02	541.7	3.366E-01	3.366E-01	1.137E+00
Nd-147	9.441E-01	51.5	4.860E-01	4.889E-01	1.170E+00
TL-210	-7.886E-02	119.0	9.385E-02	9.395E-02	3.208E-01
Kr-85	-2.296E+01	175.1	4.021E+01	4.023E+01	1.351E+02
Total	1.001E+02				

Analyst: Morgan Reichert

Sample description
405454_Gamma_490-164491-A-1-A

Spectrum Filename: C:\User\SPC\Det17\17_Gamma_20190012.An1

Acquisition information
Start time: 1/3/2019 1:56:41 AM
Live time: 7200
Real time: 7237
Dead time: 0.51 %
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	1/3/2019 1:56:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2018-12-22_1406.PBC 12/22/2018 2:06:33 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2320

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.71	110.	17.96	0.69	4.370E-02	46.54	4.250	PBC<MDA	PB210
59.54	14.	158.11	0.79	4.928E-02	59.54	35.900	PBC<MDA	AM241
63.33	9.	315.13	0.77	5.039E-02	63.29	3.810	PBC<MDA	TH234
87.57	5.	736.47	0.81	5.358E-02	87.57	37.500	PBC<MDA	Sn126
91.16	12.	298.85	0.82	5.364E-02	91.10	28.300	PBC<MDA	Nd147
92.65	-146.	24.86	0.82	5.364E-02	92.59	5.584	PBC<MDA	TH234
93.35	23.	142.90	0.82	5.364E-02	93.35	5.561	PBC<MDA	AC228
96.26	20.	97.33	0.82	5.357E-02	97.50	30.000	PBC<MDA	Gd153
99.50	12.	197.12	0.82	5.350E-02	99.50	15.000	PBC<MDA	Np239
106.13	5.	541.70	0.83	5.317E-02	106.13	22.700	PBC<MDA	Np239
122.06	6.	378.22	0.85	5.180E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.840E-02	CO57
123.10	10.	242.24	0.85	5.168E-02	123.10	40.790	PBC<MDA	EU154
133.02	11.	260.72	0.86	5.053E-02	133.02	43.300	PBC<MDA	HF181
139.72	21.	129.54	0.86	4.957E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	21.	121.15	0.87	4.913E-02	143.79	10.960	PBC<MDA	U235
145.46	21.	130.55	0.87	4.891E-02	145.44	48.200	PBC<MDA	CE141
163.23	26.	46.77	0.72	4.640E-02	162.66	6.220	1.264E+00	Ba140
					163.38	5.080	PBC<MDA	U235
176.60	9.	256.51	0.90	4.422E-02	176.60	17.000	PBC<MDA	Cf251
185.76	93.	21.92	0.92	4.295E-02	185.72	54.000	5.569E-01	U235
205.33	37.	47.30	0.92	4.048E-02	205.33	5.010	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
227.00	16.	102.22	0.94	3.810E-02	227.00	6.300	PBC<MDA	Cf251
238.53	44.	40.23	1.41	3.695E-02	238.63	43.300	PBC<MDA	PB212
256.24	17.	105.55	0.97	3.534E-02	256.24	7.000	PBC<MDA	TH227
300.03	12.	248.53	1.01	3.195E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	2.082E+00	PA231
					300.18	6.200	8.264E-01	PA233
302.85	12.	253.97	1.01	3.175E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	2.750E-01	BA133
312.01	14.	110.84	1.02	3.114E-02	312.01	36.000	PBC<MDA	PA233
316.49	16.	102.91	1.03	3.085E-02	316.49	87.040	PBC<MDA	Ir192
320.08	12.	135.39	1.03	3.062E-02	320.08	9.940	PBC<MDA	CR51
338.32	20.	83.54	1.05	2.951E-02	338.32	12.010	PBC<MDA	AC228
340.57	14.	125.67	1.05	2.938E-02	340.57	46.900	PBC<MDA	Cs136
344.29	14.	130.78	1.05	2.917E-02	344.29	26.500	PBC<MDA	EU152
345.83	14.	135.90	1.05	2.908E-02	345.83	15.070	PBC<MDA	HF181
351.93	4.	357.65	1.06	2.874E-02	351.93	37.600	PBC<MDA	PB214
356.50	4.	420.32	1.06	2.851E-02	356.00	62.050	PBC<MDA	BA133
364.48	6.	285.82	1.07	2.806E-02	364.48	81.700	PBC<MDA	I131
383.84	12.	147.22	1.09	2.709E-02	383.84	8.940	PBC<MDA	BA133
387.95	15.	115.84	1.09	2.689E-02	387.95	66.000	PBC<MDA	Cf249
433.94	11.	105.24	1.13	2.487E-02	433.94	90.480	PBC<MDA	AG108M
463.37	10.	119.20	1.16	2.373E-02	463.37	10.470	PBC<MDA	SB125
468.06	11.	107.70	1.16	2.356E-02	468.06	51.750	PBC<MDA	Ir192
477.60	13.	101.97	1.17	2.322E-02	477.60	10.520	PBC<MDA	BE7
487.02	5.	274.95	1.18	2.290E-02	487.02	45.500	PBC<MDA	La140
497.05	6.	247.58	1.19	2.256E-02	497.05	90.900	PBC<MDA	RU103
511.23	261.	8.89	2.48	2.209E-02	511.86	20.000	8.196E+00	RH106
530.58	19.	51.48	1.22	2.150E-02	531.00	13.000	PBC<MDA	Nd147
537.26	13.	96.18	1.22	2.132E-02	537.26	24.390	PBC<MDA	Ba140
563.24	4.	369.53	1.25	2.058E-02	563.24	8.350	PBC<MDA	CS134
569.32	8.	132.29	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	11.	82.09	1.25	2.042E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	8.849E-01	PA234
					569.70	97.740	7.426E-02	BI207
569.70	11.	94.90	1.25	2.041E-02	569.32	15.380	4.865E-01	CS134
					569.47	8.200	9.126E-01	PA234
					569.70	97.740	7.659E-02	BI207
583.02	-3.	427.68	1.26	2.006E-02	583.02	84.500	PBC<MDA	TL208
600.50	15.	141.96	1.28	1.962E-02	600.50	17.860	PBC<MDA	SB125
602.73	10.	210.21	1.28	1.957E-02	602.73	98.260	PBC<MDA	SB124
636.97	8.	139.88	1.31	1.876E-02	636.97	7.170	PBC<MDA	I131
657.76	9.	102.44	1.33	1.831E-02	657.76	94.640	PBC<MDA	AG110M
722.79	29.	26.03	1.39	1.702E-02	722.79	10.810	2.189E+00	SB124
					722.94	90.840	2.605E-01	AG108M
					723.36	20.220	1.171E+00	EU154
747.16	2.	678.97	1.41	1.659E-02	747.16	34.000	PBC<MDA	PM146

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
756.73	8.	134.82	1.41	1.642E-02	756.73	54.460	PBC<MDA	ZR95
763.94	11.	69.75	1.42	1.630E-02	763.94	22.280	PBC<MDA	AG110M
765.79	7.	140.25	1.42	1.627E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.020E+01	PA234M
766.41	9.	104.72	1.42	1.626E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.491E+01	PA234M
778.92	-2.	513.33	1.43	1.605E-02	778.92	12.940	PBC<MDA	EU152
795.87	2.	587.89	1.45	1.578E-02	795.87	85.530	PBC<MDA	CS134
801.95	12.	93.29	1.45	1.568E-02	801.95	8.690	PBC<MDA	CS134
873.23	6.	202.00	1.51	1.465E-02	873.23	12.270	PBC<MDA	EU154
898.04	-3.	398.24	1.53	1.432E-02	898.04	93.700	PBC<MDA	Y88
946.02	6.	185.64	1.57	1.373E-02	946.02	13.400	PBC<MDA	PA234
1001.00	-15.	92.66	1.62	1.310E-02	1001.00	0.837	PBC<MDA	PA234M
1037.84	10.	93.09	1.65	1.271E-02	1037.84	14.130	PBC<MDA	Co56
1050.14	13.	91.85	1.66	1.259E-02	1050.36	1.560	PBC<MDA	RH106
1063.66	8.	133.68	1.67	1.246E-02	1063.66	74.500	PBC<MDA	BI207
1077.40	3.	332.78	1.68	1.232E-02	1077.40	3.300	PBC<MDA	Ga68
1099.25	8.	127.88	1.70	1.212E-02	1099.25	56.500	PBC<MDA	FE59
1120.29	-12.	106.48	1.72	1.193E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.30	12.	89.85	1.72	1.192E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	3.991E-01	Ta182
1189.05	17.	47.55	1.77	1.134E-02	1189.05	16.200	PBC<MDA	Ta182
1238.28	3.	403.30	1.81	1.095E-02	1238.28	66.070	PBC<MDA	Co56
1274.53	18.	30.80	1.84	1.068E-02	1274.53	99.940	2.320E-01	NA22
					1274.54	35.190	6.589E-01	EU154
1332.50	12.	53.50	1.89	1.028E-02	1332.50	99.980	PBC<MDA	CO60
1460.83	-12.	97.19	1.98	9.483E-03	1460.83	10.670	PBC<MDA	K40
1596.21	5.	71.60	2.09	8.765E-03	1596.21	95.400	PBC<MDA	La140
1764.49	-3.	225.85	2.21	8.006E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	5.	133.50	2.22	7.978E-03	1771.35	15.480	PBC<MDA	Co56
1836.06	3.	284.80	2.26	7.721E-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
652.18	163.23	40.	32.	6.897E+02	36.80	0.716	-
742.27	185.76	88.	93.	2.166E+03	21.92	0.918	-

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	318.	-42.	-0.006	68.23	0.775
TH-227	200.03	50.14	198.	-22.	-0.003	109.90	0.778s
AM-241	237.59	59.54	168.	14.	0.002	158.11	0.787
TH-234	252.74	63.33	257.	9.	0.001	315.13	0.768
Sn-126	256.56	64.28	415.	-11.	-0.002	256.03	0.792
BA-133	323.36	80.99	225.	-17.	-0.002	150.49	0.807s
EU-155	345.56	86.54	234.	-18.	-0.002	153.79	0.813s
Sn-126	347.15	86.94	266.	-5.	-0.001	448.44	0.813
Sn-126	349.67	87.57	639.	5.	0.001	736.47	0.814
Cd-109	351.55	88.04	644.	0.	0.000	1000.00	0.814
Nd-147	363.79	91.10	632.	12.	0.002	298.85	0.817s
TH-234	369.74	92.59	691.	-146.	-0.020	24.86	0.818s
AC-228	372.78	93.35	534.	23.	0.003	142.90	0.819s
Gd-153	389.37	97.50	176.	20.	0.003	97.33	0.823s
Np-239	397.37	99.50	267.	12.	0.002	197.12	0.825s
Gd-153	412.16	103.20	391.	-24.	-0.003	118.74	0.828
Np-239	414.16	103.70	415.	-24.	-0.003	122.14	0.829
EU-155	420.61	105.31	446.	-11.	-0.002	334.76	0.830
Np-239	423.88	106.13	415.	5.	0.001	541.70	0.831s
EU-152	486.45	121.78	308.	-24.	-0.003	105.95	0.846
CO-57	487.57	122.06	244.	6.	0.001	378.22	0.846s
EU-154	491.73	123.10	269.	10.	0.001	242.24	0.847s
PA-234	524.49	131.29	423.	-23.	-0.003	129.19	0.855s
HF-181	531.41	133.02	392.	11.	0.002	260.72	0.856s
CE-144	533.46	133.54	381.	0.	0.000	1000.00	0.857s
HF-181	544.50	136.30	381.	0.	0.000	1000.00	0.859s
CO-57	545.20	136.47	381.	0.	0.000	1000.00	0.859s
Tc-99m	561.34	140.51	352.	21.	0.003	129.54	0.863s
U-235	574.43	143.79	309.	21.	0.003	121.15	0.866
CE-141	581.05	145.44	362.	21.	0.003	130.55	0.868s
Ba-140	649.90	162.66	266.	-19.	-0.003	122.37	0.884
U-235	652.78	163.38	213.	-10.	-0.001	351.20	0.885
Cf-251	705.64	176.60	153.	9.	0.001	256.51	0.897s
U-235	742.10	185.72	273.	-22.	-0.003	110.47	0.905
TH-229	773.25	193.51	160.	-8.	-0.001	283.58	0.913
U-235	820.52	205.33	87.	37.	0.005	47.30	0.924s
TH-229	842.58	210.85	143.	-14.	-0.002	150.97	0.929
Cf-251	907.16	227.00	77.	16.	0.002	102.22	0.944s
TH-227	943.03	235.97	411.	-12.	-0.002	243.98	0.952s
PB-212	953.26	238.53	91.	44.	0.006	40.23	1.410s
PB-214	967.13	242.00	399.	0.	0.000	1000.00	0.958s
TH-227	1024.08	256.24	91.	17.	0.002	105.55	0.971s
Hg-203	1115.89	279.20	137.	-7.	-0.001	330.34	0.992s
I-131	1136.28	284.30	125.	-18.	-0.003	102.46	0.996

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	1179.43	295.09	447.	-32.	-0.004	63.47	1.006
TL-210	1183.07	296.00	415.	-7.	-0.001	435.83	1.007s
PB-212	1199.19	300.03	423.	12.	0.002	248.53	1.011s
BA-133	1210.47	302.85	423.	12.	0.002	253.97	1.013
PA-233	1247.10	312.01	67.	14.	0.002	110.84	1.022s
Ir-192	1265.01	316.49	127.	16.	0.002	102.91	1.026
CR-51	1279.38	320.08	115.	12.	0.002	135.39	1.029s
La-140	1314.07	328.76	93.	-6.	-0.001	289.09	1.037s
AC-228	1352.30	338.32	130.	20.	0.003	83.54	1.046
Cs-136	1361.30	340.57	150.	14.	0.002	125.67	1.048s
EU-152	1376.16	344.29	164.	14.	0.002	130.78	1.051
HF-181	1382.33	345.83	178.	14.	0.002	135.90	1.053
PB-214	1406.74	351.93	101.	4.	0.001	357.65	1.058
BA-133	1423.00	356.00	148.	4.	0.001	420.32	1.062s
I-131	1456.93	364.48	73.	6.	0.001	285.82	1.070
BA-133	1534.34	383.84	159.	12.	0.002	147.22	1.087
Cf-249	1550.77	387.95	137.	15.	0.002	115.84	1.091s
SN-113	1565.73	391.69	180.	-15.	-0.002	128.96	1.094s
SB-125	1710.44	427.88	72.	-11.	-0.002	138.52	1.127
AG-108M	1734.69	433.94	38.	11.	0.002	105.24	1.132s
PM-146	1814.44	453.88	70.	-6.	-0.001	206.80	1.150
SB-125	1852.38	463.37	69.	10.	0.001	119.20	1.158
Ir-192	1871.15	468.06	70.	11.	0.002	107.70	1.163s
BE-7	1909.29	477.59	85.	13.	0.002	101.97	1.171s
HF-181	1926.89	482.00	133.	-17.	-0.002	80.16	1.175
La-140	1946.98	487.02	48.	5.	0.001	274.95	1.180s
RU-103	1987.11	497.05	56.	6.	0.001	247.58	1.188s
RH-106	2043.83	511.23	31.	261.	0.036	8.89	2.481s
Kr-85	2054.81	513.98	368.	-16.	-0.002	175.14	1.203s
Nd-147	2122.88	531.00	20.	19.	0.003	51.48	1.219s
Ba-140	2147.92	537.26	36.	13.	0.002	96.18	1.224s
CS-134	2251.82	563.24	50.	4.	0.001	369.53	1.247s
CS-134	2276.15	569.32	52.	8.	0.001	132.29	1.252s
PA-234	2276.75	569.47	33.	11.	0.001	82.09	1.253s
BI-207	2277.67	569.70	49.	11.	0.002	94.90	1.253s
TL-208	2330.95	583.02	62.	-3.	0.000	427.68	1.264s
SB-125	2400.86	600.50	212.	15.	0.002	141.96	1.280s
SB-124	2409.78	602.73	227.	10.	0.001	210.21	1.282s
CS-134	2417.70	604.71	237.	0.	0.000	1000.00	1.284s
BI-214	2436.10	609.31	265.	-28.	-0.004	64.40	1.287s
RU-103	2440.05	610.30	237.	0.	0.000	1000.00	1.288s
AG-108M	2455.98	614.28	237.	0.	0.000	1000.00	1.292s
PM-144	2471.11	618.06	237.	0.	0.000	1000.00	1.295s
RH-106	2486.52	621.92	304.	-22.	-0.003	36.64	1.299
SB-125	2542.41	635.89	56.	-10.	-0.001	86.99	1.311s
I-131	2546.75	636.97	54.	8.	0.001	139.88	1.312s
AG-110M	2629.90	657.76	38.	9.	0.001	102.44	1.330s
CS-137	2645.49	661.66	73.	-16.	-0.002	57.12	1.333s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-144	2785.03	696.54	53.	-13.	-0.002	75.46	1.363s
NB-94	2809.38	702.63	61.	-11.	-0.002	91.45	1.368s
SB-124	2890.01	722.79	14.	29.	0.004	26.03	1.386s
AG-108M	2890.61	722.94	43.	0.	0.000	1000.00	1.386s
EU-154	2892.30	723.36	43.	0.	0.000	1000.00	1.386s
ZR-95	2895.66	724.20	43.	0.	0.000	1000.00	1.387s
PM-146	2941.74	735.72	52.	-12.	-0.002	126.01	1.397s
PM-146	2987.51	747.16	30.	2.	0.000	678.97	1.407s
ZR-95	3025.79	756.73	26.	8.	0.001	134.82	1.415s
AG-110M	3054.64	763.94	24.	11.	0.002	69.75	1.421s
NB-95	3062.03	765.79	44.	7.	0.001	140.25	1.423s
PA-234M	3064.52	766.41	36.	9.	0.001	104.72	1.423s
EU-152	3114.56	778.92	33.	-2.	0.000	513.33	1.434s
BI-212	3140.56	785.42	49.	-8.	-0.001	142.54	1.440s
CS-134	3182.36	795.87	57.	2.	0.000	587.89	1.448s
TL-210	3197.29	799.60	51.	-9.	-0.001	119.00	1.451s
CS-134	3206.69	801.95	58.	12.	0.002	93.29	1.454s
CO-58	3241.99	810.78	121.	-18.	-0.003	88.21	1.461s
La-140	3261.97	815.77	114.	-17.	-0.002	92.49	1.465s
Cs-136	3272.90	818.50	183.	-20.	-0.003	99.31	1.467s
MN-54	3338.30	834.85	42.	-10.	-0.001	141.07	1.481s
Co-56	3385.99	846.77	51.	-16.	-0.002	96.29	1.491s
NB-94	3483.32	871.10	68.	-17.	-0.002	72.76	1.512s
EU-154	3491.85	873.23	79.	6.	0.001	202.00	1.514s
PA-234	3521.06	880.53	105.	-17.	-0.002	90.10	1.520
PA-234	3531.90	883.24	122.	-14.	-0.002	112.35	1.522s
AG-110M	3537.67	884.68	136.	0.	0.000	1000.00	1.523s
Sc-46	3556.06	889.28	136.	0.	0.000	1000.00	1.527s
Y-88	3591.11	898.04	32.	-3.	0.000	398.24	1.534s
AC-228	3643.24	911.07	37.	-1.	0.000	975.96	1.545s
AG-110M	3748.95	937.49	24.	-5.	-0.001	237.52	1.567s
PA-234	3783.07	946.02	23.	6.	0.001	185.64	1.574s
EU-152	3855.45	964.11	56.	-4.	-0.001	308.09	1.589s
AC-228	3874.90	968.97	66.	-8.	-0.001	141.82	1.593s
EU-154	3984.36	996.33	71.	-6.	-0.001	197.61	1.616s
PA-234M	4003.04	1001.00	92.	-15.	-0.002	92.66	1.620s
EU-154	4018.15	1004.77	101.	-17.	-0.002	87.25	1.623s
Co-56	4150.45	1037.84	15.	10.	0.001	93.09	1.650s
Cs-136	4191.39	1048.07	63.	-20.	-0.003	60.47	1.658s
RH-106	4200.55	1050.36	61.	13.	0.002	91.85	1.661s
BI-207	4253.77	1063.66	21.	8.	0.001	133.68	1.671s
Ga-68	4308.74	1077.40	20.	3.	0.000	332.78	1.683s
FE-59	4396.18	1099.25	20.	8.	0.001	127.88	1.700s
EU-152	4447.49	1112.07	66.	-8.	-0.001	135.08	1.711s
ZN-65	4461.38	1115.55	72.	0.	0.000	1000.00	1.713s
BI-214	4480.35	1120.29	84.	-12.	-0.002	106.48	1.717s
Sc-46	4481.41	1120.55	72.	0.	0.000	1000.00	1.717s
Ta-182	4484.41	1121.30	52.	12.	0.002	89.85	1.718s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	4755.52	1189.05	10.	17.	0.002	47.55	1.772s
Ta-182	4885.02	1221.41	27.	-3.	0.000	444.41	1.798s
Co-56	4952.53	1238.28	28.	3.	0.000	403.30	1.812s
NA-22	5097.60	1274.53	6.	18.	0.002	30.80	1.840s
FE-59	5165.90	1291.60	27.	-3.	0.000	444.41	1.854s
TL-210	5251.56	1313.00	16.	-1.	0.000	914.69	1.870s
CO-60	5329.61	1332.50	6.	12.	0.002	53.50	1.886s
AG-110M	5536.92	1384.30	27.	-9.	-0.001	139.63	1.926s
EU-152	5631.79	1408.00	19.	-3.	0.000	248.64	1.944s
K-40	5843.25	1460.83	41.	-12.	-0.002	97.19	1.985s
La-140	6385.15	1596.21	2.	5.	0.001	71.60	2.087s
SB-124	6764.55	1690.98	24.	-15.	-0.002	83.00	2.157s
BI-214	7058.84	1764.49	20.	-3.	0.000	225.85	2.211s
Co-56	7086.31	1771.35	18.	5.	0.001	133.50	2.216s
Y-88	7345.39	1836.06	12.	3.	0.000	284.80	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	7.5852E-01				5.31E+01	
			477.60	7.585E-01	?(P	2.593E+00 1.02E+02 1.05E+01	G
NA-22	C	2.3201E-01				9.50E+02	
			1274.53	2.320E-01	?(	1.858E-01 3.08E+01 9.99E+01	G
K-40	N	-1.6734E+00				4.66E+11	
			1460.83	-1.673E+00	?(P	4.475E+00 9.72E+01 1.07E+01	G
CR-51	F	5.2724E-01				2.77E+01	
			320.08	5.272E-01	&(P	2.401E+00 1.35E+02 9.94E+00	G
MN-54	C	-9.1462E-02				3.12E+02	
			834.85	-9.146E-02	&(	3.010E-01 1.41E+02 1.00E+02	G
FE-59	F	1.6230E-01				4.45E+01	
			1099.25	1.623E-01	?(	4.778E-01 1.28E+02 5.65E+01	G
			1291.60	-8.119E-02	-	8.151E-01 4.44E+02 4.32E+01	G
Co-56	C	-3.8267E-02				7.73E+01	
			846.77	-1.512E-01	?(	3.341E-01 9.63E+01 9.99E+01	G
			1238.28	5.740E-02	+ P	5.255E-01 4.03E+02 6.61E+01	G
			1037.84	7.602E-01	?(P	1.610E+00 9.31E+01 1.41E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1771.35	5.407E-01	?	2.540E+00	1.33E+02	1.55E+01 A
CO-57	C	1.8401E-02					2.72E+02	
			122.06	1.840E-02	(	2.365E-01	3.78E+02	8.56E+01 G
			136.47	0.000E+00	&	2.432E+00	1.00E+03	1.07E+01 G
CO-58	C	-1.6450E-01					7.09E+01	
			810.78	-1.645E-01	?(	4.854E-01	8.82E+01	9.95E+01 G
CO-60	F	1.6395E-01					1.93E+03	
			1332.50	1.640E-01	&(P	1.892E-01	5.35E+01	1.00E+02 G
			1173.24	7.233E-03	% P	2.880E-01	1.67E+03	9.99E+01 G
NB-94	I	-8.9002E-02					7.41E+06	
			702.63	-8.900E-02	?(P	3.186E-01	9.14E+01	9.79E+01 G
			871.10	-1.610E-01	+	3.897E-01	7.28E+01	9.99E+01 G
ZR-95	I	1.2425E-01					6.40E+01	
			756.73	1.242E-01	?(	4.111E-01	1.35E+02	5.45E+01 G
			724.20	0.000E+00	-	6.158E-01	1.00E+03	4.42E+01 G
NB-95	I	5.9474E-02					6.40E+01	
			765.79	5.947E-02	?(	2.878E-01	1.40E+02	9.98E+01 G
RU-103	I	4.0629E-02					3.93E+01	
			497.05	4.063E-02	?(	2.545E-01	2.48E+02	9.09E+01 G
			610.30	0.000E+00	-	9.278E+00	1.00E+03	5.75E+00 GA
RH-106	I	-1.5974E+00					3.74E+02	
			621.92	-1.597E+00	?(P	6.149E+00	3.66E+01	9.93E+00 G
			1050.36	9.014E+00	+ P	2.774E+01	9.18E+01	1.56E+00 G
			511.86	8.196E+00	+	9.053E-01	8.89E+00	2.00E+01 GA
AG-108M	C	7.0443E-02					1.53E+05	
			433.94	7.044E-02	?(P	1.934E-01	1.05E+02	9.05E+01 G
			722.94	0.000E+00	-	2.989E-01	1.00E+03	9.08E+01 G
			614.28	0.000E+00	-	5.967E-01	1.00E+03	8.98E+01 G
AG-110M	F	8.5668E-02					2.50E+02	
			884.68	0.000E+00	&(	7.522E-01	1.00E+03	7.27E+01 G
			657.76	7.214E-02	?(	2.520E-01	1.02E+02	9.46E+01 G
			937.49	-1.369E-01	+ P	7.422E-01	2.38E+02	3.44E+01 G
			1384.30	-4.984E-01	+	1.540E+00	1.40E+02	2.43E+01 G
			763.94	4.226E-01	?(	9.798E-01	6.97E+01	2.23E+01 G
SN-113	F	-1.2201E-01					1.15E+02	
			391.69	-1.220E-01	?(	5.300E-01	1.29E+02	6.40E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-124	F	2.8362E-01					6.02E+01	
			602.73	7.401E-02	?(	5.265E-01	2.10E+02	9.83E+01 G
			1690.98	-5.239E-01	+	8.920E-01	8.30E+01	4.78E+01 G
			722.79	2.189E+00	?(	1.521E+00	2.60E+01	1.08E+01 G
SB-125	I	1.7746E-01					1.01E+03	
			427.88	-2.093E-01	(P	7.904E-01	1.39E+02	2.96E+01 G
			600.50	5.848E-01	&(	2.797E+00	1.42E+02	1.79E+01 G
			635.89	-6.496E-01	+ P	2.455E+00	8.70E+01	1.13E+01 G
			463.37	5.759E-01	?(P	2.316E+00	1.19E+02	1.05E+01 G
I-131	I	9.5764E-02					8.02E+00	
			364.48	3.445E-02	(	2.591E-01	2.86E+02	8.17E+01 G
			284.30	-1.253E+00	+ P	3.765E+00	1.02E+02	6.14E+00 G
			636.97	7.944E-01	&(	3.818E+00	1.40E+02	7.17E+00 G
Gd-153	F	1.7122E-01					2.42E+02	
			97.50	1.712E-01	&(	5.577E-01	9.73E+01	3.00E+01 G
			103.20	-2.856E-01	+	1.133E+00	1.19E+02	2.18E+01 G
Ga-68	C	1.7955E+00					4.71E-02	
			1077.40	1.795E+00	?(	1.409E+01	3.33E+02	3.30E+00 G
Tc-99m	I	7.3143E-02					2.51E-01	
			140.51	7.314E-02	&(	3.172E-01	1.30E+02	8.93E+01 G
BA-133	F	8.7677E-02					3.85E+03	
			356.00	3.234E-02	?(	4.661E-01	4.20E+02	6.20E+01 G
			302.85	2.750E-01	&(	2.350E+00	2.54E+02	1.83E+01 G
			383.84	7.074E-01		3.522E+00	1.47E+02	8.94E+00 GA
			80.99	-1.302E-01	+	5.561E-01	1.50E+02	3.41E+01 GA
CS-134	I	1.7358E-01					7.54E+02	
			795.87	1.887E-02	?(	3.905E-01	5.88E+02	8.55E+01 G
			604.71	0.000E+00	-	5.427E-01	1.00E+03	9.76E+01 G
			569.32	3.538E-01	?(	1.606E+00	1.32E+02	1.54E+01 G
			801.95	1.251E+00	?(P	3.896E+00	9.33E+01	8.69E+00 G
			563.24	3.046E-01	?(P	2.888E+00	3.70E+02	8.35E+00 G
CS-137	I	-1.4402E-01					1.10E+04	
			661.66	-1.440E-01	&(P	3.796E-01	5.71E+01	8.52E+01 G
CE-139	F	-1.8963E-03					1.38E+02	
			165.85	-1.896E-03	&(	2.739E-01	4.22E+03	7.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ba-140	I	3.4104E-01					1.28E+01	
			537.26	3.410E-01	&(	8.193E-01	9.62E+01	2.44E+01 G
			162.66	-9.217E-01	&	3.781E+00	1.22E+02	6.22E+00 G
			304.85	-4.883E-08	&	9.952E+00	6.01E+09	4.29E+00 G
La-140	I	7.2527E-02					1.28E+01	
			1596.21	7.533E-02	?(P	1.666E-01	7.16E+01	9.54E+01 G
			487.02	6.665E-02	?(	4.665E-01	2.75E+02	4.55E+01 G
			328.76	-1.255E-01	- P	1.081E+00	2.89E+02	2.03E+01 G
			815.77	-6.515E-01	+	2.020E+00	9.25E+01	2.33E+01 G
CE-141	I	1.2311E-01					3.25E+01	
			145.44	1.231E-01	?(	5.381E-01	1.31E+02	4.82E+01 G
PM-144	C	-1.0239E-01					3.63E+02	
			696.54	-1.024E-01	?(P	2.928E-01	7.55E+01	9.90E+01 G
			618.06	0.000E+00	+	5.435E-01	1.00E+03	9.91E+01 G
EU-152	F	6.1744E-03					4.94E+03	
			121.78	-2.239E-01	&(	7.923E-01	1.06E+02	2.86E+01 G
			344.29	2.543E-01	&(	1.122E+00	1.31E+02	2.65E+01 G
			1112.07	-6.711E-01	& P	3.439E+00	1.35E+02	1.36E+01 G
			778.92	-1.497E-01	+ P	1.978E+00	5.13E+02	1.29E+01 G
			964.11	-2.615E-01	+ P	2.638E+00	3.08E+02	1.46E+01 G
			244.69	-7.868E-02	% P	4.834E+00	1.17E+03	7.58E+00 G
			1408.00	-1.919E-01	+ P	1.548E+00	2.49E+02	2.10E+01 GA
EU-154	I	1.6212E-01					3.14E+03	
			123.10	6.368E-02	&(	5.217E-01	2.42E+02	4.08E+01 G
			1274.54	-6.158E-03	%	9.289E-01	4.09E+03	3.52E+01 G
			723.36	0.000E+00	-	1.343E+00	1.00E+03	2.02E+01 G
			873.23	4.894E-01	?(	3.403E+00	2.02E+02	1.23E+01 G
			1004.77	-9.997E-01	+	2.921E+00	8.73E+01	1.80E+01 G
			996.33	-6.143E-01	&	4.186E+00	1.98E+02	1.06E+01 G
EU-155	I	-1.3422E-01					1.81E+03	
			105.31	-1.342E-01	?(P	1.244E+00	3.35E+02	2.12E+01 G
			86.54	-1.513E-01	&	6.250E-01	1.54E+02	3.07E+01 G
HF-181	F	-3.7403E-02					4.24E+01	
			482.00	-1.285E-01	?(P	4.228E-01	8.02E+01	8.05E+01 G
			133.02	6.863E-02	&	6.027E-01	2.61E+02	4.33E+01 G
			345.83	4.491E-01	?(	2.058E+00	1.36E+02	1.51E+01 G
			136.30	0.000E+00	&	4.437E+00	1.00E+03	5.85E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ta-182	F	6.8011E-01					1.14E+02	
			1121.30	3.991E-01	&(	1.209E+00	8.99E+01	3.49E+01 G
			1221.41	-1.238E-01	-	1.243E+00	4.44E+02	2.70E+01 G
			1189.05	1.286E+00	?(	1.319E+00	4.75E+01	1.62E+01 G
Hg-203	F	-3.3962E-02					4.66E+01	
			279.20	-3.396E-02	?(	2.913E-01	3.30E+02	8.15E+01 G
TL-208	N	-2.8033E-02					6.98E+02	
			583.02	-2.803E-02	?(P	3.228E-01	4.28E+02	8.45E+01 G
			277.28	-6.548E-02	%	4.097E+00	1.82E+03	6.31E+00 G
			860.56	8.929E-02	% P	2.279E+00	1.05E+03	1.24E+01 G
PM-146	C	-2.0734E-02					2.02E+03	
			453.88	-5.305E-02	&(P	3.699E-01	2.07E+02	6.50E+01 G
			747.16	4.105E-02	&(	6.989E-01	6.79E+02	3.40E+01 G
			735.72	-4.412E-01	+	1.335E+00	1.26E+02	2.25E+01 G
Y-88	F	5.4401E-02					1.07E+02	
			1836.06	5.440E-02	&(	3.419E-01	2.85E+02	9.92E+01 G
			898.04	-2.842E-02	& P	3.013E-01	3.98E+02	9.37E+01 G
Cd-113m		8.8920E+01					5.33E+03	
			263.70	8.892E+01	%(	3.733E+03	1.22E+03	6.00E-03 K
Cf-251	T	1.6012E-01					3.28E+05	
			176.60	1.601E-01	&(	1.116E+00	2.57E+02	1.70E+01 G
			227.00	9.100E-01	?	2.518E+00	1.02E+02	6.30E+00 GA
Cf-249	T	1.1492E-01					1.28E+05	
			387.95	1.149E-01	?(	4.486E-01	1.16E+02	6.60E+01 G
			333.44	-4.007E-02	%	1.368E+00	1.29E+03	1.55E+01 G
Sn-126		-3.2045E-01					3.65E+07	
			87.57	3.362E-02	+	8.331E-01	7.36E+02	3.75E+01 GA
			64.28	-3.205E-01	(	2.762E+00	2.56E+02	9.70E+00 G
			86.94	-1.482E-01	+	2.257E+00	4.48E+02	9.04E+00 GA
PB-210	N	-3.1104E+00					8.14E+03	
			46.54	-3.110E+00	(P	6.436E+00	6.82E+01	4.25E+00 G
PB-212	N	3.8616E-01					6.98E+02	
			238.63	3.862E-01	*(P	4.084E-01	4.02E+01	4.33E+01 G
			300.03	1.562E+00	?	1.306E+01	2.49E+02	3.28E+00 GA

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PB-214   N   5.4587E-02                                     5.84E+05
                          351.93 5.459E-02  (P 6.367E-01 3.58E+02 3.76E+01 G
                          295.09-7.124E-01 + P 2.255E+00 6.35E+01 1.93E+01 G
                          242.00 0.000E+00 &   4.889E+00 1.00E+03 7.43E+00 GA

BI-207   C   9.4061E-02                                     1.18E+04
                         1063.66 1.170E-01 ?(P 3.616E-01 1.34E+02 7.45E+01 G
                          569.70 7.659E-02 &(  2.460E-01 9.49E+01 9.77E+01 G

BI-212   N  -7.2389E-02                                     6.98E+02
                          727.17-7.239E-02 %(  3.638E+00 1.41E+03 7.55E+00 G
                          785.42-5.634E+00 + P 2.411E+01 1.43E+02 1.28E+00 GA

U-235    N   1.1712E+00                                     2.57E+11
                          143.79 5.379E-01  (  2.182E+00 1.21E+02 1.10E+01 G
                          205.33 2.557E+00 *(  3.156E+00 4.73E+01 5.01E+00 G
                          163.38-6.186E-01 - P 4.174E+00 3.51E+02 5.08E+00 G
                          185.72-1.292E-01 -   4.774E-01 1.10E+02 5.40E+01 GA

BI-214   N  -4.2728E-01                                     5.84E+05
                          609.31-4.273E-01  (P 1.219E+00 6.44E+01 4.61E+01 G
                         1120.29-8.909E-01 + P 3.494E+00 1.06E+02 1.51E+01 G
                         1764.49-3.200E-01 + P 2.674E+00 2.26E+02 1.54E+01 G

BI-210M  T  -1.2209E-02                                     1.10E+09
                          265.83-1.221E-02 %(P 3.881E-01 1.20E+03 5.00E+01 G
                          304.90-7.482E-09 %   1.525E+00 6.01E+09 2.80E+01 G

AC-228   N   1.9798E-01                                     2.10E+03
                          911.07-4.512E-02 ?(  1.055E+00 9.76E+02 2.90E+01 G
                          968.97-4.926E-01 +   2.392E+00 1.42E+02 1.75E+01 G
                          338.32 7.850E-01 ?(  2.188E+00 8.35E+01 1.20E+01 G
                           93.35 1.077E+00 ?   5.142E+00 1.43E+02 5.56E+00 XA

TH-227   N   9.3351E-01                                     7.95E+03
                          256.24 9.335E-01  (P 2.646E+00 1.06E+02 7.00E+00 G
                          235.97-3.591E-01 -   2.949E+00 2.44E+02 1.23E+01 G
                           50.14-8.382E-01 -   2.605E+00 1.10E+02 8.00E+00 G

TH-229   N  -6.0224E-01                                     2.68E+06
                          193.51-6.022E-01 ?(  4.641E+00 2.84E+02 4.40E+00 G
                          210.85-1.671E+00 +   6.820E+00 1.51E+02 2.99E+00 G

TH-234   N  -6.7531E+00                                     1.63E+12
                           92.59-6.753E+00 @(P 5.807E+00 2.49E+01 5.58E+00 G
                           63.29 6.343E-01 + P 5.604E+00 3.15E+02 3.81E+00 G
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Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-231	N 1.4478E-07					1.20E+07	
		302.65	1.448E-07	%(	1.475E+01	3.01E+09	2.88E+00 G
		300.07	1.686E-07	%	1.718E+01	3.01E+09	2.46E+00 G
PA-233	C 1.7720E-01					7.82E+08	
		312.01	1.772E-01	&(P	5.059E-01	1.11E+02	3.60E+01 G
		300.18	-6.689E-08	%	6.817E+00	3.01E+09	6.20E+00 G
PA-234	N 1.7036E-01					1.63E+12	
		131.29	-3.469E-01	?(	1.498E+00	1.29E+02	1.80E+01 G
		946.02	4.279E-01	&(	1.904E+00	1.86E+02	1.34E+01 G
		569.47	8.849E-01	?(	2.446E+00	8.21E+01	8.20E+00 G
		883.24	-1.424E+00	+	5.394E+00	1.12E+02	9.60E+00 G
		880.53	-2.658E+00	+	8.027E+00	9.01E+01	6.00E+00 GA
PA-234M	N -7.2101E+00					1.63E+12	
		1001.00	-1.849E+01	(P	6.002E+01	9.27E+01	8.37E-01 G
		766.41	2.491E+01	?(	8.912E+01	1.05E+02	2.94E-01 G
AM-241	T 1.0990E-01					1.58E+05	
		59.54	1.099E-01	&(	4.954E-01	1.58E+02	3.59E+01 G
Np-237	F 1.1411E-02					2.14E+06	
		86.49	1.141E-02	%(	1.993E+00	5.16E+03	1.31E+01 G
Ir-192	F 1.0027E-01					7.40E+01	
		316.49	8.248E-02	&(	2.853E-01	1.03E+02	8.70E+01 G
		468.06	1.302E-01	?(	4.751E-01	1.08E+02	5.18E+01 G
		308.44	2.324E-03	%	8.116E-01	1.01E+04	3.18E+01 G
Cs-136	F -1.7788E-01					1.30E+01	
		818.50	-1.779E-01	?(	5.914E-01	9.93E+01	1.00E+02 G
		1048.07	-2.751E-01	+	5.465E-01	6.05E+01	8.00E+01 G
		340.57	1.422E-01	&	6.027E-01	1.26E+02	4.69E+01 G
Np-239	T 6.2139E-02					2.36E+00	
		103.70	-2.629E-01	+	1.073E+00	1.22E+02	2.40E+01 X
		106.13	6.214E-02	?(	1.137E+00	5.42E+02	2.27E+01 G
		99.50	2.077E-01	&	1.382E+00	1.97E+02	1.50E+01 X
Nd-147	9.4412E-01					1.11E+01	
		531.00	9.441E-01	?(	1.170E+00	5.15E+01	1.30E+01 G
		91.10	1.094E-01	&	1.097E+00	2.99E+02	2.83E+01 G
TL-210	N -7.8862E-02					5.84E+05	
		799.60	-7.886E-02	?(	3.208E-01	1.19E+02	9.90E+01 G
		296.00	-3.619E-02	+	5.324E-01	4.36E+02	7.90E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          1313.00-6.353E-02 +   1.356E+00 9.15E+02 2.10E+01 GA

Kr-85    I  -2.2961E+01                                      3.92E+03
                          513.98-2.296E+01 ?(  1.351E+02 1.75E+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	318.	-42.	-0.006	68.23	-3.110E+00	P
TH-227	50.14	198.	-22.	-0.003	109.90	-8.382E-01	
AM-241	59.54	168.	14.	0.002	158.11	1.099E-01	
EU-155	86.54	234.	-18.	-0.002	153.79	-1.513E-01	
AC-228	93.35	534.	23.	0.003	142.90	1.077E+00	
Np-239	99.50	267.	12.	0.002	197.12	2.077E-01	
Np-239	103.70	415.	-24.	-0.003	122.14	-2.629E-01	
EU-155	105.31	446.	-11.	-0.002	334.76	-1.342E-01	P
Np-239	106.13	415.	5.	0.001	541.70	6.214E-02	
EU-152	121.78	308.	-24.	-0.003	105.95	-2.239E-01	
CO-57	122.06	244.	6.	0.001	378.22	1.840E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	123.10	269.	10.	0.001	242.24	6.368E-02	
PA-234	131.29	423.	-23.	-0.003	129.19	-3.469E-01	
HF-181	133.02	392.	11.	0.002	260.72	6.863E-02	
U-235	143.79	309.	21.	0.003	121.15	5.379E-01	
Ba-140	162.66	266.	-19.	-0.003	122.37	-9.217E-01	
U-235	163.38	213.	-10.	-0.001	351.20	-6.186E-01	P
Cf-251	176.60	153.	9.	0.001	256.51	1.601E-01	
U-235	185.72	273.	-22.	-0.003	110.47	-1.292E-01	
TH-229	193.51	160.	-8.	-0.001	283.58	-6.022E-01	
U-235	205.33	87.	37.	0.005	47.30	2.557E+00	
TH-229	210.85	143.	-14.	-0.002	150.97	-1.671E+00	
Cf-251	227.00	77.	16.	0.002	102.22	9.100E-01	
TH-227	235.97	411.	-12.	-0.002	243.98	-3.591E-01	
TH-227	256.24	91.	17.	0.002	105.55	9.335E-01	P
Hg-203	279.20	137.	-7.	-0.001	330.34	-3.396E-02	
I-131	284.30	125.	-18.	-0.003	102.46	-1.253E+00	P
PB-214	295.09	447.	-32.	-0.004	63.47	-7.124E-01	P
TL-210	296.00	415.	-7.	-0.001	435.83	-3.619E-02	
PA-233	312.01	67.	14.	0.002	110.84	1.772E-01	P
Ir-192	316.49	127.	16.	0.002	102.91	8.248E-02	
CR-51	320.08	115.	12.	0.002	135.39	5.272E-01	P
La-140	328.76	93.	-6.	-0.001	289.09	-1.255E-01	P
AC-228	338.32	130.	20.	0.003	83.54	7.850E-01	
Cs-136	340.57	150.	14.	0.002	125.67	1.422E-01	
EU-152	344.29	164.	14.	0.002	130.78	2.543E-01	
HF-181	345.83	178.	14.	0.002	135.90	4.491E-01	
PB-214	351.93	101.	4.	0.001	357.65	5.459E-02	P
I-131	364.48	73.	6.	0.001	285.82	3.445E-02	
Cf-249	387.95	137.	15.	0.002	115.84	1.149E-01	
SN-113	391.69	180.	-15.	-0.002	128.96	-1.220E-01	
SB-125	427.88	72.	-11.	-0.002	138.52	-2.093E-01	P
AG-108M	433.94	38.	11.	0.002	105.24	7.044E-02	P
PM-146	453.88	70.	-6.	-0.001	206.80	-5.305E-02	P
SB-125	463.37	69.	10.	0.001	119.20	5.759E-01	P
Ir-192	468.06	70.	11.	0.002	107.70	1.302E-01	
BE-7	477.59	85.	13.	0.002	101.97	7.585E-01	P
HF-181	482.00	133.	-17.	-0.002	80.16	-1.285E-01	P
La-140	487.02	48.	5.	0.001	274.95	6.665E-02	
RU-103	497.05	56.	6.	0.001	247.58	4.063E-02	
Kr-85	513.98	368.	-16.	-0.002	175.14	-2.296E+01	
Ba-140	537.26	36.	13.	0.002	96.18	3.410E-01	
CS-134	563.24	50.	4.	0.001	369.53	3.046E-01	P
CS-134	569.32	52.	8.	0.001	132.29	3.538E-01	
PA-234	569.47	33.	11.	0.001	82.09	8.849E-01	
BI-207	569.70	49.	11.	0.002	94.90	7.659E-02	
TL-208	583.02	62.	-3.	0.000	427.68	-2.803E-02	P
SB-125	600.50	212.	15.	0.002	141.96	5.848E-01	
SB-124	602.73	227.	10.	0.001	210.21	7.401E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	609.31	265.	-28.	-0.004	64.40	-4.273E-01	P
SB-125	635.89	56.	-10.	-0.001	86.99	-6.496E-01	P
I-131	636.97	54.	8.	0.001	139.88	7.944E-01	
AG-110M	657.76	38.	9.	0.001	102.44	7.214E-02	
CS-137	661.66	73.	-16.	-0.002	57.12	-1.440E-01	P
PM-144	696.54	53.	-13.	-0.002	75.46	-1.024E-01	P
NB-94	702.63	61.	-11.	-0.002	91.45	-8.900E-02	P
SB-124	722.79	14.	29.	0.004	26.03	2.189E+00	
PM-146	735.72	52.	-12.	-0.002	126.01	-4.412E-01	
PM-146	747.16	30.	2.	0.000	678.97	4.105E-02	
ZR-95	756.73	26.	8.	0.001	134.82	1.242E-01	
AG-110M	763.94	24.	11.	0.002	69.75	4.226E-01	
NB-95	765.79	44.	7.	0.001	140.25	5.947E-02	
PA-234M	766.41	36.	9.	0.001	104.72	2.491E+01	
EU-152	778.92	33.	-2.	0.000	513.33	-1.497E-01	P
BI-212	785.42	49.	-8.	-0.001	142.54	-5.634E+00	P
CS-134	795.87	57.	2.	0.000	587.89	1.887E-02	
TL-210	799.60	51.	-9.	-0.001	119.00	-7.886E-02	
CS-134	801.95	58.	12.	0.002	93.29	1.251E+00	P
CO-58	810.78	121.	-18.	-0.003	88.21	-1.645E-01	
La-140	815.77	114.	-17.	-0.002	92.49	-6.515E-01	
Cs-136	818.50	183.	-20.	-0.003	99.31	-1.779E-01	
MN-54	834.85	42.	-10.	-0.001	141.07	-9.146E-02	
Co-56	846.77	51.	-16.	-0.002	96.29	-1.512E-01	
NB-94	871.10	68.	-17.	-0.002	72.76	-1.610E-01	
EU-154	873.23	79.	6.	0.001	202.00	4.894E-01	
PA-234	880.53	105.	-17.	-0.002	90.10	-2.658E+00	
PA-234	883.24	122.	-14.	-0.002	112.35	-1.424E+00	
Y-88	898.04	32.	-3.	0.000	398.24	-2.842E-02	P
AC-228	911.07	37.	-1.	0.000	975.96	-4.512E-02	
AG-110M	937.49	24.	-5.	-0.001	237.52	-1.369E-01	P
PA-234	946.02	23.	6.	0.001	185.64	4.279E-01	
EU-152	964.11	56.	-4.	-0.001	308.09	-2.615E-01	P
AC-228	968.97	66.	-8.	-0.001	141.82	-4.926E-01	
EU-154	996.33	71.	-6.	-0.001	197.61	-6.143E-01	
PA-234M	1001.00	92.	-15.	-0.002	92.66	-1.849E+01	P
EU-154	1004.77	101.	-17.	-0.002	87.25	-9.997E-01	
Co-56	1037.84	15.	10.	0.001	93.09	7.602E-01	P
Cs-136	1048.07	63.	-20.	-0.003	60.47	-2.751E-01	
BI-207	1063.66	21.	8.	0.001	133.68	1.170E-01	P
Ga-68	1077.40	20.	3.	0.000	332.78	1.795E+00	
FE-59	1099.25	20.	8.	0.001	127.88	1.623E-01	
EU-152	1112.07	66.	-8.	-0.001	135.08	-6.711E-01	P
BI-214	1120.29	84.	-12.	-0.002	106.48	-8.909E-01	P
Ta-182	1121.30	52.	12.	0.002	89.85	3.991E-01	
Ta-182	1189.05	10.	17.	0.002	47.55	1.286E+00	
Ta-182	1221.41	27.	-3.	0.000	444.41	-1.238E-01	
Co-56	1238.28	28.	3.	0.000	403.30	5.740E-02	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
FE-59	1291.60	27.	-3.	0.000	444.41	-8.119E-02		
TL-210	1313.00	16.	-1.	0.000	914.69	-6.353E-02		
CO-60	1332.50	6.	12.	0.002	53.50	1.640E-01		P
AG-110M	1384.30	27.	-9.	-0.001	139.63	-4.984E-01		
EU-152	1408.00	19.	-3.	0.000	248.64	-1.919E-01		P
K-40	1460.83	41.	-12.	-0.002	97.19	-1.673E+00		P
La-140	1596.21	2.	5.	0.001	71.60	7.533E-02		P
SB-124	1690.98	24.	-15.	-0.002	83.00	-5.239E-01		
BI-214	1764.49	20.	-3.	0.000	225.85	-3.200E-01		P
Co-56	1771.35	18.	5.	0.001	133.50	5.407E-01		
Y-88	1836.06	12.	3.	0.000	284.80	5.440E-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 *****

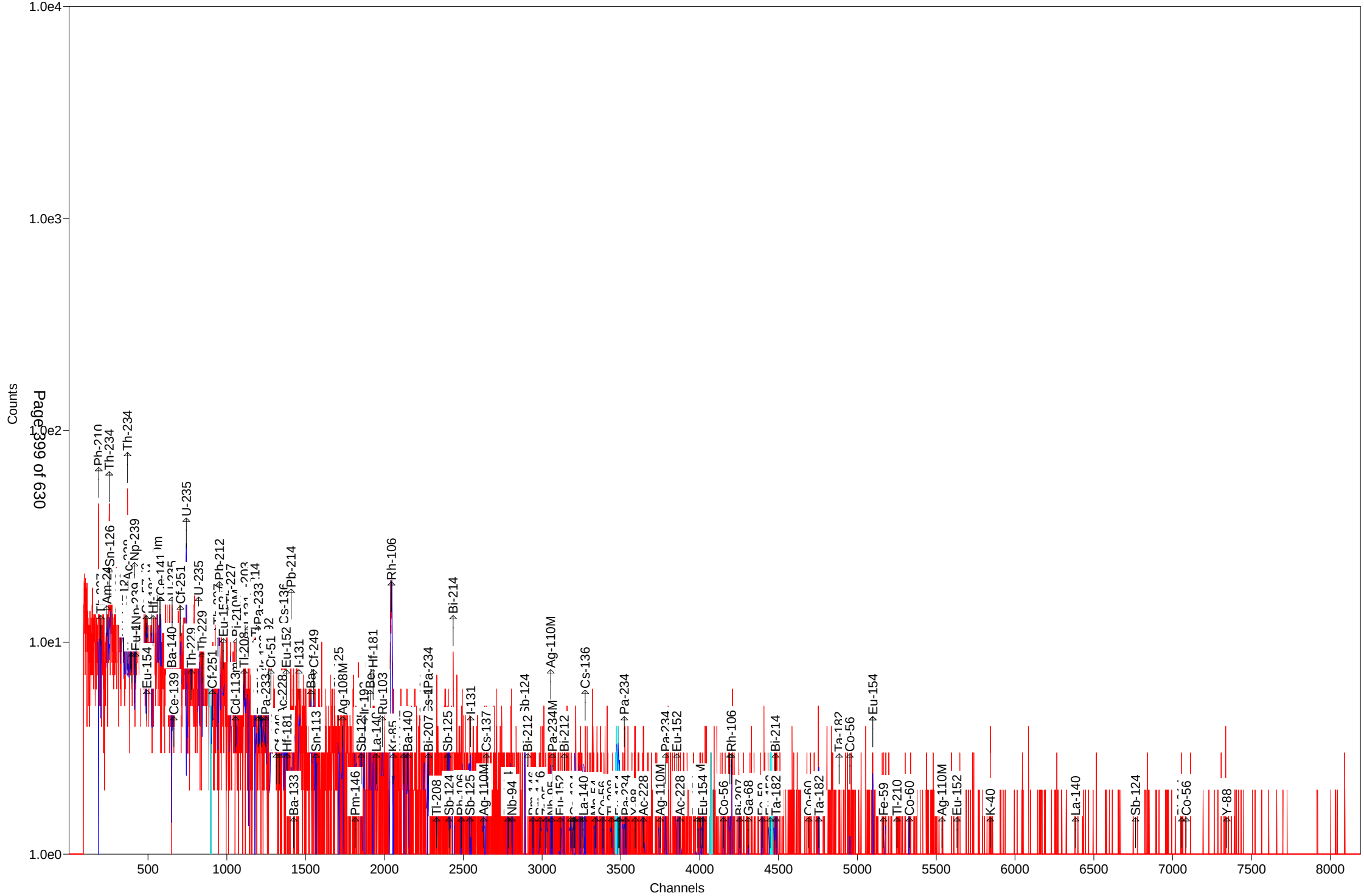
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	7.5851E-01	7.5852E-01	1.020E+02%	2.59E+00
NA-22	#	2.3201E-01	2.3201E-01	3.080E+01%	1.86E-01
K-40	#A	-1.6734E+00	-1.6734E+00	9.719E+01%	4.48E+00
Sc-46	#A	0.0000E+00	0.0000E+00	7.071E+02%	5.49E-01
CR-51	#A	5.2723E-01	5.2724E-01	1.354E+02%	2.40E+00
MN-54	#A	-9.1462E-02	-9.1462E-02	1.411E+02%	3.01E-01
FE-59	#A	1.6230E-01	1.6230E-01	1.279E+02%	4.78E-01
Co-56	#A	-3.8267E-02	-3.8267E-02	6.696E+01%	3.34E-01
CO-57	#A	1.8401E-02	1.8401E-02	3.782E+02%	2.36E-01
CO-58	#A	-1.6450E-01	-1.6450E-01	8.821E+01%	4.85E-01
CO-60	#A	1.6395E-01	1.6395E-01	5.350E+01%	1.89E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	9.69E-01
NB-94	#A	-8.9002E-02	-8.9002E-02	9.145E+01%	3.19E-01
ZR-95	#A	1.2425E-01	1.2425E-01	1.348E+02%	4.11E-01
NB-95	#A	5.9473E-02	5.9474E-02	1.403E+02%	2.88E-01
RU-103	#A	4.0629E-02	4.0629E-02	2.476E+02%	2.54E-01
RH-106	#A	-1.5974E+00	-1.5974E+00	3.664E+01%	6.15E+00
AG-108M	#A	7.0443E-02	7.0443E-02	1.052E+02%	1.93E-01
AG-110M	#A	8.5668E-02	8.5668E-02	6.975E+01%	7.52E-01
SN-113	#A	-1.2201E-01	-1.2201E-01	1.290E+02%	5.30E-01
SB-124	#A	2.8362E-01	2.8362E-01	2.603E+01%	5.27E-01
SB-125	#A	1.7746E-01	1.7746E-01	7.713E+01%	7.90E-01
I-131	#A	9.5760E-02	9.5764E-02	1.399E+02%	2.59E-01
Gd-153	#A	1.7122E-01	1.7122E-01	9.733E+01%	5.58E-01
Ga-68	#A	1.7830E+00	1.7955E+00	3.328E+02%	1.41E+01
Tc-99m	#A	7.3047E-02	7.3143E-02	1.295E+02%	3.17E-01
BA-133	A	8.7677E-02	8.7677E-02	2.455E+02%	4.66E-01
CS-134	#A	1.7358E-01	1.7358E-01	9.329E+01%	3.90E-01
CS-137	#A	-1.4402E-01	-1.4402E-01	5.712E+01%	3.80E-01

CE-139	#A	-1.8963E-03	-1.8963E-03	4.221E+03%	2.74E-01
Ba-140	#A	3.4103E-01	3.4104E-01	9.618E+01%	8.19E-01
La-140	#A	7.2525E-02	7.2527E-02	7.160E+01%	1.67E-01
CE-141	#A	1.2311E-01	1.2311E-01	1.305E+02%	5.38E-01
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.32E+00
PM-144	#A	-1.0239E-01	-1.0239E-01	7.546E+01%	2.93E-01
EU-152	#A	6.1744E-03	6.1744E-03	8.416E+01%	7.92E-01
EU-154	#A	1.6212E-01	1.6212E-01	1.577E+02%	5.22E-01
EU-155	#A	-1.3422E-01	-1.3422E-01	3.348E+02%	1.24E+00
HF-181	#A	-3.7403E-02	-3.7403E-02	7.889E+01%	4.23E-01
Ta-182	#A	6.8011E-01	6.8011E-01	4.755E+01%	1.21E+00
Hg-203	#A	-3.3962E-02	-3.3962E-02	3.303E+02%	2.91E-01
TL-208	#A	-2.8033E-02	-2.8033E-02	4.277E+02%	3.23E-01
PM-146	#A	-2.0734E-02	-2.0734E-02	2.068E+02%	3.70E-01
Y-88	#A	5.4401E-02	5.4401E-02	2.848E+02%	3.42E-01
Cd-113m	#B	8.8920E+01	8.8920E+01	1.216E+03%	3.73E+03
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.27E+00
Cf-251	#A	1.6012E-01	1.6012E-01	2.565E+02%	1.12E+00
Cf-249	#A	1.1492E-01	1.1492E-01	1.158E+02%	4.49E-01
Sn-126	A	-3.2045E-01	-3.2045E-01	2.560E+02%	2.76E+00
PB-210	#A	-3.1104E+00	-3.1104E+00	6.823E+01%	6.44E+00
PB-212	#A	3.8616E-01	3.8616E-01	4.023E+01%	4.08E-01
PB-214	#A	5.4587E-02	5.4587E-02	3.577E+02%	6.37E-01
BI-207	#A	9.4061E-02	9.4061E-02	8.197E+01%	3.62E-01
BI-212	#A	-7.2389E-02	-7.2389E-02	1.407E+03%	3.64E+00
U-235	#A	1.1712E+00	1.1712E+00	4.730E+01%	2.18E+00
BI-214	#A	-4.2728E-01	-4.2728E-01	6.440E+01%	1.22E+00
BI-210M	#A	-1.2209E-02	-1.2209E-02	1.203E+03%	3.88E-01
AC-228	#A	1.9798E-01	1.9798E-01	8.354E+01%	1.06E+00
TH-227	#A	9.3351E-01	9.3351E-01	1.056E+02%	2.65E+00
TH-229	#A	-6.0224E-01	-6.0224E-01	2.836E+02%	4.64E+00
TH-234	A	-6.7531E+00	-6.7531E+00	2.486E+01%	5.81E+00
PA-231	#A	1.4478E-07	1.4478E-07	3.006E+09%	1.48E+01
PA-233	#A	1.7720E-01	1.7720E-01	1.108E+02%	5.06E-01
PA-234	#A	1.7036E-01	1.7036E-01	8.020E+01%	1.50E+00
PA-234M	#A	-7.2101E+00	-7.2101E+00	6.992E+01%	6.00E+01
AM-241	#A	1.0990E-01	1.0990E-01	1.581E+02%	4.95E-01
Np-237	A	1.1411E-02	1.1411E-02	5.159E+03%	1.99E+00
Ir-192	#A	1.0027E-01	1.0027E-01	7.448E+01%	2.85E-01
Cs-136	#A	-1.7788E-01	-1.7788E-01	9.931E+01%	5.91E-01
Np-239	#A	6.2130E-02	6.2139E-02	5.417E+02%	1.14E+00
Nd-147	#A	9.4409E-01	9.4412E-01	5.148E+01%	1.17E+00
TL-210	#A	-7.8862E-02	-7.8862E-02	1.190E+02%	3.21E-01
Kr-85	#A	-2.2961E+01	-2.2961E+01	1.751E+02%	1.35E+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  1999.5 keV)     1.330E+00  Bq/Sample
Total Decayed Activity (   25.1 to  1999.5 keV) 1.3302803E+00  Bq/Sample
```

405454_Gamma_490-164491-A-1-A. 17_Gamma_20190012.spc.



Test America St. Louis Spectrum ID: 16_Gamma_20190014

Sample Description: 405454_Gamma_490-164491-A-1-B DU
Detector: Detector #16
Batch ID: 405454
Work Order Number: Gamma
Lot Number: 490-164491-A-1-B DU

Decay to Time: 1/3/2019 08:46 Live Time: 7200 sec
Acquisition Time: 1/3/2019 08:46:46 Real Time: 7210 sec
Analysis Time: 1/7/2019 13:15 Dead Time: 0.13 %
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_2018-12-22_1359.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	7.126E-01	101.2	7.209E-01	7.218E-01	2.429E+00
NA-22	-1.473E-01	75.7	1.116E-01	1.118E-01	3.729E-01
K-40	-2.213E-01	839.0	1.857E+00	1.857E+00	4.874E+00
Sc-46	4.589E-02	118.2	5.423E-02	5.428E-02	4.591E-01
CR-51	0.000E+00	1.#INF	2.821E-01	2.821E-01	4.873E+00
MN-54	4.524E-02	240.2	1.087E-01	1.087E-01	2.480E-01
FE-59	7.896E-02	233.1	1.840E-01	1.841E-01	4.916E-01
Co-56	9.853E-02	115.7	1.140E-01	1.141E-01	2.593E-01
CO-57	3.123E-02	235.1	7.343E-02	7.345E-02	2.475E-01
CO-58	1.021E-01	83.2	8.492E-02	8.507E-02	2.852E-01
CO-60	6.434E-02	151.8	9.764E-02	9.769E-02	3.327E-01
ZN-65	0.000E+00	1.#INF	2.895E-02	2.896E-02	8.306E-01
NB-94	1.070E-01	99.8	1.068E-01	1.069E-01	3.565E-01
ZR-95	3.520E-02	520.0	1.830E-01	1.831E-01	4.369E-01
NB-95	0.000E+00	1.#INF	6.896E-02	6.897E-02	3.075E-01
RU-103	-3.803E-02	291.7	1.109E-01	1.110E-01	2.664E-01
RH-106	9.715E-01	89.5	8.693E-01	8.707E-01	6.018E+00
AG-108M	7.866E-02	111.9	8.804E-02	8.813E-02	2.214E-01
AG-110M	7.255E-02	98.5	7.147E-02	7.156E-02	6.247E-01
SN-113	6.272E-02	232.3	1.457E-01	1.457E-01	4.946E-01
SB-124	8.692E-02	83.4	7.252E-02	7.265E-02	5.837E-01
SB-125	3.008E-01	87.9	2.646E-01	2.650E-01	7.111E-01
I-131	8.695E-02	143.6	1.249E-01	1.250E-01	2.405E-01
Gd-153	-1.808E-02	104.9	1.896E-02	1.899E-02	1.375E+00
Ga-68	-6.402E+00	134.4	8.603E+00	8.610E+00	1.867E+01
Tc-99m	8.361E-02	148.7	1.243E-01	1.244E-01	4.147E-01
BA-133	-4.921E-02	113.8	5.601E-02	5.606E-02	5.400E-01
CS-134	2.650E-01	64.9	1.719E-01	1.724E-01	3.730E-01
CS-137	5.039E-02	209.3	1.055E-01	1.055E-01	3.627E-01
CE-139	-9.922E-02	99.3	9.848E-02	9.888E-02	3.280E-01
Ba-140	2.706E-01	122.0	3.302E-01	3.305E-01	9.573E-01
La-140	1.166E-01	91.9	1.071E-01	1.073E-01	3.431E-01
CE-141	-1.488E-01	144.4	2.150E-01	2.151E-01	7.166E-01

CE-144	0.000E+00	1.#INF	2.971E-01	2.971E-01	3.039E+00
PM-144	7.126E-02	149.0	1.062E-01	1.062E-01	3.612E-01
EU-152	3.721E-01	93.3	3.472E-01	3.478E-01	7.115E-01
EU-154	5.231E-02	274.2	1.434E-01	1.435E-01	4.849E-01
EU-155	-8.791E-02	406.7	3.575E-01	3.576E-01	1.013E+00
HF-181	8.904E-02	107.7	9.586E-02	9.596E-02	3.412E-01
Ta-182	1.526E-01	197.8	3.019E-01	3.020E-01	1.244E+00
Hg-203	-1.821E-02	483.5	8.804E-02	8.805E-02	3.009E-01
TL-208	-3.084E-02	165.3	5.097E-02	5.100E-02	3.191E-01
PM-146	-3.685E-02	409.8	1.510E-01	1.510E-01	3.639E-01
Y-88	-1.145E-01	152.5	1.746E-01	1.747E-01	3.842E-01
Cd-113m	1.252E+03	91.7	1.149E+03	1.152E+03	3.838E+03
Cd-109	-1.895E+00	172.0	3.259E+00	3.260E+00	1.084E+01
Cf-251	3.994E-01	97.7	3.901E-01	3.916E-01	9.954E-01
Cf-249	1.016E-01	138.1	1.403E-01	1.404E-01	4.986E-01
Sn-126	-8.044E-01	119.7	9.629E-01	9.639E-01	3.205E+00
PB-210	-4.554E+00	45.5	2.071E+00	2.111E+00	7.041E+00
PB-212	-2.302E-01	102.9	2.370E-01	2.375E-01	8.005E-01
PB-214	5.325E-01	47.1	2.506E-01	2.521E-01	5.770E-01
BI-207	3.160E-01	30.2	9.557E-02	9.680E-02	1.799E-01
BI-212	0.000E+00	1.#INF	5.293E-01	5.293E-01	4.264E+00
U-235	2.952E-01	157.4	4.646E-01	4.649E-01	3.096E+00
BI-214	-5.802E-01	49.2	2.857E-01	2.872E-01	1.339E+00
BI-210M	-7.193E-02	201.0	1.446E-01	1.446E-01	4.899E-01
AC-228	-7.259E-02	102.6	7.452E-02	7.460E-02	1.298E+00
TH-227	5.941E-01	109.8	6.521E-01	6.531E-01	2.742E+00
TH-229	-1.401E+00	160.8	2.252E+00	2.255E+00	7.534E+00
TH-234	1.071E+00	96.8	1.037E+00	1.039E+00	3.540E+00
PA-231	2.961E+00	119.3	3.533E+00	3.537E+00	1.580E+01
PA-233	1.867E-01	168.9	3.153E-01	3.155E-01	1.323E+00
PA-234	2.621E-01	152.4	3.996E-01	3.998E-01	1.815E+00
PA-234M	5.941E+00	71.3	4.236E+00	4.246E+00	5.758E+01
AM-241	-1.429E-01	178.6	2.552E-01	2.553E-01	8.578E-01
Np-237	-5.279E-01	182.3	9.622E-01	9.627E-01	3.202E+00
Ir-192	4.248E-02	135.7	5.766E-02	5.772E-02	5.524E-01
Cs-136	7.073E-02	164.0	1.160E-01	1.160E-01	3.482E-01
Np-239	1.290E-01	217.3	2.804E-01	2.805E-01	9.436E-01
Nd-147	-4.126E-01	167.4	6.906E-01	6.910E-01	1.666E+00
TL-210	1.101E-01	87.7	9.656E-02	9.675E-02	3.512E-01
Kr-85	1.001E+01	331.1	3.313E+01	3.313E+01	1.120E+02
Total	1.280E+03				

Analyst: conrad.reuscher

Sample description
405454_Gamma_490-164491-A-1-B DU

Spectrum Filename: C:\User\SPC\Det16\16_Gamma_20190014.An1

Acquisition information
Start time: 1/3/2019 8:46:46 AM
Live time: 7200
Real time: 7210
Dead time: 0.13 %
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	1/3/2019 8:46:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	16_2018-12-22_1359.PBC 12/22/2018 1:59:52 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1389

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.48	-70.	45.47	0.96	5.055E-02	46.54	4.250	PBC<MDA	PB210
59.54	-21.	178.60	0.97	5.727E-02	59.54	35.900	PBC<MDA	AM241
63.13	32.	96.79	0.66	5.849E-02	63.29	3.810	PBC<MDA	TH234
92.64	11.	297.88	1.19	6.175E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	4.444E-01	AC228
103.20	28.	122.40	1.01	6.109E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	2.678E-01	Np239
106.13	13.	217.26	1.01	6.081E-02	106.13	22.700	PBC<MDA	Np239
121.78	28.	93.30	1.03	5.878E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	7.650E-02	CO57
122.06	11.	235.13	1.03	5.874E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.123E-02	CO57
123.10	9.	274.20	1.03	5.858E-02	123.10	40.790	PBC<MDA	EU154
131.29	26.	152.43	1.04	5.726E-02	131.29	18.000	PBC<MDA	PA234
133.02	14.	288.55	1.04	5.696E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	3.120E-01	CE144
139.83	27.	148.69	1.05	5.565E-02	140.51	89.300	PBC<MDA	Tc99m
162.66	22.	122.00	1.07	5.153E-02	162.66	6.220	PBC<MDA	Ba140
163.38	18.	157.37	1.07	5.140E-02	163.38	5.080	PBC<MDA	U235
176.60	24.	97.68	1.08	4.912E-02	176.60	17.000	PBC<MDA	Cf251
185.75	45.	45.91	1.09	4.775E-02	185.72	54.000	2.443E-01	U235
189.93	16.	81.38	1.09	4.715E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
235.97	19.	162.48	1.13	4.154E-02	235.97	12.300	PBC<MDA	TH227
238.43	-30.	102.94	1.14	4.126E-02	238.63	43.300	PBC<MDA	PB212
241.80	23.	123.09	1.14	4.091E-02	242.00	7.430	PBC<MDA	PB214
244.69	24.	122.55	1.14	4.064E-02	244.69	7.580	PBC<MDA	EU152
256.24	15.	147.62	1.15	3.951E-02	256.24	7.000	PBC<MDA	TH227
263.70	21.	91.72	1.16	3.881E-02	263.70	0.006	PBC<MDA	Cd113m
277.28	6.	261.72	1.17	3.761E-02	277.28	6.310	PBC<MDA	TL208
294.89	-16.	210.88	1.19	3.616E-02	295.09	19.300	PBC<MDA	PB214
296.00	20.	160.44	1.19	3.609E-02	296.00	79.000	PBC<MDA	TL210
300.03	16.	212.79	1.19	3.578E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	20.	165.96	1.19	3.578E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	3.202E+00	PA231
					300.18	6.200	1.271E+00	PA233
300.18	20.	168.91	1.19	3.577E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	3.202E+00	PA231
					300.18	6.200	1.271E+00	PA233
302.65	20.	171.48	1.19	3.558E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	4.331E-01	BA133
302.85	12.	285.30	1.19	3.557E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	2.638E-01	BA133
328.76	19.	140.06	1.22	3.372E-02	328.76	20.300	PBC<MDA	La140
333.44	20.	138.09	1.22	3.341E-02	333.44	15.510	PBC<MDA	Cf249
338.32	20.	141.17	1.23	3.309E-02	338.32	12.010	PBC<MDA	AC228
340.57	16.	181.20	1.23	3.294E-02	340.57	46.900	PBC<MDA	Cs136
351.87	46.	47.06	1.66	3.223E-02	351.93	37.600	PBC<MDA	PB214
364.48	8.	221.74	1.25	3.149E-02	364.48	81.700	PBC<MDA	I131
383.84	13.	159.80	1.27	3.040E-02	383.84	8.940	PBC<MDA	BA133
391.69	9.	232.30	1.27	2.999E-02	391.69	64.000	PBC<MDA	SN113
427.88	8.	219.10	1.31	2.821E-02	427.88	29.600	PBC<MDA	SB125
433.94	3.	551.60	1.31	2.793E-02	433.94	90.480	PBC<MDA	AG108M
463.37	15.	87.95	1.34	2.667E-02	463.37	10.470	PBC<MDA	SB125
468.06	11.	135.74	1.34	2.648E-02	468.06	51.750	PBC<MDA	Ir192
477.60	14.	101.16	1.35	2.610E-02	477.60	10.520	PBC<MDA	BE7
482.00	14.	107.66	1.35	2.593E-02	482.00	80.500	PBC<MDA	HF181
487.02	14.	113.68	1.36	2.573E-02	487.02	45.500	PBC<MDA	La140
511.86	164.	13.44	2.63	2.482E-02	511.86	20.000	4.597E+00	RH106
513.97	8.	331.09	1.38	2.475E-02	513.98	0.430	PBC<MDA	Kr85
537.26	4.	414.45	1.40	2.396E-02	537.26	24.390	PBC<MDA	Ba140
563.24	6.	226.04	1.43	2.314E-02	563.24	8.350	PBC<MDA	CS134
569.32	14.	64.87	1.43	2.295E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.039E+00	PA234
					569.70	97.740	PBC<MDA	BI207
583.02	-8.	201.95	1.44	2.255E-02	583.02	84.500	PBC<MDA	TL208
609.31	-42.	49.24	1.47	2.181E-02	609.31	46.090	PBC<MDA	BI214
614.28	20.	111.93	1.47	2.168E-02	614.28	89.850	PBC<MDA	AG108M
636.97	6.	182.55	1.49	2.109E-02	636.97	7.170	PBC<MDA	I131

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
657.76	11.	98.52	1.51	2.058E-02	657.76	94.640	PBC<MDA	AG110M
661.66	6.	209.27	1.51	2.049E-02	661.66	85.210	PBC<MDA	CS137
696.24	10.	149.00	1.54	1.969E-02	696.54	99.000	PBC<MDA	PM144
702.63	15.	99.83	1.55	1.955E-02	702.63	97.900	PBC<MDA	NB94
722.79	10.	121.66	1.57	1.913E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	7.995E-02	AG108M
					723.36	20.220	3.593E-01	EU154
756.73	3.	520.02	1.60	1.845E-02	756.73	54.460	PBC<MDA	ZR95
766.41	15.	71.31	1.60	1.826E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	3.818E+01	PA234M
778.92	5.	281.58	1.62	1.803E-02	778.92	12.940	PBC<MDA	EU152
785.42	13.	105.01	1.62	1.791E-02	785.42	1.280	PBC<MDA	BI212
795.87	13.	94.87	1.63	1.772E-02	795.87	85.530	PBC<MDA	CS134
799.60	15.	87.68	1.63	1.766E-02	799.60	98.960	PBC<MDA	TL210
801.95	11.	103.64	1.64	1.762E-02	801.95	8.690	PBC<MDA	CS134
810.78	13.	83.15	1.64	1.746E-02	810.78	99.460	PBC<MDA	CO58
815.77	13.	91.86	1.65	1.738E-02	815.77	23.280	PBC<MDA	La140
818.50	5.	273.30	1.65	1.733E-02	818.50	100.000	PBC<MDA	Cs136
834.85	6.	240.23	1.66	1.706E-02	834.85	99.980	PBC<MDA	MN54
846.77	12.	115.67	1.67	1.686E-02	846.77	99.935	PBC<MDA	Co56
946.02	2.	654.15	1.76	1.540E-02	946.02	13.400	PBC<MDA	PA234
968.97	3.	479.26	1.78	1.510E-02	968.97	17.460	PBC<MDA	AC228
1001.00	-5.	306.24	1.81	1.469E-02	1001.00	0.837	PBC<MDA	PA234M
1050.36	12.	89.49	1.85	1.411E-02	1050.36	1.560	PBC<MDA	RH106
1063.66	24.	30.24	1.86	1.396E-02	1063.66	74.500	3.160E-01	BI207
1099.25	3.	344.53	1.89	1.358E-02	1099.25	56.500	PBC<MDA	FE59
1120.13	3.	403.98	1.91	1.335E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	3.079E-02	Sc46
					1121.30	34.900	8.827E-02	Ta182
1120.29	-3.	364.49	1.91	1.336E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1120.55	9.	118.18	1.91	1.336E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	9.749E-02	Sc46
					1121.30	34.900	2.795E-01	Ta182
1173.24	8.	151.76	1.95	1.284E-02	1173.24	99.900	PBC<MDA	CO60
1187.66	5.	271.48	1.96	1.269E-02	1189.05	16.200	PBC<MDA	Ta182
1221.89	3.	339.41	1.99	1.240E-02	1221.41	27.000	PBC<MDA	Ta182
1291.60	4.	313.98	2.05	1.181E-02	1291.60	43.200	PBC<MDA	FE59
1313.00	2.	488.62	2.07	1.164E-02	1313.00	21.000	PBC<MDA	TL210
1332.50	4.	344.44	2.08	1.149E-02	1332.50	99.980	PBC<MDA	CO60
1384.30	5.	209.76	2.12	1.111E-02	1384.30	24.290	PBC<MDA	AG110M
1408.00	9.	118.63	2.14	1.094E-02	1408.00	21.005	PBC<MDA	EU152
1460.61	-2.	839.02	2.19	1.059E-02	1460.83	10.670	PBC<MDA	K40
1690.98	8.	83.43	2.37	9.267E-03	1690.98	47.790	PBC<MDA	SB124
1764.49	-14.	76.97	2.43	8.909E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	9.	101.99	2.43	8.877E-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
742.47	185.78	171.	45.	9.499E+02	45.91	1.087	- sD
759.16	189.95	81.	16.	3.473E+02	81.38	1.091	- sc

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

This section based on library: Client_Long_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	185.86	46.54	519.	-70.	-0.010	45.47	0.959
TH-227	200.26	50.14	488.	-28.	-0.004	113.24	0.963
AM-241	237.83	59.54	711.	-21.	-0.003	178.60	0.971s
TH-234	252.20	63.13	288.	32.	0.004	96.79	0.659s
Sn-126	256.79	64.28	766.	-33.	-0.005	119.70	0.976s
BA-133	323.60	80.99	285.	-11.	-0.002	280.40	0.991s
Np-237	345.59	86.49	1558.	-31.	-0.004	182.26	0.996
EU-155	345.80	86.54	1527.	-31.	-0.004	180.47	0.996
Sn-126	347.39	86.94	1558.	-32.	-0.004	175.75	0.997
Sn-126	349.91	87.57	1527.	-32.	-0.004	173.84	0.997
Cd-109	351.79	88.04	1495.	-32.	-0.004	171.95	0.998
Nd-147	364.02	91.10	1463.	-32.	-0.004	169.65	1.001s
TH-234	370.19	92.64	334.	11.	0.002	297.88	1.194s
AC-228	373.02	93.35	1459.	-32.	-0.004	169.12	1.003s
Gd-153	389.61	97.50	1492.	-32.	-0.004	170.29	1.007s
Gd-153	412.40	103.20	569.	28.	0.004	122.40	1.012s
Np-239	414.40	103.70	400.	-29.	-0.004	99.25	1.012s
EU-155	420.85	105.31	385.	-8.	-0.001	406.73	1.014s
Np-239	424.11	106.13	372.	13.	0.002	217.26	1.014s
EU-152	486.69	121.78	320.	28.	0.004	93.30	1.029s
CO-57	487.81	122.06	348.	11.	0.002	235.13	1.029s
EU-154	491.96	123.10	300.	9.	0.001	274.20	1.030s
PA-234	524.73	131.29	802.	26.	0.004	152.43	1.038s
HF-181	531.64	133.02	829.	14.	0.002	288.55	1.039s
CE-144	533.70	133.54	843.	0.	0.000	1000.00	1.040s
HF-181	544.74	136.30	843.	0.	0.000	1000.00	1.042s
CO-57	545.43	136.47	847.	-27.	-0.004	151.74	1.042s
Tc-99m	561.57	140.51	773.	27.	0.004	148.69	1.046s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	574.67	143.79	800.	0.	0.000	1000.00	1.049
CE-141	581.29	145.44	820.	-28.	-0.004	144.45	1.050s
Ba-140	650.14	162.66	349.	22.	0.003	122.00	1.066s
U-235	653.01	163.38	371.	18.	0.002	157.37	1.067s
CE-139	662.90	165.85	400.	-29.	-0.004	99.25	1.069s
Cf-251	705.88	176.60	150.	24.	0.003	97.68	1.079s
U-235	742.34	185.72	530.	-26.	-0.004	125.87	1.087s
TH-229	773.49	193.51	544.	-21.	-0.003	160.80	1.094s
TH-229	842.82	210.85	198.	-28.	-0.004	94.71	1.110s
Cf-251	907.40	227.00	154.	-9.	-0.001	260.10	1.125s
TH-227	943.27	235.97	443.	19.	0.003	162.48	1.133s
PB-212	953.91	238.63	463.	-30.	-0.004	102.94	1.136
PB-214	967.37	242.00	404.	23.	0.003	123.09	1.139s
EU-152	978.14	244.69	413.	24.	0.003	122.55	1.141s
TH-227	1024.32	256.24	124.	15.	0.002	147.62	1.152s
Cd-113m	1054.15	263.70	175.	21.	0.003	91.72	1.158s
BI-210M	1062.67	265.83	197.	-10.	-0.001	201.00	1.160s
TL-208	1108.46	277.28	127.	6.	0.001	261.72	1.171s
Hg-203	1116.13	279.20	185.	-4.	-0.001	483.48	1.173s
PB-214	1179.67	295.09	532.	-16.	-0.002	210.88	1.187
TL-210	1183.31	296.00	516.	20.	0.003	160.44	1.188s
PB-212	1199.42	300.03	541.	16.	0.002	212.79	1.191
PA-231	1199.58	300.07	557.	20.	0.003	165.96	1.192s
PA-233	1200.02	300.18	577.	20.	0.003	168.91	1.192s
PA-231	1209.90	302.65	597.	20.	0.003	171.48	1.194s
BA-133	1210.70	302.85	618.	12.	0.002	285.30	1.194s
BI-210M	1218.88	304.90	630.	0.	0.000	1000.00	1.196
Ir-192	1233.05	308.44	630.	0.	0.000	1000.00	1.199s
PA-233	1247.34	312.01	630.	0.	0.000	1000.00	1.202s
Ir-192	1265.24	316.49	630.	0.	0.000	1000.00	1.206
CR-51	1279.62	320.08	630.	0.	0.000	1000.00	1.210s
La-140	1314.31	328.76	349.	19.	0.003	140.06	1.217s
Cf-249	1333.02	333.44	368.	20.	0.003	138.09	1.222s
AC-228	1352.54	338.32	388.	20.	0.003	141.17	1.226s
Cs-136	1361.54	340.57	408.	16.	0.002	181.20	1.228s
EU-152	1376.40	344.29	424.	0.	0.000	1000.00	1.231s
HF-181	1382.56	345.83	494.	-22.	-0.003	142.78	1.233s
PB-214	1406.73	351.87	105.	46.	0.006	47.06	1.661s
BA-133	1423.24	356.00	255.	-20.	-0.003	113.81	1.242s
I-131	1457.16	364.48	80.	8.	0.001	221.74	1.250s
BA-133	1534.57	383.84	205.	13.	0.002	159.80	1.267
Cf-249	1551.01	387.95	218.	0.	0.000	1000.00	1.271s
SN-113	1565.96	391.69	198.	9.	0.001	232.30	1.274s
SB-125	1710.67	427.88	74.	8.	0.001	219.10	1.307s
AG-108M	1734.91	433.94	65.	3.	0.000	551.60	1.312
PM-146	1814.67	453.88	87.	-5.	-0.001	409.83	1.330
SB-125	1852.61	463.37	84.	15.	0.002	87.95	1.338s
Ir-192	1871.38	468.06	111.	11.	0.002	135.74	1.342s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BE-7	1909.51	477.60	94.	14.	0.002	101.16	1.351s
HF-181	1927.12	482.00	109.	14.	0.002	107.66	1.355s
La-140	1947.21	487.02	123.	14.	0.002	113.68	1.359s
RU-103	1987.33	497.05	79.	-6.	-0.001	291.72	1.368s
RH-106	2046.57	511.86	162.	164.	0.023	13.44	2.631
Kr-85	2055.03	513.98	318.	8.	0.001	331.09	1.383s
Nd-147	2123.10	531.00	56.	-9.	-0.001	167.38	1.398s
Ba-140	2148.14	537.26	65.	4.	0.001	414.45	1.404
CS-134	2252.03	563.24	48.	6.	0.001	226.04	1.427s
CS-134	2276.36	569.32	35.	14.	0.002	64.87	1.432s
PA-234	2276.96	569.47	77.	-17.	-0.002	76.62	1.432s
BI-207	2277.89	569.70	79.	-11.	-0.002	174.67	1.432s
TL-208	2331.16	583.02	78.	-8.	-0.001	201.95	1.444s
SB-125	2401.07	600.50	336.	-22.	-0.003	122.34	1.460s
SB-124	2409.99	602.73	358.	-9.	-0.001	284.13	1.462s
CS-134	2417.91	604.71	367.	0.	0.000	1000.00	1.463s
BI-214	2436.31	609.31	409.	-42.	-0.006	49.24	1.467s
RU-103	2440.26	610.30	367.	0.	0.000	1000.00	1.468s
AG-108M	2456.19	614.28	236.	20.	0.003	111.93	1.472s
PM-144	2471.31	618.06	351.	-23.	-0.003	90.43	1.475
SB-125	2542.62	635.89	56.	-5.	-0.001	216.33	1.491s
I-131	2546.96	636.97	64.	6.	0.001	182.55	1.492
AG-110M	2630.10	657.76	57.	11.	0.002	98.52	1.510s
CS-137	2645.69	661.66	85.	6.	0.001	209.27	1.513s
PM-144	2785.22	696.54	106.	10.	0.001	149.00	1.544s
NB-94	2809.57	702.63	99.	15.	0.002	99.83	1.549s
SB-124	2890.19	722.79	69.	10.	0.001	121.66	1.567s
AG-108M	2890.80	722.94	79.	0.	0.000	1000.00	1.567s
EU-154	2892.49	723.36	79.	0.	0.000	1000.00	1.567s
ZR-95	2895.84	724.20	79.	0.	0.000	1000.00	1.568s
BI-212	2907.73	727.17	79.	0.	0.000	1000.00	1.570
PM-146	2941.93	735.72	55.	-12.	-0.002	129.45	1.578s
PM-146	2987.69	747.16	61.	-13.	-0.002	133.43	1.588s
ZR-95	3025.97	756.73	38.	3.	0.000	520.02	1.596s
AG-110M	3054.82	763.94	62.	-4.	-0.001	307.35	1.602s
NB-95	3062.21	765.79	65.	0.	0.000	1000.00	1.604s
PA-234M	3064.70	766.41	48.	15.	0.002	71.31	1.605s
EU-152	3114.73	778.92	37.	5.	0.001	281.58	1.615s
BI-212	3140.74	785.42	38.	13.	0.002	105.01	1.621s
CS-134	3182.54	795.87	66.	13.	0.002	94.87	1.630s
TL-210	3197.46	799.60	79.	15.	0.002	87.68	1.633s
CS-134	3206.86	801.95	64.	11.	0.002	103.64	1.635s
CO-58	3242.16	810.78	50.	13.	0.002	83.15	1.643s
La-140	3262.14	815.77	63.	13.	0.002	91.86	1.647s
Cs-136	3273.06	818.50	76.	5.	0.001	273.30	1.649s
MN-54	3338.46	834.85	35.	6.	0.001	240.23	1.663s
Co-56	3386.15	846.77	38.	12.	0.002	115.67	1.674s
TL-208	3441.33	860.56	63.	-16.	-0.002	87.33	1.685s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
NB-94	3483.47	871.10	84.	-16.	-0.002	82.54	1.695s
EU-154	3492.00	873.23	101.	0.	0.000	1000.00	1.696s
PA-234	3521.21	880.53	107.	-11.	-0.001	140.31	1.703s
PA-234	3532.05	883.24	117.	0.	0.000	1000.00	1.705s
AG-110M	3537.82	884.68	117.	0.	0.000	1000.00	1.706s
Y-88	3591.26	898.04	37.	-5.	-0.001	312.06	1.718s
AC-228	3643.38	911.07	75.	-13.	-0.002	149.06	1.729s
AG-110M	3749.09	937.49	80.	-24.	-0.003	83.23	1.751s
PA-234	3783.21	946.02	35.	2.	0.000	654.15	1.759s
EU-152	3855.58	964.11	57.	-15.	-0.002	75.72	1.774s
AC-228	3875.02	968.97	80.	3.	0.000	479.26	1.778s
EU-154	3984.48	996.33	119.	-22.	-0.003	67.89	1.801s
PA-234M	4003.15	1001.00	107.	-5.	-0.001	306.24	1.805s
EU-154	4018.27	1004.77	163.	-23.	-0.003	82.36	1.808s
Co-56	4150.56	1037.84	30.	-4.	-0.001	389.95	1.836s
Cs-136	4191.49	1048.07	43.	-7.	-0.001	143.87	1.845s
RH-106	4200.65	1050.36	49.	12.	0.002	89.49	1.847s
BI-207	4253.86	1063.66	5.	24.	0.003	30.24	1.858s
Ga-68	4308.84	1077.40	48.	-12.	-0.002	134.37	1.870s
FE-59	4396.27	1099.25	28.	3.	0.000	344.53	1.888s
EU-152	4447.58	1112.07	72.	-6.	-0.001	194.02	1.899s
ZN-65	4461.46	1115.55	66.	0.	0.000	1000.00	1.901s
BI-214	4480.43	1120.29	70.	-3.	0.000	364.49	1.906s
Sc-46	4481.49	1120.55	57.	9.	0.001	118.18	1.906s
Ta-182	4484.49	1121.30	70.	3.	0.000	403.98	1.906s
CO-60	4692.30	1173.24	25.	8.	0.001	151.76	1.950s
Ta-182	4755.57	1189.05	28.	5.	0.001	271.48	1.963s
Ta-182	4885.06	1221.41	23.	3.	0.000	339.41	1.990s
Co-56	4952.57	1238.28	40.	-12.	-0.002	99.97	2.004s
NA-22	5097.62	1274.53	40.	-13.	-0.002	75.72	2.034s
EU-154	5097.66	1274.54	52.	0.	0.000	1000.00	2.034s
FE-59	5165.91	1291.60	23.	4.	0.001	313.98	2.048s
TL-210	5251.57	1313.00	17.	2.	0.000	488.62	2.066s
CO-60	5329.61	1332.50	28.	4.	0.001	344.44	2.081s
AG-110M	5536.89	1384.30	18.	5.	0.001	209.76	2.124s
EU-152	5631.75	1408.00	18.	9.	0.001	118.63	2.143s
K-40	5843.19	1460.83	63.	-2.	0.000	839.02	2.186s
La-140	6385.02	1596.21	19.	-3.	0.000	365.40	2.294s
SB-124	6764.37	1690.98	6.	8.	0.001	83.43	2.369s
BI-214	7058.61	1764.49	59.	-14.	-0.002	76.97	2.427s
Co-56	7086.08	1771.35	36.	9.	0.001	101.99	2.433s
Y-88	7345.12	1836.06	20.	-7.	-0.001	152.45	2.483s

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   7.1263E-01                                     5.31E+01
                           477.60 7.126E-01 ?(  2.429E+00 1.01E+02 1.05E+01 G

NA-22    C  -1.4734E-01                                     9.50E+02
                          1274.53-1.473E-01 &(  3.729E-01 7.57E+01 9.99E+01 G

K-40     N  -2.2133E-01                                     4.66E+11
                          1460.83-2.213E-01 ?(P 4.874E+00 8.39E+02 1.07E+01 G

Sc-46    F   4.5886E-02                                     8.38E+01
                           889.28-5.716E-03 %(  4.591E-01 2.32E+03 1.00E+02 G
                          1120.55 9.749E-02 ?(  3.930E-01 1.18E+02 1.00E+02 G

MN-54    C   4.5236E-02                                     3.12E+02
                           834.85 4.524E-02 ?(P 2.480E-01 2.40E+02 1.00E+02 G

FE-59    F   7.8959E-02                                     4.45E+01
                          1099.25 6.336E-02 &(P 4.916E-01 3.45E+02 5.65E+01 G
                          1291.60 9.936E-02 ?(P 6.869E-01 3.14E+02 4.32E+01 G

Co-56    C   9.8535E-02                                     7.73E+01
                           846.77 9.853E-02 ?(P 2.593E-01 1.16E+02 9.99E+01 G
                          1238.28-2.065E-01 & P 5.524E-01 1.00E+02 6.61E+01 G
                          1037.84-2.648E-01 + P 1.942E+00 3.90E+02 1.41E+01 G
                          1771.35 8.928E-01 ?   3.106E+00 1.02E+02 1.55E+01  A

CO-57    C   3.1228E-02                                     2.72E+02
                           122.06 3.123E-02 ?(  2.475E-01 2.35E+02 8.56E+01 G
                           136.47-6.309E-01 &   3.192E+00 1.52E+02 1.07E+01 G

CO-58    C   1.0213E-01                                     7.09E+01
                           810.78 1.021E-01 ?(  2.852E-01 8.32E+01 9.95E+01 G

CO-60    F   6.4336E-02                                     1.93E+03
                          1332.50 4.433E-02 ?(  3.327E-01 3.44E+02 1.00E+02 G
                          1173.24 8.435E-02 &(P 2.827E-01 1.52E+02 9.99E+01 G

NB-94    I   1.0700E-01                                     7.41E+06
                           702.63 1.070E-01 ?(P 3.565E-01 9.98E+01 9.79E+01 G
                           871.10-1.392E-01 +   3.843E-01 8.25E+01 9.99E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZR-95	I	3.5200E-02					6.40E+01	
			756.73	3.520E-02	?(P	4.369E-01	5.20E+02	5.45E+01 G
			724.20	0.000E+00	-	7.269E-01	1.00E+03	4.42E+01 G
RU-103	I	-3.8030E-02					3.93E+01	
			497.05	-3.803E-02	?(P	2.664E-01	2.92E+02	9.09E+01 G
			610.30	0.000E+00	+	1.020E+01	1.00E+03	5.75E+00 GA
RH-106	I	9.7146E-01					3.74E+02	
			621.92	-3.243E-02	%(P	6.018E+00	4.26E+03	9.93E+00 G
			1050.36	7.362E+00	?(	2.222E+01	8.95E+01	1.56E+00 G
			511.86	4.597E+00		1.733E+00	1.34E+01	2.00E+01 GA
AG-108M	C	7.8660E-02					1.53E+05	
			433.94	1.649E-02	?(	2.214E-01	5.52E+02	9.05E+01 G
			722.94	0.000E+00	&	3.528E-01	1.00E+03	9.08E+01 G
			614.28	1.413E-01	&(	5.297E-01	1.12E+02	8.98E+01 G
AG-110M	F	7.2550E-02					2.50E+02	
			884.68	0.000E+00	?(	6.247E-01	1.00E+03	7.27E+01 G
			657.76	8.082E-02	?(	2.695E-01	9.85E+01	9.46E+01 G
			937.49	-6.346E-01	+	1.157E+00	8.32E+01	3.44E+01 G
			1384.30	2.574E-01	?(	1.157E+00	2.10E+02	2.43E+01 G
			763.94	-1.248E-01	+	1.338E+00	3.07E+02	2.23E+01 G
SN-113	F	6.2722E-02					1.15E+02	
			391.69	6.272E-02	?(	4.946E-01	2.32E+02	6.40E+01 G
SB-124	F	8.6919E-02					6.02E+01	
			602.73	-6.088E-02	&(	5.837E-01	2.84E+02	9.83E+01 G
			1690.98	2.585E-01	?(	4.528E-01	8.34E+01	4.78E+01 G
			722.79	6.717E-01	?(	2.782E+00	1.22E+02	1.08E+01 G
SB-125	I	3.0083E-01					1.01E+03	
			427.88	1.358E-01	*(P	7.111E-01	2.19E+02	2.96E+01 G
			600.50	-7.590E-01	+	3.107E+00	1.22E+02	1.79E+01 G
			635.89	-2.907E-01	+	2.185E+00	2.16E+02	1.13E+01 G
			463.37	7.674E-01	&(	2.264E+00	8.79E+01	1.05E+01 G
I-131	I	8.6954E-02					8.02E+00	
			364.48	4.335E-02	?(	2.405E-01	2.22E+02	8.17E+01 G
			284.30	1.257E-01	% P	3.510E+00	1.12E+03	6.14E+00 G
			636.97	5.838E-01	?(	3.677E+00	1.83E+02	7.17E+00 G
Gd-153	F	-1.8078E-02					2.42E+02	
			97.50	-2.427E-01	&(	1.375E+00	1.70E+02	3.00E+01 G
			103.20	2.910E-01	&(	1.188E+00	1.22E+02	2.18E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ga-68	C	-6.4024E+00					4.71E-02	
			1077.40	-6.402E+00	?(	1.867E+01	1.34E+02	3.30E+00 G
Tc-99m	I	8.3609E-02					2.51E-01	
			140.51	8.361E-02	&(	4.147E-01	1.49E+02	8.93E+01 G
BA-133	F	-4.9210E-02					3.85E+03	
			356.00	-1.417E-01	&(	5.400E-01	1.14E+02	6.20E+01 G
			302.85	2.638E-01	?(	2.525E+00	2.85E+02	1.83E+01 G
			383.84	6.619E-01	& P	3.548E+00	1.60E+02	8.94E+00 GA
			80.99	-7.411E-02	+ P	5.390E-01	2.80E+02	3.41E+01 GA
CS-134	I	2.6501E-01					7.54E+02	
			795.87	1.166E-01	?(	3.730E-01	9.49E+01	8.55E+01 G
			604.71	0.000E+00	-	5.965E-01	1.00E+03	9.76E+01 G
			569.32	5.539E-01	&(	1.186E+00	6.49E+01	1.54E+01 G
			801.95	1.032E+00	&(	3.622E+00	1.04E+02	8.69E+00 G
			563.24	4.553E-01	?(	2.508E+00	2.26E+02	8.35E+00 G
CS-137	I	5.0392E-02					1.10E+04	
			661.66	5.039E-02	&(	3.627E-01	2.09E+02	8.52E+01 G
CE-139	F	-9.9219E-02					1.38E+02	
			165.85	-9.922E-02	?(	3.280E-01	9.93E+01	7.99E+01 G
Ba-140	I	2.7063E-01					1.28E+01	
			537.26	9.507E-02	&(	9.573E-01	4.14E+02	2.44E+01 G
			162.66	9.591E-01	?(P	3.892E+00	1.22E+02	6.22E+00 G
			304.85	-1.395E-06	%	1.094E+01	2.33E+08	4.29E+00 G
La-140	I	1.1665E-01					1.28E+01	
			1596.21	-4.471E-02	?(	3.431E-01	3.65E+02	9.54E+01 G
			487.02	1.681E-01	&(	6.445E-01	1.14E+02	4.55E+01 G
			328.76	3.891E-01	?(P	1.821E+00	1.40E+02	2.03E+01 G
			815.77	4.397E-01	?(	1.361E+00	9.19E+01	2.33E+01 G
CE-141	I	-1.4881E-01					3.25E+01	
			145.44	-1.488E-01	?(	7.166E-01	1.44E+02	4.82E+01 G
PM-144	C	7.1260E-02					3.63E+02	
			696.54	7.126E-02	?(	3.612E-01	1.49E+02	9.90E+01 G
			618.06	-1.510E-01	+ P	5.843E-01	9.04E+01	9.91E+01 G
EU-152	F	3.7212E-01					4.94E+03	
			121.78	2.289E-01	?(	7.115E-01	9.33E+01	2.86E+01 G
			344.29	0.000E+00	-	1.581E+00	1.00E+03	2.65E+01 G
			1112.07	-4.796E-01	+	3.207E+00	1.94E+02	1.36E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			778.92	2.778E-01	?(	1.856E+00	2.82E+02	1.29E+01 G
			964.11	-9.410E-01	+	2.377E+00	7.57E+01	1.46E+01 G
			244.69	1.073E+00	(	4.394E+00	1.23E+02	7.58E+00 G
			1408.00	5.439E-01	&	1.359E+00	1.19E+02	2.10E+01 GA
EU-154	I	5.2310E-02					3.14E+03	
			123.10	5.231E-02	(	4.849E-01	2.74E+02	4.08E+01 G
			1274.54	0.000E+00	&	1.203E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	&	1.586E+00	1.00E+03	2.02E+01 G
			873.23	0.000E+00	&	3.410E+00	1.00E+03	1.23E+01 G
			1004.77	-1.194E+00	+	3.275E+00	8.24E+01	1.80E+01 G
			996.33	-1.954E+00	+ P	4.748E+00	6.79E+01	1.06E+01 G
EU-155	I	-8.7906E-02					1.81E+03	
			105.31	-8.791E-02	&(P	1.013E+00	4.07E+02	2.12E+01 G
			86.54	-2.253E-01	&	1.353E+00	1.80E+02	3.07E+01 G
HF-181	F	8.9036E-02					4.24E+01	
			482.00	9.401E-02	?(	3.412E-01	1.08E+02	8.05E+01 G
			133.02	7.980E-02	&(	7.707E-01	2.89E+02	4.33E+01 G
			345.83	-6.292E-01	+	3.004E+00	1.43E+02	1.51E+01 G
			136.30	0.000E+00	&	5.810E+00	1.00E+03	5.85E+00 G
Ta-182	F	1.5264E-01					1.14E+02	
			1121.30	8.827E-02	&(	1.244E+00	4.04E+02	3.49E+01 G
			1221.41	1.383E-01	?(	1.033E+00	3.39E+02	2.70E+01 G
			1189.05	3.153E-01	&(	1.859E+00	2.71E+02	1.62E+01 G
Hg-203	F	-1.8210E-02					4.66E+01	
			279.20	-1.821E-02	?(	3.009E-01	4.83E+02	8.15E+01 G
TL-208	N	-3.0840E-02					6.98E+02	
			583.02	-6.032E-02	(P	3.191E-01	2.02E+02	8.45E+01 G
			277.28	3.640E-01	(P	3.229E+00	2.62E+02	6.31E+00 G
			860.56	-1.102E+00	+ P	2.675E+00	8.73E+01	1.24E+01 G
PM-146	C	-3.6846E-02					2.02E+03	
			453.88	-3.685E-02	?(	3.639E-01	4.10E+02	6.50E+01 G
			747.16	-2.777E-01	+	8.551E-01	1.33E+02	3.40E+01 G
			735.72	-3.820E-01	+ P	1.216E+00	1.29E+02	2.25E+01 G
Y-88	F	-1.1450E-01					1.07E+02	
			1836.06	-1.145E-01	?(P	3.842E-01	1.52E+02	9.92E+01 G
			898.04	-4.344E-02	+ P	2.854E-01	3.12E+02	9.37E+01 G
Cd-113m		1.2525E+03					5.33E+03	
			263.70	1.252E+03	?(	3.838E+03	9.17E+01	6.00E-03 K

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cd-109	F	-1.8951E+00					4.53E+02	
			88.04	-1.895E+00	&(	1.084E+01	1.72E+02	3.79E+00 G
Cf-251	T	3.9939E-01					3.28E+05	
			176.60	3.994E-01	?(	9.954E-01	9.77E+01	1.70E+01 G
			227.00	-4.667E-01	+	3.139E+00	2.60E+02	6.30E+00 GA
Cf-249	T	1.0157E-01					1.28E+05	
			387.95	0.000E+00	?(	4.986E-01	1.00E+03	6.60E+01 G
			333.44	5.338E-01	?(	2.469E+00	1.38E+02	1.55E+01 G
Sn-126		-8.0445E-01					3.65E+07	
			87.57	-1.914E-01	+	1.107E+00	1.74E+02	3.75E+01 GA
			64.28	-8.044E-01	?(	3.205E+00	1.20E+02	9.70E+00 G
			86.94	-7.937E-01	+	4.640E+00	1.76E+02	9.04E+00 GA
PB-210	N	-4.5542E+00					8.14E+03	
			46.54	-4.554E+00	(P	7.041E+00	4.55E+01	4.25E+00 G
PB-212	N	-2.3024E-01					6.98E+02	
			238.63	-2.302E-01	(P	8.005E-01	1.03E+02	4.33E+01 G
			300.03	1.847E+00	P	1.315E+01	2.13E+02	3.28E+00 GA
PB-214	N	5.3248E-01					5.84E+05	
			351.93	5.325E-01	@(P	5.770E-01	4.71E+01	3.76E+01 G
			295.09	-3.109E-01	- P	2.193E+00	2.11E+02	1.93E+01 G
			242.00	1.070E+00	?	4.401E+00	1.23E+02	7.43E+00 GA
BI-207	C	3.1605E-01					1.18E+04	
			1063.66	3.160E-01	&(	1.799E-01	3.02E+01	7.45E+01 G
			569.70	-6.916E-02	- P	2.736E-01	1.75E+02	9.77E+01 G
U-235	N	2.9523E-01					2.57E+11	
			143.79	0.000E+00	(	3.096E+00	1.00E+03	1.10E+01 G
			205.33	-4.098E-02	%	4.007E+00	3.76E+03	5.01E+00 G
			163.38	9.322E-01	(	4.922E+00	1.57E+02	5.08E+00 G
			185.72	-1.410E-01	+	5.923E-01	1.26E+02	5.40E+01 GA
BI-214	N	-5.8019E-01					5.84E+05	
			609.31	-5.802E-01	(P	1.339E+00	4.92E+01	4.61E+01 G
			1120.29	-2.318E-01	+ P	2.878E+00	3.64E+02	1.51E+01 G
			1764.49	-1.395E+00	+ P	3.891E+00	7.70E+01	1.54E+01 G
BI-210M	T	-7.1928E-02					1.10E+09	
			265.83	-7.193E-02	?(	4.899E-01	2.01E+02	5.00E+01 G
			304.90	0.000E+00	+	1.676E+00	1.00E+03	2.80E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AC-228	N	-7.2593E-02					2.10E+03	
			911.07	-3.920E-01	(	1.298E+00	1.49E+02	2.90E+01 G
			968.97	1.405E-01	+	2.344E+00	4.79E+02	1.75E+01 G
			338.32	6.986E-01	?(	3.303E+00	1.41E+02	1.20E+01 G
			93.35	-1.300E+00	+	7.313E+00	1.69E+02	5.56E+00 XA
TH-227	N	5.9407E-01					7.95E+03	
			256.24	7.533E-01	&(	2.742E+00	1.48E+02	7.00E+00 G
			235.97	5.034E-01	&(	2.741E+00	1.62E+02	1.23E+01 G
			50.14	-9.197E-01	&	3.473E+00	1.13E+02	8.00E+00 G
TH-229	N	-1.4005E+00					2.68E+06	
			193.51	-1.401E+00	?(	7.534E+00	1.61E+02	4.40E+00 G
			210.85	-2.966E+00	+	7.143E+00	9.47E+01	2.99E+00 G
TH-234	N	1.0713E+00					1.63E+12	
			92.59	4.424E-01	@(P	3.540E+00	2.98E+02	5.58E+00 G
			63.29	1.993E+00	(P	5.094E+00	9.68E+01	3.81E+00 G
PA-231	N	2.9608E+00					1.20E+07	
			302.65	2.755E+00	&(	1.580E+01	1.71E+02	2.88E+00 G
			300.07	3.202E+00	&(	1.778E+01	1.66E+02	2.46E+00 G
PA-233	C	1.8668E-01					7.82E+08	
			312.01	0.000E+00	&(	1.323E+00	1.00E+03	3.60E+01 G
			300.18	1.271E+00	&(	7.180E+00	1.69E+02	6.20E+00 G
PA-234	N	2.6214E-01					1.63E+12	
			131.29	3.571E-01	?(	1.815E+00	1.52E+02	1.80E+01 G
			946.02	1.346E-01	?(	2.038E+00	6.54E+02	1.34E+01 G
			569.47	-1.261E+00	&	3.219E+00	7.66E+01	8.20E+00 G
			883.24	0.000E+00	-	4.723E+00	1.00E+03	9.60E+00 G
			880.53	-1.512E+00	+	7.205E+00	1.40E+02	6.00E+00 GA
PA-234M	N	5.9411E+00					1.63E+12	
			1001.00	-5.382E+00	&(P	5.758E+01	3.06E+02	8.37E-01 G
			766.41	3.818E+01	?(	9.052E+01	7.13E+01	2.94E-01 G
AM-241	T	-1.4289E-01					1.58E+05	
			59.54	-1.429E-01	(P	8.578E-01	1.79E+02	3.59E+01 G
Np-237	F	-5.2795E-01					2.14E+06	
			86.49	-5.279E-01	&(	3.202E+00	1.82E+02	1.31E+01 G
Ir-192	F	4.2479E-02					7.40E+01	
			316.49	0.000E+00	&(	5.524E-01	1.00E+03	8.70E+01 G
			468.06	1.139E-01	?(	5.246E-01	1.36E+02	5.18E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          308.44 0.000E+00 -   1.489E+00 1.00E+03 3.18E+01 G

Cs-136   F   7.0734E-02                                     1.30E+01
                          818.50 3.679E-02 ?(  3.482E-01 2.73E+02 1.00E+02 G
                         1048.07-8.188E-02 +   4.071E-01 1.44E+02 8.00E+01 G
                          340.57 1.431E-01 &(  8.706E-01 1.81E+02 4.69E+01 G

Np-239   T   1.2904E-01                                     2.36E+00
                          103.70-2.784E-01 +   9.202E-01 9.92E+01 2.40E+01 X
                          106.13 1.290E-01  (  9.436E-01 2.17E+02 2.27E+01 G
                           99.50-3.342E-02 %   2.819E+00 2.52E+03 1.50E+01 X

Nd-147      -4.1261E-01                                     1.11E+01
                          531.00-4.126E-01  (  1.666E+00 1.67E+02 1.30E+01 G
                           91.10-2.546E-01 +   1.437E+00 1.70E+02 2.83E+01 G

TL-210   N   1.1013E-01                                     5.84E+05
                          799.60 1.194E-01 ?(  3.512E-01 8.77E+01 9.90E+01 G
                          296.00 9.851E-02 ?(  5.290E-01 1.60E+02 7.90E+01 G
                         1313.00 1.136E-01 ?   1.246E+00 4.89E+02 2.10E+01 GA

Kr-85    I   1.0005E+01                                     3.92E+03
                          513.98 1.001E+01 ?(  1.120E+02 3.31E+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
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C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
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	519.	-70.	-0.010	45.47	-4.554E+00	P
TH-227	50.14	488.	-28.	-0.004	113.24	-9.197E-01	
AM-241	59.54	711.	-21.	-0.003	178.60	-1.429E-01	P
Sn-126	64.28	766.	-33.	-0.005	119.70	-8.044E-01	
BA-133	80.99	285.	-11.	-0.002	280.40	-7.411E-02	P
Np-237	86.49	1558.	-31.	-0.004	182.26	-5.279E-01	
EU-155	86.54	1527.	-31.	-0.004	180.47	-2.253E-01	
Sn-126	86.94	1558.	-32.	-0.004	175.75	-7.937E-01	
Sn-126	87.57	1527.	-32.	-0.004	173.84	-1.914E-01	
Cd-109	88.04	1495.	-32.	-0.004	171.95	-1.895E+00	
Nd-147	91.10	1463.	-32.	-0.004	169.65	-2.546E-01	
AC-228	93.35	1459.	-32.	-0.004	169.12	-1.300E+00	
Gd-153	97.50	1492.	-32.	-0.004	170.29	-2.427E-01	
Gd-153	103.20	569.	28.	0.004	122.40	2.910E-01	
Np-239	103.70	400.	-29.	-0.004	99.25	-2.784E-01	
EU-155	105.31	385.	-8.	-0.001	406.73	-8.791E-02	P
Np-239	106.13	372.	13.	0.002	217.26	1.290E-01	
EU-152	121.78	320.	28.	0.004	93.30	2.289E-01	
CO-57	122.06	348.	11.	0.002	235.13	3.123E-02	
EU-154	123.10	300.	9.	0.001	274.20	5.231E-02	
PA-234	131.29	802.	26.	0.004	152.43	3.571E-01	
HF-181	133.02	829.	14.	0.002	288.55	7.980E-02	
CO-57	136.47	847.	-27.	-0.004	151.74	-6.309E-01	
CE-141	145.44	820.	-28.	-0.004	144.45	-1.488E-01	
Ba-140	162.66	349.	22.	0.003	122.00	9.591E-01	P
U-235	163.38	371.	18.	0.002	157.37	9.322E-01	
CE-139	165.85	400.	-29.	-0.004	99.25	-9.922E-02	
Cf-251	176.60	150.	24.	0.003	97.68	3.994E-01	
U-235	185.72	530.	-26.	-0.004	125.87	-1.410E-01	
TH-229	193.51	544.	-21.	-0.003	160.80	-1.401E+00	
TH-229	210.85	198.	-28.	-0.004	94.71	-2.966E+00	
Cf-251	227.00	154.	-9.	-0.001	260.10	-4.667E-01	
TH-227	235.97	443.	19.	0.003	162.48	5.034E-01	
EU-152	244.69	413.	24.	0.003	122.55	1.073E+00	
TH-227	256.24	124.	15.	0.002	147.62	7.533E-01	
Cd-113m	263.70	175.	21.	0.003	91.72	1.252E+03	
BI-210M	265.83	197.	-10.	-0.001	201.00	-7.193E-02	
TL-208	277.28	127.	6.	0.001	261.72	3.640E-01	P
Hg-203	279.20	185.	-4.	-0.001	483.48	-1.821E-02	
TL-210	296.00	516.	20.	0.003	160.44	9.851E-02	
PA-231	300.07	557.	20.	0.003	165.96	3.202E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-233	300.18	577.	20.	0.003	168.91	1.271E+00	
PA-231	302.65	597.	20.	0.003	171.48	2.755E+00	
BA-133	302.85	618.	12.	0.002	285.30	2.638E-01	
La-140	328.76	349.	19.	0.003	140.06	3.891E-01	P
Cf-249	333.44	368.	20.	0.003	138.09	5.338E-01	
AC-228	338.32	388.	20.	0.003	141.17	6.986E-01	
Cs-136	340.57	408.	16.	0.002	181.20	1.431E-01	
HF-181	345.83	494.	-22.	-0.003	142.78	-6.292E-01	
BA-133	356.00	255.	-20.	-0.003	113.81	-1.417E-01	
I-131	364.48	80.	8.	0.001	221.74	4.335E-02	
BA-133	383.84	205.	13.	0.002	159.80	6.619E-01	P
SN-113	391.69	198.	9.	0.001	232.30	6.272E-02	
SB-125	427.88	74.	8.	0.001	219.10	1.358E-01	P
AG-108M	433.94	65.	3.	0.000	551.60	1.649E-02	
PM-146	453.88	87.	-5.	-0.001	409.83	-3.685E-02	
SB-125	463.37	84.	15.	0.002	87.95	7.674E-01	
Ir-192	468.06	111.	11.	0.002	135.74	1.139E-01	
BE-7	477.60	94.	14.	0.002	101.16	7.126E-01	
HF-181	482.00	109.	14.	0.002	107.66	9.401E-02	
La-140	487.02	123.	14.	0.002	113.68	1.681E-01	
RU-103	497.05	79.	-6.	-0.001	291.72	-3.803E-02	P
RH-106	511.86	162.	164.	0.023	13.44	4.597E+00	
Nd-147	531.00	56.	-9.	-0.001	167.38	-4.126E-01	
Ba-140	537.26	65.	4.	0.001	414.45	9.507E-02	
CS-134	563.24	48.	6.	0.001	226.04	4.553E-01	
CS-134	569.32	35.	14.	0.002	64.87	5.539E-01	
PA-234	569.47	77.	-17.	-0.002	76.62	-1.261E+00	
TL-208	583.02	78.	-8.	-0.001	201.95	-6.032E-02	P
SB-125	600.50	336.	-22.	-0.003	122.34	-7.590E-01	
SB-124	602.73	358.	-9.	-0.001	284.13	-6.088E-02	
BI-214	609.31	409.	-42.	-0.006	49.24	-5.802E-01	P
AG-108M	614.28	236.	20.	0.003	111.93	1.413E-01	
SB-125	635.89	56.	-5.	-0.001	216.33	-2.907E-01	
I-131	636.97	64.	6.	0.001	182.55	5.838E-01	
AG-110M	657.76	57.	11.	0.002	98.52	8.082E-02	
CS-137	661.66	85.	6.	0.001	209.27	5.039E-02	
NB-94	702.63	99.	15.	0.002	99.83	1.070E-01	P
SB-124	722.79	69.	10.	0.001	121.66	6.717E-01	
PM-146	735.72	55.	-12.	-0.002	129.45	-3.820E-01	P
PM-146	747.16	61.	-13.	-0.002	133.43	-2.777E-01	
ZR-95	756.73	38.	3.	0.000	520.02	3.520E-02	P
AG-110M	763.94	62.	-4.	-0.001	307.35	-1.248E-01	
PA-234M	766.41	48.	15.	0.002	71.31	3.818E+01	
EU-152	778.92	37.	5.	0.001	281.58	2.778E-01	
BI-212	785.42	38.	13.	0.002	105.01	7.848E+00	P
CS-134	795.87	66.	13.	0.002	94.87	1.166E-01	
TL-210	799.60	79.	15.	0.002	87.68	1.194E-01	
CS-134	801.95	64.	11.	0.002	103.64	1.032E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CO-58	810.78	50.	13.	0.002	83.15	1.021E-01		
La-140	815.77	63.	13.	0.002	91.86	4.397E-01		
Cs-136	818.50	76.	5.	0.001	273.30	3.679E-02		
MN-54	834.85	35.	6.	0.001	240.23	4.524E-02		P
Co-56	846.77	38.	12.	0.002	115.67	9.853E-02		P
TL-208	860.56	63.	-16.	-0.002	87.33	-1.102E+00		P
NB-94	871.10	84.	-16.	-0.002	82.54	-1.392E-01		
PA-234	880.53	107.	-11.	-0.001	140.31	-1.512E+00		
Y-88	898.04	37.	-5.	-0.001	312.06	-4.344E-02		P
AC-228	911.07	75.	-13.	-0.002	149.06	-3.920E-01		
AG-110M	937.49	80.	-24.	-0.003	83.23	-6.346E-01		
PA-234	946.02	35.	2.	0.000	654.15	1.346E-01		
EU-152	964.11	57.	-15.	-0.002	75.72	-9.410E-01		
AC-228	968.97	80.	3.	0.000	479.26	1.405E-01		
EU-154	996.33	119.	-22.	-0.003	67.89	-1.954E+00		P
PA-234M	1001.00	107.	-5.	-0.001	306.24	-5.382E+00		P
EU-154	1004.77	163.	-23.	-0.003	82.36	-1.194E+00		
Co-56	1037.84	30.	-4.	-0.001	389.95	-2.648E-01		P
Cs-136	1048.07	43.	-7.	-0.001	143.87	-8.188E-02		
RH-106	1050.36	49.	12.	0.002	89.49	7.362E+00		
Ga-68	1077.40	48.	-12.	-0.002	134.37	-6.402E+00		
FE-59	1099.25	28.	3.	0.000	344.53	6.336E-02		P
EU-152	1112.07	72.	-6.	-0.001	194.02	-4.796E-01		
BI-214	1120.29	70.	-3.	0.000	364.49	-2.318E-01		P
Sc-46	1120.55	57.	9.	0.001	118.18	9.749E-02		
CO-60	1173.24	25.	8.	0.001	151.76	8.435E-02		P
Co-56	1238.28	40.	-12.	-0.002	99.97	-2.065E-01		P
NA-22	1274.53	40.	-13.	-0.002	75.72	-1.473E-01		
FE-59	1291.60	23.	4.	0.001	313.98	9.936E-02		P
TL-210	1313.00	17.	2.	0.000	488.62	1.136E-01		
CO-60	1332.50	28.	4.	0.001	344.44	4.433E-02		
AG-110M	1384.30	18.	5.	0.001	209.76	2.574E-01		
EU-152	1408.00	18.	9.	0.001	118.63	5.439E-01		
K-40	1460.83	63.	-2.	0.000	839.02	-2.213E-01		P
La-140	1596.21	19.	-3.	0.000	365.40	-4.471E-02		
SB-124	1690.98	6.	8.	0.001	83.43	2.585E-01		
BI-214	1764.49	59.	-14.	-0.002	76.97	-1.395E+00		P
Co-56	1771.35	36.	9.	0.001	101.99	8.928E-01		
Y-88	1836.06	20.	-7.	-0.001	152.45	-1.145E-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	7.1263E-01	7.1263E-01	1.012E+02%	2.43E+00
NA-22	#A	-1.4734E-01	-1.4734E-01	7.572E+01%	3.73E-01
K-40	#A	-2.2133E-01	-2.2133E-01	8.390E+02%	4.87E+00
Sc-46	#A	4.5886E-02	4.5886E-02	1.182E+02%	4.59E-01
CR-51	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.87E+00
MN-54	#A	4.5236E-02	4.5236E-02	2.402E+02%	2.48E-01
FE-59	#A	7.8958E-02	7.8959E-02	2.331E+02%	4.92E-01
Co-56	#A	9.8534E-02	9.8535E-02	1.157E+02%	2.59E-01
CO-57	#A	3.1228E-02	3.1228E-02	2.351E+02%	2.47E-01
CO-58	#A	1.0213E-01	1.0213E-01	8.315E+01%	2.85E-01
CO-60	#A	6.4336E-02	6.4336E-02	1.518E+02%	3.33E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.31E-01
NB-94	#A	1.0700E-01	1.0700E-01	9.983E+01%	3.56E-01
ZR-95	#A	3.5199E-02	3.5200E-02	5.200E+02%	4.37E-01
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.08E-01
RU-103	#A	-3.8030E-02	-3.8030E-02	2.917E+02%	2.66E-01
RH-106	#A	9.7146E-01	9.7146E-01	8.949E+01%	6.02E+00
AG-108M	#A	7.8660E-02	7.8660E-02	1.119E+02%	2.21E-01
AG-110M	#A	7.2549E-02	7.2550E-02	9.852E+01%	6.25E-01
SN-113	#A	6.2722E-02	6.2722E-02	2.323E+02%	4.95E-01
SB-124	#A	8.6919E-02	8.6919E-02	8.343E+01%	5.84E-01
SB-125	#A	3.0083E-01	3.0083E-01	8.795E+01%	7.11E-01
I-131	#A	8.6950E-02	8.6954E-02	1.436E+02%	2.41E-01
Gd-153	#A	-1.8078E-02	-1.8078E-02	1.049E+02%	1.37E+00
Ga-68	#A	-6.3524E+00	-6.4024E+00	1.344E+02%	1.87E+01
Tc-99m	#A	8.3486E-02	8.3609E-02	1.487E+02%	4.15E-01
BA-133	#A	-4.9210E-02	-4.9210E-02	1.138E+02%	5.40E-01
CS-134	#A	2.6501E-01	2.6501E-01	6.487E+01%	3.73E-01
CS-137	#A	5.0392E-02	5.0392E-02	2.093E+02%	3.63E-01
CE-139	#A	-9.9218E-02	-9.9219E-02	9.925E+01%	3.28E-01
Ba-140	#A	2.7062E-01	2.7063E-01	1.220E+02%	9.57E-01
La-140	#A	1.1664E-01	1.1665E-01	9.186E+01%	3.43E-01
CE-141	#A	-1.4881E-01	-1.4881E-01	1.444E+02%	7.17E-01
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.04E+00
PM-144	#A	7.1260E-02	7.1260E-02	1.490E+02%	3.61E-01
EU-152	#A	3.7212E-01	3.7212E-01	9.330E+01%	7.12E-01
EU-154	#A	5.2310E-02	5.2310E-02	2.742E+02%	4.85E-01
EU-155	#A	-8.7906E-02	-8.7906E-02	4.067E+02%	1.01E+00
HF-181	#A	8.9036E-02	8.9036E-02	1.077E+02%	3.41E-01
Ta-182	#A	1.5264E-01	1.5264E-01	1.978E+02%	1.24E+00
Hg-203	#A	-1.8210E-02	-1.8210E-02	4.835E+02%	3.01E-01
TL-208	#A	-3.0840E-02	-3.0840E-02	1.653E+02%	3.19E-01
PM-146	#A	-3.6846E-02	-3.6846E-02	4.098E+02%	3.64E-01

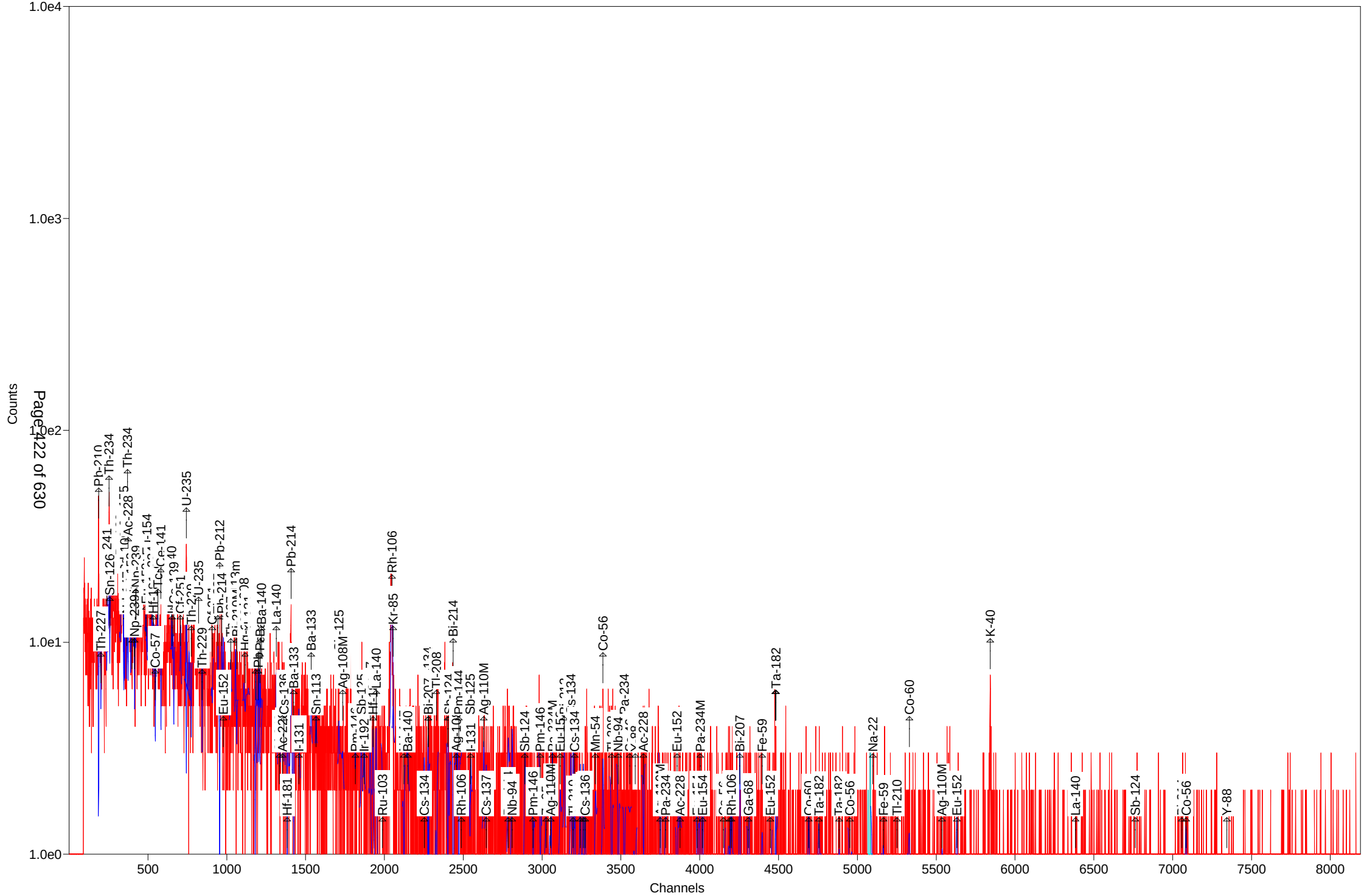
Y-88	#A	-1.1450E-01	-1.1450E-01	1.525E+02%	3.84E-01
Cd-113m	#A	1.2525E+03	1.2525E+03	9.172E+01%	3.84E+03
Cd-109	#A	-1.8951E+00	-1.8951E+00	1.720E+02%	1.08E+01
Cf-251	#A	3.9939E-01	3.9939E-01	9.768E+01%	9.95E-01
Cf-249	#A	1.0157E-01	1.0157E-01	1.381E+02%	4.99E-01
Sn-126	#A	-8.0445E-01	-8.0445E-01	1.197E+02%	3.21E+00
PB-210	#A	-4.5542E+00	-4.5542E+00	4.547E+01%	7.04E+00
PB-212	A	-2.3024E-01	-2.3024E-01	1.029E+02%	8.00E-01
PB-214	#A	5.3248E-01	5.3248E-01	4.706E+01%	5.77E-01
BI-207	#	3.1605E-01	3.1605E-01	3.024E+01%	1.80E-01
BI-212	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.26E+00
U-235	#A	2.9523E-01	2.9523E-01	1.574E+02%	3.10E+00
BI-214	#A	-5.8019E-01	-5.8019E-01	4.924E+01%	1.34E+00
BI-210M	#A	-7.1928E-02	-7.1928E-02	2.010E+02%	4.90E-01
AC-228	#A	-7.2593E-02	-7.2593E-02	1.026E+02%	1.30E+00
TH-227	#A	5.9407E-01	5.9407E-01	1.098E+02%	2.74E+00
TH-229	#A	-1.4005E+00	-1.4005E+00	1.608E+02%	7.53E+00
TH-234	A	1.0713E+00	1.0713E+00	9.679E+01%	3.54E+00
PA-231	#A	2.9608E+00	2.9608E+00	1.193E+02%	1.58E+01
PA-233	#A	1.8668E-01	1.8668E-01	1.689E+02%	1.32E+00
PA-234	#A	2.6214E-01	2.6214E-01	1.524E+02%	1.82E+00
PA-234M	#A	5.9411E+00	5.9411E+00	7.131E+01%	5.76E+01
AM-241	#A	-1.4289E-01	-1.4289E-01	1.786E+02%	8.58E-01
Np-237	#A	-5.2795E-01	-5.2795E-01	1.823E+02%	3.20E+00
Ir-192	#A	4.2479E-02	4.2479E-02	1.357E+02%	5.52E-01
Cs-136	#A	7.0732E-02	7.0734E-02	1.640E+02%	3.48E-01
Np-239	#A	1.2902E-01	1.2904E-01	2.173E+02%	9.44E-01
Nd-147	#A	-4.1259E-01	-4.1261E-01	1.674E+02%	1.67E+00
TL-210	#A	1.1013E-01	1.1013E-01	8.768E+01%	3.51E-01
Kr-85	#A	1.0005E+01	1.0005E+01	3.311E+02%	1.12E+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) 5.325E-01 Bq/Sample
Total Decayed Activity (25.1 to 1999.6 keV) 5.3247595E-01 Bq/Sample

405454_Gamma_490-164491-A-1-B DU. 16_Gamma_20190014.spc.



Test America St. Louis Spectrum ID: 7_Gamma_20190013

Sample Description: 405454_Gamma_490-164491-A-10-A
Detector: Detector # 7
Batch ID: 405454
Work Order Number: Gamma
Lot Number: 490-164491-A-10-A

Decay to Time: 1/3/2019 02:03 Live Time: 7200 sec
Acquisition Time: 1/3/2019 02:04:10 Real Time: 7219 sec
Analysis Time: 1/3/2019 04:04 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_2018-12-22_1401.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	-1.339E+00	57.5	7.695E-01	7.725E-01	4.565E+00
NA-22	1.104E-01	76.5	8.453E-02	8.471E-02	2.858E-01
K-40	-1.459E+00	136.1	1.986E+00	1.988E+00	5.364E+00
Sc-46	-1.355E-01	44.9	6.083E-02	6.119E-02	5.626E-01
CR-51	-5.516E-02	1804.2	9.953E-01	9.953E-01	7.636E+00
MN-54	1.887E-02	692.8	1.307E-01	1.307E-01	3.233E-01
FE-59	1.592E-02	427.6	6.808E-02	6.808E-02	8.570E-01
Co-56	1.982E-01	73.6	1.458E-01	1.462E-01	2.484E-01
CO-57	-5.776E-02	116.8	6.747E-02	6.754E-02	2.272E-01
CO-58	1.327E-01	85.9	1.140E-01	1.142E-01	3.855E-01
CO-60	-2.405E-02	727.3	1.749E-01	1.749E-01	4.223E-01
ZN-65	2.319E-01	100.2	2.325E-01	2.327E-01	8.021E-01
NB-94	-1.825E-01	92.1	1.680E-01	1.683E-01	3.877E-01
ZR-95	-4.552E-01	43.7	1.989E-01	2.002E-01	8.707E-01
NB-95	4.382E-02	169.7	7.436E-02	7.439E-02	2.675E-01
RU-103	1.098E-01	99.3	1.090E-01	1.092E-01	2.642E-01
RH-106	2.134E+00	87.1	1.858E+00	1.861E+00	5.918E+00
AG-108M	4.025E-02	102.1	4.109E-02	4.114E-02	2.883E-01
AG-110M	1.356E-02	463.7	6.286E-02	6.287E-02	6.818E-01
SN-113	1.553E-02	1331.8	2.069E-01	2.069E-01	7.117E-01
SB-124	2.200E-01	48.6	1.069E-01	1.075E-01	6.787E-01
SB-125	6.587E-01	48.6	3.204E-01	3.221E-01	5.958E-01
I-131	2.207E-01	91.6	2.022E-01	2.025E-01	2.781E-01
Gd-153	-1.845E-01	145.0	2.675E-01	2.678E-01	8.980E-01
Ga-68	-6.942E+00	147.8	1.026E+01	1.027E+01	2.294E+01
Tc-99m	7.005E-02	121.4	8.502E-02	8.512E-02	2.860E-01
BA-133	-9.639E-02	196.4	1.893E-01	1.894E-01	4.739E-01
CS-134	1.795E-01	24.5	4.396E-02	4.485E-02	6.525E-01
CS-137	1.356E-02	932.7	1.265E-01	1.265E-01	4.512E-01
CE-139	-6.311E-02	139.5	8.806E-02	8.825E-02	2.974E-01
Ba-140	3.913E-02	133.0	5.203E-02	5.207E-02	1.265E+00
La-140	9.330E-02	99.0	9.240E-02	9.253E-02	5.039E-01
CE-141	1.006E-01	131.3	1.321E-01	1.322E-01	3.585E-01

CE-144	0.000E+00	1.#INF	2.300E-01	2.300E-01	2.119E+00
PM-144	1.017E-01	115.3	1.173E-01	1.174E-01	2.788E-01
EU-152	3.646E-01	83.3	3.039E-01	3.045E-01	6.779E-01
EU-154	1.709E-01	95.6	1.634E-01	1.637E-01	4.923E-01
EU-155	1.620E-01	211.4	3.425E-01	3.426E-01	1.154E+00
HF-181	1.746E-01	104.1	1.818E-01	1.821E-01	5.215E-01
Ta-182	-7.572E-01	88.0	6.660E-01	6.670E-01	2.236E+00
Hg-203	4.657E-02	186.9	8.706E-02	8.710E-02	2.996E-01
TL-208	-3.305E-01	57.4	1.896E-01	1.903E-01	4.835E-01
PM-146	2.018E-01	92.1	1.858E-01	1.861E-01	3.762E-01
Y-88	-1.076E-01	246.6	2.653E-01	2.653E-01	5.660E-01
Cd-113m	0.000E+00	1.#INF	6.016E+02	6.016E+02	4.211E+03
Cd-109	3.007E-01	712.3	2.141E+00	2.142E+00	7.263E+00
Cf-251	-1.337E-01	354.5	4.741E-01	4.742E-01	1.236E+00
Cf-249	-2.435E-02	85.0	2.069E-02	2.072E-02	6.618E-01
Sn-126	6.579E-01	103.0	6.776E-01	6.785E-01	2.271E+00
PB-210	2.859E+00	66.5	1.901E+00	1.919E+00	5.025E+00
PB-212	-2.278E-01	100.4	2.286E-01	2.291E-01	7.792E-01
PB-214	-2.425E-02	1112.4	2.697E-01	2.697E-01	9.353E-01
BI-207	-1.117E-01	167.1	1.866E-01	1.867E-01	5.759E-01
BI-212	-1.661E-01	1014.9	1.686E+00	1.686E+00	5.977E+00
U-235	2.842E-02	3186.5	9.055E-01	9.055E-01	3.062E+00
BI-214	3.579E-01	30.2	1.079E-01	1.094E-01	1.472E+00
BI-210M	-1.085E-01	148.1	1.606E-01	1.607E-01	5.243E-01
AC-228	1.024E-01	72.0	7.369E-02	7.386E-02	1.596E+00
TH-227	9.292E-01	118.3	1.099E+00	1.100E+00	2.852E+00
TH-229	1.225E+00	127.5	1.563E+00	1.565E+00	4.507E+00
TH-234	-4.649E+00	33.1	1.537E+00	1.561E+00	5.351E+00
PA-231	-3.970E+00	182.3	7.240E+00	7.243E+00	2.424E+01
PA-233	0.000E+00	1.#INF	1.759E-01	1.759E-01	2.065E+00
PA-234	4.646E-01	106.3	4.937E-01	4.943E-01	1.251E+00
PA-234M	-9.198E+00	87.6	8.055E+00	8.067E+00	7.323E+01
AM-241	-7.502E-02	263.7	1.978E-01	1.979E-01	5.397E-01
Np-237	0.000E+00	1.#INF	6.559E-01	6.559E-01	2.226E+00
Ir-192	0.000E+00	1.#INF	5.401E-02	5.401E-02	8.637E-01
Cs-136	-1.890E-01	91.2	1.723E-01	1.726E-01	5.798E-01
Np-239	2.270E-01	139.3	3.162E-01	3.165E-01	1.063E+00
Nd-147	5.921E-01	98.2	5.816E-01	5.826E-01	1.439E+00
TL-210	-1.859E-01	99.5	1.849E-01	1.852E-01	6.235E-01
Kr-85	1.720E+01	211.5	3.638E+01	3.640E+01	1.241E+02
Total	3.083E+01				

Analyst: Morgan Reichert

Sample description
405454_Gamma_490-164491-A-10-A

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20190013.An1

Acquisition information
Start time: 1/3/2019 2:04:10 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	1/3/2019 2:03:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2018-12-22_1401.PBC 12/22/2018 2:01:31 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 8 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0921

***** 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	30.	66.52	0.75	3.385E-02	46.54	4.250	PBC<MDA	PB210
50.14	6.	381.90	0.84	3.568E-02	50.14	8.000	PBC<MDA	TH227
62.92	-59.	35.75	0.85	4.068E-02	63.29	3.810	PBC<MDA	TH234
63.91	19.	102.99	0.86	4.095E-02	64.28	9.700	PBC<MDA	Sn126
87.76	7.	157.29	0.88	4.403E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	5.911E-01	Cd109
88.12	4.	712.25	0.88	4.405E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	3.007E-01	Cd109
91.10	7.	379.98	0.88	4.409E-02	91.10	28.300	PBC<MDA	Nd147
92.78	63.	28.17	0.67	4.410E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	3.569E+00	AC228
99.50	12.	213.47	0.89	4.395E-02	99.50	15.000	PBC<MDA	Np239
105.31	11.	211.35	0.90	4.365E-02	105.31	21.200	PBC<MDA	EU155
106.13	16.	139.30	0.90	4.359E-02	106.13	22.700	PBC<MDA	Np239
121.78	14.	124.54	0.92	4.217E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	5.391E-02	CO57
131.29	14.	136.11	0.93	4.103E-02	131.29	18.000	PBC<MDA	PA234
140.51	16.	121.37	0.94	3.981E-02	140.51	89.300	PBC<MDA	Tc99m
145.44	14.	131.28	0.94	3.913E-02	145.44	48.200	PBC<MDA	CE141
162.66	14.	132.99	0.96	3.664E-02	162.66	6.220	PBC<MDA	Ba140
185.72	45.	42.21	0.99	3.334E-02	185.72	54.000	PBC<MDA	U235
193.51	14.	127.54	0.99	3.233E-02	193.51	4.400	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
210.85	7.	260.60	1.01	3.031E-02	210.85	2.990	PBC<MDA	TH229
235.97	7.	263.94	1.04	2.781E-02	235.97	12.300	PBC<MDA	TH227
238.63	-20.	100.38	1.04	2.757E-02	238.63	43.300	PBC<MDA	PB212
242.00	14.	133.98	1.04	2.728E-02	242.00	7.430	PBC<MDA	PB214
244.69	7.	225.08	1.05	2.704E-02	244.69	7.580	PBC<MDA	EU152
256.24	12.	118.25	1.06	2.610E-02	256.24	7.000	PBC<MDA	TH227
277.28	6.	219.67	1.08	2.454E-02	277.28	6.310	PBC<MDA	TL208
279.20	7.	186.95	1.08	2.441E-02	279.20	81.460	PBC<MDA	Hg203
284.30	4.	423.88	1.09	2.407E-02	284.30	6.140	PBC<MDA	I131
328.76	12.	99.04	1.13	2.145E-02	328.76	20.300	PBC<MDA	La140
333.44	12.	106.45	1.14	2.121E-02	333.44	15.510	PBC<MDA	Cf249
338.32	12.	110.56	1.14	2.097E-02	338.32	12.010	PBC<MDA	AC228
340.57	12.	117.67	1.15	2.086E-02	340.57	46.900	PBC<MDA	Cs136
344.29	12.	124.18	1.15	2.067E-02	344.29	26.500	PBC<MDA	EU152
345.83	9.	170.65	1.15	2.060E-02	345.83	15.070	PBC<MDA	HF181
364.48	9.	141.57	1.17	1.975E-02	364.48	81.700	PBC<MDA	I131
427.88	19.	48.64	1.23	1.733E-02	427.88	29.600	PBC<MDA	SB125
463.37	17.	53.73	1.27	1.623E-02	463.37	10.470	PBC<MDA	SB125
482.00	12.	119.35	1.29	1.571E-02	482.00	80.500	PBC<MDA	HF181
487.02	11.	124.82	1.29	1.557E-02	487.02	45.500	PBC<MDA	La140
497.05	11.	99.31	1.30	1.531E-02	497.05	90.900	PBC<MDA	RU103
511.86	116.	12.89	2.56	1.494E-02	511.86	20.000	5.377E+00	RH106
513.98	8.	211.49	1.32	1.489E-02	513.98	0.430	PBC<MDA	Kr85
531.00	8.	98.24	1.33	1.449E-02	531.00	13.000	PBC<MDA	Nd147
563.24	2.	678.97	1.36	1.378E-02	563.24	8.350	PBC<MDA	CS134
569.32	23.	24.49	1.37	1.366E-02	569.32	15.380	1.543E+00	CS134
					569.47	8.200	2.894E+00	PA234
					569.70	97.740	2.429E-01	BI207
600.50	8.	213.88	1.40	1.306E-02	600.50	17.860	PBC<MDA	SB125
602.73	-2.	986.79	1.40	1.301E-02	602.73	98.260	PBC<MDA	SB124
609.31	-4.	366.13	1.41	1.290E-02	609.31	46.090	PBC<MDA	BI214
618.06	-2.	825.44	1.42	1.274E-02	618.06	99.100	PBC<MDA	PM144
621.92	12.	131.07	1.42	1.267E-02	621.92	9.930	PBC<MDA	RH106
636.97	11.	91.64	1.43	1.242E-02	636.97	7.170	PBC<MDA	I131
657.76	2.	463.68	1.45	1.208E-02	657.76	94.640	PBC<MDA	AG110M
661.66	1.	932.74	1.46	1.202E-02	661.66	85.210	PBC<MDA	CS137
696.54	8.	115.31	1.49	1.150E-02	696.54	99.000	PBC<MDA	PM144
722.79	16.	48.59	1.51	1.113E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.209E-01	AG108M
					723.36	20.220	9.930E-01	EU154
722.94	9.	102.08	1.51	1.113E-02	722.79	10.810	1.050E+00	SB124
					722.94	90.840	1.250E-01	AG108M
					723.36	20.220	5.617E-01	EU154
723.36	3.	299.46	1.51	1.113E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.556E-02	AG108M
					723.36	20.220	2.048E-01	EU154
735.72	9.	103.51	1.52	1.096E-02	735.72	22.500	PBC<MDA	PM146
747.16	9.	92.08	1.53	1.082E-02	747.16	34.000	PBC<MDA	PM146

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
765.79	3.	169.71	1.55	1.059E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.488E+01	PA234M
766.41	4.	136.93	1.55	1.058E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.786E+01	PA234M
778.92	2.	565.69	1.56	1.043E-02	778.92	12.940	PBC<MDA	EU152
801.95	12.	102.45	1.58	1.017E-02	801.95	8.690	PBC<MDA	CS134
810.78	10.	85.91	1.59	1.007E-02	810.78	99.460	PBC<MDA	CO58
815.77	1.	619.09	1.59	1.002E-02	815.77	23.280	PBC<MDA	La140
834.85	1.	692.82	1.61	9.817E-03	834.85	99.980	PBC<MDA	MN54
846.77	7.	100.39	1.62	9.695E-03	846.77	99.935	PBC<MDA	Co56
860.56	4.	81.81	1.63	9.558E-03	860.56	12.420	PBC<MDA	TL208
880.53	10.	85.40	1.65	9.366E-03	880.53	6.000	PBC<MDA	PA234
883.24	2.	442.76	1.65	9.340E-03	883.24	9.600	PBC<MDA	PA234
946.02	7.	106.27	1.70	8.788E-03	946.02	13.400	PBC<MDA	PA234
964.11	5.	175.84	1.72	8.641E-03	964.11	14.605	PBC<MDA	EU152
968.97	7.	111.34	1.72	8.602E-03	968.97	17.460	PBC<MDA	AC228
1001.00	-9.	109.20	1.75	8.355E-03	1001.00	0.837	PBC<MDA	PA234M
1004.77	9.	95.64	1.75	8.327E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	7.	107.62	1.78	8.089E-03	1037.84	14.130	PBC<MDA	Co56
1050.36	6.	114.61	1.79	8.002E-03	1050.36	1.560	PBC<MDA	RH106
1112.07	6.	83.35	1.84	7.600E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	6.	100.24	1.84	7.578E-03	1115.55	50.600	PBC<MDA	ZN65
1120.29	1.	995.15	1.85	7.549E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1189.05	5.	155.93	1.90	7.151E-03	1189.05	16.200	PBC<MDA	Ta182
1274.53	5.	76.55	1.96	6.712E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	3.136E-01	EU154
1291.60	1.	427.57	1.98	6.630E-03	1291.60	43.200	PBC<MDA	FE59
1313.00	1.	427.57	1.99	6.531E-03	1313.00	21.000	PBC<MDA	TL210
1332.50	-1.	727.27	2.01	6.443E-03	1332.50	99.980	PBC<MDA	CO60
1460.83	-7.	136.12	2.10	5.917E-03	1460.83	10.670	PBC<MDA	K40
1690.98	6.	106.72	2.25	5.160E-03	1690.98	47.790	PBC<MDA	SB124
1764.49	11.	30.15	2.29	4.957E-03	1764.49	15.400	2.002E+00	BI214

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	186.35	46.70	111.	30.	0.004	66.52	0.747s
TH-227	200.12	50.14	231.	6.	0.001	381.90	0.840s
AM-241	237.70	59.54	127.	-8.	-0.001	263.72	0.850s
TH-234	252.71	63.29	231.	-59.	-0.008	35.75	0.854s
Sn-126	256.68	64.28	178.	19.	0.003	102.99	0.856s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-237	345.53	86.49	370.	0.	0.000	1000.00	0.880A
EU-155	345.74	86.54	395.	-19.	-0.003	150.89	0.880s
Sn-126	349.85	87.57	312.	7.	0.001	157.29	0.881D
Cd-109	351.73	88.04	329.	4.	0.001	712.25	0.881A
Nd-147	363.97	91.10	347.	7.	0.001	379.98	0.885
TH-234	369.93	92.59	391.	-82.	-0.011	33.07	0.886s
AC-228	372.97	93.35	311.	18.	0.002	140.67	0.887s
Gd-153	389.57	97.50	315.	-18.	-0.002	145.02	0.892s
Np-239	397.57	99.50	298.	12.	0.002	213.47	0.894s
Gd-153	412.38	103.20	286.	0.	0.000	1000.00	0.898s
Np-239	414.38	103.70	286.	0.	0.000	1000.00	0.898s
EU-155	420.83	105.31	253.	11.	0.001	211.35	0.900s
Np-239	424.10	106.13	240.	16.	0.002	139.30	0.901s
EU-152	486.70	121.78	145.	14.	0.002	124.54	0.918s
CO-57	487.83	122.06	146.	-15.	-0.002	116.81	0.918s
EU-154	491.98	123.10	155.	-15.	-0.002	118.96	0.919s
PA-234	524.77	131.29	188.	14.	0.002	136.11	0.928s
HF-181	531.68	133.02	202.	0.	0.000	1000.00	0.930s
CE-144	533.74	133.54	202.	0.	0.000	1000.00	0.930s
HF-181	544.79	136.30	202.	0.	0.000	1000.00	0.933s
CO-57	545.48	136.47	208.	-17.	-0.002	119.09	0.933s
Tc-99m	561.63	140.51	180.	16.	0.002	121.37	0.938s
CE-141	581.35	145.44	97.	14.	0.002	131.28	0.943s
Ba-140	650.24	162.66	158.	14.	0.002	132.99	0.961s
CE-139	663.01	165.85	162.	-13.	-0.002	139.53	0.965s
Cf-251	706.00	176.60	114.	-6.	-0.001	354.48	0.976s
U-235	742.49	185.72	92.	45.	0.006	42.21	0.986s
TH-229	773.64	193.51	87.	14.	0.002	127.54	0.994s
U-235	820.94	205.33	92.	-4.	-0.001	491.29	1.007s
TH-229	843.01	210.85	84.	7.	0.001	260.60	1.012s
Cf-251	907.62	227.00	99.	-9.	-0.001	209.50	1.029s
TH-227	943.50	235.97	150.	7.	0.001	263.94	1.039s
PB-212	954.15	238.63	190.	-20.	-0.003	100.38	1.041s
PB-214	967.61	242.00	171.	14.	0.002	133.98	1.045
EU-152	978.39	244.69	103.	7.	0.001	225.08	1.048
TH-227	1024.59	256.24	56.	12.	0.002	118.25	1.060s
Cd-113m	1054.43	263.70	88.	0.	0.000	1000.00	1.067s
BI-210M	1062.96	265.83	94.	-10.	-0.001	148.07	1.070s
TL-208	1108.77	277.28	70.	6.	0.001	219.67	1.081s
Hg-203	1116.44	279.20	74.	7.	0.001	186.95	1.083s
I-131	1136.83	284.30	66.	4.	0.001	423.88	1.089s
PB-214	1180.00	295.09	488.	-19.	-0.003	168.39	1.100s
TL-210	1183.64	296.00	507.	-19.	-0.003	171.38	1.101s
PB-212	1199.76	300.03	525.	-19.	-0.003	173.82	1.105s
PA-231	1199.92	300.07	544.	-19.	-0.003	176.85	1.105s
PA-233	1200.36	300.18	563.	-19.	-0.003	179.83	1.105s
PA-231	1210.24	302.65	582.	-19.	-0.003	182.35	1.107s
BA-133	1211.05	302.85	601.	-19.	-0.003	185.19	1.108s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ba-140	1219.04	304.85	620.	-10.	-0.001	341.56	1.110s
BI-210M	1219.23	304.90	630.	0.	0.000	1000.00	1.110s
Ir-192	1233.41	308.44	630.	0.	0.000	1000.00	1.113s
PA-233	1247.69	312.01	630.	0.	0.000	1000.00	1.117
Ir-192	1265.61	316.49	630.	0.	0.000	1000.00	1.122s
La-140	1314.69	328.76	70.	12.	0.002	99.04	1.134s
Cf-249	1333.41	333.44	74.	12.	0.002	106.45	1.139s
AC-228	1352.93	338.32	81.	12.	0.002	110.56	1.144s
Cs-136	1361.93	340.57	93.	12.	0.002	117.67	1.146s
EU-152	1376.80	344.29	105.	12.	0.002	124.18	1.150s
HF-181	1382.97	345.83	120.	9.	0.001	170.65	1.151s
BA-133	1423.66	356.00	73.	-9.	-0.001	196.42	1.162s
I-131	1457.59	364.48	40.	9.	0.001	141.57	1.170s
BA-133	1535.03	383.84	131.	-15.	-0.002	107.53	1.189s
Cf-249	1551.47	387.95	146.	-13.	-0.002	132.46	1.193s
SB-125	1711.18	427.88	17.	19.	0.003	48.64	1.233s
AG-108M	1735.43	433.94	40.	-5.	-0.001	251.66	1.239s
SB-125	1853.15	463.37	30.	17.	0.002	53.73	1.268s
Ir-192	1871.93	468.06	75.	-7.	-0.001	171.53	1.272s
BE-7	1910.07	477.60	125.	-16.	-0.002	57.47	1.282s
HF-181	1927.68	482.00	92.	12.	0.002	119.35	1.286s
La-140	1947.77	487.02	86.	11.	0.002	124.82	1.291s
RU-103	1987.91	497.05	26.	11.	0.002	99.31	1.301s
RH-106	2047.15	511.86	53.	116.	0.016	12.89	2.565s
Kr-85	2055.62	513.98	137.	8.	0.001	211.49	1.317s
Nd-147	2123.70	531.00	13.	8.	0.001	98.24	1.333
Ba-140	2148.74	537.26	39.	-4.	-0.001	333.80	1.339s
CS-134	2252.65	563.24	30.	2.	0.000	678.97	1.364
CS-134	2276.99	569.32	5.	23.	0.003	24.49	1.369s
PA-234	2277.59	569.47	28.	0.	0.000	1000.00	1.370s
BI-207	2278.51	569.70	28.	0.	0.000	1000.00	1.370s
TL-208	2331.79	583.02	62.	-27.	-0.004	57.38	1.382s
SB-125	2401.71	600.50	155.	8.	0.001	213.88	1.399
SB-124	2410.64	602.73	165.	-2.	0.000	986.79	1.401s
CS-134	2418.55	604.71	163.	0.	0.000	1000.00	1.403
BI-214	2436.96	609.31	167.	-4.	-0.001	366.13	1.407s
RU-103	2440.91	610.30	163.	0.	0.000	1000.00	1.408s
AG-108M	2456.84	614.28	163.	0.	0.000	1000.00	1.412s
PM-144	2471.96	618.06	165.	-2.	0.000	825.44	1.415s
RH-106	2487.38	621.92	119.	12.	0.002	131.07	1.419s
I-131	2547.62	636.97	22.	11.	0.002	91.64	1.433s
AG-110M	2630.77	657.76	42.	2.	0.000	463.68	1.452s
CS-137	2646.36	661.66	43.	1.	0.000	932.74	1.455s
PM-144	2785.90	696.54	19.	8.	0.001	115.31	1.487s
NB-94	2810.25	702.63	37.	-15.	-0.002	92.08	1.493s
SB-124	2890.87	722.79	22.	16.	0.002	48.59	1.511s
AG-108M	2891.48	722.94	39.	9.	0.001	102.08	1.511s
EU-154	2893.17	723.36	48.	3.	0.000	299.46	1.511s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZR-95	2896.52	724.20	51.	0.	0.000	1000.00	1.512s
PM-146	2942.61	735.72	19.	9.	0.001	103.51	1.523s
PM-146	2988.37	747.16	14.	9.	0.001	92.08	1.533s
ZR-95	3026.65	756.73	53.	-19.	-0.003	43.70	1.541s
NB-95	3062.89	765.79	14.	3.	0.000	169.71	1.549s
PA-234M	3065.38	766.41	13.	4.	0.001	136.93	1.550s
EU-152	3115.41	778.92	28.	2.	0.000	565.69	1.561s
BI-212	3141.41	785.42	44.	-18.	-0.003	48.14	1.567s
CS-134	3183.22	795.87	68.	-15.	-0.002	79.43	1.576s
TL-210	3198.14	799.60	83.	-14.	-0.002	99.49	1.579s
CS-134	3207.54	801.95	73.	12.	0.002	102.45	1.581s
CO-58	3242.84	810.78	29.	10.	0.001	85.91	1.589s
La-140	3262.82	815.77	39.	1.	0.000	619.09	1.593s
Cs-136	3273.74	818.50	70.	-14.	-0.002	91.20	1.596s
MN-54	3339.13	834.85	19.	1.	0.000	692.82	1.610s
Co-56	3386.82	846.77	10.	7.	0.001	100.39	1.620s
TL-208	3442.00	860.56	3.	4.	0.001	81.81	1.632s
NB-94	3484.13	871.10	42.	-15.	-0.002	65.95	1.641s
EU-154	3492.66	873.23	61.	-5.	-0.001	208.17	1.643s
PA-234	3521.86	880.53	31.	10.	0.001	85.40	1.649
PA-234	3532.70	883.24	41.	2.	0.000	442.76	1.652s
Sc-46	3556.86	889.28	56.	-9.	-0.001	44.90	1.657s
Y-88	3591.90	898.04	30.	-4.	-0.001	305.16	1.664s
AC-228	3644.02	911.07	35.	-9.	-0.001	148.31	1.675s
AG-110M	3749.71	937.49	15.	-3.	0.000	289.64	1.697s
PA-234	3783.82	946.02	10.	7.	0.001	106.27	1.704s
EU-152	3856.18	964.11	31.	5.	0.001	175.84	1.719s
AC-228	3875.62	968.97	30.	7.	0.001	111.34	1.724s
EU-154	3985.06	996.33	41.	-9.	-0.001	109.46	1.746s
PA-234M	4003.73	1001.00	54.	-9.	-0.001	109.20	1.750s
EU-154	4018.84	1004.77	30.	9.	0.001	95.64	1.753s
Co-56	4151.10	1037.84	12.	7.	0.001	107.62	1.780s
Cs-136	4192.02	1048.07	26.	-4.	-0.001	187.08	1.788s
RH-106	4201.18	1050.36	24.	6.	0.001	114.61	1.790s
BI-207	4254.38	1063.66	22.	-5.	-0.001	167.07	1.801s
Ga-68	4309.34	1077.40	21.	-7.	-0.001	147.85	1.812s
EU-152	4448.04	1112.07	11.	6.	0.001	83.35	1.839s
ZN-65	4461.92	1115.55	17.	6.	0.001	100.24	1.842s
BI-214	4480.88	1120.29	25.	1.	0.000	995.15	1.845s
Sc-46	4481.94	1120.55	26.	0.	0.000	1000.00	1.846s
Ta-182	4484.94	1121.30	72.	-14.	-0.002	87.96	1.846s
CO-60	4692.68	1173.24	23.	-6.	-0.001	133.79	1.886s
Ta-182	4755.93	1189.05	11.	5.	0.001	155.93	1.899s
Ta-182	4885.37	1221.41	16.	-7.	-0.001	135.27	1.923
NA-22	5097.84	1274.53	6.	5.	0.001	76.55	1.963s
EU-154	5097.88	1274.54	11.	0.	0.000	1000.00	1.963s
FE-59	5166.10	1291.60	6.	1.	0.000	427.57	1.975s
TL-210	5251.71	1313.00	6.	1.	0.000	427.57	1.991s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	5329.71	1332.50	13.	-1.	0.000	727.27	2.005s
AG-110M	5536.89	1384.30	23.	-13.	-0.002	92.52	2.042s
EU-152	5631.70	1408.00	28.	-11.	-0.002	114.08	2.059s
K-40	5843.01	1460.83	22.	-7.	-0.001	136.12	2.095s
La-140	6384.49	1596.21	12.	-1.	0.000	842.61	2.185s
SB-124	6763.55	1690.98	6.	6.	0.001	106.72	2.245s
BI-214	7057.56	1764.49	0.	11.	0.002	30.15	2.290s
Co-56	7084.99	1771.35	11.	0.	0.000	1000.00	2.294s
Y-88	7343.81	1836.06	13.	-4.	-0.001	246.63	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	-1.3390E+00				5.31E+01	
			477.60	-1.339E+00	?(P	4.565E+00 5.75E+01 1.05E+01	G
NA-22	C	1.1043E-01				9.50E+02	
			1274.53	1.104E-01	?(	2.858E-01 7.65E+01 9.99E+01	G
K-40	N	-1.4593E+00				4.66E+11	
			1460.83	-1.459E+00	?(P	5.364E+00 1.36E+02 1.07E+01	G
Sc-46	F	-1.3547E-01				8.38E+01	
			889.28	-1.355E-01	?(P	5.626E-01 4.49E+01 1.00E+02	G
			1120.55	0.000E+00	+	4.872E-01 1.00E+03 1.00E+02	G
CR-51	F	-5.5164E-02				2.77E+01	
			320.08	-5.516E-02	%(P	7.636E+00 1.80E+03 9.94E+00	G
MN-54	C	1.8868E-02				3.12E+02	
			834.85	1.887E-02	&(	3.233E-01 6.93E+02 1.00E+02	G
FE-59	F	1.5922E-02				4.45E+01	
			1099.25	-2.134E-02	&(	8.570E-01 1.76E+03 5.65E+01	G
			1291.60	6.466E-02	?(	6.693E-01 4.28E+02 4.32E+01	G
Co-56	C	1.9817E-01				7.73E+01	
			846.77	1.027E-01	?(P	2.484E-01 1.00E+02 9.99E+01	G
			1238.28	-1.085E-02	% P	5.823E-01 2.17E+03 6.61E+01	G
			1037.84	8.734E-01	?(P	2.255E+00 1.08E+02 1.41E+01	G
			1771.35	0.000E+00	-	3.300E+00 1.00E+03 1.55E+01	A

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	C	-5.7758E-02					2.72E+02	
			122.06	-5.776E-02	?(	2.272E-01	1.17E+02	8.56E+01 G
			136.47	-5.631E-01	+	2.252E+00	1.19E+02	1.07E+01 G
CO-58	C	1.3265E-01					7.09E+01	
			810.78	1.327E-01	?(	3.855E-01	8.59E+01	9.95E+01 G
CO-60	F	-2.4054E-02					1.93E+03	
			1332.50	-2.405E-02	?(P	4.223E-01	7.27E+02	1.00E+02 G
			1173.24	-1.095E-01	+ P	4.785E-01	1.34E+02	9.99E+01 G
ZN-65	F	2.3190E-01					2.44E+02	
			1115.55	2.319E-01	?(	8.021E-01	1.00E+02	5.06E+01 G
NB-94	I	-1.8250E-01					7.41E+06	
			702.63	-1.825E-01	?(	3.877E-01	9.21E+01	9.79E+01 G
			871.10	-2.220E-01	+	4.839E-01	6.59E+01	9.99E+01 G
ZR-95	I	-4.5521E-01					6.40E+01	
			756.73	-4.552E-01	?(P	8.707E-01	4.37E+01	5.45E+01 G
			724.20	0.000E+00	+	1.019E+00	1.00E+03	4.42E+01 G
NB-95	I	4.3817E-02					6.40E+01	
			765.79	4.382E-02	?(	2.675E-01	1.70E+02	9.98E+01 G
RU-103	I	1.0978E-01					3.93E+01	
			497.05	1.098E-01	?(	2.642E-01	9.93E+01	9.09E+01 G
			610.30	0.000E+00	-	1.167E+01	1.00E+03	5.75E+00 GA
RH-106	I	2.1344E+00					3.74E+02	
			621.92	1.334E+00	*(	5.918E+00	1.31E+02	9.93E+00 G
			1050.36	7.232E+00	?(	2.868E+01	1.15E+02	1.56E+00 G
			511.86	5.377E+00	?	1.708E+00	1.29E+01	2.00E+01 GA
AG-108M	C	4.0252E-02					1.53E+05	
			433.94	-4.480E-02	&(	2.883E-01	2.52E+02	9.05E+01 G
			722.94	1.250E-01	?(	4.348E-01	1.02E+02	9.08E+01 G
			614.28	0.000E+00	-	7.509E-01	1.00E+03	8.98E+01 G
AG-110M	F	1.3557E-02					2.50E+02	
			884.68	-4.336E-04	%(P	6.818E-01	1.70E+04	7.27E+01 G
			657.76	2.430E-02	?(	3.999E-01	4.64E+02	9.46E+01 G
			937.49	-1.369E-01	+	9.471E-01	2.90E+02	3.44E+01 G
			1384.30	-1.164E+00	+	2.289E+00	9.25E+01	2.43E+01 G
			763.94	-1.958E-02	%	1.482E+00	2.06E+03	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	1.5532E-02					1.15E+02	
			391.69	1.553E-02	%(	7.117E-01	1.33E+03	6.40E+01 G
SB-124	F	2.2004E-01					6.02E+01	
			602.73	-1.729E-02	?(P	6.787E-01	9.87E+02	9.83E+01 G
			1690.98	3.380E-01	?(	7.956E-01	1.07E+02	4.78E+01 G
			722.79	1.856E+00	&(	2.863E+00	4.86E+01	1.08E+01 G
SB-125	I	6.5869E-01					1.01E+03	
			427.88	5.103E-01	?(P	5.958E-01	4.86E+01	2.96E+01 G
			600.50	4.964E-01	&(	3.613E+00	2.14E+02	1.79E+01 G
			635.89	-7.361E-02	% P	2.861E+00	1.08E+03	1.13E+01 G
			463.37	1.355E+00	&(P	2.310E+00	5.37E+01	1.05E+01 G
I-131	I	2.2067E-01					8.02E+00	
			364.48	7.776E-02	?(	2.781E-01	1.42E+02	8.17E+01 G
			284.30	3.430E-01	&(P	3.837E+00	4.24E+02	6.14E+00 G
			636.97	1.744E+00	?(	3.873E+00	9.16E+01	7.17E+00 G
Gd-153	F	-1.8447E-01					2.42E+02	
			97.50	-1.845E-01	?(	8.980E-01	1.45E+02	3.00E+01 G
			103.20	0.000E+00	&	1.187E+00	1.00E+03	2.18E+01 G
Ga-68	C	-6.9416E+00					4.71E-02	
			1077.40	-6.942E+00	?(	2.294E+01	1.48E+02	3.30E+00 G
Tc-99m	I	7.0050E-02					2.51E-01	
			140.51	7.005E-02	*(	2.860E-01	1.21E+02	8.93E+01 G
BA-133	F	-9.6385E-02					3.85E+03	
			356.00	-9.639E-02	?(	4.739E-01	1.96E+02	6.20E+01 G
			302.85	-6.243E-01	&	3.870E+00	1.85E+02	1.83E+01 G
			383.84	-1.269E+00	+	4.592E+00	1.08E+02	8.94E+00 GA
			80.99	-7.225E-03	% P	5.285E-01	2.75E+03	3.41E+01 GA
CS-134	I	1.7948E-01					7.54E+02	
			795.87	-2.458E-01	?(	6.525E-01	7.94E+01	8.55E+01 G
			604.71	0.000E+00	+	6.819E-01	1.00E+03	9.76E+01 G
			569.32	1.543E+00	&(	8.446E-01	2.45E+01	1.54E+01 G
			801.95	1.932E+00	?(	6.690E+00	1.02E+02	8.69E+00 G
			563.24	2.011E-01	&(	3.424E+00	6.79E+02	8.35E+00 G
CS-137	I	1.3564E-02					1.10E+04	
			661.66	1.356E-02	?(	4.512E-01	9.33E+02	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	-6.3113E-02					1.38E+02	
			165.85	-6.311E-02	&(	2.974E-01	1.40E+02	7.99E+01 G
Ba-140	I	3.9127E-02					1.28E+01	
			537.26	-1.633E-01	&(P	1.265E+00	3.34E+02	2.44E+01 G
			162.66	8.330E-01	(	3.739E+00	1.33E+02	6.22E+00 G
			304.85	-1.471E+00	+	1.687E+01	3.42E+02	4.29E+00 G
La-140	I	9.3296E-02					1.28E+01	
			1596.21	-2.673E-02	?(	5.039E-01	8.43E+02	9.54E+01 G
			487.02	2.133E-01	?(P	8.988E-01	1.25E+02	4.55E+01 G
			328.76	3.977E-01	?(	1.330E+00	9.90E+01	2.03E+01 G
			815.77	8.527E-02	?(	1.885E+00	6.19E+02	2.33E+01 G
CE-141	I	1.0065E-01					3.25E+01	
			145.44	1.006E-01	?(	3.585E-01	1.31E+02	4.82E+01 G
PM-144	C	1.0169E-01					3.63E+02	
			696.54	1.017E-01	?(	2.788E-01	1.15E+02	9.90E+01 G
			618.06	-2.188E-02	- P	6.883E-01	8.25E+02	9.91E+01 G
EU-152	F	3.6460E-01					4.94E+03	
			121.78	1.613E-01	?(	6.779E-01	1.25E+02	2.86E+01 G
			344.29	3.040E-01	?(	1.279E+00	1.24E+02	2.65E+01 G
			1112.07	8.563E-01	?(	2.433E+00	8.33E+01	1.36E+01 G
			778.92	2.058E-01	?(	2.816E+00	5.66E+02	1.29E+01 G
			964.11	5.136E-01	?(	3.169E+00	1.76E+02	1.46E+01 G
			244.69	4.418E-01	&(P	3.391E+00	2.25E+02	7.58E+00 G
			1408.00	-1.224E+00	+	2.971E+00	1.14E+02	2.10E+01 GA
EU-154	I	1.7088E-01					3.14E+03	
			123.10	-1.229E-01	*(	4.923E-01	1.19E+02	4.08E+01 G
			1274.54	0.000E+00	+	1.068E+00	1.00E+03	3.52E+01 G
			723.36	2.048E-01	?(	2.154E+00	2.99E+02	2.02E+01 G
			873.23	-6.484E-01	+	4.677E+00	2.08E+02	1.23E+01 G
			1004.77	7.982E-01	&(	2.602E+00	9.56E+01	1.80E+01 G
			996.33	-1.353E+00	+	5.064E+00	1.09E+02	1.06E+01 G
EU-155	I	1.6203E-01					1.81E+03	
			105.31	1.620E-01	?(P	1.154E+00	2.11E+02	2.12E+01 G
			86.54	-1.939E-01	+	9.806E-01	1.51E+02	3.07E+01 G
HF-181	F	1.7464E-01					4.24E+01	
			482.00	1.297E-01	?(P	5.215E-01	1.19E+02	8.05E+01 G
			133.02	0.000E+00	-	5.419E-01	1.00E+03	4.33E+01 G
			345.83	4.149E-01	&(P	2.401E+00	1.71E+02	1.51E+01 G
			136.30	0.000E+00	-	4.053E+00	1.00E+03	5.85E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ta-182	F	-7.5719E-01					1.14E+02	
			1121.30	-7.572E-01	?(	2.236E+00	8.80E+01	3.49E+01 G
			1221.41	-5.160E-01	+	1.574E+00	1.35E+02	2.70E+01 G
			1189.05	6.036E-01	+ P	2.175E+00	1.56E+02	1.62E+01 G
Hg-203	F	4.6568E-02					4.66E+01	
			279.20	4.657E-02	?(	2.996E-01	1.87E+02	8.15E+01 G
TL-208	N	-3.3046E-01					6.98E+02	
			583.02	-3.305E-01	?(P	4.835E-01	5.74E+01	8.45E+01 G
			277.28	4.985E-01	+ P	3.751E+00	2.20E+02	6.31E+00 G
			860.56	4.787E-01	+ P	1.239E+00	8.18E+01	1.24E+01 G
PM-146	C	2.0176E-01					2.02E+03	
			453.88	1.294E-02	%(	3.762E-01	1.11E+03	6.50E+01 G
			747.16	3.485E-01	&(	7.607E-01	9.21E+01	3.40E+01 G
			735.72	5.255E-01	?(	1.286E+00	1.04E+02	2.25E+01 G
Y-88	F	-1.0755E-01					1.07E+02	
			1836.06	-1.076E-01	?(	5.660E-01	2.47E+02	9.92E+01 G
			898.04	-6.442E-02	+	4.547E-01	3.05E+02	9.37E+01 G
Cd-109	F	3.0066E-01					4.53E+02	
								Derived Ave Activity
			88.04	3.007E-01	}(	7.263E+00	7.12E+02	3.79E+00 G
Cf-251	T	-1.3373E-01					3.28E+05	
			176.60	-1.337E-01	?(	1.236E+00	3.54E+02	1.70E+01 G
			227.00	-6.925E-01	&	3.776E+00	2.09E+02	6.30E+00 GA
Cf-249	T	-2.4347E-02					1.28E+05	
			387.95	-1.479E-01	?(	6.618E-01	1.32E+02	6.60E+01 G
			333.44	5.014E-01	?(	1.806E+00	1.06E+02	1.55E+01 G
Sn-126		6.5791E-01					3.65E+07	
			87.57	5.976E-02	}	7.150E-01	1.57E+02	3.75E+01 GA
			64.28	6.579E-01	?(	2.271E+00	1.03E+02	9.70E+00 G
			86.94	0.000E+00	}	3.198E+00	1.13E+03	9.04E+00 GA
PB-210	N	2.8587E+00					8.14E+03	
			46.54	2.859E+00	*(P	5.025E+00	6.65E+01	4.25E+00 G
PB-212	N	-2.2776E-01					6.98E+02	
			238.63	-2.278E-01	@(P	7.792E-01	1.00E+02	4.33E+01 G
			300.03	-3.454E+00	+	2.011E+01	1.74E+02	3.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	-2.4246E-02					5.84E+05	
			351.93	-2.425E-02	%(	9.353E-01	1.11E+03	3.76E+01 G
			295.09	-5.767E-01	&	3.253E+00	1.68E+02	1.93E+01 G
			242.00	9.643E-01	?	4.358E+00	1.34E+02	7.43E+00 GA
BI-207	C	-1.1171E-01					1.18E+04	
			1063.66	-1.117E-01	?(P	5.759E-01	1.67E+02	7.45E+01 G
			569.70	0.000E+00	+	2.849E-01	1.00E+03	9.77E+01 G
BI-212	N	-1.6609E-01					6.98E+02	
			727.17	-1.661E-01	&(	5.977E+00	1.01E+03	7.55E+00 G
			785.42	-1.899E+01	+ P	3.515E+01	4.81E+01	1.28E+00 GA
U-235	N	2.8415E-02					2.57E+11	
			143.79	2.842E-02	%(P	3.062E+00	3.19E+03	1.10E+01 G
			205.33	-3.287E-01	+	4.243E+00	4.91E+02	5.01E+00 G
			163.38	-1.513E-01	% P	4.804E+00	1.40E+03	5.08E+00 G
			185.72	3.497E-01	*	3.651E-01	4.22E+01	5.40E+01 GA
BI-214	N	3.5794E-01					5.84E+05	
			609.31	-1.032E-01	&(P	1.472E+00	3.66E+02	4.61E+01 G
			1120.29	8.916E-02	?(P	3.184E+00	9.95E+02	1.51E+01 G
			1764.49	2.002E+00	?(	1.341E+00	3.02E+01	1.54E+01 G
BI-210M	T	-1.0845E-01					1.10E+09	
			265.83	-1.085E-01	?(P	5.243E-01	1.48E+02	5.00E+01 G
			304.90	0.000E+00	+	2.607E+00	1.00E+03	2.80E+01 G
AC-228	N	1.0239E-01					2.10E+03	
			911.07	-4.743E-01	?(	1.596E+00	1.48E+02	2.90E+01 G
			968.97	6.782E-01	?(	2.598E+00	1.11E+02	1.75E+01 G
			338.32	6.579E-01	(	2.463E+00	1.11E+02	1.20E+01 G
			93.35	1.019E+00	?	4.809E+00	1.41E+02	5.56E+00 XA
TH-227	N	9.2920E-01					7.95E+03	
			256.24	9.292E-01	&(P	2.852E+00	1.18E+02	7.00E+00 G
			235.97	2.694E-01	-	2.427E+00	2.64E+02	1.23E+01 G
			50.14	2.758E-01	-	3.581E+00	3.82E+02	8.00E+00 G
TH-229	N	1.2251E+00					2.68E+06	
			193.51	1.363E+00	&(P	4.507E+00	1.28E+02	4.40E+00 G
			210.85	1.022E+00	?(	6.975E+00	2.61E+02	2.99E+00 G
TH-234	N	-4.6486E+00					1.63E+12	
			92.59	-4.649E+00	(P	5.351E+00	3.31E+01	5.58E+00 G
			63.29	-5.273E+00	+ P	6.593E+00	3.58E+01	3.81E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-231   N  -3.9703E+00                                     1.20E+07
                         302.65-3.970E+00 &(  2.424E+01 1.82E+02 2.88E+00 G
                         300.07-4.606E+00 +   2.728E+01 1.77E+02 2.46E+00 G

PA-234   N   4.6458E-01                                     1.63E+12
                         131.29 2.727E-01 &(  1.251E+00 1.36E+02 1.80E+01 G
                         946.02 8.256E-01 ?(  2.058E+00 1.06E+02 1.34E+01 G
                         569.47 0.000E+00 -   3.394E+00 1.00E+03 8.20E+00 G
                         883.24 3.205E-01 ?(  5.038E+00 4.43E+02 9.60E+00 G
                         880.53 2.454E+00 ?   7.082E+00 8.54E+01 6.00E+00 GA

PA-234M  N  -9.1976E+00                                     1.63E+12
                        1001.00-1.870E+01 ?(P 7.323E+01 1.09E+02 8.37E-01 G
                         766.41 1.786E+01 ?(  8.712E+01 1.37E+02 2.94E-01 G

AM-241   T  -7.5017E-02                                     1.58E+05
                          59.54-7.502E-02 ?(  5.397E-01 2.64E+02 3.59E+01 G

Cs-136   F  -1.8896E-01                                     1.30E+01
                         818.50-1.890E-01 ?(  5.798E-01 9.12E+01 1.00E+02 G
                        1048.07-8.662E-02 +   5.732E-01 1.87E+02 8.00E+01 G
                         340.57 1.697E-01 &   6.764E-01 1.18E+02 4.69E+01 G

Np-239   T   2.2699E-01                                     2.36E+00
                         103.70 0.000E+00 -   1.092E+00 1.00E+03 2.40E+01 X
                         106.13 2.270E-01 ?(  1.063E+00 1.39E+02 2.27E+01 G
                          99.50 2.462E-01 ?   1.773E+00 2.13E+02 1.50E+01 X

Nd-147       5.9208E-01                                     1.11E+01
                         531.00 5.921E-01 ?(  1.439E+00 9.82E+01 1.30E+01 G
                          91.10 7.756E-02 -   9.964E-01 3.80E+02 2.83E+01 G

TL-210   N  -1.8589E-01                                     5.84E+05
                         799.60-1.859E-01 ?(  6.235E-01 9.95E+01 9.90E+01 G
                         296.00-1.414E-01 +   8.115E-01 1.71E+02 7.90E+01 G
                        1313.00 1.350E-01 +   1.398E+00 4.28E+02 2.10E+01 GA

Kr-85    I   1.7204E+01                                     3.92E+03
                         513.98 1.720E+01 ?(  1.241E+02 2.11E+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

- -

********** 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	231.	6.	0.001	381.90	2.758E-01	
AM-241	59.54	127.	-8.	-0.001	263.72	-7.502E-02	
TH-234	63.29	231.	-59.	-0.008	35.75	-5.273E+00	P
EU-155	86.54	395.	-19.	-0.003	150.89	-1.939E-01	
Nd-147	91.10	347.	7.	0.001	379.98	7.756E-02	
TH-234	92.59	391.	-82.	-0.011	33.07	-4.649E+00	P
AC-228	93.35	311.	18.	0.002	140.67	1.019E+00	
Gd-153	97.50	315.	-18.	-0.002	145.02	-1.845E-01	
Np-239	99.50	298.	12.	0.002	213.47	2.462E-01	
EU-155	105.31	253.	11.	0.001	211.35	1.620E-01	P
Np-239	106.13	240.	16.	0.002	139.30	2.270E-01	
EU-152	121.78	145.	14.	0.002	124.54	1.613E-01	
CO-57	122.06	146.	-15.	-0.002	116.81	-5.776E-02	
EU-154	123.10	155.	-15.	-0.002	118.96	-1.229E-01	
PA-234	131.29	188.	14.	0.002	136.11	2.727E-01	
CO-57	136.47	208.	-17.	-0.002	119.09	-5.631E-01	
Tc-99m	140.51	180.	16.	0.002	121.37	7.005E-02	
CE-141	145.44	97.	14.	0.002	131.28	1.006E-01	
Ba-140	162.66	158.	14.	0.002	132.99	8.330E-01	
CE-139	165.85	162.	-13.	-0.002	139.53	-6.311E-02	
Cf-251	176.60	114.	-6.	-0.001	354.48	-1.337E-01	
U-235	185.72	92.	45.	0.006	42.21	3.497E-01	
TH-229	193.51	87.	14.	0.002	127.54	1.363E+00	P
U-235	205.33	92.	-4.	-0.001	491.29	-3.287E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-229	210.85	84.	7.	0.001	260.60	1.022E+00	
Cf-251	227.00	99.	-9.	-0.001	209.50	-6.925E-01	
TH-227	235.97	150.	7.	0.001	263.94	2.694E-01	
PB-212	238.63	190.	-20.	-0.003	100.38	-2.278E-01	P
PB-214	242.00	171.	14.	0.002	133.98	9.643E-01	
EU-152	244.69	103.	7.	0.001	225.08	4.418E-01	P
TH-227	256.24	56.	12.	0.002	118.25	9.292E-01	P
BI-210M	265.83	94.	-10.	-0.001	148.07	-1.085E-01	P
TL-208	277.28	70.	6.	0.001	219.67	4.985E-01	P
Hg-203	279.20	74.	7.	0.001	186.95	4.657E-02	
I-131	284.30	66.	4.	0.001	423.88	3.430E-01	P
PB-214	295.09	488.	-19.	-0.003	168.39	-5.767E-01	
TL-210	296.00	507.	-19.	-0.003	171.38	-1.414E-01	
PB-212	300.03	525.	-19.	-0.003	173.82	-3.454E+00	
PA-231	300.07	544.	-19.	-0.003	176.85	-4.606E+00	
PA-233	300.18	563.	-19.	-0.003	179.83	-1.828E+00	
PA-231	302.65	582.	-19.	-0.003	182.35	-3.970E+00	
BA-133	302.85	601.	-19.	-0.003	185.19	-6.243E-01	
Ba-140	304.85	620.	-10.	-0.001	341.56	-1.471E+00	
La-140	328.76	70.	12.	0.002	99.04	3.977E-01	
Cf-249	333.44	74.	12.	0.002	106.45	5.014E-01	
AC-228	338.32	81.	12.	0.002	110.56	6.579E-01	
Cs-136	340.57	93.	12.	0.002	117.67	1.697E-01	
EU-152	344.29	105.	12.	0.002	124.18	3.040E-01	
HF-181	345.83	120.	9.	0.001	170.65	4.149E-01	P
BA-133	356.00	73.	-9.	-0.001	196.42	-9.639E-02	
I-131	364.48	40.	9.	0.001	141.57	7.776E-02	
BA-133	383.84	131.	-15.	-0.002	107.53	-1.269E+00	
Cf-249	387.95	146.	-13.	-0.002	132.46	-1.479E-01	
AG-108M	433.94	40.	-5.	-0.001	251.66	-4.480E-02	
Ir-192	468.06	75.	-7.	-0.001	171.53	-1.222E-01	
BE-7	477.60	125.	-16.	-0.002	57.47	-1.339E+00	P
HF-181	482.00	92.	12.	0.002	119.35	1.297E-01	P
La-140	487.02	86.	11.	0.002	124.82	2.133E-01	P
RU-103	497.05	26.	11.	0.002	99.31	1.098E-01	
RH-106	511.86	53.	116.	0.016	12.89	5.377E+00	
Kr-85	513.98	137.	8.	0.001	211.49	1.720E+01	
Nd-147	531.00	13.	8.	0.001	98.24	5.921E-01	
Ba-140	537.26	39.	-4.	-0.001	333.80	-1.633E-01	P
CS-134	563.24	30.	2.	0.000	678.97	2.011E-01	
CS-134	569.32	5.	23.	0.003	24.49	1.543E+00	
TL-208	583.02	62.	-27.	-0.004	57.38	-3.305E-01	P
SB-124	602.73	165.	-2.	0.000	986.79	-1.729E-02	P
BI-214	609.31	167.	-4.	-0.001	366.13	-1.032E-01	P
PM-144	618.06	165.	-2.	0.000	825.44	-2.188E-02	P
RH-106	621.92	119.	12.	0.002	131.07	1.334E+00	
I-131	636.97	22.	11.	0.002	91.64	1.744E+00	
AG-110M	657.76	42.	2.	0.000	463.68	2.430E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	661.66	43.	1.	0.000	932.74	1.356E-02	
PM-144	696.54	19.	8.	0.001	115.31	1.017E-01	
NB-94	702.63	37.	-15.	-0.002	92.08	-1.825E-01	
SB-124	722.79	22.	16.	0.002	48.59	1.856E+00	
AG-108M	722.94	39.	9.	0.001	102.08	1.250E-01	
EU-154	723.36	48.	3.	0.000	299.46	2.048E-01	
PM-146	735.72	19.	9.	0.001	103.51	5.255E-01	
PM-146	747.16	14.	9.	0.001	92.08	3.485E-01	
ZR-95	756.73	53.	-19.	-0.003	43.70	-4.552E-01	P
NB-95	765.79	14.	3.	0.000	169.71	4.382E-02	
PA-234M	766.41	13.	4.	0.001	136.93	1.786E+01	
EU-152	778.92	28.	2.	0.000	565.69	2.058E-01	
BI-212	785.42	44.	-18.	-0.003	48.14	-1.899E+01	P
CS-134	795.87	68.	-15.	-0.002	79.43	-2.458E-01	
TL-210	799.60	83.	-14.	-0.002	99.49	-1.859E-01	
CS-134	801.95	73.	12.	0.002	102.45	1.932E+00	
CO-58	810.78	29.	10.	0.001	85.91	1.327E-01	
La-140	815.77	39.	1.	0.000	619.09	8.527E-02	
Cs-136	818.50	70.	-14.	-0.002	91.20	-1.890E-01	
MN-54	834.85	19.	1.	0.000	692.82	1.887E-02	
Co-56	846.77	10.	7.	0.001	100.39	1.027E-01	P
TL-208	860.56	3.	4.	0.001	81.81	4.787E-01	P
NB-94	871.10	42.	-15.	-0.002	65.95	-2.220E-01	
EU-154	873.23	61.	-5.	-0.001	208.17	-6.484E-01	
PA-234	880.53	31.	10.	0.001	85.40	2.454E+00	
PA-234	883.24	41.	2.	0.000	442.76	3.205E-01	
Sc-46	889.28	56.	-9.	-0.001	44.90	-1.355E-01	P
Y-88	898.04	30.	-4.	-0.001	305.16	-6.442E-02	
AC-228	911.07	35.	-9.	-0.001	148.31	-4.743E-01	
AG-110M	937.49	15.	-3.	0.000	289.64	-1.369E-01	
PA-234	946.02	10.	7.	0.001	106.27	8.256E-01	
EU-152	964.11	31.	5.	0.001	175.84	5.136E-01	
AC-228	968.97	30.	7.	0.001	111.34	6.782E-01	
EU-154	996.33	41.	-9.	-0.001	109.46	-1.353E+00	
PA-234M	1001.00	54.	-9.	-0.001	109.20	-1.870E+01	P
EU-154	1004.77	30.	9.	0.001	95.64	7.982E-01	
Co-56	1037.84	12.	7.	0.001	107.62	8.734E-01	P
Cs-136	1048.07	26.	-4.	-0.001	187.08	-8.662E-02	
RH-106	1050.36	24.	6.	0.001	114.61	7.232E+00	
BI-207	1063.66	22.	-5.	-0.001	167.07	-1.117E-01	P
Ga-68	1077.40	21.	-7.	-0.001	147.85	-6.942E+00	
EU-152	1112.07	11.	6.	0.001	83.35	8.563E-01	
ZN-65	1115.55	17.	6.	0.001	100.24	2.319E-01	
BI-214	1120.29	25.	1.	0.000	995.15	8.916E-02	P
Ta-182	1121.30	72.	-14.	-0.002	87.96	-7.572E-01	
CO-60	1173.24	23.	-6.	-0.001	133.79	-1.095E-01	P
Ta-182	1189.05	11.	5.	0.001	155.93	6.036E-01	P
Ta-182	1221.41	16.	-7.	-0.001	135.27	-5.160E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
NA-22	1274.53	6.	5.	0.001	76.55	1.104E-01		
FE-59	1291.60	6.	1.	0.000	427.57	6.466E-02		
TL-210	1313.00	6.	1.	0.000	427.57	1.350E-01		
CO-60	1332.50	13.	-1.	0.000	727.27	-2.405E-02		P
AG-110M	1384.30	23.	-13.	-0.002	92.52	-1.164E+00		
EU-152	1408.00	28.	-11.	-0.002	114.08	-1.224E+00		
K-40	1460.83	22.	-7.	-0.001	136.12	-1.459E+00		P
La-140	1596.21	12.	-1.	0.000	842.61	-2.673E-02		
SB-124	1690.98	6.	6.	0.001	106.72	3.380E-01		
BI-214	1764.49	0.	11.	0.002	30.15	2.002E+00		
Y-88	1836.06	13.	-4.	-0.001	246.63	-1.076E-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	-1.3389E+00	-1.3390E+00	5.747E+01%	4.57E+00
NA-22	#A	1.1043E-01	1.1043E-01	7.655E+01%	2.86E-01
K-40	#A	-1.4593E+00	-1.4593E+00	1.361E+02%	5.36E+00
Sc-46	#A	-1.3546E-01	-1.3547E-01	4.490E+01%	5.63E-01
CR-51	#A	-5.5163E-02	-5.5164E-02	1.804E+03%	7.64E+00
MN-54	#A	1.8868E-02	1.8868E-02	6.928E+02%	3.23E-01
FE-59	#A	1.5922E-02	1.5922E-02	4.276E+02%	8.57E-01
Co-56	#A	1.9817E-01	1.9817E-01	7.359E+01%	2.48E-01
CO-57	#A	-5.7757E-02	-5.7758E-02	1.168E+02%	2.27E-01
CO-58	#A	1.3265E-01	1.3265E-01	8.591E+01%	3.85E-01
CO-60	#A	-2.4054E-02	-2.4054E-02	7.273E+02%	4.22E-01
ZN-65	#A	2.3190E-01	2.3190E-01	1.002E+02%	8.02E-01
NB-94	#A	-1.8250E-01	-1.8250E-01	9.208E+01%	3.88E-01
ZR-95	#A	-4.5521E-01	-4.5521E-01	4.370E+01%	8.71E-01
NB-95	#A	4.3816E-02	4.3817E-02	1.697E+02%	2.68E-01
RU-103	#A	1.0978E-01	1.0978E-01	9.931E+01%	2.64E-01
RH-106	#A	2.1344E+00	2.1344E+00	8.706E+01%	5.92E+00
AG-108M	#A	4.0252E-02	4.0252E-02	1.021E+02%	2.88E-01
AG-110M	#A	1.3557E-02	1.3557E-02	4.637E+02%	6.82E-01
SN-113	#A	1.5532E-02	1.5532E-02	1.332E+03%	7.12E-01
SB-124	#A	2.2004E-01	2.2004E-01	4.859E+01%	6.79E-01
SB-125	#	6.5869E-01	6.5869E-01	4.864E+01%	5.96E-01
I-131	#A	2.2065E-01	2.2067E-01	9.164E+01%	2.78E-01
Gd-153	#A	-1.8447E-01	-1.8447E-01	1.450E+02%	8.98E-01
Ga-68	#A	-6.8593E+00	-6.9416E+00	1.478E+02%	2.29E+01
Tc-99m	#A	6.9893E-02	7.0050E-02	1.214E+02%	2.86E-01
BA-133	#A	-9.6385E-02	-9.6385E-02	1.964E+02%	4.74E-01
CS-134	#A	1.7948E-01	1.7948E-01	2.449E+01%	6.53E-01
CS-137	#A	1.3564E-02	1.3564E-02	9.327E+02%	4.51E-01

CE-139	#A	-6.3113E-02	-6.3113E-02	1.395E+02%	2.97E-01
Ba-140	#A	3.9125E-02	3.9127E-02	1.330E+02%	1.26E+00
La-140	#A	9.3291E-02	9.3296E-02	9.904E+01%	5.04E-01
CE-141	#A	1.0065E-01	1.0065E-01	1.313E+02%	3.59E-01
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.12E+00
PM-144	#A	1.0169E-01	1.0169E-01	1.153E+02%	2.79E-01
EU-152	#A	3.6460E-01	3.6460E-01	8.335E+01%	6.78E-01
EU-154	#A	1.7088E-01	1.7088E-01	9.564E+01%	4.92E-01
EU-155	#A	1.6203E-01	1.6203E-01	2.114E+02%	1.15E+00
HF-181	#A	1.7464E-01	1.7464E-01	1.041E+02%	5.21E-01
Ta-182	#A	-7.5718E-01	-7.5719E-01	8.796E+01%	2.24E+00
Hg-203	#A	4.6568E-02	4.6568E-02	1.869E+02%	3.00E-01
TL-208	#A	-3.3046E-01	-3.3046E-01	5.738E+01%	4.83E-01
PM-146	#A	2.0176E-01	2.0176E-01	9.208E+01%	3.76E-01
Y-88	#A	-1.0755E-01	-1.0755E-01	2.466E+02%	5.66E-01
Cd-113m	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.21E+03
Cd-109	#A	3.0066E-01	3.0066E-01	7.123E+02%	7.26E+00
Cf-251	#A	-1.3373E-01	-1.3373E-01	3.545E+02%	1.24E+00
Cf-249	#A	-2.4347E-02	-2.4347E-02	8.497E+01%	6.62E-01
Sn-126	#A	6.5791E-01	6.5791E-01	1.030E+02%	2.27E+00
PB-210	#A	2.8587E+00	2.8587E+00	6.652E+01%	5.02E+00
PB-212	#A	-2.2776E-01	-2.2776E-01	1.004E+02%	7.79E-01
PB-214	#A	-2.4246E-02	-2.4246E-02	1.112E+03%	9.35E-01
BI-207	#A	-1.1171E-01	-1.1171E-01	1.671E+02%	5.76E-01
BI-212	#A	-1.6609E-01	-1.6609E-01	1.015E+03%	5.98E+00
U-235	#A	2.8415E-02	2.8415E-02	3.186E+03%	3.06E+00
BI-214	#A	3.5794E-01	3.5794E-01	3.015E+01%	1.47E+00
BI-210M	#A	-1.0845E-01	-1.0845E-01	1.481E+02%	5.24E-01
AC-228	#A	1.0239E-01	1.0239E-01	7.197E+01%	1.60E+00
TH-227	#A	9.2919E-01	9.2920E-01	1.183E+02%	2.85E+00
TH-229	#A	1.2251E+00	1.2251E+00	1.275E+02%	4.51E+00
TH-234	#A	-4.6486E+00	-4.6486E+00	3.307E+01%	5.35E+00
PA-231	#A	-3.9703E+00	-3.9703E+00	1.823E+02%	2.42E+01
PA-233	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.06E+00
PA-234	#A	4.6458E-01	4.6458E-01	1.063E+02%	1.25E+00
PA-234M	#A	-9.1976E+00	-9.1976E+00	8.757E+01%	7.32E+01
AM-241	#A	-7.5017E-02	-7.5017E-02	2.637E+02%	5.40E-01
Np-237	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.23E+00
Ir-192	#A	0.0000E+00	0.0000E+00	7.071E+02%	8.64E-01
Cs-136	#A	-1.8895E-01	-1.8896E-01	9.120E+01%	5.80E-01
Np-239	#A	2.2693E-01	2.2699E-01	1.393E+02%	1.06E+00
Nd-147	#A	5.9205E-01	5.9208E-01	9.824E+01%	1.44E+00
TL-210	#A	-1.8589E-01	-1.8589E-01	9.949E+01%	6.23E-01
Kr-85	#A	1.7204E+01	1.7204E+01	2.115E+02%	1.24E+02

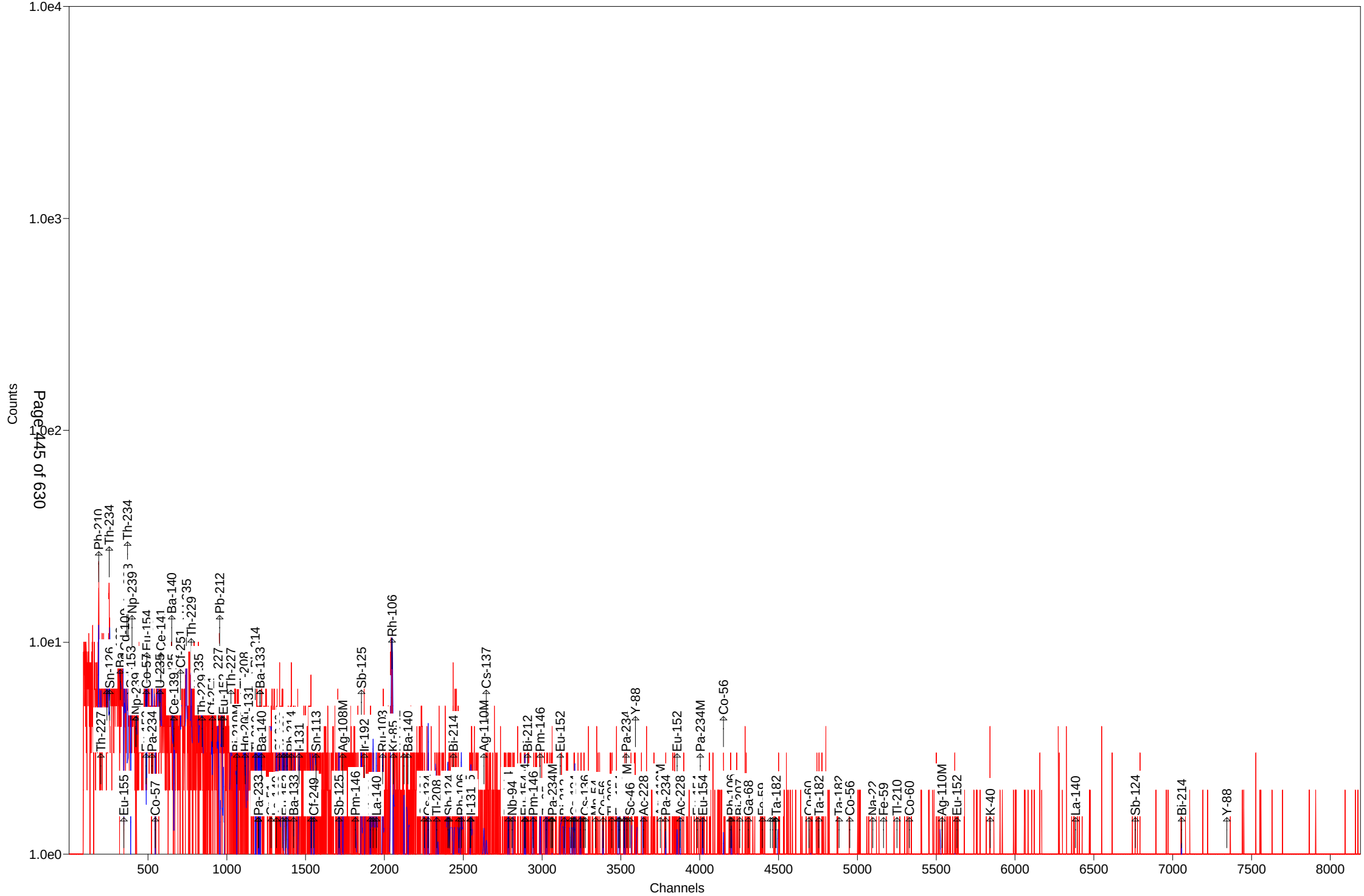
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

< - 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 (37.6 to 2000.1 keV) 2.859E+00 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 2.8586750E+00 Bq/Sample

405454_Gamma_490-164491-A-10-A. 7_Gamma_20190013.spc.



Daily Checks

Test America
St. Louis
Background Check

Spectrum: 9_20190102001_BG
Description: Background Contamination Check
Acquired: 1/2/2019 12:06:33 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	1.73	2.14	2.26	PASS

Analyst: Morgan Reichert Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 9_20190102002_QCAsLeft
Description: Quality control Check (QC Source 'E') Post Stabilization
Acquired: 1/2/2019 1:07:49 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	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.58	59.79	60.04	PASS
FWHM	1.08	0.00	0.00	0.93	2.18	2.28	PASS
ActivityDiff	649.44	-5.00	-4.00	1.45	4.00	5.00	PASS
QA-662							
FWHM	1.62	0.00	0.00	1.47	3.32	3.42	PASS
ActivityDiff	607.56	-5.00	-4.00	1.08	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	1332.39	1333.01	1333.26	PASS
FWHM	2.12	0.00	0.00	1.93	4.32	4.42	PASS
ActivityDiff	1191.31	-5.00	-4.00	-0.31	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 12_20190101001_BG
Description: Background Contamination Check
Acquired: 1/2/2019 12:01:01 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	1.94	2.07	2.10	PASS

Analyst: Morgan Reichert Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 12_20190102001_QCAsLeft
Description: Quality control Check (QC Source 'H') Post Stabilization
Acquired: 1/2/2019 1:08:35 AM
Detector: Detector #12
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.10	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.64	59.79	60.04	PASS
FWHM	0.90	0.00	0.00	0.84	2.00	2.10	PASS
ActivityDiff	691.00	-5.00	-4.00	-0.42	4.00	5.00	PASS
QA-662							
FWHM	1.48	0.00	0.00	1.44	3.18	3.28	PASS
ActivityDiff	659.00	-5.00	-4.00	-0.18	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.61	1333.01	1333.26	PASS
FWHM	2.00	0.00	0.00	2.04	4.20	4.30	PASS
ActivityDiff	1274.00	-5.00	-4.00	1.31	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 14_20190101001_QCAsLeft
Description: Quality control Check (QC Source 'E') Post Stabilization
Acquired: 1/2/2019 12:22:08 AM
Detector: Detector #14
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.62	59.79	60.04	PASS
FWHM	0.76	0.00	0.00	0.88	1.86	1.96	PASS
ActivityDiff	671.90	-5.00	-4.00	0.34	4.00	5.00	PASS
QA-662							
FWHM	1.35	0.00	0.00	1.41	3.05	3.15	PASS
ActivityDiff	628.85	-5.00	-4.00	0.11	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	1332.38	1333.01	1333.26	PASS
FWHM	1.91	0.00	0.00	1.98	4.11	4.21	PASS
ActivityDiff	1224.59	-5.00	-4.00	-1.32	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 14_20190102001_BG
Description: Background Contamination Check
Acquired: 1/2/2019 12:48:36 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	1.73	1.90	1.94	PASS

Analyst: Morgan Reichert Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 14_20190103002_QCAsLeft
Description: Quality control Check (QC Source 'E') Post Stabilization
Acquired: 1/3/2019 12:48:54 AM
Detector: Detector #14
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.64	59.79	60.04	PASS
FWHM	0.76	0.00	0.00	0.86	1.86	1.96	PASS
ActivityDiff	671.90	-5.00	-4.00	-0.33	4.00	5.00	PASS
QA-662							
FWHM	1.35	0.00	0.00	1.43	3.05	3.15	PASS
ActivityDiff	628.85	-5.00	-4.00	-0.31	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.00	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.27	1333.01	1333.26	PASS
FWHM	1.91	0.00	0.00	1.99	4.11	4.21	PASS
ActivityDiff	1224.59	-5.00	-4.00	0.14	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 16_20190102001_QCAsLeft
Description: Quality control Check (QC Source 'G') Post Stabilization
Acquired: 1/2/2019 12:23:23 AM
Detector: Detector #16
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.54	59.79	60.04	PASS
FWHM	0.96	0.00	0.00	1.01	2.06	2.16	PASS
ActivityDiff	602.10	-5.00	-4.00	1.81	4.00	5.00	PASS
QA-662							
FWHM	1.53	0.00	0.00	1.74	3.23	3.33	PASS
ActivityDiff	571.13	-5.00	-4.00	-1.14	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	2.65	4.29	4.39	PASS
ActivityDiff	1139.05	-5.00	-4.00	1.80	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 16_20190102002_BG
Description: Background Contamination Check
Acquired: 1/2/2019 12:47:04 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	2.58	2.80	2.86	PASS

Analyst: Morgan Reichert Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 16_20190103001_QCAsLeft
Description: Quality control Check (QC Source 'G') Post Stabilization
Acquired: 1/3/2019 12:24:19 AM
Detector: Detector #16
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.59	59.79	60.04	PASS
FWHM	0.96	0.00	0.00	1.01	2.06	2.16	PASS
ActivityDiff	602.10	-5.00	-4.00	2.01	4.00	5.00	PASS
QA-662							
FWHM	1.53	0.00	0.00	1.67	3.23	3.33	PASS
ActivityDiff	571.13	-5.00	-4.00	-0.84	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.00	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.35	1333.01	1333.26	PASS
FWHM	2.09	0.00	0.00	2.61	4.29	4.39	PASS
ActivityDiff	1139.05	-5.00	-4.00	0.23	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 17_20190102010_QCAsLeft
Description: Quality control Check (QC Source 'H') Post Stabilization
Acquired: 1/3/2019 12:23:46 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	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.66	59.79	60.04	PASS
FWHM	0.77	0.00	0.00	0.76	1.87	1.97	PASS
ActivityDiff	691.00	-5.00	-4.00	-0.04	4.00	5.00	PASS
QA-662							
FWHM	1.37	0.00	0.00	1.34	3.07	3.17	PASS
ActivityDiff	659.00	-5.00	-4.00	-1.38	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	1332.47	1333.01	1333.26	PASS
FWHM	1.88	0.00	0.00	1.89	4.08	4.18	PASS
ActivityDiff	1274.00	-5.00	-4.00	-0.93	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: Rachel Mueller

Initial Calibrations

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

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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

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TestAmerica                     Spectrum name: 7_1Lmarn_20120463.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       1/1/2012 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

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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	Peak Code	Peak 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

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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

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 9:26:09 AM Page 6
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:	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	Peak 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

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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                    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       5.0982E+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
```



```
----------------------------   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:	Ge14
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14422	96.6
Am-241	2037	418	0.3590	1163	1222.5	105.1
Cd-109	2881	591	0.0361	16363	16145	98.7
Co-57	1511	310	0.8560	362	349.28	96.5
Ce-139	2139	439	0.7990	549	538.52	98.1
Hg-203	4651	954	0.8146	1171	1205.9	103.0
Sn-113	3015	618	0.6400	966	971.36	100.6
Cs-137	1938	397	0.8510	467	465.65	99.7
Y-88	7264	1489	0.9370	1589	1570	98.8
Co-60	3580	734	0.9997	734	724.16	98.6
Co-60	3581	734	0.9999	734	720.6	98.1
Y-88	7690	1577	0.9920	1589	1634	102.8

Reviewed By: Jody Watson

Date: 4/23/2012

Calibration Data from file: 14_Soil_TunaCan.Clb
Energy Calibration Date: 4/23/2012 Time: 11:29:29 AM
Efficiency Calibration Date: 4/23/2012 Time: 11:29:47 AM

Calibration Description:
14_TunaCan_90099_042312

Energy Calibration Fit
Energy = 0.1578 +0.250077*Channel -1.95882e-008*Channel**2
FWHM (ch) = 2.7879 +0.000947*Channel -1.45727e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
186.01	46.54	46.67	-0.29%	0.73	0.74	-2.18%
237.82	59.54	59.63	-0.15%	0.74	0.75	-1.99%
351.26	88.03	88.00	0.04%	0.78	0.78	-0.25%
487.04	122.06	121.95	0.09%	0.82	0.81	0.58%
662.28	165.85	165.77	0.05%	0.86	0.85	1.23%
1115.71	279.17	279.15	0.01%	0.98	0.96	2.15%
1565.69	391.69	391.65	0.01%	1.09	1.06	2.42%
2645.83	661.66	661.68	-0.00%	1.30	1.30	0.28%
3591.53	898.02	898.06	-0.00%	1.42	1.50	-5.87%
4692.63	1173.24	1173.24	-0.00%	1.76	1.73	2.11%
5329.97	1332.50	1332.50	-0.00%	1.88	1.86	1.08%
7345.32	1836.01	1836.00	0.00%	2.23	2.24	-0.37%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.0212 %
Ln(Eff) = 0.2101 -0.595197*Ln(Eng) -0.0160533*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.2797 %
Ln(Eff) = -23.9149 +8.828985*Ln(Eng) -0.93715*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.0990E-002	2.1711E-002	-3.44%
59.54	3.2006E-002	3.0654E-002	4.23%
88.03	4.1381E-002	4.1960E-002	-1.40%
122.06	4.2230E-002	4.3784E-002	-3.68%
165.85	========== Knee ==========		
165.85	3.7957E-002	3.8722E-002	-2.02%
279.17	2.6754E-002	2.5963E-002	2.96%
391.69	2.0047E-002	1.9926E-002	0.60%
661.66	1.3125E-002	1.3132E-002	-0.05%
898.02	1.0136E-002	1.0258E-002	-1.20%
1173.24	8.1251E-003	8.2437E-003	-1.46%
1332.50	7.2859E-003	7.4227E-003	-1.88%
1836.01	5.8454E-003	5.6863E-003	2.72%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  7/6/2012 11:13:09 AM    Page  1
TestAmerica, Inc.               Spectrum name: 14_TunaCan_20120385.An1

Sample description
     17_TunaCan_90099_032612


Spectrum Filename: C:\User\Cal\Spectra\Det14\14_TunaCan_20120385.An1

Acquisition information
       Start time:                 4/23/2012 9:56:44 AM
       Live time:               3600
       Real time:               3665
       Dead time:                  1.77 %
       Detector ID:                   14

Detector system
     Ge17 SN/11080671


Calibration
       Filename:                   14_Soil_TunaCan.Clb
     14_TunaCan_90099_042312


       Energy Calibration
            Created:               4/23/2012 11:29:29 AM
            Zero offset:           0.158 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.959E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/23/2012 11:29:47 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.02 %
            Log(Eff):              2.101260E-01 + (-5.951973E-01*Log(E) ) +
                                   ( -1.605331E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.28 %
            Log(Eff):             -2.391492E+01 + ( 8.828985E+00*Log(E) ) +
                                   ( -9.371496E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.67keV )
       Stop channel:            8000 (  1999.52keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (1087) Env32  G53W4.25  7/6/2012 11:13:09 AM    Page  2
TestAmerica, Inc.               Spectrum name: 14_TunaCan_20120385.An1
                                      Page 1
```

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       1/1/2012 11:00:00 AM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.   12 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0575
```

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.67	47449.	0.64	0.73	2.181E-02	46.54	4.250	1.442E+04	Pb210
59.63	48139.	0.67	0.74	3.071E-02	59.54	35.700	1.223E+03	AM241
72.88	1815.	8.13	0.77	3.737E-02				
88.00	74331.	0.47	0.79	4.195E-02	88.03	3.610	1.614E+04	CD109
121.95	35331.	0.76	0.82	4.379E-02	122.06	85.600	3.493E+02	CO57
136.39	4314.	3.84	0.82	4.244E-02				
165.77	33960.	0.70	0.89	3.800E-02	165.85	79.900	5.385E+02	Ce139
279.15	17136.	1.05	1.00	2.596E-02	279.17	81.500	1.206E+03	Hg203
391.65	22586.	0.85	1.13	1.993E-02	391.69	64.000	9.714E+02	SN113
661.68	18625.	0.92	1.36	1.313E-02	661.66	85.210	4.657E+02	CS137
898.06	26064.	0.74	1.56	1.026E-02	898.02	93.700	1.570E+03	Y898
1173.24	20614.	0.80	1.76	8.244E-03	1173.24	99.900	7.242E+02	Co1173
1332.50	18485.	0.81	1.88	7.423E-03	1332.50	99.982	7.206E+02	Co1332
1835.98	15919.	0.83	2.23	5.686E-03	1836.01	99.200	1.634E+03	Y1836

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

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
290.81	72.88	9094.	1708.	4.569E+04	9.16	0.857	-
544.77	136.39	6618.	4314.	1.017E+05	3.84	0.819	-

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

This section based on library: DET_EnergyStandardMix & Pb.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.01	46.67	13580.	47449.	13.180	0.64	0.728
AM-241	237.82	59.63	14856.	48139.	13.372	0.67	0.736
CD-109	351.26	88.00	13424.	74331.	20.647	0.47	0.793
CO-57	487.04	121.95	9138.	35331.	9.814	0.76	0.820
Ce-139	662.28	165.77	5743.	33960.	9.433	0.70	0.887
Hg-203	1115.71	279.15	3658.	17136.	4.760	1.05	0.998
SN-113	1565.69	391.65	3032.	22586.	6.274	0.85	1.125
CS-137	2645.83	661.68	2231.	18625.	5.174	0.92	1.364
Y-898	3591.53	898.06	1967.	26064.	7.240	0.74	1.562
Co-1173	4692.63	1173.24	1001.	20614.	5.726	0.80	1.765
Co-1332	5329.97	1332.50	650.	18485.	5.135	0.81	1.875
Y-1836	7345.28	1835.98	147.	15919.	4.422	0.83	2.232

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

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

Nuclide Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq		COMMENTS
Pb-210	N	1.4422E+04					8.15E+03	
			46.54	1.442E+04	(	1.659E+02	6.42E-01 4.25E+00	G
AM-241		1.2225E+03					1.58E+05	
			59.54	1.223E+03	(	1.449E+01	6.65E-01 3.57E+01	G
CD-109		1.6145E+04					4.63E+02	
			88.03	1.614E+04	(	1.179E+02	4.73E-01 3.61E+00	G
CO-57		3.4928E+02					2.72E+02	
			122.06	3.493E+02	(	4.431E+00	7.59E-01 8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 7/6/2012 11:13:09 AM Page 4
TestAmerica, Inc. Spectrum name: 14_TunaCan_20120385.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Ce-139	5.3852E+02				1.38E+02	
		165.85	5.385E+02	(	5.643E+00 6.97E-01 7.99E+01	G
Hg-203	1.2059E+03				4.66E+01	
		279.17	1.206E+03	(	2.002E+01 1.05E+00 8.15E+01	G
SN-113	9.7136E+02				1.15E+02	
		391.69	9.714E+02	(	1.115E+01 8.54E-01 6.40E+01	G
CS-137	4.6565E+02				1.10E+04	
		661.66	4.657E+02	(	5.571E+00 9.21E-01 8.52E+01	G
Y-898	1.5700E+03				1.07E+02	

```
                          898.02 1.570E+03  (  1.261E+01 7.43E-01 9.37E+01 G

Co-1173      7.2416E+02                                        1.93E+03
                         1173.24 7.242E+02  (  5.275E+00 7.99E-01 9.99E+01 G

Co-1332      7.2060E+02                                        1.93E+03
                         1332.50 7.206E+02  (  4.737E+00 8.09E-01 1.00E+02 G

Y-1836       1.6340E+03                                        1.07E+02
                         1836.01 1.634E+03  (  6.084E+00 8.27E-01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

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

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
```



```
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count  Time Corrected  Uncertainty  1 Sigma
 Nuclide     Activity       Activity       Counting                   MDA
               Bq             Bq

 ____________________________________________________________________________
 Pb-210       1.4284E+04    1.4422E+04    6.417E-01%                1.66E+02
 AM-241       1.2219E+03    1.2225E+03    6.654E-01%                1.45E+01
 CD-109       1.3631E+04    1.6145E+04    4.729E-01%                1.18E+02
```

CO-57	2.6186E+02	3.4928E+02	7.589E-01%	4.43E+00
Ce-139	3.0490E+02	5.3852E+02	6.967E-01%	5.64E+00
Hg-203	2.2495E+02	1.2059E+03	1.050E+00%	2.00E+01
SN-113	4.9196E+02	9.7136E+02	8.544E-01%	1.12E+01
CS-137	4.6235E+02	4.6565E+02	9.207E-01%	5.57E+00
Y-898	7.5323E+02	1.5700E+03	7.434E-01%	1.26E+01
Co-1173	6.9530E+02	7.2416E+02	7.989E-01%	5.27E+00
Co-1332	6.9188E+02	7.2060E+02	8.094E-01%	4.74E+00
Y-1836	7.8390E+02	1.6340E+03	8.273E-01%	6.08E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

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

Total Activity (37.7 to 1999.5 keV) 3.381E+04 Bq
Total Decayed Activity (37.7 to 1999.5 keV) 3.9968746E+04 Bq

Gamma Verification per Geometry

Detector: 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

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     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
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	5.0133E+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:	Ge16
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14377	96.3
Am-241	2037	418	0.3590	1163	1228.5	105.6
Cd-109	2881	591	0.0361	16363	16032	98.0
Co-57	1511	310	0.8560	362	349.8	96.7
Ce-139	2139	439	0.7990	549	538.18	98.0
Sn-113	3015	618	0.6400	966	969.68	100.4
Cs-137	1938	397	0.8510	467	468.24	100.3
Y-88	7264	1489	0.9370	1589	1552.4	97.7
Co-60	3580	734	0.9997	734	725.6	98.8
Co-60	3581	734	0.9999	734	726.23	98.9
Y-88	7690	1577	0.9920	1589	1629.1	102.5

Reviewed By: Jody Watson

Date: 7/13/2012

Calibration Data from file: 16_Soil_TunaCan.Clb
Energy Calibration Date: 7/13/2012 Time: 9:47:11 AM
Efficiency Calibration Date: 7/13/2012 Time: 9:47:24 AM

Calibration Description:
16_TunaCan_90099_071012

Energy Calibration Fit
Energy = 0.1106 +0.250095*Channel -1.95476e-008*Channel**2
FWHM (ch) = 3.6339 +0.000937*Channel -2.1273e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.57	46.54	46.52	0.04%	0.97	0.95	1.52%
237.71	59.54	59.56	-0.03%	0.95	0.96	-1.11%
351.71	88.03	88.07	-0.05%	1.00	0.99	0.52%
487.80	122.06	122.10	-0.04%	1.03	1.02	1.07%
662.91	165.85	165.89	-0.03%	1.08	1.06	1.71%
1115.49	279.17	279.06	0.04%	1.13	1.16	-3.06%
1565.59	391.69	391.61	0.02%	1.25	1.26	-0.74%
2645.84	661.66	661.68	-0.00%	1.44	1.49	-3.61%
3591.32	898.02	898.03	-0.00%	1.74	1.68	3.44%
4692.55	1173.24	1173.26	-0.00%	1.94	1.89	2.70%
5329.87	1332.50	1332.53	-0.00%	1.95	2.01	-2.97%
7344.93	1836.01	1835.99	0.00%	2.34	2.34	0.11%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.0068 %
Ln(Eff) = 0.0148 -0.551427*Ln(Eng) -0.0144348*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.1708 %
Ln(Eff) = -24.0844 +8.948554*Ln(Eng) -0.95136*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.2670E-002	2.3523E-002	-3.76%
59.54	3.4907E-002	3.3268E-002	4.69%
88.03	4.4561E-002	4.5501E-002	-2.11%
122.06	4.5678E-002	4.7288E-002	-3.52%
165.85	========== Knee ==========		
165.85	4.0710E-002	4.1557E-002	-2.08%
279.17	2.9697E-002	2.8765E-002	3.14%
391.69	2.2647E-002	2.2549E-002	0.43%
661.66	1.5445E-002	1.5368E-002	0.50%
898.02	1.1965E-002	1.2246E-002	-2.35%
1173.24	9.8925E-003	1.0017E-002	-1.26%
1332.50	8.9987E-003	9.0965E-003	-1.09%
1836.01	7.2985E-003	7.1212E-003	2.43%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  7/13/2012 9:50:48 AM
TestAmerica, Inc.                Spectrum name: 16_Soil_TunaCan_90099_20120752.A

Sample description
     16_Soil_TunaCan_90099_071012


Spectrum Filename: C:\User\SPC\Det16\16_Soil_TunaCan_90099_20120752.A

Acquisition information
       Start time:                 7/10/2012 10:35:34 AM
       Live time:               3600
       Real time:               3674
       Dead time:                  2.03 %
       Detector ID:                   16

Detector system
     Ge16 SN/11012217


Calibration
       Filename:                   16_Soil_TunaCan.Clb
     16_TunaCan_90099_071012


       Energy Calibration
            Created:               7/13/2012 9:47:11 AM
            Zero offset:           0.111 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.955E-08 keV/channel^2

       Efficiency Calibration
            Created:               7/13/2012 9:47:24 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.01 %
            Log(Eff):              1.477416E-02 + (-5.514266E-01*Log(E) ) +
                                   ( -1.443482E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.17 %
            Log(Eff):             -2.408438E+01 + ( 8.948554E+00*Log(E) ) +
                                   ( -9.513599E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.62keV )
       Stop channel:            8000 (  1999.62keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 7/13/2012 9:50:48 AM
TestAmerica, Inc. Spectrum name: 16_Soil_TunaCan_90099_20120752.A

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

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0309

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.52	50908.	0.67	0.97	2.351E-02	46.54	4.250	1.438E+04	Pb210
59.56	52484.	0.66	0.95	3.328E-02	59.54	35.700	1.229E+03	AM241
88.07	71211.	0.52	1.00	4.551E-02	88.03	3.610	1.603E+04	CD109
122.10	31320.	0.80	1.03	4.728E-02	122.06	85.600	3.498E+02	CO57
136.55	3896.	3.92	1.12	4.572E-02				
165.89	24588.	0.86	1.08	4.155E-02	165.85	79.900	5.382E+02	Ce139
279.05	6035.	2.82	1.13	2.877E-02	279.17	81.500	1.223E+03	Hg203
391.61	15948.	1.14	1.25	2.255E-02	391.69	64.000	9.697E+02	SN113
661.68	21809.	0.83	1.44	1.537E-02	661.66	85.210	4.682E+02	CS137
898.03	18524.	0.90	1.74	1.225E-02	898.02	93.700	1.552E+03	Y898
1173.26	24403.	0.75	1.94	1.002E-02	1173.24	99.900	7.256E+02	Co1173
1332.53	22198.	0.75	1.95	9.096E-03	1332.50	99.982	7.262E+02	Co1332
1835.98	11967.	0.97	2.34	7.121E-03	1836.01	99.200	1.629E+03	Y1836

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
545.57	136.55	5299.	3896.	8.521E+04	3.92	1.117	-

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

This section based on library: DET_EnergyStandardMix & Pb.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.57	46.52	16008.	50908.	14.141	0.67	0.967
AM-241	237.71	59.56	16109.	52484.	14.579	0.66	0.954
CD-109	351.71	88.07	14747.	71211.	19.781	0.52	0.996
CO-57	487.80	122.10	7590.	31320.	8.700	0.80	1.033
Ce-139	662.91	165.89	4947.	24588.	6.830	0.86	1.080
Hg-203	1115.49	279.06	4192.	5963.	1.656	2.79	1.129
SN-113	1565.60	391.61	3105.	15948.	4.430	1.14	1.253
CS-137	2645.84	661.68	2129.	21809.	6.058	0.83	1.439
Y-898	3591.32	898.03	1720.	18524.	5.145	0.90	1.741
Co-1173	4692.53	1173.26	1220.	24403.	6.779	0.75	1.944
Co-1332	5329.86	1332.53	680.	22198.	6.166	0.75	1.948
Y-1836	7344.92	1835.98	144.	11967.	3.324	0.97	2.344

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

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

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq			COMMENTS
Pb-210	N	1.4377E+04					8.15E+03		
			46.54	1.438E+04	(	1.673E+02	6.66E-01	4.25E+00	G
AM-241		1.2285E+03					1.58E+05		
			59.54	1.229E+03	(	1.391E+01	6.59E-01	3.57E+01	G
CD-109		1.6032E+04					4.63E+02		
			88.03	1.603E+04	(	1.280E+02	5.16E-01	3.61E+00	G
CO-57		3.4980E+02					2.72E+02		
			122.06	3.498E+02	(	4.565E+00	8.01E-01	8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 7/13/2012 9:50:48 AM
TestAmerica, Inc. Spectrum name: 16_Soil_TunaCan_90099_20120752.A

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3818E+02					1.38E+02	
		165.85	5.382E+02	(	7.233E+00	8.57E-01	7.99E+01 G
Hg-203	1.2081E+03					4.66E+01	
		279.17	1.208E+03	(	6.167E+01	2.79E+00	8.15E+01 G
SN-113	9.6968E+02					1.15E+02	
		391.69	9.697E+02	(	1.595E+01	1.14E+00	6.40E+01 G
CS-137	4.6824E+02					1.10E+04	
		661.66	4.682E+02	(	4.675E+00	8.31E-01	8.52E+01 G
Y-898	1.5524E+03					1.07E+02	
		898.02	1.552E+03	(	1.643E+01	8.98E-01	9.37E+01 G
Co-1173	7.2560E+02					1.93E+03	
		1173.24	7.256E+02	(	4.920E+00	7.53E-01	9.99E+01 G
Co-1332	7.2623E+02					1.93E+03	
		1332.50	7.262E+02	(	4.064E+00	7.46E-01	1.00E+02 G
Y-1836	1.6291E+03					1.07E+02	
		1836.01	1.629E+03	(	7.981E+00	9.68E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

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

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 7/13/2012 9:50:48 AM
TestAmerica, Inc. Spectrum name: 16_Soil_TunaCan_90099_20120752.A

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4145E+04	1.4377E+04	6.660E-01%	1.67E+02
AM-241	1.2275E+03	1.2285E+03	6.589E-01%	1.39E+01
CD-109	1.2043E+04	1.6032E+04	5.162E-01%	1.28E+02
CO-57	2.1493E+02	3.4980E+02	8.011E-01%	4.56E+00
Ce-139	2.0570E+02	5.3818E+02	8.567E-01%	7.23E+00
Hg-203	7.0659E+01	1.2081E+03	2.787E+00%	6.17E+01
SN-113	3.0697E+02	9.6968E+02	1.140E+00%	1.60E+01
CS-137	4.6263E+02	4.6824E+02	8.306E-01%	4.67E+00
Y-898	4.4842E+02	1.5524E+03	8.985E-01%	1.64E+01
Co-1173	6.7738E+02	7.2560E+02	7.529E-01%	4.92E+00
Co-1332	6.7797E+02	7.2623E+02	7.458E-01%	4.06E+00
Y-1836	4.7056E+02	1.6291E+03	9.676E-01%	7.98E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

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

Total Activity (37.6 to 1999.6 keV) 3.095E+04 Bq
Total Decayed Activity (37.6 to 1999.6 keV) 3.9805016E+04 Bq

Analyzed by: _____
403135

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc.

Gamma Verification per Geometry

Detector: Ge17

Geometry: 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

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     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
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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:       0.0383
```

***** 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

ORTEC g v - i (1087) Env32 G53W4.25 3/7/2012 11:48:20 AM Page 3
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	

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                                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

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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

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

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     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
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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	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

ORTEC g v - i (3263) Env32 G53W4.25 4/3/2012 8:09:21 AM Page 3
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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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	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	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   *****
                                      Page 5
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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:	Ge9
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1169.4	100.4
Cs-137	1926	396	0.851	465	444.52	95.6
Co-60	3611	742	0.99974	742	687.72	92.7
Co-60	3612	742	0.999856	742	692.56	93.3

Reviewed By: Jody Watson

Date: 6/14/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  6/14/2012 1:20:45 PM    Page  1
TestAmerica, Inc                Spectrum name: 9_TunaCan_20120371.An1

Sample description
     9_TunaCan_90099_061412


Spectrum Filename: C:\User\SPC\Det9\9_TunaCan_20120371.An1

Acquisition information
       Start time:                 6/14/2012 10:54:15 AM
       Live time:               3600
       Real time:               3629
       Dead time:                  0.81 %
       Detector ID:                    9

Detector system
     Ge 9 SN/100113


Calibration
       Filename:                   9_Soil_TunaCan.Clb
     9_Soil_TunaCan_90099_050312


       Energy Calibration
            Created:               6/14/2012 10:19:40 AM
            Zero offset:           0.088 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.039E-08 keV/channel^2

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

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.60keV )
       Stop channel:            8000 (  1999.66keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  6/14/2012 1:20:45 PM    Page  2
TestAmerica, Inc                Spectrum name: 9_TunaCan_20120371.An1
                                      Page 1
```

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2012-05-27_0502.PBC 5/27/2012 5:02:59 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0390

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.54	860.	12.66	1.34	1.634E-02				
46.62	48876.	0.54	1.09	2.580E-02	46.54	4.250	1.338E+04	Pb210
50.03	116.	122.12	1.09	2.886E-02				
59.57	54776.	0.62	1.11	3.661E-02	59.54	35.700	1.169E+03	AM241
63.90	47.	193.18	0.35	3.962E-02				
88.09	26880.	0.87	1.14	5.052E-02	88.03	3.610	1.566E+04	CD109
122.10	5522.	2.86	1.15	5.303E-02	122.06	85.600	3.312E+02	CO57
136.38	729.	11.64	1.25	5.151E-02				
165.67	814.	10.74	1.30	4.629E-02	165.85	79.900	5.417E+02	Ce139
295.46	252.	33.13	0.56	3.229E-02				
316.16	66.	75.82	0.25	3.082E-02				
356.41	45.	97.50	1.36	2.835E-02				
358.68	42.	110.02	1.37	2.822E-02				
379.76	37.	75.05	0.46	2.711E-02				
391.75	310.	24.80	1.08	2.652E-02	391.69	64.000	1.113E+03	SN113
454.98	83.	53.05	0.37	2.383E-02				
568.66	103.	37.41	0.47	2.026E-02				
626.42	84.	49.00	0.45	1.885E-02				
661.66	23324.	0.76	1.61	1.810E-02	661.66	85.210	4.445E+02	CS137
821.54	239.	27.43	0.39	1.536E-02				
876.16	66.	52.19	0.61	1.462E-02				
898.25	346.	23.61	1.52	1.434E-02	898.02	93.700	2.406E+03	Y898
937.90	34.	79.64	0.44	1.387E-02				
1071.41	38.	61.01	0.57	1.249E-02				
1085.31	68.	35.74	1.00	1.237E-02				
1098.64	14.	140.33	0.47	1.225E-02				
1173.23	20836.	0.81	2.05	1.163E-02	1173.24	99.900	6.877E+02	Co1173
1332.49	18966.	0.75	2.11	1.050E-02	1332.50	99.982	6.926E+02	Co1332
1835.90	150.	10.23	1.72	8.080E-03	1836.01	99.200	1.745E+03	Y1836

9_TunaCan_20120371

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
145.76	36.54	3297.	860.	5.262E+04	12.66	1.336	- s
199.48	49.98	8660.	956.	3.313E+04	18.50	0.958	- sM
255.13	63.90	2893.	47.	1.186E+03	193.18	0.347	- sc
544.97	136.38	1941.	729.	1.415E+04	11.64	1.247	-

ORTEC g v - i (3263) Env32 G53W4.25 6/14/2012 1:20:45 PM Page 3

TestAmerica, Inc Spectrum name: 9_TunaCan_20120371.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
1181.07	295.46	1550.	252.	7.804E+03	33.13	0.562	- s
1263.87	316.16	856.	66.	2.136E+03	75.82	0.245	- sc
1424.84	356.47	930.	45.	1.579E+03	97.50	1.363	- sc
1433.89	358.73	1025.	42.	1.473E+03	110.02	1.365	- sc
1518.22	379.76	367.	37.	1.365E+03	75.05	0.460	- sc
1819.03	454.98	702.	83.	3.496E+03	53.05	0.375	- s
2273.73	568.66	433.	103.	5.068E+03	37.41	0.468	- s
2504.73	626.42	460.	84.	4.455E+03	49.00	0.451	- s
3285.25	821.54	812.	239.	1.556E+04	27.43	0.391	- s
3503.76	876.16	400.	66.	4.538E+03	52.19	0.608	- s
3750.76	937.90	332.	34.	2.488E+03	79.64	0.436	- sc
4284.91	1071.41	226.	38.	3.015E+03	61.01	0.571	- s
4340.51	1085.31	224.	68.	5.498E+03	35.74	1.000	- s
4393.86	1098.64	186.	14.	1.143E+03	140.33	0.472	- sc

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

This section based on library: DET_EnergyStandardMix & Pb.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.86	46.57	13300.	51041.	14.178	0.65	1.116
AM-241	237.82	59.57	11784.	54776.	15.216	0.62	1.111
CD-109	351.87	88.09	5995.	26880.	7.467	0.87	1.137
CO-57	487.85	122.10	3767.	5522.	1.534	2.86	1.155
Ce-139	662.09	165.67	1864.	814.	0.226	10.74	1.299
Hg-203	1120.44	280.29	2362.	-52.	-0.014	133.84	1.296s
SN-113	1565.85	391.67	1962.	266.	0.074	24.38	1.393
CS-137	2645.72	661.66	1258.	23324.	6.479	0.76	1.614
Y-898	3592.12	898.25	1148.	346.	0.096	23.61	1.524s
Co-1173	4692.30	1173.23	840.	20836.	5.788	0.81	2.049
Co-1332	5329.58	1332.49	131.	18966.	5.268	0.75	2.109
Y-1836	7344.43	1835.90	14.	150.	0.042	10.23	1.719s

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

ORTEC g v - i (3263) Env32 G53W4.25 6/14/2012 1:20:45 PM Page 4

Page 3

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

Pb-210   N   1.3971E+04                                     8.15E+03
                            46.54 1.397E+04  (  1.478E+02 6.46E-01 4.25E+00 G

AM-241       1.1694E+03                                     1.58E+05
                            59.54 1.169E+03  (  1.086E+01 6.16E-01 3.57E+01 G

CD-109       1.5657E+04                                     4.63E+02
                            88.03 1.566E+04  (  2.117E+02 8.71E-01 3.61E+00 G

CO-57        3.3118E+02                                     2.72E+02
                           122.06 3.312E+02  (  1.731E+01 2.86E+00 8.56E+01 G

Ce-139       5.4173E+02                                     1.38E+02
                           165.85 5.417E+02  (  1.357E+02 1.07E+01 7.99E+01 G

Hg-203      -5.2429E-01                                     4.66E+01
                           279.17-5.243E-01 ?(  2.327E+00 1.34E+02 8.15E+01 G

SN-113       9.5260E+02                                     1.15E+02
                           391.69 9.526E+02 ?(  7.503E+02 2.44E+01 6.40E+01 G

CS-137       4.4452E+02                                     1.10E+04
                           661.66 4.445E+02  (  3.202E+00 7.63E-01 8.52E+01 G

Y-898        2.4057E+03                                     1.07E+02
                           898.02 2.406E+03 @(  1.118E+03 2.36E+01 9.37E+01 G

Co-1173      6.8772E+02                                     1.93E+03
                          1173.24 6.877E+02  (  4.547E+00 8.09E-01 9.99E+01 G

Co-1332      6.9256E+02                                     1.93E+03
                          1332.50 6.926E+02  (  2.044E+00 7.49E-01 1.00E+02 G

Y-1836       1.7452E+03                                     1.07E+02
                          1836.01 1.745E+03  (  2.388E+02 1.02E+01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```



```
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
```

```
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

  Nuclide Codes:                        Peak Codes:
  T - Thermal Neutron Activation        G - Gamma Ray
  F - Fast Neutron Activation           X - X-Ray
  I - Fission Product                   P - Positron Decay
  N - Naturally Occurring Isotope       S - Single-Escape
  P - Photon Reaction                   D - Double-Escape
  C - Charged Particle Reaction         K - Key Line
  M - No MDA Calculation                A - Not in Average
  R - Coincidence Corrected             C - Coincidence Peak
  H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


*************** D I S C A R D E D  I S O T O P E  P E A K S ***************
Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
          Energy   Counts     Counts     Cts/Sec  1 Sigma %
_____________________________________________________________________________
Hg-203     280.29      2362.       -52.    -0.014   133.84   0.000E+00
  P - Peakbackground subtraction

*****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
        Time of Count  Time Corrected  Uncertainty  1 Sigma
Nuclide     Activity       Activity       Counting                    MDA
               Bq/Sample     Bq/Sample                                Bq/Sample

_____________________________________________________________________________
Pb-210       1.2947E+04    1.3971E+04    6.459E-01%                1.48E+02
AM-241       1.1648E+03    1.1694E+03    6.156E-01%                1.09E+01
CD-109       4.0954E+03    1.5657E+04    8.713E-01%                2.12E+02
CO-57        3.3792E+01    3.3118E+02    2.862E+00%                1.73E+01
Ce-139       5.9752E+00    5.4173E+02    1.074E+01%                1.36E+02
Hg-203 #A   -5.2429E-01 >12 Halflives   1.3384E+02%   2.3272E+00
SN-113 #     4.3447E+00    9.5260E+02    2.438E+01%                7.50E+02
CS-137       4.2011E+02    4.4452E+02    7.635E-01%                3.20E+00
Y-898  #     7.1422E+00    2.4057E+03    2.361E+01%                1.12E+03
Co-1173      4.9827E+02    6.8772E+02    8.087E-01%                4.55E+00
Co-1332      5.0178E+02    6.9256E+02    7.487E-01%                2.04E+00
Y-1836       5.1813E+00    1.7452E+03    1.023E+01%                2.39E+02
```



```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ---------------------------
Total Activity (  379.7 to  1999.7 keV)     1.968E+04  Bq/Sample
Total Decayed Activity (  379.7 to  1999.7 keV) 3.8598309E+04  Bq/Sample
```

2nd Source Verification

Detector: **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
```



```
 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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

********** 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

2nd Source Verification

Detector:	Ge14
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1140.8	98.0
Cs-137	1926	396	0.851	465	447.55	96.2
Co-60	3611	742	0.99974	742	690.01	93.0
Co-60	3612	742	0.999856	742	699.61	94.2

Reviewed By: Jody Watson

Date: 4/24/2012

14_TunaCan2nd_20120390

```
     ORTEC g v - i (3263) Env32  G53W4.25  7/6/2012 9:20:28 AM     Page  1
TestAmerica, Inc.               Spectrum name: 14_TunaCan2nd_20120390.An1

Sample description
     14_TunaCan2nd_rad10_042412


Spectrum Filename: C:\User\SPC\Det14\14_TunaCan2nd_20120390.An1

Acquisition information
       Start time:                 4/24/2012 8:12:45 AM
       Live time:               3600
       Real time:               3635
       Dead time:                  0.95 %
       Detector ID:                   14

Detector system
     Ge14 SN/11080670


Calibration
       Filename:                   14_Soil_TunaCan.Clb
     14_TunaCan_90099_042312


       Energy Calibration
            Created:               4/23/2012 11:29:29 AM
            Zero offset:           0.158 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.959E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/23/2012 11:29:47 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.02 %
            Log(Eff):              2.101260E-01 + (-5.951973E-01*Log(E) ) +
                                   ( -1.605331E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.28 %
            Log(Eff):             -2.391492E+01 + ( 8.828985E+00*Log(E) ) +
                                   ( -9.371496E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.67keV )
       Stop channel:            8000 (  1999.52keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  7/6/2012 9:20:28 AM     Page  2
TestAmerica, Inc.               Spectrum name: 14_TunaCan2nd_20120390.An1
                                      Page 1
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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       14_2012-04-01_0328.PBC
                                                 4/1/2012 3:28:19 AM

       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


total peaks alloc.   11 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0804
```

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.65	636.	14.35	0.68	1.394E-02				
46.70	42844.	0.65	0.73	2.183E-02	46.54	4.250	1.384E+04	Pb210
49.57	579.	23.20	1.08	2.397E-02				
59.66	44776.	0.62	0.73	3.072E-02	59.54	35.700	1.141E+03	AM241
88.02	24143.	0.88	0.79	4.196E-02	88.03	3.610	1.568E+04	CD109
121.97	5150.	2.07	0.81	4.379E-02	122.06	85.600	3.284E+02	CO57
136.39	594.	12.74	0.84	4.244E-02				
165.76	922.	8.50	0.93	3.800E-02	165.85	79.900	5.802E+02	Ce139
238.43	269.	23.37	0.71	2.933E-02				
315.48	114.	42.70	0.42	2.361E-02				
327.51	51.	61.93	0.45	2.293E-02				
351.90	216.	23.90	0.91	2.167E-02				
364.95	52.	64.29	0.48	2.106E-02				
374.52	129.	45.68	0.49	2.064E-02				
391.67	297.	17.91	1.16	1.993E-02	391.69	64.000	1.044E+03	SN113
510.55	153.	33.44	0.60	1.616E-02				
661.74	16713.	0.81	1.30	1.313E-02	661.66	85.210	4.376E+02	CS137
665.93	55.	47.01	1.30	1.306E-02				
682.98	51.	73.33	0.31	1.280E-02				
802.77	123.	33.88	0.65	1.124E-02				
897.96	328.	20.32	1.77	1.026E-02	898.02	93.700	2.290E+03	Y898
978.13	53.	59.31	0.31	9.568E-03				
1173.32	15097.	0.91	1.81	8.243E-03	1173.24	99.900	6.900E+02	Co1173
1332.58	13794.	0.88	1.91	7.422E-03	1332.50	99.982	6.996E+02	Co1332
1836.21	153.	8.94	1.16	5.686E-03	1836.01	99.200	1.816E+03	Y1836

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide

145.93	36.65	2712.	636.	4.559E+04	14.35	0.681	-	s
197.59	49.57	6158.	579.	2.414E+04	23.20	1.078	-	s
544.79	136.39	1623.	594.	1.400E+04	12.74	0.836	-	
952.87	238.43	1166.	269.	9.182E+03	23.37	0.709	-	

ORTEC g v - i (3263) Env32 G53W4.25 7/6/2012 9:20:28 AM Page 3
TestAmerica, Inc. Spectrum name: 14_TunaCan2nd_20120390.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
1261.02	315.48	752.	114.	4.829E+03	42.70	0.415	-	s
1309.15	327.51	440.	51.	2.232E+03	61.93	0.449	-	s
1406.69	351.90	776.	216.	9.981E+03	23.90	0.914	-	
1458.89	364.95	463.	52.	2.484E+03	64.29	0.475	-	s
1497.18	374.52	912.	129.	6.250E+03	45.68	0.487	-	s
2041.26	510.55	669.	153.	9.449E+03	33.44	0.603	-	s
2662.75	665.91	160.	40.	3.074E+03	48.94	0.586	-	sM
2731.03	682.98	385.	51.	3.984E+03	73.33	0.306	-	s
3210.25	802.77	443.	123.	1.098E+04	33.88	0.654	-	s
3911.87	978.13	330.	53.	5.539E+03	59.31	0.307	-	s

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

This section based on library: DET_EnergyStandardMix & Pb.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.10	46.70	10276.	42803.	11.890	0.65	0.733
AM-241	237.93	59.66	8589.	44776.	12.438	0.62	0.733
CD-109	351.36	88.02	4956.	24143.	6.706	0.88	0.785
CO-57	487.12	121.97	1860.	5150.	1.431	2.07	0.805
Ce-139	662.24	165.76	1490.	922.	0.256	8.50	0.930s
Hg-203	1114.33	278.80	1377.	-40.	-0.011	133.76	0.957s
SN-113	1565.78	391.67	802.	297.	0.083	17.91	1.165
CS-137	2645.99	661.72	749.	17094.	4.748	0.86	1.367
Y-898	3591.10	897.96	851.	328.	0.091	20.32	1.769s
Co-1173	4692.93	1173.32	513.	15097.	4.194	0.91	1.810
Co-1332	5330.26	1332.58	105.	13794.	3.832	0.88	1.907
Y-1836	7346.17	1836.21	5.	153.	0.042	8.94	1.165s

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

ORTEC g v - i (3263) Env32 G53W4.25 7/6/2012 9:20:28 AM Page 4
TestAmerica, Inc. Spectrum name: 14_TunaCan2nd_20120390.An1

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS

```
Pb-210   N   1.3845E+04                                        8.15E+03
                            46.54 1.384E+04  (P 1.537E+02 6.55E-01 4.25E+00 G

AM-241       1.1408E+03                                        1.58E+05
                            59.54 1.141E+03  (  1.107E+01 6.17E-01 3.57E+01 G

CD-109       1.5678E+04                                        4.63E+02
                            88.03 1.568E+04  (  2.148E+02 8.77E-01 3.61E+00 G

CO-57        3.2838E+02                                        2.72E+02
                           122.06 3.284E+02  (  1.299E+01 2.07E+00 8.56E+01 G

Ce-139       5.8018E+02                                        1.38E+02
                           165.85 5.802E+02 *(  1.149E+02 8.50E+00 7.99E+01 G

Hg-203      -5.1862E-01                                        4.66E+01
                           279.17-5.186E-01 ?(  2.305E+00 1.34E+02 8.15E+01 G

SN-113       1.0438E+03                                        1.15E+02
                           391.69 1.044E+03  (  4.727E+02 1.79E+01 6.40E+01 G

CS-137       4.4755E+02                                        1.10E+04
                           661.66 4.475E+02  (  3.410E+00 8.57E-01 8.52E+01 G

Y-898        2.2899E+03                                        1.07E+02
                           898.02 2.290E+03 *(  9.680E+02 2.03E+01 9.37E+01 G

Co-1173      6.9001E+02                                        1.93E+03
                          1173.24 6.900E+02  (  4.948E+00 9.10E-01 9.99E+01 G

Co-1332      6.9961E+02                                        1.93E+03
                          1332.50 6.996E+02  (  2.559E+00 8.77E-01 1.00E+02 G

Y-1836       1.8162E+03                                        1.07E+02
                          1836.01 1.816E+03  (  1.603E+02 8.94E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```



```
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
                                       Page 4
```

I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	278.80	1377.	-40.	-0.011	133.76	0.000E+00

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma		MDA Bq/Sample
Pb-210	1.2885E+04	1.3845E+04	6.553E-01%		1.54E+02
AM-241	1.1366E+03	1.1408E+03	6.168E-01%		1.11E+01
CD-109	4.4274E+03	1.5678E+04	8.766E-01%		2.15E+02
CO-57	3.8172E+01	3.2838E+02	2.068E+00%		1.30E+01
Ce-139 #	8.2779E+00	5.8018E+02	8.497E+00%		1.15E+02
Hg-203 #A	-5.1862E-01	>12 Halflives	1.3376E+02%	2.3053E+00	
SN-113	6.4765E+00	1.0438E+03	1.791E+01%		4.73E+02
CS-137	4.2434E+02	4.4755E+02	8.571E-01%		3.41E+00
Y-898 #	9.4790E+00	2.2899E+03	2.032E+01%		9.68E+02
Co-1173	5.0921E+02	6.9001E+02	9.096E-01%		4.95E+00
Co-1332	5.1630E+02	6.9961E+02	8.770E-01%		2.56E+00
Y-1836	7.5179E+00	1.8162E+03	8.944E+00%		1.60E+02

ORTEC g v - i (3263) Env32 G53W4.25 7/6/2012 9:20:28 AM Page 6
TestAmerica, Inc. Spectrum name: 14_TunaCan2nd_20120390.An1

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

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

Total Activity (37.7 to 1999.5 keV) 1.997E+04 Bq/Sample
Total Decayed Activity (37.7 to 1999.5 keV) 3.8559289E+04 Bq/Sample

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: _____

16_1Lmarn2nd_20120385

```
     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
```

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 Channel	Centroid 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

ORTEC g v - i (3263) Env32 G53W4.25 4/24/2012 10:47:24 AM Page 4
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
```

```
     ORTEC g v - i (3263) Env32  G53W4.25  4/24/2012 10:47:24 AM   Page  5
 TestAmerica, Inc.              Spectrum name: 16_1Lmarn2nd_20120385.An1

 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
```

```
     ORTEC g v - i (3263) Env32  G53W4.25  4/24/2012 10:47:24 AM   Page  6
 TestAmerica, Inc.              Spectrum name: 16_1Lmarn2nd_20120385.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   *****
         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

2nd Source Verification

Detector:	Ge16
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1175.5	101.0
Cs-137	1926	396	0.851	465	456.26	98.1
Co-60	3611	742	0.99974	742	696.55	93.8
Co-60	3612	742	0.999856	742	694.91	93.6

Reviewed By: Jody Watson

Date: 7/17/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  7/17/2012 12:43:11 PM   Page  1
TestAmerica, Inc.               Spectrum name: 16_TunaCan2nd_81427_071712.An1

Sample description
     16_Soil_TunaCan2nd_81427


Spectrum Filename: C:\User\SPC\Det16\16_TunaCan2nd_81427_071712.An1

Acquisition information
       Start time:                 7/17/2012 11:27:38 AM
       Live time:               3600
       Real time:               3637
       Dead time:                  1.01 %
       Detector ID:                   16

Detector system
     Ge16 SN/11012217


Calibration
       Filename:                   16_Soil_TunaCan.Clb
     16_TunaCan_90099_071012


       Energy Calibration
            Created:               7/13/2012 9:47:11 AM
            Zero offset:           0.111 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.955E-08 keV/channel^2

       Efficiency Calibration
            Created:               7/13/2012 9:47:24 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.01 %
            Log(Eff):              1.477416E-02 + (-5.514266E-01*Log(E) ) +
                                   ( -1.443482E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.17 %
            Log(Eff):             -2.408438E+01 + ( 8.948554E+00*Log(E) ) +
                                   ( -9.513599E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.62keV )
       Stop channel:            8000 (  1999.62keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  7/17/2012 12:43:11 PM   Page  2
TestAmerica, Inc.               Spectrum name: 16_TunaCan2nd_81427_071712.An1
                                      Page 1
```

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	16_2012-07-01_0410.PBC 7/1/2012 4:10:46 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0735

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.61	662.	16.00	0.95	1.502E-02				
46.61	44788.	0.57	0.95	2.354E-02	46.54	4.250	1.344E+04	Pb210
49.73	846.	14.98	0.96	2.615E-02				
51.93	67.	175.93	0.96	2.781E-02				
59.60	50058.	0.62	0.95	3.331E-02	59.54	35.700	1.176E+03	AM241
67.02	327.	40.04	0.43	3.772E-02				
77.05	248.	35.16	0.66	4.226E-02				
88.11	23229.	0.97	1.00	4.552E-02	88.03	3.610	1.578E+04	CD109
92.72	154.	41.19	0.62	4.641E-02				
102.49	234.	36.86	0.72	4.751E-02				
122.18	4603.	2.65	1.08	4.728E-02	122.06	85.600	3.368E+02	CO57
136.63	690.	11.63	1.03	4.571E-02				
165.89	573.	14.69	0.88	4.155E-02	165.85	79.900	5.132E+02	Ce139
279.05	48.	131.87	1.16	2.876E-02	279.17	81.500	HL>Cutoff	Hg203
383.49	28.	109.64	0.60	2.290E-02				
391.47	391.	21.81	0.93	2.256E-02	391.69	64.000	2.012E+03	SN113
416.76	115.	47.52	0.73	2.156E-02				
454.44	148.	42.64	0.71	2.024E-02				
470.03	138.	36.11	1.33	1.974E-02				
471.50	87.	46.19	1.33	1.970E-02				
609.23	184.	25.35	0.44	1.633E-02				
661.72	20285.	0.80	1.52	1.537E-02	661.66	85.210	4.563E+02	CS137
688.53	70.	44.77	0.67	1.492E-02				
756.44	34.	63.94	0.34	1.392E-02				
891.54	148.	42.73	0.38	1.231E-02				
898.03	342.	24.68	0.43	1.225E-02	898.02	93.700	3.456E+03	Y898
1092.88	180.	35.97	0.46	1.057E-02				
1173.34	17966.	0.81	1.90	1.002E-02	1173.24	99.900	6.965E+02	Co1173
1332.62	16290.	0.80	2.05	9.096E-03	1332.50	99.982	6.949E+02	Co1332
1836.30	109.	12.59	1.70	7.121E-03	1836.01	99.200	1.789E+03	Y1836

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
145.94	36.61	3330.	662.	4.407E+04	16.00	0.954	-
198.40	49.77	7608.	846.	3.236E+04	14.98	0.955	- D
206.87	51.89	6455.	301.	1.081E+04	38.23	0.957	- D

ORTEC g v - i (3263) Env32 G53W4.25 7/17/2012 12:43:11 PM Page 3
TestAmerica, Inc. Spectrum name: 16_TunaCan2nd_81427_071712.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
267.54	67.02	4805.	327.	8.670E+03	40.04	0.431	- s
307.65	77.05	2954.	248.	5.881E+03	35.16	0.659	- s
370.31	92.72	1548.	154.	3.319E+03	41.19	0.623	- s
409.40	102.49	2168.	234.	4.932E+03	36.86	0.719	- s
545.90	136.63	1724.	690.	1.509E+04	11.63	1.033	-
1533.12	383.49	438.	28.	1.245E+03	109.64	0.596	- c
1666.20	416.76	856.	115.	5.319E+03	47.52	0.732	- s
1816.90	454.44	1051.	148.	7.328E+03	42.64	0.711	- s
1879.23	470.27	1171.	138.	6.985E+03	36.11	1.330	- D
1885.13	471.75	760.	87.	4.406E+03	46.19	1.331	- D
2436.00	609.23	541.	184.	1.125E+04	25.35	0.437	- s
2753.21	688.53	304.	70.	4.691E+03	44.77	0.673	- s
3024.88	756.44	198.	34.	2.419E+03	63.94	0.336	- s
3565.37	891.54	821.	148.	1.199E+04	42.73	0.382	- sM
4370.93	1092.88	734.	180.	1.708E+04	35.97	0.458	- s

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

This section based on library: DET_EnergyStandardMix & Pb.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.74	46.56	12987.	46638.	12.955	0.67	0.934
AM-241	237.89	59.60	10773.	50058.	13.905	0.62	0.952
CD-109	351.86	88.11	5903.	23229.	6.452	0.97	0.996
CO-57	488.11	122.18	2577.	4603.	1.279	2.65	1.080
Ce-139	662.88	165.89	1776.	573.	0.159	14.69	0.876
Hg-203	1115.44	279.05	1953.	48.	0.013	131.87	1.164s
SN-113	1566.59	391.86	1251.	282.	0.078	26.27	0.890s
CS-137	2645.99	661.72	1025.	20285.	5.635	0.80	1.515
Y-898	3591.33	898.03	1130.	342.	0.095	24.68	0.434s
Co-1173	4692.85	1173.34	496.	17966.	4.991	0.81	1.896
Co-1332	5330.25	1332.62	94.	16290.	4.525	0.80	2.052
Y-1836	7346.21	1836.30	14.	109.	0.030	12.59	1.698s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.4024E+04				8.15E+03	
			46.54	1.402E+04	(P	1.605E+02 6.71E-01 4.25E+00	G
AM-241		1.1755E+03				1.58E+05	
			59.54	1.176E+03	(	1.142E+01 6.21E-01 3.57E+01	G
CD-109		1.5779E+04				4.63E+02	
			88.03	1.578E+04	(	2.451E+02 9.70E-01 3.61E+00	G
CO-57		3.3677E+02				2.72E+02	
			122.06	3.368E+02	(	1.751E+01 2.65E+00 8.56E+01	G
Ce-139		5.1324E+02				1.38E+02	
			165.85	5.132E+02	(	1.783E+02 1.47E+01 7.99E+01	G
Hg-203		5.6505E-01				4.66E+01	
			279.17	5.651E-01	*(	2.473E+00 1.32E+02 8.15E+01	G
SN-113		1.4529E+03				1.15E+02	
			391.69	1.453E+03	(	8.626E+02 2.63E+01 6.40E+01	G
CS-137		4.5626E+02				1.10E+04	
			661.66	4.563E+02	(	3.417E+00 8.02E-01 8.52E+01	G
Y-898		3.4565E+03				1.07E+02	
			898.02	3.456E+03	*(	1.611E+03 2.47E+01 9.37E+01	G
Co-1173		6.9655E+02				1.93E+03	
			1173.24	6.965E+02	(	4.129E+00 8.09E-01 9.99E+01	G
Co-1332		6.9491E+02				1.93E+03	
			1332.50	6.949E+02	(	2.043E+00 8.03E-01 1.00E+02	G
Y-1836		1.7894E+03				1.07E+02	
			1836.01	1.789E+03	(	3.307E+02 1.26E+01 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.

& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	279.05	1953.	48.	0.013	131.87	0.000E+00

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.2959E+04	1.4024E+04	6.724E-01%		1.60E+02
AM-241	1.1708E+03	1.1755E+03	6.214E-01%		1.14E+01
CD-109	3.9282E+03	1.5779E+04	9.701E-01%		2.45E+02
CO-57	3.1587E+01	3.3677E+02	2.653E+00%		1.75E+01
Ce-139	4.7936E+00	5.1324E+02	1.469E+01%		1.78E+02
Hg-203 #A	5.6505E-01	>12 Halflives	1.3187E+02%	2.4725E+00	
SN-113	5.4311E+00	1.4529E+03	2.627E+01%		8.63E+02
CS-137	4.3030E+02	4.5626E+02	8.015E-01%		3.42E+00
Y-898 #	8.2791E+00	3.4565E+03	2.468E+01%		1.61E+03
Co-1173	4.9870E+02	6.9655E+02	8.087E-01%		4.13E+00
Co-1332	4.9753E+02	6.9491E+02	8.032E-01%		2.04E+00
Y-1836	4.2861E+00	1.7894E+03	1.259E+01%		3.31E+02

ORTEC g v - i (3263) Env32 G53W4.25 7/17/2012 12:43:11 PM Page 6
TestAmerica, Inc. Spectrum name: 16_TunaCan2nd_81427_071712.An1

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

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

Total Activity (609.2 to 1999.6 keV) 1.954E+04 Bq/Sample
Total Decayed Activity (609.2 to 1999.6 keV) 4.0374930E+04 Bq/Sample

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: 7_20181221006_BGLong
Description: Background Long PBC Count
Acquired: 12/21/2018 5:57:10 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	1.30	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_20181221006_BGLong.An1

Acquisition information

Start time:	12/21/2018 5:57:10 PM
Live time:	72000
Real time:	72221
Dead time:	0.31 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration

Filename:	7_QC.Clb

Ge7_QC

Energy Calibration

Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration

Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files

Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.13keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3

(Page 2 of 7)

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 14 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0229

***** 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
46.45	501.	11.14	0.94	8.091E-02	46.54	4.250	2.020E+00	PB210
63.25	772.	8.09	1.07	1.228E-01	63.29	3.810	2.289E+00	TH234
74.76	147.	24.15	0.87	1.512E-01				
77.22	175.	19.24	0.87	1.573E-01				
92.55	1001.	6.56	1.44	1.861E-01	92.59	5.584	1.338E+00	TH234
					93.35	5.561	1.342E+00	AC228
185.58	425.	12.26	1.24	1.634E-01	185.72	54.000	6.693E-02	U235
					185.99	3.280	1.103E+00	Ra226
238.53	336.	14.98	1.03	1.417E-01	238.63	43.300	7.606E-02	PB212
510.82	1693.	5.73	2.63	6.490E-02	511.86	20.000	1.815E+00	RH106
582.99	142.	22.97	1.46	5.624E-02	583.02	84.500	4.165E-02	TL208
1000.85	98.	28.40	1.42	2.864E-02	1001.00	0.837	5.649E+00	PA234M
1460.82	103.	22.20	1.23	1.997E-02	1460.83	10.670	6.715E-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	
298.58	74.66	560.	147.	9.748E+02	24.15	0.867	-	sD
308.43	77.13	478.	175.	1.111E+03	19.24	0.870	-	D
2042.98	510.82	682.	1693.	2.609E+04	5.73	2.632	-	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	185.37	46.45	715.	501.	0.007	11.14	0.936s
TH-234	252.57	63.25	750.	772.	0.011	8.09	1.069s
TH-234	369.77	92.55	795.	1001.	0.014	6.56	1.443s
Ra-226	741.91	185.58	573.	425.	0.006	12.26	1.235s
PB-212	953.74	238.53	549.	336.	0.005	14.98	1.031s
TL-208	2331.66	582.99	206.	142.	0.002	22.97	1.465
PA-234M	4003.14	1000.85	108.	98.	0.001	28.40	1.423
K-40	5842.95	1460.82	70.	103.	0.001	22.20	1.232s

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

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

Nuclide Name	Nuclide Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	MDA Value DPS		COMMENTS
K-40	N	6.7149E-01					4.66E+11	
			1460.83	6.715E-01	(	2.718E-01	2.22E+01	1.07E+01 G
TL-208	N	4.1645E-02					6.98E+02	
			583.02	4.165E-02	(	2.036E-02	2.30E+01	8.45E+01 G
			277.28	0.000E+00	%	9.968E-02	1.45E+02	6.31E+00 G
			860.56	0.000E+00	%	1.191E-01	4.14E+01	1.24E+01 G
PB-210	N	2.0197E+00					8.14E+03	
			46.54	2.020E+00	*(	5.128E-01	1.11E+01	4.25E+00 G
PB-212	N	7.6060E-02					6.98E+02	
			238.63	7.606E-02	@(	2.533E-02	1.50E+01	4.33E+01 G
			300.03	0.000E+00	%	2.182E-01	1.00E+03	3.28E+00 GA
TH-234	N	2.2893E+00					1.63E+12	
			63.29	2.289E+00	*(	3.869E-01	8.09E+00	3.81E+00 G
			92.59	1.338E+00	-	1.792E-01	6.56E+00	5.58E+00 G
PA-234M	N	5.6493E+00					1.63E+12	
			1001.00	5.649E+00	?(	2.969E+00	2.84E+01	8.37E-01 G
			766.41	0.000E+00	&	5.075E+00	1.00E+03	2.94E-01 G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Ra-226       1.1027E+00                                        5.84E+05
                            185.99 1.103E+00  (  2.965E-01 1.23E+01 3.28E+00 G
   ( - This peak used in the nuclide activity average.

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

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count   Uncertainty  1 Sigma
 Nuclide    Activity        Counting                   MDA
               DPS
 ____________________________________________________________________________
 BE-7    <    9.5179E-02
 NA-22   <    1.0909E-02
 K-40         6.7149E-01   2.2203E+01%               2.718E-01
 Sc-46   <    1.4633E-02
```

CR-51	<	6.7891E-02		
MN-54	<	1.4961E-02		
FE-59	<	3.2671E-02		
Co-56	<	1.6658E-02		
CO-57	<	4.0577E-03		
CO-58	<	1.0752E-02		
CO-60	<	1.9661E-02		
ZN-65	<	5.1803E-02		
NB-94	<	1.4689E-02		
ZR-95	<	2.2414E-02		
NB-95	<	2.7503E-02		
RU-103	<	1.1646E-02		
RH-106	<	1.3019E-01		
AG-108M	<	9.8438E-03		
AG-110M	<	1.9206E-02		
SN-113	<	1.1555E-02		
SB-124	<	1.3376E-02		
SB-125	<	2.7694E-02		
I-131	<	9.4648E-03		
BA-133	<	2.1281E-02		
CS-134	<	1.3454E-02		
CS-137	<	2.9186E-02		
CE-139	<	9.0263E-03		
Ba-140	<	4.3509E-02		
La-140	<	2.6304E-02		
CE-141	<	9.6844E-03		
CE-144	<	4.1059E-02		
PM-144	<	1.7403E-02		
EU-152	<	2.7534E-02		
EU-154	<	1.3231E-01		
EU-155	<	2.2237E-02		
HF-181	<	1.2118E-02		
Ta-182	<	1.0799E-01		
Hg-203	<	1.5503E-02		
TL-208		4.1645E-02	2.2974E+01%	2.036E-02
pm-146	<	4.4673E-02		
y-88	<	2.2299E-02		
PB-210	#	2.0197E+00	1.1145E+01%	5.128E-01
PB-212	#	7.6060E-02	1.4976E+01%	2.533E-02
PB-214	<	3.0416E-02		
BI-207	<	2.1869E-02		
BI-212	<	2.7512E-01		
BI-214	<	2.9676E-02		
BI-210M	<	1.1090E-02		
RA-224	<	2.3001E-01		
AC-228	<	8.5365E-02		
TH-227	<	6.5654E-02		
TH-229	<	1.1500E-01		
TH-234	#	2.2893E+00	8.0931E+00%	3.869E-01

PA-231	<	3.0882E-01		
PA-233	<	1.9633E-02		
PA-234	<	3.2141E-02		
PA-234M#		5.6493E+00	2.8397E+01%	2.969E+00
Ra-226 #		1.1027E+00	1.2265E+01%	2.965E-01
U-235	<	4.5831E-02		
AM-241	<	3.7490E-02		
Np-237	<	6.2680E-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) 1.185E+01 DPS

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Test America
St. Louis
Background Check

Spectrum: 9_20181221008_BGLong
Description: Background Long PBC Count
Acquired: 12/21/2018 5:54:59 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	1.83	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_20181221008_BGLong.An1

Acquisition information
Start time: 12/21/2018 5:54:59 PM
Live time: 72000
Real time: 72081
Dead time: 0.11 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_QC.Clb
9_QC-E_79670-334_060211

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

Efficiency Calibration
Created: 6/3/2011 12:03:10 PM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.59keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1308

***** 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
139.77	211.	23.17	0.85	1.565E-01				
198.64	202.	24.70	0.97	1.357E-01				
295.15	214.	25.63	1.82	1.047E-01	295.09	19.300	1.473E-01	PB214
351.85	294.	21.82	1.34	8.639E-02	351.93	37.600	1.258E-01	PB214
510.98	2537.	4.64	2.71	6.208E-02	511.86	20.000	2.842E+00	RH106
609.54	294.	18.17	1.56	5.256E-02	609.31	46.090	1.686E-01	BI214
					610.30	5.750	1.354E+00	RU103
1120.64	86.	28.77	1.08	2.761E-02	1120.29	15.100	2.876E-01	BI214
					1120.55	99.987	4.344E-02	Sc46
1460.87	322.	12.30	1.98	2.339E-02	1460.83	10.670	1.792E+00	K40
1763.92	136.	16.53	3.17	2.159E-02	1764.49	15.400	5.694E-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	
558.62	139.77	656.	211.	1.350E+03	23.17	0.849	-	sM
794.03	198.72	686.	202.	1.489E+03	24.70	0.966	-	M
2043.28	510.98	971.	2537.	4.087E+04	4.64	2.711	-	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.

(Page 3 of 7)

This section based on library: DET_Long Background PBC.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-214	1180.02	295.15	647.	214.	0.003	25.63	1.823s
PB-214	1406.80	351.85	742.	294.	0.004	21.82	1.340s
BI-214	2437.55	609.54	496.	294.	0.004	18.17	1.558s
BI-214	4482.48	1120.64	114.	86.	0.001	28.77	1.077s
K-40	5844.17	1460.87	141.	322.	0.004	12.30	1.983
BI-214	7057.38	1763.92	51.	136.	0.002	16.53	3.165s

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

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

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	MDA Value DPS	COMMENTS
K-40	N	1.7918E+00				4.66E+11	
			1460.83	1.792E+00	(	3.230E-01 1.23E+01 1.07E+01	G
PB-214	N	1.3313E-01				5.84E+05	
			351.93	1.258E-01	(	5.542E-02 2.18E+01 3.76E+01	G
			295.09	1.473E-01	*(	8.332E-02 2.56E+01 1.93E+01	G
			242.00	0.000E+00	%	1.148E-01 5.10E+01 7.43E+00	GA
BI-214	N	1.6859E-01				5.84E+05	
			609.31	1.686E-01	@(	6.102E-02 1.82E+01 4.61E+01	G
			1120.29	2.876E-01	+	1.745E-01 2.88E+01 1.51E+01	G
			1764.49	5.694E-01	+	1.498E-01 1.65E+01 1.54E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.

= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	1.5825E-01		
NA-22	<	3.3604E-02		
K-40		1.7918E+00	1.2296E+01%	3.230E-01
Sc-46	<	3.1858E-02		
CR-51	<	1.0580E-01		
MN-54	<	1.8952E-02		
FE-59	<	3.9286E-02		
Co-56	<	2.3182E-02		
CO-57	<	6.7614E-03		
CO-58	<	2.3326E-02		
CO-60	<	2.0979E-02		
ZN-65	<	5.5564E-02		
NB-94	<	1.1008E-02		
ZR-95	<	2.7951E-02		
NB-95	<	1.0190E-02		
RU-103	<	1.3195E-02		
RH-106	<	2.3895E-01		
AG-108M	<	1.3462E-02		
AG-110M	<	3.6510E-02		
SN-113	<	2.0763E-02		
SB-124	<	1.7841E-02		

SB-125	<	4.4020E-02		
I-131	<	1.4498E-02		
BA-133	<	1.6170E-02		
CS-134	<	2.4550E-02		
CS-137	<	1.8194E-02		
CE-139	<	9.0350E-03		
Ba-140	<	5.0969E-02		
La-140	<	1.9931E-02		
CE-141	<	2.4485E-02		
CE-144	<	1.1719E-01		
PM-144	<	2.4930E-02		
EU-152	<	6.8020E-02		
EU-154	<	1.5419E-01		
EU-155	<	3.1820E-02		
HF-181	<	1.0711E-02		
Ta-182	<	9.5875E-02		
Hg-203	<	1.1174E-02		
TL-208	<	1.7386E-02		
pm-146	<	4.3156E-02		
y-88	<	2.3761E-02		
PB-210	<	4.2222E-01		
PB-212	<	1.9426E-02		
PB-214	#	1.3313E-01	1.6830E+01%	5.542E-02
BI-207	<	2.4102E-02		
BI-212	<	3.8066E-01		
BI-214		1.6859E-01	1.8167E+01%	6.102E-02
BI-210M	<	1.5488E-02		
RA-224	<	2.1680E-01		
AC-228	<	1.0235E-01		
TH-227	<	6.7217E-02		
TH-229	<	1.8434E-01		
TH-234	<	4.9926E-01		
PA-231	<	3.5608E-01		
PA-233	<	2.5189E-02		
PA-234	<	2.7736E-02		
PA-234M	<	2.1082E+00		
Ra-226	<	4.1686E-01		
U-235	<	5.0129E-02		
AM-241	<	5.3234E-02		
Np-237	<	7.4750E-02		

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

```
-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   37.6 to  1999.3 keV)     2.093E+00  DPS
```

Test America
St. Louis
Background Check

Spectrum: 12_20181221008_BGLong
Description: Background Long PBC Count
Acquired: 12/21/2018 7:31:04 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	2.00	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_20181221008_BGLong.An1

Acquisition information
Start time: 12/21/2018 7:31:04 PM
Live time: 72000
Real time: 72041
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

Half lives decay limit:	12.000
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
46.63	1357.	5.07	0.84	5.842E-02				
63.31	866.	7.76	0.84	7.856E-02				
74.80	273.	17.66	0.88	9.245E-02				
77.21	216.	20.20	0.88	9.536E-02				
92.58	1199.	5.56	1.06	1.066E-01				
185.69	688.	10.61	0.94	8.764E-02				
198.31	198.	26.98	0.78	8.618E-02				
238.43	397.	13.96	1.08	8.153E-02				
294.89	256.	16.28	0.88	7.498E-02				
351.70	382.	12.09	1.33	6.839E-02				
510.87	2362.	4.51	2.49	4.994E-02				
802.60	154.	25.48	1.34	2.864E-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	
186.15	46.63	1013.	1357.	2.323E+04	5.07	0.842	-	
252.81	63.31	1097.	866.	1.103E+04	7.76	0.840	-	
298.76	74.81	1025.	273.	2.952E+03	17.66	0.880	-	D
308.41	77.22	846.	216.	2.268E+03	20.20	0.883	-	sD
369.82	92.58	973.	1199.	1.124E+04	5.56	1.057	-	
742.06	185.69	1070.	688.	7.850E+03	10.61	0.945	-	
792.53	198.27	762.	198.	2.303E+03	26.98	0.781	-	s
952.93	238.43	731.	397.	4.874E+03	13.96	1.084	-	
1178.67	294.89	443.	256.	3.410E+03	16.28	0.879	-	

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
1405.84	351.70	456.	382.	5.583E+03	12.09	1.332	- s
2042.36	510.87	868.	2362.	4.729E+04	4.51	2.491	-
3209.36	802.60	252.	154.	5.378E+03	25.48	1.338	-

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:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

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  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
```

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Test America
St. Louis
Background Check

Spectrum: 14_20181221007_BGLong
Description: Background Long PBC Count
Acquired: 12/21/2018 5:54:03 PM
Detector: Detector #14
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.80	1.66	1.71	1.77	1.90	1.94	PASS

Analyst: Joey Sausto Reviewer:

(Page 1 of 7)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det14\14_20181221007_BGLong.An1

Acquisition information
Start time: 12/21/2018 5:54:03 PM
Live time: 72000
Real time: 72024
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

Half lives decay limit: 12.000
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. 12 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1752

***** 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	758.	9.18	0.87	6.124E-02	46.54	4.250	4.044E+00	PB210
63.34	670.	8.86	0.90	8.544E-02	63.29	3.810	2.860E+00	TH234
74.98	206.	20.08	0.78	1.023E-01				
77.09	166.	24.79	0.78	1.053E-01				
92.62	965.	7.19	1.11	1.215E-01	92.59	5.584	1.977E+00	TH234
					93.35	5.561	1.984E+00	AC228
185.49	510.	11.96	1.00	1.072E-01	185.72	54.000	1.225E-01	U235
238.30	303.	14.76	1.23	9.398E-02	238.63	43.300	1.035E-01	PB212
294.88	138.	26.64	1.07	7.973E-02	295.09	19.300	1.243E-01	PB214
351.48	246.	19.52	0.83	6.558E-02	351.93	37.600	1.390E-01	PB214
510.59	1860.	5.07	2.50	4.543E-02	511.86	20.000	2.849E+00	RH106
583.17	130.	26.31	1.08	3.931E-02	583.02	84.500	5.436E-02	TL208
608.71	252.	16.37	1.27	3.708E-02	609.31	46.090	2.051E-01	BI214
					610.30	5.750	1.647E+00	RU103
1460.93	129.	19.10	2.45	1.557E-02	1460.83	10.670	1.078E+00	K40
1764.56	71.	23.03	2.00	1.327E-02	1764.49	15.400	4.837E-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	
299.31	75.00	752.	206.	2.014E+03	20.08	0.777	-	D
307.72	77.11	762.	166.	1.575E+03	24.79	0.780	-	D
2041.48	510.67	681.	1860.	4.094E+04	5.07	2.499	-	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	185.67	46.56	1062.	758.	0.011	9.18	0.866
TH-234	252.74	63.34	901.	670.	0.009	8.86	0.899s
TH-234	369.83	92.62	1051.	965.	0.013	7.19	1.114s
U-235	741.23	185.49	839.	510.	0.007	11.96	0.997s
PB-212	952.41	238.30	535.	303.	0.004	14.76	1.226s
PB-214	1178.70	294.88	381.	138.	0.002	26.64	1.073
PB-214	1405.07	351.48	477.	246.	0.003	19.52	0.826
TL-208	2331.79	583.17	240.	130.	0.002	26.31	1.079
BI-214	2433.94	608.71	312.	252.	0.004	16.37	1.272s
K-40	5843.98	1460.93	70.	129.	0.002	19.10	2.449s
BI-214	7059.35	1764.56	34.	71.	0.001	23.03	2.005

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	1.0782E+00					4.66E+11	
			1460.83	1.078E+00	(	3.485E-01	1.91E+01	1.07E+01 G
TL-208	N	5.4362E-02					6.98E+02	
			583.02	5.436E-02	(	3.132E-02	2.63E+01	8.45E+01 G
			277.28	0.000E+00	%	1.779E-01	1.17E+02	6.31E+00 G
			860.56	0.000E+00	%	1.642E-01	5.59E+01	1.24E+01 G
PB-210	N	4.0442E+00					8.14E+03	
			46.54	4.044E+00	(	8.254E-01	9.18E+00	4.25E+00 G
PB-212	N	1.0346E-01					6.98E+02	
			238.63	1.035E-01	(	3.775E-02	1.48E+01	4.33E+01 G
			300.03	0.000E+00	%	3.251E-01	9.54E+01	3.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	1.3400E-01					5.84E+05	
			351.93	1.390E-01	(	5.894E-02	1.95E+01	3.76E+01 G
			295.09	1.243E-01	(	8.458E-02	2.66E+01	1.93E+01 G
			242.00	0.000E+00	@	2.210E-01	0.00E+00	7.43E+00 GA
BI-214	N	2.0505E-01					5.84E+05	
			609.31	2.051E-01	*(	6.906E-02	1.64E+01	4.61E+01 G
			1120.29	0.000E+00	%	1.945E-01	6.90E+01	1.51E+01 G
			1764.49	4.837E-01	+	2.026E-01	2.30E+01	1.54E+01 G
TH-234	N	2.8597E+00					1.63E+12	
			63.29	2.860E+00	*(	6.090E-01	8.86E+00	3.81E+00 G
			92.59	1.977E+00	-	3.149E-01	7.19E+00	5.58E+00 G
U-235	N	1.2248E-01					2.57E+11	
			185.72	1.225E-01		3.304E-02	1.20E+01	5.40E+01 GA
			143.79	0.000E+00	%	8.944E-02	3.73E+01	1.10E+01 G
			205.33	0.000E+00	%	2.117E-01	1.00E+03	5.01E+00 G
			163.38	0.000E+00	%	2.083E-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	< 2.3421E-01		
NA-22	< 1.8891E-02		
K-40	1.0782E+00	1.9104E+01%	3.485E-01
Sc-46	< 2.5634E-02		
CR-51	< 1.1372E-01		
MN-54	< 2.0504E-02		
FE-59	< 4.6002E-02		
Co-56	< 2.2130E-02		
CO-57	< 8.5936E-03		
CO-58	< 1.9215E-02		
CO-60	< 2.6705E-02		
ZN-65	< 5.1121E-02		
NB-94	< 2.1179E-02		
ZR-95	< 3.5189E-02		
NB-95	< 3.4221E-02		
RU-103	< 1.6491E-02		
RH-106	< 1.9493E-01		
AG-108M	< 1.5032E-02		
AG-110M	< 3.5959E-02		
SN-113	< 2.0319E-02		
SB-124	< 2.7788E-02		
SB-125	< 4.5330E-02		
I-131	< 1.6524E-02		
BA-133	< 3.1308E-02		
CS-134	< 2.1663E-02		
CS-137	< 2.2819E-02		
CE-139	< 1.6969E-02		
Ba-140	< 5.6800E-02		
La-140	< 2.8257E-02		
CE-141	< 2.1250E-02		
CE-144	< 9.2003E-02		
PM-144	< 2.6693E-02		
EU-152	< 4.2361E-02		
EU-154	< 1.6091E-01		
EU-155	< 3.8377E-02		

HF-181	<	2.5499E-02		
Ta-182	<	9.6938E-02		
Hg-203	<	1.9980E-02		
TL-208		5.4362E-02	2.6312E+01%	3.132E-02
pm-146	<	5.8445E-02		
y-88	<	2.2332E-02		
PB-210		4.0442E+00	9.1751E+00%	8.254E-01
PB-212		1.0346E-01	1.4759E+01%	3.775E-02
PB-214		1.3400E-01	1.6514E+01%	5.894E-02
BI-207	<	2.6899E-02		
BI-212	<	3.1226E-01		
BI-214		2.0505E-01	1.6372E+01%	6.906E-02
BI-210M	<	2.0625E-02		
RA-224	<	4.3652E-01		
AC-228	<	7.7039E-02		
TH-227	<	1.3025E-01		
TH-229	<	2.3320E-01		
TH-234	#	2.8597E+00	8.8645E+00%	6.090E-01
PA-231	<	4.8506E-01		
PA-233	<	3.1119E-02		
PA-234	<	6.9465E-02		
PA-234M	<	2.7232E+00		
Ra-226	<	6.5852E-01		
U-235	#	1.2248E-01	1.1960E+01%	3.304E-02
AM-241	<	3.3947E-02		
Np-237	<	1.1499E-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)     8.601E+00  DPS
```

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Test America
St. Louis
Background Check

Spectrum: 16_20181221007_BGLong
Description: Background Long PBC Count
Acquired: 12/21/2018 5:57:11 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	2.65	2.80	2.86	PASS

Analyst: Joey Sausto Reviewer:

(Page 1 of 8)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det16\16_20181221007_BGLong.An1

Acquisition information
Start time: 12/21/2018 5:57:11 PM
Live time: 72000
Real time: 72092
Dead time: 0.13 %
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. 21 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1025

***** 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
46.49	1620.	4.69	1.11	7.065E-02	46.54	4.250	7.483E+00	PB210
59.51	232.	22.05	0.97	8.954E-02	59.54	35.900	1.000E-01	AM241
63.27	1063.	7.95	1.05	9.494E-02	63.29	3.810	4.081E+00	TH234
74.91	444.	13.60	0.99	1.118E-01				
77.19	283.	19.91	0.99	1.151E-01				
84.35	495.	16.19	1.26	1.255E-01				
92.68	1640.	5.44	1.22	1.312E-01	92.59	5.584	3.109E+00	TH234
					93.35	5.561	3.121E+00	AC228
185.71	682.	10.06	1.19	1.130E-01	185.72	54.000	1.551E-01	U235
					185.99	3.280	2.555E+00	Ra226
198.13	238.	25.93	1.58	1.097E-01				
238.54	530.	10.91	1.13	9.904E-02	238.63	43.300	1.716E-01	PB212
294.87	358.	17.06	1.03	8.415E-02	295.09	19.300	3.067E-01	PB214
351.77	439.	10.28	1.50	6.910E-02	351.93	37.600	2.346E-01	PB214
510.86	2517.	3.94	2.52	4.941E-02	511.86	20.000	3.548E+00	RH106
569.92	108.	29.00	1.24	4.480E-02	569.70	97.740	3.436E-02	BI207
					569.32	15.380	2.182E-01	CS134
					569.47	8.200	4.094E-01	PA234
582.82	257.	17.25	1.72	4.377E-02	583.02	84.500	9.638E-02	TL208
609.54	420.	13.51	1.40	4.172E-02	609.31	46.090	3.032E-01	BI214
					610.30	5.750	2.435E+00	RU103
1120.74	137.	26.53	1.14	2.235E-02	1120.29	15.100	5.639E-01	BI214
					1120.55	99.987	8.518E-02	Sc46
					1121.30	34.900	2.442E-01	Ta182
1460.62	388.	9.03	2.17	1.797E-02	1460.83	10.670	2.811E+00	K40
1764.29	174.	16.96	2.16	1.550E-02	1764.49	15.400	1.015E+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
299.30	74.93	1599.	444.	3.969E+03	13.60	0.986	- D
308.40	77.21	1442.	283.	2.455E+03	19.91	0.988	- sD
337.05	84.35	1616.	495.	3.945E+03	16.19	1.263	- sM
791.96	198.13	1020.	238.	2.169E+03	25.93	1.577	- sM
2042.54	510.02	917.	2517.	5.094E+04	3.94	2.521	-

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	185.65	46.49	1188.	1620.	0.022	4.69	1.114
AM-241	237.83	59.54	1187.	232.	0.003	22.05	0.971D
TH-234	252.82	63.29	1295.	987.	0.014	6.06	0.975D
TH-234	370.32	92.68	1652.	1640.	0.023	5.44	1.219s
Ra-226	742.31	185.71	1148.	682.	0.009	10.06	1.186s
PB-212	953.55	238.54	842.	530.	0.007	10.91	1.129
PB-214	1178.78	294.87	811.	358.	0.005	17.06	1.029s
PB-214	1406.34	351.77	478.	439.	0.006	10.28	1.500s
BI-207	2278.77	569.92	264.	108.	0.002	29.00	1.243
TL-208	2330.36	582.82	393.	257.	0.004	17.25	1.722s
BI-214	2437.24	609.54	560.	420.	0.006	13.51	1.403s
BI-214	4482.23	1120.74	203.	137.	0.002	26.53	1.143s
K-40	5842.32	1460.62	120.	388.	0.005	9.03	2.175
BI-214	7057.81	1764.29	82.	174.	0.002	16.96	2.158s

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	2.8109E+00					4.66E+11	
			1460.83	2.811E+00	(	3.895E-01	9.03E+00 1.07E+01	G
TL-208	N	9.6378E-02					6.98E+02	
			583.02	9.638E-02	@(	3.572E-02	1.73E+01 8.45E+01	G
			277.28	0.000E+00	&	1.965E-01	8.23E+01 6.31E+00	G
			860.56	0.000E+00	%	2.162E-01	5.50E+01 1.24E+01	G
PB-210	N	7.4835E+00					8.14E+03	
			46.54	7.483E+00	(	7.546E-01	4.69E+00 4.25E+00	G
PB-212	N	1.7158E-01					6.98E+02	
			238.63	1.716E-01	(	4.469E-02	1.09E+01 4.33E+01	G
			300.03	0.000E+00	%	3.701E-01	4.56E+01 3.28E+00	GA
PB-214	N	2.3463E-01					5.84E+05	
			351.93	2.346E-01	(	5.596E-02	1.03E+01 3.76E+01	G
			295.09	3.067E-01	+	1.159E-01	1.71E+01 1.93E+01	G
			242.00	0.000E+00	&	2.534E-01	0.00E+00 7.43E+00	GA
BI-207	C	3.4361E-02					1.18E+04	
			569.70	3.436E-02	(	2.486E-02	2.90E+01 9.77E+01	G
			1063.66	0.000E+00	&	4.010E-02	1.00E+03 7.45E+01	G
BI-214	N	3.0320E-01					5.84E+05	
			609.31	3.032E-01	*(	8.157E-02	1.35E+01 4.61E+01	G
			1120.29	5.639E-01	+	2.844E-01	2.65E+01 1.51E+01	G
			1764.49	1.015E+00	+	2.620E-01	1.70E+01 1.54E+01	G
TH-234	N	3.7872E+00					1.63E+12	
			63.29	3.787E+00	(	6.542E-01	6.06E+00 3.81E+00	G
			92.59	3.109E+00	-	3.642E-01	5.44E+00 5.58E+00	G
Ra-226		2.5552E+00					5.84E+05	
			185.99	2.555E+00	(	6.020E-01	1.01E+01 3.28E+00	G
AM-241	T	1.0004E-01					1.58E+05	
			59.54	1.000E-01	(	7.055E-02	2.21E+01 3.59E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.

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

  Nuclide Codes:                      Peak Codes:
  T - Thermal Neutron Activation      G - Gamma Ray
  F - Fast Neutron Activation         X - X-Ray
  I - Fission Product                 P - Positron Decay
  N - Naturally Occurring Isotope     S - Single-Escape
  P - Photon Reaction                 D - Double-Escape
  C - Charged Particle Reaction       K - Key Line
  M - No MDA Calculation              A - Not in Average
  R - Coincidence Corrected           C - Coincidence Peak
  H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


*************** D I S C A R D E D  I S O T O P E  P E A K S ***************
Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
          Energy   Counts     Counts     Cts/Sec  1 Sigma %
_____________________________________________________________________________
  P - Peakbackground subtraction

*****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count   Uncertainty  1 Sigma
Nuclide    Activity        Counting                  MDA
              DPS
_____________________________________________________________________________
BE-7    <    2.8100E-01
NA-22   <    1.9771E-02
K-40         2.8109E+00   9.0317E+00%              3.895E-01
Sc-46   <    3.8977E-02
CR-51   <    1.3620E-01
MN-54   <    2.4012E-02
FE-59   <    5.1466E-02
Co-56   <    2.8282E-02
CO-57   <    1.8668E-02
CO-58   <    3.2096E-02
CO-60   <    2.4440E-02
ZN-65   <    9.2903E-02
```

NB-94	<	2.4252E-02		
ZR-95	<	3.9868E-02		
NB-95	<	3.4293E-02		
RU-103	<	1.8349E-02		
RH-106	<	2.1579E-01		
AG-108M	<	1.9658E-02		
AG-110M	<	2.0892E-02		
SN-113	<	2.7586E-02		
SB-124	<	3.2666E-02		
SB-125	<	5.8638E-02		
I-131	<	1.7128E-02		
BA-133	<	4.6612E-02		
CS-134	<	3.7479E-02		
CS-137	<	4.8550E-02		
CE-139	<	1.4352E-02		
Ba-140	<	7.5716E-02		
La-140	<	3.3623E-02		
CE-141	<	2.4601E-02		
CE-144	<	1.0448E-01		
PM-144	<	2.5656E-02		
EU-152	<	8.1025E-02		
EU-154	<	3.0851E-01		
EU-155	<	5.1792E-02		
HF-181	<	3.3271E-02		
Ta-182	<	1.0288E-01		
Hg-203	<	2.5992E-02		
TL-208	#	9.6378E-02	1.7254E+01%	3.572E-02
pm-146	<	6.3327E-02		
y-88	<	3.2855E-02		
PB-210		7.4835E+00	4.6927E+00%	7.546E-01
PB-212		1.7158E-01	1.0907E+01%	4.469E-02
PB-214		2.3463E-01	1.0279E+01%	5.596E-02
BI-207		3.4361E-02	2.9003E+01%	2.486E-02
BI-212	<	4.1017E-01		
BI-214	#	3.0320E-01	1.3511E+01%	8.157E-02
BI-210M	<	2.3623E-02		
RA-224	<	4.8226E-01		
AC-228	<	1.3758E-01		
TH-227	<	1.0263E-01		
TH-229	<	2.6981E-01		
TH-234	#	3.7872E+00	6.0619E+00%	6.542E-01
PA-231	<	5.7293E-01		
PA-233	<	3.6598E-02		
PA-234	<	1.0078E-01		
PA-234M	<	3.3219E+00		
Ra-226	#	2.5552E+00	1.0057E+01%	6.020E-01
U-235	<	1.0540E-01		
AM-241	#	1.0004E-01	2.2050E+01%	7.055E-02
Np-237	<	1.4346E-01		

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   37.6 to  1999.6 keV)     1.758E+01  DPS
```

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Test America
St. Louis
Background Check

Spectrum: 17_20181221006_BGLong
Description: Background Long PBC Count
Acquired: 12/21/2018 5:59:29 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	2.34	2.42	2.46	PASS

Analyst: Joey Sausto Reviewer:

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Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det17\17_20181221006_BGLong.An1

Acquisition information
Start time: 12/21/2018 5:59:29 PM
Live time: 72000
Real time: 72380
Dead time: 0.53 %
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. 23 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1401

***** 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
46.70	1355.	5.41	0.80	5.960E-02	46.54	4.250	7.454E+00	PB210
63.34	1149.	6.17	0.79	8.044E-02	63.29	3.810	5.212E+00	TH234
75.07	323.	15.21	0.80	9.513E-02				
77.21	207.	22.99	0.80	9.781E-02				
84.63	375.	17.03	1.49	1.071E-01				
92.68	1688.	5.07	0.91	1.119E-01	92.59	5.584	3.751E+00	TH234
					93.35	5.561	3.764E+00	AC228
139.68	235.	22.82	1.01	1.105E-01				
185.62	906.	8.04	0.97	9.858E-02	185.72	54.000	2.364E-01	U235
					185.99	3.280	3.895E+00	Ra226
198.28	158.	29.16	0.91	9.571E-02				
238.41	364.	15.45	0.97	8.659E-02	238.63	43.300	1.347E-01	PB212
295.18	138.	29.91	0.70	7.370E-02	295.09	19.300	1.347E-01	PB214
351.81	423.	11.70	0.94	6.083E-02	351.93	37.600	2.570E-01	PB214
510.91	2255.	4.08	2.50	4.373E-02	511.86	20.000	3.586E+00	RH106
582.88	180.	19.94	0.90	3.888E-02	583.02	84.500	7.611E-02	TL208
609.04	275.	17.20	1.23	3.712E-02	609.31	46.090	2.235E-01	BI214
898.45	134.	25.23	2.90	2.378E-02	898.04	93.700	8.364E-02	y88
1000.63	146.	23.09	1.29	2.198E-02	1001.00	0.837	1.102E+01	PA234M
1120.22	116.	22.88	1.55	1.989E-02	1120.29	15.100	5.341E-01	BI214
					1120.55	99.987	8.068E-02	Sc46
					1121.30	34.900	2.313E-01	Ta182
1460.72	242.	13.60	2.17	1.608E-02	1460.83	10.670	1.954E+00	K40
1764.22	105.	17.19	0.64	1.381E-02	1764.49	15.400	6.880E-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
299.70	75.09	1046.	323.	3.397E+03	15.21	0.802	- D
308.25	77.23	1033.	207.	2.121E+03	22.99	0.804	- D
337.92	84.69	1170.	375.	3.500E+03	17.03	1.486	- sM
558.00	139.68	880.	235.	2.127E+03	22.82	1.010	- sM
792.34	198.28	697.	158.	1.654E+03	29.16	0.909	- M
2042.51	510.91	777.	2255.	5.156E+04	4.08	2.503	- 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	186.26	46.70	1150.	1355.	0.019	5.41	0.796
TH-234	252.82	63.34	1162.	1149.	0.016	6.17	0.790
TH-234	370.10	92.68	1470.	1688.	0.023	5.07	0.912s
Ra-226	741.72	185.62	1101.	906.	0.013	8.04	0.968s
PB-212	952.80	238.41	798.	364.	0.005	15.45	0.967s
PB-214	1179.78	295.18	522.	138.	0.002	29.91	0.701s
PB-214	1406.23	351.81	507.	423.	0.006	11.70	0.942s
TL-208	2330.39	582.88	289.	180.	0.002	19.94	0.903s
BI-214	2435.03	609.04	472.	275.	0.004	17.20	1.226
y-88	3592.73	898.45	196.	134.	0.002	25.23	2.901s
PA-234M	4001.57	1000.63	180.	146.	0.002	23.09	1.287
BI-214	4480.09	1120.22	130.	116.	0.002	22.88	1.552
K-40	5842.80	1460.72	122.	242.	0.003	13.60	2.167
BI-214	7057.77	1764.22	48.	105.	0.001	17.19	0.644s

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	1.9543E+00					4.66E+11	
			1460.83	1.954E+00	?(	4.393E-01	1.36E+01	1.07E+01 G
TL-208	N	7.6112E-02					6.98E+02	
			583.02	7.611E-02	(	3.464E-02	1.99E+01	8.45E+01 G
			277.28	0.000E+00	&	2.159E-01	1.00E+03	6.31E+00 G
			860.56	0.000E+00	%	2.018E-01	6.68E+01	1.24E+01 G
y-88	F	8.3635E-02					1.07E+02	
			898.04	8.364E-02	(	4.234E-02	2.52E+01	9.37E+01 G
			1836.06	0.000E+00	%	3.188E-02	1.00E+03	9.92E+01 G
PB-210	N	7.4541E+00					8.14E+03	
			46.54	7.454E+00	(	8.842E-01	5.41E+00	4.25E+00 G
PB-212	N	1.3473E-01					6.98E+02	
			238.63	1.347E-01	(	4.978E-02	1.55E+01	4.33E+01 G
			300.03	0.000E+00	%	4.113E-01	1.00E+03	3.28E+00 GA
PB-214	N	2.5698E-01					5.84E+05	
			351.93	2.570E-01	*(	6.539E-02	1.17E+01	3.76E+01 G
			295.09	1.347E-01	-	1.066E-01	2.99E+01	1.93E+01 G
			242.00	0.000E+00		2.566E-01	0.00E+00	7.43E+00 GA
BI-214	N	2.2351E-01					5.84E+05	
			609.31	2.235E-01	(	8.442E-02	1.72E+01	4.61E+01 G
			1120.29	5.341E-01	+	2.578E-01	2.29E+01	1.51E+01 G
			1764.49	6.880E-01	+	2.278E-01	1.72E+01	1.54E+01 G
TH-234	N	5.2119E+00					1.63E+12	
			63.29	5.212E+00	(	7.328E-01	6.17E+00	3.81E+00 G
			92.59	3.751E+00	-	4.033E-01	5.07E+00	5.58E+00 G
PA-234M	N	1.1023E+01					1.63E+12	
			1001.00	1.102E+01	(	4.925E+00	2.31E+01	8.37E-01 G
			766.41	0.000E+00	&	8.694E+00	1.00E+03	2.94E-01 G
Ra-226		3.8948E+00					5.84E+05	
			185.99	3.895E+00	@(	6.764E-01	8.04E+00	3.28E+00 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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


*************** 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    <    1.5436E-01
NA-22   <    2.1434E-02
K-40   #     1.9543E+00   1.3599E+01%               4.393E-01
Sc-46   <    4.3957E-02
CR-51   <    1.3632E-01
MN-54   <    2.7381E-02
FE-59   <    5.1765E-02
Co-56   <    2.7778E-02
CO-57   <    1.9058E-02
CO-58   <    3.4040E-02
CO-60   <    2.9723E-02
```

ZN-65	<	9.1763E-02		
NB-94	<	2.5647E-02		
ZR-95	<	4.5218E-02		
NB-95	<	4.2047E-02		
RU-103	<	1.8206E-02		
RH-106	<	2.1508E-01		
AG-108M	<	1.7306E-02		
AG-110M	<	4.9848E-02		
SN-113	<	2.5324E-02		
SB-124	<	3.4448E-02		
SB-125	<	5.1635E-02		
I-131	<	1.8310E-02		
BA-133	<	4.4177E-02		
CS-134	<	3.5941E-02		
CS-137	<	2.5756E-02		
CE-139	<	2.1850E-02		
Ba-140	<	6.0542E-02		
La-140	<	2.7001E-02		
CE-141	<	2.6045E-02		
CE-144	<	8.0145E-02		
PM-144	<	2.6534E-02		
EU-152	<	7.5955E-02		
EU-154	<	2.1651E-01		
EU-155	<	4.3168E-02		
HF-181	<	1.8914E-02		
Ta-182	<	1.1162E-01		
Hg-203	<	2.7841E-02		
TL-208		7.6112E-02	1.9937E+01%	3.464E-02
pm-146	<	6.7921E-02		
y-88	#	8.3635E-02	2.5231E+01%	4.234E-02
PB-210		7.4541E+00	5.4132E+00%	8.842E-01
PB-212	#	1.3473E-01	1.5452E+01%	4.978E-02
PB-214	#	2.5698E-01	1.1704E+01%	6.539E-02
BI-207	<	3.4408E-02		
BI-212	<	4.3382E-01		
BI-214		2.2351E-01	1.7204E+01%	8.442E-02
BI-210M	<	2.4783E-02		
RA-224	<	5.1666E-01		
AC-228	<	1.2829E-01		
TH-227	<	1.3217E-01		
TH-229	<	2.9179E-01		
TH-234		5.2119E+00	6.1678E+00%	7.328E-01
PA-231	<	4.1787E-01		
PA-233	<	3.8561E-02		
PA-234	<	8.3003E-02		
PA-234M		1.1023E+01	2.3085E+01%	4.925E+00
Ra-226	#	3.8948E+00	8.0430E+00%	6.764E-01
U-235	<	1.7757E-01		
AM-241	<	7.4703E-02		

Np-237 < 1.6185E-01

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

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

Total Activity (37.6 to 1999.5 keV) 3.031E+01 DPS

Run Logs

Gamma Spectroscopy Run Log

Detector: GV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/26/12 06:37		IC 160-12306/1		12306			JLW
04/02/12 14:43		ICV 160-12306/2		12306			JLW
12/21/18 17:57		ICB 160-407300/1		407300			RTM
01/03/19 00:03		CCV 160-408900/1		408900			
01/03/19 00:25		CCV 160-408900/2		408900			
01/03/19 01:12		CCB 160-408900/3		408900			
01/03/19 02:04	120	490-164491-10	CUF-BS-EB04-20181206	408900	405454	901.1	RTM
01/03/19 08:41	120	ZZZZZ		408900			
01/03/19 11:47	60	ZZZZZ		408900			
01/03/19 12:52	30	ZZZZZ		408900			
01/03/19 13:39	60	ZZZZZ		408900			
01/03/19 14:44	60	ZZZZZ		408900			

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
12/21/18 17:54		ICB 160-407298/1		407298			RTM
01/02/19 00:06		CCB 160-408603/1		408603			RTM
01/02/19 00:47		CCV 160-408603/2		408603			
01/02/19 01:07		CCV 160-408603/3		408603			RTM
01/02/19 01:38	60	ZZZZZ		408603			
01/02/19 02:45	120	ZZZZZ		408603			
01/02/19 12:53	30	MB 160-405451/1-A		408603	405451	901.1	RTM
01/02/19 13:30	30	490-164491-4	CUF-BS-BG11-11.2/13.2-20181206	408603	405451	901.1	RTM
01/02/19 14:11	30	490-164491-8	CUF-BS-BG12-10.6/12.6-20181206	408603	405451	901.1	RTM
01/02/19 14:51	30	ZZZZZ		408603			
01/02/19 15:29	30	ZZZZZ		408603			
01/02/19 16:13	30	ZZZZZ		408603			
01/02/19 16:55	30	ZZZZZ		408603			

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
12/21/18 19:31		ICB 160-407296/1		407296			RTM
01/02/19 00:01		CCB 160-408602/1		408602			RTM
01/02/19 00:47		CCV 160-408602/2		408602			
01/02/19 01:08		CCV 160-408602/3		408602			RTM
01/02/19 01:33	60	ZZZZZ		408602			
01/02/19 12:54	30	LCS 160-405451/2-A		408602	405451	901.1	RTM
01/02/19 13:31	30	490-164491-5	CUF-BS-BG11-0.0/0.5-20181206	408602	405451	901.1	RTM
01/02/19 14:12	30	490-164491-9	CUF-BS-BG12-0.0/0.5-20181206	408602	405451	901.1	RTM
01/02/19 14:53	30	490-164491-8 DU	CUF-BS-BG12-10.6/12.6-20181206 DU	408602	405451	901.1	RTM
01/02/19 15:29	30	ZZZZZ		408602			

Gamma Spectroscopy Run Log

Detector: GV12 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
01/02/19 16:14	30	ZZZZZ		408602			

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
04/23/12 09:56		IC 160-12359/1		12359			JLW
04/24/12 08:12		ICV 160-12359/2		12359			JLW
12/21/18 17:54		ICB 160-407292/1		407292			RTM
01/02/19 00:00		CCV 160-408606/1		408606			
01/02/19 00:22		CCV 160-408606/2		408606			RTM
01/02/19 00:48		CCB 160-408606/3		408606			RTM
01/02/19 01:31	60	ZZZZZ		408606			
01/02/19 10:39	120	ZZZZZ		408606			
01/02/19 12:54	30	490-164491-2	CUF-BS-BG11-1.0/3.0-20 181206	408606	405451	901.1	RTM
01/02/19 13:30	30	490-164491-6	CUF-BS-BG12-2.5/4.5-20 181206	408606	405451	901.1	RTM
01/02/19 14:12	30	ZZZZZ		408606			
01/02/19 14:52	30	ZZZZZ		408606			
01/02/19 15:29	30	ZZZZZ		408606			
01/02/19 16:15	30	ZZZZZ		408606			
01/03/19 00:04		CCV 160-408894/1		408894			
01/03/19 00:28		CCV 160-408894/2		408894			
01/03/19 00:48		CCV 160-408894/3		408894			CDR
01/03/19 01:07		CCB 160-408894/4		408894			
01/03/19 02:00	120	MB 160-405454/1-A		408894	405454	901.1	CDR
01/03/19 08:50	120	ZZZZZ		408894			
01/03/19 11:39	120	ZZZZZ		408894			
01/03/19 13:45	60	ZZZZZ		408894			
01/03/19 15:15	60	ZZZZZ		408894			
01/03/19 20:37	60	ZZZZZ		408894			

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
07/10/12 10:35		IC 160-12382/1		12382			JLW
07/17/12 11:27		ICV 160-12382/2		12382			JLW
12/21/18 17:57		ICB 160-407290/1		407290			RTM
01/02/19 00:01		CCV 160-408607/1		408607			
01/02/19 00:23		CCV 160-408607/2		408607			RTM
01/02/19 00:47		CCB 160-408607/3		408607			RTM
01/02/19 01:32	60	ZZZZZ		408607			
01/02/19 10:41	120	ZZZZZ		408607			
01/02/19 12:55	30	490-164491-3	CUF-BS-BG11-6.5/8.5-20 181206	408607	405451	901.1	RTM
01/02/19 13:32	30	490-164491-7	CUF-BS-BG12-6.5/8.5-20 181206	408607	405451	901.1	RTM
01/02/19 14:13	30	ZZZZZ		408607			

Gamma Spectroscopy Run Log

Detector: GV16 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
01/02/19 14:54	30	ZZZZZ		408607			
01/02/19 15:30	30	ZZZZZ		408607			
01/03/19 00:00		CCV 160-408895/1		408895			
01/03/19 00:24		CCV 160-408895/2		408895			CDR
01/03/19 01:08		CCB 160-408895/3		408895			
01/03/19 01:57	120	LCS 160-405454/2-A		408895	405454	901.1	CDR
01/03/19 08:46	120	490-164491-1 DU	CUF-BS-FB13-20181206 DU	408895	405454	901.1	CDR
01/03/19 11:41	120	ZZZZZ		408895			
01/03/19 13:46	60	ZZZZZ		408895			
01/03/19 15:17	60	ZZZZZ		408895			

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
12/21/18 17:59		ICB 160-407291/1		407291			RTM
01/03/19 00:00		CCV 160-408896/1		408896			
01/03/19 00:23		CCV 160-408896/2		408896			CDR
01/03/19 01:09		CCB 160-408896/3		408896			
01/03/19 01:56	120	490-164491-1	CUF-BS-FB13-20181206	408896	405454	901.1	CDR
01/03/19 08:49	120	ZZZZZ		408896			
01/03/19 11:42	120	ZZZZZ		408896			
01/03/19 13:48	60	ZZZZZ		408896			
01/03/19 15:18	60	ZZZZZ		408896			

Subcontract Data

Shipping and Receiving Documents

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
Nashville, TN

COOLER RECEIPT FORM

490-164491 Chain of Custody

Cooler Received/Opened On 12/6/2018 @ 18:10

Time Samples Removed From Cooler_____ Time Samples Placed In Storage_____ (2 Hour Window)

1. Tracking #____NA_____(last 4 digits, FedEx) Courier: Lab

   IR Gun ID 31470366 pH Strip Lot_____ Chlorine Strip Lot_____

2. Temperature of rep. sample or temp blank when opened: 4.8 *Degrees Celsius*

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO...NA

4. Were custody seals on outside of cooler? YES...NO...NA

   If yes, how many and where: 2 Front

5. Were the seals intact, signed, and dated correctly? YES...NO...NA

6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (intial) ACG

7. Were custody seals on containers: YES NO and Intact YES...NO...NA

   Were these signed and dated correctly? YES...NO...NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: Ice Ice-pack Ice (direct contact) Dry ice Other None

10. Did all containers arrive in good condition (unbroken)? YES...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA

12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received? YES...NO...NA

   b. Was there any observable headspace present in any VOA vial? YES...NO...NA

Larger than this.

14. Was there a Trip Blank in this cooler? YES...NO...NA If multiple coolers, sequence # NA

I certify that I unloaded the cooler and answered questions 7-14 (intial) EA

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES...NO...NA

   b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

16. Was residual chlorine present? YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial) EA

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA

18. Did you sign the custody papers in the appropriate place? YES...NO...NA

19. Were correct containers used for the analysis requested? YES...NO...NA

20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (intial) EA

I certify that I attached a label with the unique LIMS number to each container (intial) EA

21. Were there Non-Conformance issues at login? YES...NO Was a NCM generated? YES...NO...#_____

BIS = Broken in shipment

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
Nashville, TN

Loc: 490
164491

COOLER RECEIPT FORM

Cooler Received/Opened On 12/6/2018 @ 18:10

Time Samples Removed From Cooler_____ Time Samples Placed In Storage_____ (2 Hour Window)

1. Tracking #____NA_____(last 4 digits, FedEx) Courier: Lab

   IR Gun ID 31470366 pH Strip Lot_____ Chlorine Strip Lot_____

2. Temperature of rep. sample or temp blank when opened: 1.8 *Degrees Celsius*

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO...NA

4. Were custody seals on outside of cooler? YES...NO...NA

   If yes, how many and where: 2 Front

5. Were the seals intact, signed, and dated correctly? YES...NO...NA

6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (intial) ACE

7. Were custody seals on containers: YES NO and Intact YES...NO...NA

   Were these signed and dated correctly? YES...NO...NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: Ice Ice-pack Ice (direct contact) Dry ice Other None

10. Did all containers arrive in good condition (unbroken)? YES...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA

12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received? YES...NO...NA

   b. Was there any observable headspace present in any VOA vial? YES...NO...NA

Larger than this.

14. Was there a Trip Blank in this cooler? YES...NO...NA If multiple coolers, sequence # NA

I certify that I unloaded the cooler and answered questions 7-14 (intial) EA

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES...NO...NA

   b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

16. Was residual chlorine present? YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial) EA

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA

18. Did you sign the custody papers in the appropriate place? YES...NO...NA

19. Were correct containers used for the analysis requested? YES...NO...NA

20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (intial) EA

I certify that I attached a label with the unique LIMS number to each container (intial) EA

21. Were there Non-Conformance issues at login? YES...NO Was a NCM generated? YES...NO...#_____

BIS = Broken in shipment

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
Nashville, TN

COOLER RECEIPT FORM

Loc: 490
164491
#1
A

Cooler Received/Opened On 12/6/2018 @ 18:10

Time Samples Removed From Cooler_____ Time Samples Placed In Storage_____ (2 Hour Window)

1. Tracking #____NA_____(last 4 digits, FedEx) Courier: Lab

   IR Gun ID 31470366 pH Strip Lot_____ Chlorine Strip Lot_____

2. Temperature of rep. sample or temp blank when opened: 4.2 *Degrees Celsius*

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO...NA

4. Were custody seals on outside of cooler? YES...NO...NA

   If yes, how many and where: 1 Front 1 Back

5. Were the seals intact, signed, and dated correctly? YES...NO...NA

6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (intial) ACE

7. Were custody seals on containers: YES NO and Intact YES...NO...NA

   Were these signed and dated correctly? YES...NO...NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: Ice Ice-pack Ice (direct contact) Dry ice Other None

10. Did all containers arrive in good condition (unbroken)? YES...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA

12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received? YES...NO...NA

   b. Was there any observable headspace present in any VOA vial? YES...NO...NA

Larger than this.

14. Was there a Trip Blank in this cooler? YES...NO...NA If multiple coolers, sequence # NA

I certify that I unloaded the cooler and answered questions 7-14 (intial) EA

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES...NO...NA

   b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

16. Was residual chlorine present? YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial) EA

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA

18. Did you sign the custody papers in the appropriate place? YES...NO...NA

19. Were correct containers used for the analysis requested? YES...NO...NA

20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (intial) EA

I certify that I attached a label with the unique LIMS number to each container (intial) EA

21. Were there Non-Conformance issues at login? YES...NO Was a NCM generated? YES...NO...#_____

BIS = Broken in shipment

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
Nashville, TN

Loc: 490
164491

COOLER RECEIPT FORM

Cooler Received/Opened On 12/6/2018 @ 18:10

Time Samples Removed From Cooler_____ Time Samples Placed In Storage_____ (2 Hour Window)

1. Tracking #____NA_____(last 4 digits, FedEx) Courier: Lab

IR Gun ID 31470366 pH Strip Lot_____ Chlorine Strip Lot_____

2. Temperature of rep. sample or temp blank when opened: 2.6 *Degrees Celsius*

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO..NA

4. Were custody seals on outside of cooler? YES...NO...NA

If yes, how many and where: 2 Front

5. Were the seals intact, signed, and dated correctly? YES...NO...NA

6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (intial) AB

7. Were custody seals on containers: YES NO and Intact YES...NO...NA

Were these signed and dated correctly? YES...NO...NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: Ice Ice-pack Ice (direct contact) Dry ice Other None

10. Did all containers arrive in good condition (unbroken)? YES...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA

12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received? YES...NO...NA

b. Was there any observable headspace present in any VOA vial? YES...NO...NA

Larger than this.

14. Was there a Trip Blank in this cooler? YES...NO...NA If multiple coolers, sequence # NA

I certify that I unloaded the cooler and answered questions 7-14 (intial) EA

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES...NO...NA

b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

16. Was residual chlorine present? YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial) EA

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA

18. Did you sign the custody papers in the appropriate place? YES...NO...NA

19. Were correct containers used for the analysis requested? YES...NO...NA

20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (intial) EA

I certify that I attached a label with the unique LIMS number to each container (intial) EA

21. Were there Non-Conformance issues at login? YES...NO Was a NCM generated? YES...NO...#_____

BIS = Broken in shipment

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	1	of	4
COC No:	CUF_BS_20181206_1B		
1 of 1 Pages	[redacted]		
Task Desc:	CUF_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 #:	CUMBERLAND FOSSIL PLANT	Sampler:	M.Edmunds, S.Bolden and W. Padgett
Lab Address:	2960 Foster Creighton Drive	Project #:	49014071	Sampling Company:	Stantec
	Nashville, TN 37204	Site Address	815 Cumberland City Road	Address	Warehouse Row North 1110 Market Street, Suite
		City	Cumberland City State, Zip: TN, 37763	City/State	Chattanooga Phone: 901-319-8787
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_deliverables@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)

Loc: 490
164491

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: BACKGROUNDSOIL_RAD	Analysis: BACKGROUNDSOIL_BLANKS_RAD	Filtered N	Filtered N	Preserve None	Preserve HNO3
1	CUF-BS-FB13-20181206	BG-11	NA	NA	W	G	FB	12/6/2018	0840	3		☐		X				
2	CUF-BS-BG11-1.0/3.0-20181206	BG-11	1.0	3.0	S	G	N	12/6/2018	0908	2		☐	X					
3	CUF-BS-BG11-6.5/8.5-20181206	BG-11	6.5	8.5	S	G	N	12/6/2018	0911	2		☐	X					
4	CUF-BS-BG11-11.2/13.2-20181206	BG-11	11.2	13.2	S	G	N	12/6/2018	0940	2		☐	X					
5	CUF-BS-BG11-0.0/0.5-20181206	BG-11	0.0	0.5	S	G	N	12/6/2018	0932	2		☐	X					
6	CUF-BS-BG12-2.5/4.5-20181206	BG-12	2.5	4.5	S	G	N	12/6/2018	1100	2		☐	X					
7	CUF-BS-BG12-6.5/8.5-20181206	BG-12	6.5	8.5	S	G	N	12/6/2018	1110	2		☐	X					
8	CUF-BS-BG12-10.6/12.6-20181206	BG-12	10.6	12.6	S	G	N	12/6/2018	1125	2		☑	X					
9	CUF-BS-BG12-0.0/0.5-20181206	BG-12	0.0	0.5	S	G	N	12/6/2018	1137	2		☐	X					
9	CUF-BS-EB04-20181206	BG-12	NA	NA	W	G	EB	12/6/2018	1150	3		☐		X				

Additional Comments/Special Instructions:

RELINQISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Suama Bolden (Stantec)	12/06/2018	1600		12/6/18	1600

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Courier	Suama Bolden
	Walker Padgett
	Matt Edmunds

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	

4.8, 1.8, 4.2, 2.6

Form TVA 30067A

TestAmerica Nashville
2960 Foster Creighton Drive
Nashville, TN 37204
Phone (615) 726-0177 Fax (615) 726-3404

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: 490-83533.1
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 #: 490-164491-1
Address: 13715 Rider Trail North, .	Due Date Requested: 12/18/2018			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: CUF_BS_20181206_1B	Project #: 49014071			
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:						
CUF-BS-FB13-20181206 (490-164491-1)	12/6/18	08:40 Central		Water			X	3	TVA
CUF-BS-BG11-1.0/3.0-20181206 (490-164491-2)	12/6/18	09:08 Central		Solid			X	2	TVA
CUF-BS-BG11-6.5/8.5-20181206 (490-164491-3)	12/6/18	09:11 Central		Solid			X	2	TVA
CUF-BS-BG11-11.2/13.2-20181206 (490-164491-4)	12/6/18	09:40 Central		Solid			X	2	TVA
CUF-BS-BG11-0.0/0.5-20181206 (490-164491-5)	12/6/18	09:32 Central		Solid			X	2	TVA
CUF-BS-BG12-2.5/4.5-20181206 (490-164491-6)	12/6/18	11:00 Central		Solid			X	2	TVA
CUF-BS-BG12-6.5/8.5-20181206 (490-164491-7)	12/6/18	11:10 Central		Solid			X	2	TVA
CUF-BS-BG12-10.6/12.6-20181206 (490-164491-8)	12/6/18	11:25 Central		Solid			X	2	TVA
CUF-BS-BG12-0.0/0.5-20181206 (490-164491-9)	12/6/18	11:37 Central		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: [signature]	Date/Time: 12-10-18 @ 1140	Company: TAWAS	Received by: Michael Hem	Date/Time: 12/11/18 11:10	Company: TA SL
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:		

TestAmerica Nashville
2960 Foster Creighton Drive
Nashville, TN 37204
Phone (615) 726-0177 Fax (615) 726-3404

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: 490-83533.2
Client Contact: Shipping/Receiving	Phone:	E-Mail: gail.lage@testamericainc.com	State of Origin: Tennessee	Page: Page 2 of 2
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 490-164491-1
Address: 13715 Rider Trail North, ,	Due Date Requested: 12/18/2018			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: CUF_BS_20181206_1B	Project #: 49014071			
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:						
CUF-BS-EB04-20181206 (490-164491-10)	12/6/18	11:50 Central		Water			X	3	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: [signature]	Date/Time: 12-10-18 @ 1140	Company: TAN-NAS	Received by: [signature]	Date/Time: 12/11/18 11:10	Company: TA SR
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: 490-164491-1

Login Number: 164491
List Number: 2
Creator: Hellm, Michael

List Source: Eurofins TestAmerica, St. Louis
List Creation: 12/12/18 03:01 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	18.0
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.	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: 490-164491-1

Login Number: 164491
List Number: 3
Creator: Hellm, Michael

List Source: Eurofins TestAmerica, St. Louis
List Creation: 12/12/18 03:48 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	18.0
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	