Environment Testing
TestAmerica

ANALYTICAL REPORT

Job Number: 490-164387-1

Job Description: CUF_BS_20181205_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 12:52 PM

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04/22/2019
Revision: 1

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Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: CUF_BS_20181205_1B

Job ID: 490-164387-1

Qualifiers

Rad

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

Glossary

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

Job Narrative
490-164387-1

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 12/5/2018 6:48 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 5.0º C and 5.2º 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_20181205_1B

Job ID: 490-164387-1

Client Sample ID: CUF-BS-FB12-20181205 — Lab Sample ID: 490-164387-1

No Detections.

Client Sample ID: CUF-BS-BG10-0.0/0.5-20181205 — Lab Sample ID: 490-164387-2

No Detections.

Client Sample ID: CUF-BS-BG10-1.0/3.0-20181205 — Lab Sample ID: 490-164387-3

No Detections.

Client Sample ID: CUF-BS-DUP02-20181205 — Lab Sample ID: 490-164387-4

No Detections.

Client Sample ID: CUF-BS-BG10-5.6/7.6-20181205 — Lab Sample ID: 490-164387-5

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: CUF_BS_20181205_1B

Job ID: 490-164387-1

Client Sample ID: CUF-BS-FB12-20181205 — Lab Sample ID: 490-164387-1

Date Collected: 12/05/18 08:45 — **Matrix: Water**
Date Received: 12/05/18 18:48

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	18.2	U	9.40	9.57	50.0	35.2	pCi/L	12/08/18 10:14	12/29/18 13:51	1
Radium-228	3.30	U	7.93	7.93	50.0	37.0	pCi/L	12/08/18 10:14	12/29/18 13:51	1
Radium 226 and 228 (positive only)	21.5	U	12.3	12.4			pCi/L	12/08/18 10:14	12/29/18 13:51	1

Client Sample ID: CUF-BS-BG10-0.0/0.5-20181205 — Lab Sample ID: 490-164387-2

Date Collected: 12/05/18 10:46 — **Matrix: Solid**
Date Received: 12/05/18 18:48

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	**0.729**		0.174	0.190	1.00	0.145	pCi/g	12/08/18 11:54	12/29/18 11:55	1
Radium-228	**0.993**		0.238	0.259		0.113	pCi/g	12/08/18 11:54	12/29/18 11:55	1
Radium 226 and 228 (positive only)	**1.72**		0.295	0.321			pCi/g	12/08/18 11:54	12/29/18 11:55	1

Client Sample ID: CUF-BS-BG10-1.0/3.0-20181205 — Lab Sample ID: 490-164387-3

Date Collected: 12/05/18 10:30 — **Matrix: Solid**
Date Received: 12/05/18 18:48

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	**1.31**		0.276	0.306	1.00	0.174	pCi/g	12/08/18 11:54	12/29/18 11:56	1
Radium-228	**1.14**		0.344	0.362		0.223	pCi/g	12/08/18 11:54	12/29/18 11:56	1
Radium 226 and 228 (positive only)	**2.45**		0.441	0.474			pCi/g	12/08/18 11:54	12/29/18 11:56	1

Client Sample ID: CUF-BS-DUP02-20181205 — Lab Sample ID: 490-164387-4

Date Collected: 12/05/18 00:01 — **Matrix: Solid**
Date Received: 12/05/18 18:48

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	**0.833**		0.254	0.271	1.00	0.245	pCi/g	12/08/18 11:54	12/29/18 11:56	1
Radium-228	**1.28**		0.559	0.578		0.522	pCi/g	12/08/18 11:54	12/29/18 11:56	1
Radium 226 and 228 (positive only)	**2.11**		0.614	0.638			pCi/g	12/08/18 11:54	12/29/18 11:56	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: CUF_BS_20181205_1B

Job ID: 490-164387-1

Client Sample ID: CUF-BS-BG10-5.6/7.6-20181205

Lab Sample ID: 490-164387-5

Date Collected: 12/05/18 10:42
Date Received: 12/05/18 18:48

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	0.852		0.237	0.252	1.00	0.198	pCi/g	12/08/18 11:54	12/29/18 12:50	1
Radium-228	1.60		0.325	0.363		0.194	pCi/g	12/08/18 11:54	12/29/18 12:50	1
Radium 226 and 228 (positive only)	2.45		0.402	0.442			pCi/g	12/08/18 11:54	12/29/18 12:50	1

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

Lab Sample ID: MB 160-404676/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 408258 — **Prep Batch: 404676**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.3731	U	1.42	1.42	50.0	40.8	pCi/L	12/08/18 10:14	12/29/18 11:07	1
Radium-228	17.04	U	19.0	19.1	50.0	29.6	pCi/L	12/08/18 10:14	12/29/18 11:07	1
Radium 226 and 228 (positive only)	17.41	U	19.1	19.2			pCi/L	12/08/18 10:14	12/29/18 11:07	1

Lab Sample ID: LCS 160-404676/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 408264 — **Prep Batch: 404676**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	136000	133500		15400		290	pCi/L	98	90 - 111
Cesium-137	45000	44080		4420		87.8	pCi/L	98	90 - 111
Cobalt-60	31100	30340		3000		53.6	pCi/L	97	89 - 110

Lab Sample ID: 490-164296-C-1-B DU — **Client Sample ID: Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 408264 — **Prep Batch: 404676**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Radium-226	-15.7	U	-1.358	U	2.67	50.0	32.3	pCi/L	0.74	1
Radium-228	8.07	U	8.702	U	16.1	50.0	19.3	pCi/L	0.02	1
Radium 226 and 228 (positive only)	8.07	U	8.702	U	16.1			pCi/L	0.01	

Lab Sample ID: MB 160-404682/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408256 — **Prep Batch: 404682**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.1053	U	0.129	0.129	1.00	0.381	pCi/g	12/08/18 11:54	12/29/18 11:14	1
Radium-228	0.1088	U	0.108	0.108		0.155	pCi/g	12/08/18 11:54	12/29/18 11:14	1
Radium 226 and 228 (positive only)	0.1088	U	0.108	0.108			pCi/g	12/08/18 11:54	12/29/18 11:14	1

Lab Sample ID: LCS 160-404682/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408257 — **Prep Batch: 404682**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.7	99.67		10.5		1.19	pCi/g	103	87 - 116
Cesium-137	28.0	27.67		2.99		0.225	pCi/g	99	87 - 120
Cobalt-60	12.2	12.30		1.31		0.0587	pCi/g	100	87 - 115

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

Lab Sample ID: 490-164296-A-2-B DU
Matrix: Solid
Analysis Batch: 408256

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 404682

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Radium-226	9.68			11.64		1.51	1.00	0.443	pCi/g			0.70	1
Radium-228	1.53			1.233	U	0.649		1.25	pCi/g			0.27	1
Radium 226 and 228 (positive only)	11.2			12.87		1.64			pCi/g			0.55	

QC Association Summary

Client: Environmental Standards Inc.
Project/Site: CUF_BS_20181205_1B

Job ID: 490-164387-1

Rad

Prep Batch: 404676

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-164387-1	CUF-BS-FB12-20181205	Total/NA	Water	Fill_Geo-21	
MB 160-404676/1-A	Method Blank	Total/NA	Water	Fill_Geo-21	
LCS 160-404676/2-A	Lab Control Sample	Total/NA	Water	Fill_Geo-21	
490-164296-C-1-B DU	Duplicate	Total/NA	Water	Fill_Geo-21	

Prep Batch: 404682

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-164387-2	CUF-BS-BG10-0.0/0.5-20181205	Total/NA	Solid	Fill_Geo-21	
490-164387-3	CUF-BS-BG10-1.0/3.0-20181205	Total/NA	Solid	Fill_Geo-21	
490-164387-4	CUF-BS-DUP02-20181205	Total/NA	Solid	Fill_Geo-21	
490-164387-5	CUF-BS-BG10-5.6/7.6-20181205	Total/NA	Solid	Fill_Geo-21	
MB 160-404682/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-404682/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
490-164296-A-2-B DU	Duplicate	Total/NA	Solid	Fill_Geo-21	

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: CUF_BS_20181205_1B

Job ID: 490-164387-1

Client Sample ID: CUF-BS-FB12-20181205 — Lab Sample ID: 490-164387-1

Date Collected: 12/05/18 08:45 — **Matrix: Water**
Date Received: 12/05/18 18:48

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	404676	12/08/18 10:14	MPT	TAL SL
Total/NA	Analysis	901.1		1			408258	12/29/18 13:51	RTM	TAL SL

Client Sample ID: CUF-BS-BG10-0.0/0.5-20181205 — Lab Sample ID: 490-164387-2

Date Collected: 12/05/18 10:46 — **Matrix: Solid**
Date Received: 12/05/18 18:48

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			311.4 g	1.0 g	404682	12/08/18 11:54	MPT	TAL SL
Total/NA	Analysis	901.1		1			408261	12/29/18 11:55	CDR	TAL SL

Client Sample ID: CUF-BS-BG10-1.0/3.0-20181205 — Lab Sample ID: 490-164387-3

Date Collected: 12/05/18 10:30 — **Matrix: Solid**
Date Received: 12/05/18 18:48

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			287.9 g	1.0 g	404682	12/08/18 11:54	MPT	TAL SL
Total/NA	Analysis	901.1		1			408260	12/29/18 11:56	CDR	TAL SL

Client Sample ID: CUF-BS-DUP02-20181205 — Lab Sample ID: 490-164387-4

Date Collected: 12/05/18 00:01 — **Matrix: Solid**
Date Received: 12/05/18 18:48

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			310.4 g	1.0 g	404682	12/08/18 11:54	MPT	TAL SL
Total/NA	Analysis	901.1		1			408263	12/29/18 11:56	CDR	TAL SL

Client Sample ID: CUF-BS-BG10-5.6/7.6-20181205 — Lab Sample ID: 490-164387-5

Date Collected: 12/05/18 10:42 — **Matrix: Solid**
Date Received: 12/05/18 18:48

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			289.8 g	1.0 g	404682	12/08/18 11:54	MPT	TAL SL
Total/NA	Analysis	901.1		1			408256	12/29/18 12:50	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_20181205_1B

Job ID: 490-164387-1

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_20181205_1B

Job ID: 490-164387-1

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_20181205_1B

Job ID: 490-164387-1

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_20181205_1B

Job ID: 490-164387-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
490-164387-1	CUF-BS-FB12-20181205	Water	12/05/18 08:45	12/05/18 18:48
490-164387-2	CUF-BS-BG10-0.0/0.5-20181205	Solid	12/05/18 10:46	12/05/18 18:48
490-164387-3	CUF-BS-BG10-1.0/3.0-20181205	Solid	12/05/18 10:30	12/05/18 18:48
490-164387-4	CUF-BS-DUP02-20181205	Solid	12/05/18 00:01	12/05/18 18:48
490-164387-5	CUF-BS-BG10-5.6/7.6-20181205	Solid	12/05/18 10:42	12/05/18 18:48

REAGENT TRACEABILITY SUMMARY

Lab Name: Eurofins TestAmerica, St. Louis Job No.: 490-164387-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: Eurofins TestAmerica, St. Louis Job No.: 490-164387-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: Eurofins TestAmerica, St. Louis Job No.: 490-164387-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source F_00001	01/01/61	02/23/11	water, Lot 83725-334	10 mL	Gamma Ampuole_00003	2.0327 mL	Americium-241	1846.42 Bq
							Cd-109	26819.3 Bq
							Ce-139	890.424 Bq
							Cesium-137	743.562 Bq
							Co-57	580.6 Bq
							Cobalt-60	1222.38 Bq
							Hg-203	1926.02 Bq
							Sn-113	1576.93 Bq
							Y-88	2572.87 Bq
.Gamma Ampuole_00003	01/19/61	Analytics, Lot 83725-334			(Purchased Reagent)		Americium-241	9083.6 Bq
							Cd-109	131939 Bq
							Ce-139	4380.5 Bq
							Cesium-137	3658 Bq
							Co-57	2856.3 Bq
							Cobalt-60	6013.6 Bq
							Hg-203	9475.2 Bq
							Sn-113	7757.8 Bq
							Y-88	12657.4 Bq
Source 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_00003	02/09/17	Eckert & Ziegler, Lot 90099			(Purchased Reagent)		Americium-241	1164 Bq
							Cd-109	16373 Bq
							Ce-139	549 Bq
							Cesium-137	467 Bq
							Co-57	362 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: Eurofins TestAmerica, St. Louis Job No.: 490-164387-1

SDG No.:

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

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

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

Laboratory Control Sample Information

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

Sample Duplicate Information

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

Blanks Information

SampID	WRKNO	Analyte	Activity	UncTotal	ZFactor

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 390595 **Operator:**

MQO

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

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

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

Laboratory Control Sample Information

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

Sample Duplicate Information

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

Blanks Information

SamplD	WRKNO	Analyte	Activity	UncTotal	ZFactor

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 390816 **Operator:**

MQO

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

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

Laboratory Control Sample Information

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

Sample Duplicate Information

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

Blanks Information

SampID	WRKNO	Analyte	Activity	UncTotal	ZFactor

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83924-334

1.0 Liter Solid in 130G GA-MA Beaker

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

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101. Density of solid matrix 1.15 g/cc.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	1.830E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	2.609E+03	0.8	2.3	4.9	HPGe
Co-57	122.1	2.718E+02	8.711E+04	1.339E+03	0.5	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	1.917E+03	0.5	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	4.232E+03	0.4	1.9	3.9	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	2.719E+03	0.5	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	1.705E+03	0.7	1.9	4.0	HPGe
Mn-54	834.9	3.121E+02	———	3.083E+03	0.1	1.7	3.3	IC
Y-88	898.0	1.066E+02	4.224E+05	6.493E+03	0.5	1.9	3.9	HPGe
Zn-65	1115.6	2.441E+02	———	3.181E+03	0.1	1.7	3.5	IC
Co-60	1173.2	1.925E+03	2.142E+05	3.293E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	3.294E+03	0.6	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	6.874E+03	0.5	1.9	3.9	HPGe

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

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

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

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

This standard will expire one year after the reference date.

Source Prepared by: _____
W. Mao, Radiochemist

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

Reagent

1L Marn_00002

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83924-334

1.0 Liter Solid in 130G GA-MA Beaker

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

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101. Density of solid matrix 1.15 g/cc.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	1.830E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	2.609E+03	0.8	2.3	4.9	HPGe
Co-57	122.1	2.718E+02	8.711E+04	1.339E+03	0.5	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	1.917E+03	0.5	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	4.232E+03	0.4	1.9	3.9	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	2.719E+03	0.5	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	1.705E+03	0.7	1.9	4.0	HPGe
Mn-54	834.9	3.121E+02	———	3.083E+03	0.1	1.7	3.3	IC
Y-88	898.0	1.066E+02	4.224E+05	6.493E+03	0.5	1.9	3.9	HPGe
Zn-65	1115.6	2.441E+02	———	3.181E+03	0.1	1.7	3.5	IC
Co-60	1173.2	1.925E+03	2.142E+05	3.293E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	3.294E+03	0.6	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	6.874E+03	0.5	1.9	3.9	HPGe

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1960

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. McCorvey
J.D. McCorvey, Counting Room Manager

Date: 26 Jan 12

Reagent

Gamma Ampuole_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

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

This standard will expire one year after the calibration date.

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

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

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Gamma Ampuole_00003

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

83725-334
5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

(Certificate continued on reverse side)

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

This standard will expire one year after the reference date.

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

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

Reagent

Source A_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

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

This standard will expire one year after the calibration date.

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

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

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source B_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

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

This standard will expire one year after the calibration date.

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

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

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source C_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

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

This standard will expire one year after the calibration date.

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

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

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source E_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

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

This standard will expire one year after the calibration date.

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

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

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source F_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

83725-334
5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

(Certificate continued on reverse side)

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

This standard will expire one year after the reference date.

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

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

Reagent

Source H_00002

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

83725-334
5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

(Certificate continued on reverse side)

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

This standard will expire one year after the reference date.

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

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

Reagent

Tuna Can LCS_00008

ANALYTICS
An Isotope Products Laboratories Company

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

74139-334

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

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

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

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8145.9	———	3079.5	0.33	1.46	2.99	4π LS
Am-241	59.5	157860	———	2034.3	0.33	1.46	2.99	4π LS
Cd-109	88.0	462.60	189000	2933.5	0.57	1.70	3.59	HPGe
Co-57	122.1	271.79	94570	1467.8	0.34	1.30	2.69	HPGe
Ce-139	165.9	137.6	133800	2076.7	0.35	1.10	2.31	HPGe
Hg-203	279.2	46.61	295300	4583	0.40	1.10	2.34	HPGe
Sn-113	391.7	115.1	185600	2880.7	0.42	1.10	2.35	HPGe
Cs-137	661.7	10983	116700	1811.3	0.70	1.20	2.78	HPGe
Y-88	898.0	106.60	455400	7068	0.50	1.10	2.42	HPGe
Co-60	1173.2	1925.4	226900	3522	0.60	1.10	2.51	HPGe
Co-60	1332.5	1925.4	227000	3523	0.90	1.10	2.84	HPGe
Y-88	1836.1	106.6	481200	7469	0.90	1.10	2.84	HPGe

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

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

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

Source Prepared by: M. I. Taskaeva, Radiochemist

QA Approved: D. M. Montgomery, QA Manager, for

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_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: 404676

Fill Geometry, 21-Day In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 404676

Lab Id: MB 160-404676/1-A | Analyzed: 12/29/18 11:07 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV7 | Decay Corrected: No | Ingrowth:

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.3731	1.42	1.42	U	pCi/L	50.0	40.8	408258
Radium-228	17.04	19.0	19.1	U	pCi/L	50.0	29.6	408258
Radium 226 and 228 (positive only)	17.41	19.1	19.2	U	pCi/L		40.8	408258

Lab Id: LCS 160-404676/2-A | Analyzed: 12/29/18 11:05 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV14 | Decay Corrected: No | Ingrowth:

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	133500	427	15400		pCi/L		290	408264
Cesium-137	44080	244	4420		pCi/L		87.8	408264
Cobalt-60	30340	177	3000		pCi/L		53.6	408264

Lab Id: 490-164296-C-1-B DU | Analyzed: 12/29/18 13:50 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV14 | Decay Corrected: No | Ingrowth:

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	-1.358	2.66	2.67	U	pCi/L	50.0	32.3	408264
Radium-228	8.702	16.0	16.1	U	pCi/L	50.0	19.3	408264
Radium 226 and 228 (positive only)	8.702	16.0	16.1	U	pCi/L		32.3	408264

Lab Id: 490-164387-1 | Analyzed: 12/29/18 13:51 | Ts: 120 | Sigma: 2
Client ID: CUF-BS-FB12-20181205 | Detector: GV7 | Decay Corrected: No | Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	18.2	9.40	9.57	U	pCi/L	50.0	35.2	408258
Radium-228	3.30	7.93	7.93	U	pCi/L	50.0	37.0	408258
Radium 226 and 228 (positive only)	21.5	12.3	12.4	U	pCi/L		37.0	408258

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 404676

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 160-404676/1-A	Radium-226			0.3731	U	pCi/L							.52599697
MB 160-404676/1-A	Radium-228			17.04	U	pCi/L							1.78835339
MB 160-404676/1-A	Radium 226 and 228 (positive only)			17.41	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 160-404676/2-A	Americium-241		136000	133500		pCi/L	98	90 - 111					-.232660658
LCS 160-404676/2-A	Cesium-137		45000	44080		pCi/L	98	90 - 111					-.3043990674
LCS 160-404676/2-A	Cobalt-60		31100	30340		pCi/L	97	89 - 110					-.3625915746

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
490-164296-C-1-B DU	Radium-226	-15.7		-1.358	U	pCi/L			168	0.74	1.68	1	
490-164296-C-1-B DU	Radium-228	8.07		8.702	U	pCi/L			8	0.02	0.05	1	
490-164296-C-1-B DU	Radium 226 and 228 (positive only)	8.07		8.702	U	pCi/L			8	0.01	0.04		

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: Eurofins TestAmerica, St. Loui Job No.: 490-164387-1

SDG No.:

Batch Number: 404676 Batch Start Date: 12/08/18 10:14 Batch Analyst: Tucker, Michael P

Batch Method: Fill_Geo-21 Batch End Date: 12/08/18 10:21

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	IngDecDate1	IngDecDate3	Geometry	1L Marn LCS 00005	
MB 160-404676/1		Fill_Geo-21, 901.1		1000 mL	12/8/18	12/29/18	1 L Marn		
LCS 160-404676/2		Fill_Geo-21, 901.1		1000 mL	12/8/18	12/29/18	1 L Marn	# mL	
490-164296-C-1 DU		Fill_Geo-21, 901.1	T	1000 mL	12/8/18	12/29/18	1 L Marn		
490-164387-B-1	CUF-BS-FB12-2018 1205	Fill_Geo-21, 901.1	T	1000 mL	12/8/18	12/29/18	1 L Marn		

Batch Notes	
Balance ID	1121432711
SOP Number	ST-RC-0025

Basis	Basis Description
T	Total/NA

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

Test America St. Louis Spectrum ID: 7_Gamma_20183404

Sample Description: 404676_Gamma_MB 160-404676~1-A
Detector: Detector # 7
Batch ID: 404676
Work Order Number: Gamma
Lot Number: MB 160-404676~1-A

Decay to Time: 12/29/2018 11:07 Live Time: 7200 sec
Acquisition Time: 12/29/2018 11:07:35 Real Time: 7221 sec
Analysis Time: 12/29/2018 13:08 Dead Time: 0.30 %
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	1.003E-01	777.2	7.796E-01	7.797E-01	2.744E+00
NA-22	1.104E-01	76.5	8.453E-02	8.471E-02	2.858E-01
K-40	-3.146E+00	46.3	1.457E+00	1.466E+00	5.952E+00
Sc-46	-1.579E-01	84.4	1.332E-01	1.335E-01	5.363E-01
CR-51	-5.516E-02	1641.6	9.056E-01	9.056E-01	5.412E+00
MN-54	9.434E-03	1541.9	1.455E-01	1.455E-01	3.569E-01
FE-59	-1.067E-01	319.7	3.411E-01	3.411E-01	7.757E-01
Co-56	1.065E-01	79.2	8.436E-02	8.452E-02	1.907E-01
CO-57	-5.895E-02	92.6	5.459E-02	5.469E-02	1.833E-01
CO-58	-4.621E-02	300.0	1.386E-01	1.387E-01	4.867E-01
CO-60	1.772E-01	43.6	7.721E-02	7.771E-02	1.926E-01
ZN-65	0.000E+00	1.#INF	7.244E-02	7.244E-02	1.480E+00
NB-94	-1.533E-01	108.9	1.670E-01	1.671E-01	3.877E-01
ZR-95	-3.928E-01	50.1	1.968E-01	1.977E-01	7.553E-01
NB-95	2.361E-03	4234.2	9.995E-02	9.995E-02	3.645E-01
RU-103	2.329E-02	519.2	1.209E-01	1.209E-01	3.009E-01
RH-106	-3.495E-01	397.0	1.388E+00	1.388E+00	3.435E+00
AG-108M	-4.480E-02	239.2	1.071E-01	1.072E-01	2.748E-01
AG-110M	2.028E-01	35.4	7.171E-02	7.240E-02	6.356E-01
SN-113	1.371E-01	116.4	1.596E-01	1.597E-01	5.407E-01
SB-124	7.592E-02	103.1	7.826E-02	7.835E-02	6.962E-01
SB-125	-4.806E-01	79.8	3.836E-01	3.843E-01	1.060E+00
I-131	-9.504E-02	141.1	1.341E-01	1.342E-01	3.353E-01
Gd-153	1.494E-01	141.9	2.120E-01	2.122E-01	7.147E-01
Ga-68	9.411E-01	914.7	8.608E+00	8.608E+00	2.009E+01
Tc-99m	4.665E-02	139.5	6.506E-02	6.512E-02	2.210E-01
BA-133	-5.253E-02	314.2	1.650E-01	1.650E-01	5.680E-01
CS-134	3.024E-02	82.0	2.479E-02	2.484E-02	5.811E-01
CS-137	-1.786E-01	83.0	1.483E-01	1.485E-01	4.976E-01
CE-139	-8.807E-02	102.6	9.040E-02	9.075E-02	3.031E-01
Ba-140	4.623E-01	77.5	3.583E-01	3.591E-01	9.709E-01
La-140	3.091E-02	90.0	2.783E-02	2.788E-02	5.039E-01
CE-141	1.053E-01	156.9	1.651E-01	1.652E-01	5.562E-01

CE-144	0.000E+00	1.#INF	1.150E-01	1.150E-01	1.918E+00
PM-144	4.068E-03	3641.4	1.481E-01	1.481E-01	3.581E-01
EU-152	1.846E-01	103.1	1.903E-01	1.905E-01	4.963E-01
EU-154	2.917E-01	50.7	1.478E-01	1.487E-01	4.128E-01
EU-155	-1.059E-02	3243.4	3.434E-01	3.434E-01	1.063E+00
HF-181	1.304E-01	106.1	1.383E-01	1.384E-01	3.480E-01
Ta-182	-9.539E-02	27.4	2.611E-02	2.652E-02	2.650E+00
Hg-203	9.843E-02	96.9	9.533E-02	9.550E-02	3.209E-01
TL-208	-3.182E-01	47.5	1.512E-01	1.520E-01	4.835E-01
PM-146	-5.033E-02	75.7	3.811E-02	3.819E-02	4.700E-01
Y-88	1.531E-01	40.8	6.250E-02	6.311E-02	2.162E-01
Cd-113m	-1.467E+03	92.8	1.361E+03	1.364E+03	4.566E+03
Cd-109	0.000E+00	1.#INF	3.530E-01	3.530E-01	6.918E+00
Cf-251	7.080E-02	550.3	3.896E-01	3.896E-01	1.029E+00
Cf-249	-2.913E-02	75.3	2.193E-02	2.199E-02	5.203E-01
Sn-126	5.792E-01	104.2	6.033E-01	6.041E-01	2.027E+00
PB-210	-4.871E-01	458.3	2.232E+00	2.233E+00	7.434E+00
PB-212	5.002E-01	31.8	1.591E-01	1.622E-01	3.568E-01
PB-214	3.435E-01	56.7	1.946E-01	1.954E-01	6.354E-01
BI-207	-1.903E-01	137.1	2.608E-01	2.610E-01	6.352E-01
BI-212	-2.314E+00	83.4	1.929E+00	1.933E+00	6.470E+00
U-235	6.469E-01	105.6	6.832E-01	6.840E-01	2.417E+00
BI-214	1.381E-02	190.0	2.624E-02	2.625E-02	1.510E+00
BI-210M	1.370E-01	108.2	1.482E-01	1.484E-01	4.981E-01
AC-228	6.306E-01	55.7	3.512E-01	3.526E-01	1.094E+00
TH-227	1.079E-01	222.8	2.403E-01	2.404E-01	2.938E+00
TH-229	9.490E-01	153.7	1.458E+00	1.460E+00	3.826E+00
TH-234	1.122E+00	114.2	1.280E+00	1.282E+00	3.510E+00
PA-231	0.000E+00	1.#INF	1.073E+00	1.073E+00	1.784E+01
PA-233	0.000E+00	1.#INF	1.380E-01	1.380E-01	1.462E+00
PA-234	6.759E-01	27.7	1.875E-01	1.909E-01	1.122E+00
PA-234M	-8.077E+00	78.5	6.341E+00	6.353E+00	8.081E+01
AM-241	4.566E-02	351.2	1.604E-01	1.604E-01	4.428E-01
Np-237	0.000E+00	1.#INF	6.384E-01	6.384E-01	2.146E+00
Ir-192	0.000E+00	1.#INF	2.887E-02	2.887E-02	6.117E-01
Cs-136	1.394E-01	80.5	1.122E-01	1.124E-01	4.609E-01
Np-239	-2.181E-01	143.0	3.118E-01	3.121E-01	1.049E+00
Nd-147	-1.134E+00	95.2	1.079E+00	1.081E+00	2.573E+00
TL-210	0.000E+00	1.#INF	6.744E-02	6.744E-02	5.383E-01
Kr-85	2.676E+01	163.7	4.380E+01	4.383E+01	1.480E+02
Total	3.629E+01				

Analyst: Joey Sausto

Sample description
404676_Gamma_MB 160-404676~1-A

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20183404.An1

Acquisition information
Start time: 12/29/2018 11:07:35 AM
Live time: 7200
Real time: 7221
Dead time: 0.30 %
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	12/29/2018 11:07:00 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. 7 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0932

***** 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	-5.	458.25	0.84	3.376E-02	46.54	4.250	PBC<MDA	PB210
50.14	10.	222.81	0.84	3.568E-02	50.14	8.000	PBC<MDA	TH227
59.54	5.	351.16	0.85	3.954E-02	59.54	35.900	PBC<MDA	AM241
63.12	17.	131.77	1.01	4.063E-02	63.29	3.810	PBC<MDA	TH234
64.15	17.	104.17	0.86	4.095E-02	64.28	9.700	PBC<MDA	Sn126
86.85	5.	192.09	0.88	4.401E-02	86.54	30.700	PBC<MDA	EU155
					86.94	9.040	1.715E-01	Sn126
87.61	14.	175.52	0.88	4.403E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	1.144E+00	Cd109
92.65	20.	114.16	1.45	4.410E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	PBC<MDA	AC228
97.50	14.	141.86	0.89	4.402E-02	97.50	30.000	PBC<MDA	Gd153
99.50	3.	736.66	0.89	4.395E-02	99.50	15.000	PBC<MDA	Np239
121.78	12.	103.10	0.92	4.217E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	4.759E-02	CO57
140.51	11.	139.47	0.94	3.981E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	10.	214.69	0.94	3.936E-02	143.79	10.960	PBC<MDA	U235
145.44	14.	156.88	0.94	3.913E-02	145.44	48.200	PBC<MDA	CE141
162.66	14.	109.83	0.96	3.664E-02	162.66	6.220	PBC<MDA	Ba140
176.60	3.	550.25	0.98	3.462E-02	176.60	17.000	PBC<MDA	Cf251
185.72	14.	120.27	0.99	3.334E-02	185.72	54.000	PBC<MDA	U235
193.51	10.	153.67	0.99	3.233E-02	193.51	4.400	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
205.33	15.	105.60	1.01	3.092E-02	205.33	5.010	PBC<MDA	U235
238.79	9.	166.83	0.71	2.756E-02	238.63	43.300	PBC<MDA	PB212
244.69	11.	161.61	1.05	2.704E-02	244.69	7.580	PBC<MDA	EU152
265.83	13.	108.22	1.07	2.536E-02	265.83	50.000	PBC<MDA	BI210M
279.20	14.	96.85	1.08	2.441E-02	279.20	81.460	PBC<MDA	Hg203
295.09	5.	495.98	1.10	2.337E-02	295.09	19.300	PBC<MDA	PB214
328.76	13.	100.99	1.13	2.145E-02	328.76	20.300	PBC<MDA	La140
333.44	11.	108.17	1.14	2.121E-02	333.44	15.510	PBC<MDA	Cf249
338.32	12.	112.45	1.14	2.097E-02	338.32	12.010	PBC<MDA	AC228
340.57	12.	119.44	1.15	2.086E-02	340.57	46.900	PBC<MDA	Cs136
344.29	3.	474.27	1.15	2.067E-02	344.29	26.500	PBC<MDA	EU152
345.83	8.	177.89	1.15	2.060E-02	345.83	15.070	PBC<MDA	HF181
351.93	19.	56.66	1.16	2.031E-02	351.93	37.600	PBC<MDA	PB214
390.98	12.	116.38	1.20	1.863E-02	391.69	64.000	PBC<MDA	SN113
477.60	1.	777.24	1.28	1.583E-02	477.60	10.520	PBC<MDA	BE7
482.00	8.	115.51	1.29	1.571E-02	482.00	80.500	PBC<MDA	HF181
487.02	8.	128.53	1.29	1.557E-02	487.02	45.500	PBC<MDA	La140
497.05	2.	519.22	1.30	1.531E-02	497.05	90.900	PBC<MDA	RU103
511.86	114.	15.25	2.56	1.494E-02	511.86	20.000	5.284E+00	RH106
513.98	12.	163.71	1.32	1.489E-02	513.98	0.430	PBC<MDA	Kr85
537.26	9.	109.39	1.34	1.434E-02	537.26	24.390	PBC<MDA	Ba140
563.24	8.	148.32	1.36	1.378E-02	563.24	8.350	PBC<MDA	CS134
569.32	6.	143.73	1.37	1.366E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	7.028E-01	PA234
					569.70	97.740	5.898E-02	BI207
569.70	10.	79.85	1.37	1.365E-02	569.32	15.380	6.297E-01	CS134
					569.47	8.200	1.181E+00	PA234
					569.70	97.740	9.915E-02	BI207
600.50	2.	739.19	1.40	1.306E-02	600.50	17.860	PBC<MDA	SB125
602.73	-2.	794.22	1.40	1.301E-02	602.73	98.260	PBC<MDA	SB124
609.31	-4.	299.12	1.41	1.290E-02	609.31	46.090	PBC<MDA	BI214
635.89	7.	117.56	1.43	1.243E-02	635.89	11.310	PBC<MDA	SB125
657.76	5.	143.61	1.45	1.208E-02	657.76	94.640	PBC<MDA	AG110M
722.79	8.	103.08	1.51	1.113E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.099E-01	AG108M
					723.36	20.220	4.939E-01	EU154
735.72	7.	119.52	1.52	1.096E-02	735.72	22.500	PBC<MDA	PM146
747.16	1.	692.82	1.53	1.082E-02	747.16	34.000	PBC<MDA	PM146
763.94	9.	74.58	1.55	1.061E-02	763.94	22.280	PBC<MDA	AG110M
766.41	5.	112.47	1.55	1.058E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.406E+01	PA234M
818.50	9.	107.92	1.60	9.989E-03	818.50	100.000	PBC<MDA	Cs136
846.77	5.	102.31	1.62	9.695E-03	846.77	99.935	PBC<MDA	Co56
871.10	1.	700.00	1.64	9.456E-03	871.10	99.890	PBC<MDA	NB94
873.23	6.	79.67	1.64	9.435E-03	873.23	12.270	PBC<MDA	EU154
880.53	8.	86.72	1.65	9.366E-03	880.53	6.000	PBC<MDA	PA234
883.24	8.	99.80	1.65	9.340E-03	883.24	9.600	PBC<MDA	PA234
884.68	1.	803.47	1.65	9.327E-03	884.68	72.680	PBC<MDA	AG110M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
898.04	8.	112.15	1.66	9.204E-03	898.04	93.700	PBC<MDA	Y88
911.07	10.	90.83	1.68	9.087E-03	911.07	29.000	PBC<MDA	AC228
937.49	8.	93.82	1.70	8.859E-03	937.49	34.360	PBC<MDA	AG110M
946.02	13.	27.74	1.70	8.788E-03	946.02	13.400	1.533E+00	PA234
968.97	8.	83.84	1.72	8.602E-03	968.97	17.460	PBC<MDA	AC228
1004.77	11.	87.97	1.75	8.327E-03	1004.77	18.010	PBC<MDA	EU154
1077.40	1.	914.69	1.81	7.820E-03	1077.40	3.300	PBC<MDA	Ga68
1173.24	3.	265.74	1.89	7.239E-03	1173.24	99.900	PBC<MDA	CO60
1189.05	15.	27.37	1.90	7.151E-03	1189.05	16.200	1.762E+00	Ta182
1221.41	3.	229.35	1.92	6.978E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	5.	120.99	1.94	6.891E-03	1238.28	66.070	PBC<MDA	Co56
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
1313.00	7.	37.80	1.99	6.531E-03	1313.00	21.000	PBC<MDA	TL210
1332.50	8.	43.58	2.01	6.443E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	8.	35.36	2.04	6.220E-03	1384.30	24.290	7.355E-01	AG110M
1764.49	2.	234.52	2.29	4.957E-03	1764.49	15.400	PBC<MDA	BI214
1836.06	6.	40.82	2.33	4.773E-03	1836.06	99.200	PBC<MDA	Y88

No unknown peaks passed sensitivity test.

This section based on library: Client_Long_Rev15.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.71	46.54	253.	-5.	-0.001	458.25	0.836s
TH-227	200.12	50.14	255.	10.	0.001	222.81	0.840
AM-241	237.70	59.54	83.	5.	0.001	351.16	0.850s
TH-234	252.71	63.29	209.	-61.	-0.008	32.82	0.854
Sn-126	256.68	64.28	141.	17.	0.002	104.17	0.856
BA-133	323.52	80.99	104.	-17.	-0.002	115.88	0.874s
Np-237	345.53	86.49	343.	0.	0.000	173.22	0.880A
EU-155	345.74	86.54	328.	-15.	-0.002	169.40	0.880s
Sn-126	347.33	86.94	271.	5.	0.001	192.09	0.880D
Sn-126	349.85	87.57	284.	14.	0.002	175.52	0.881s
Cd-109	351.73	88.04	298.	0.	0.000	1000.00	0.881s
Nd-147	363.97	91.10	298.	0.	0.000	1000.00	0.885s
TH-234	370.17	92.65	163.	20.	0.003	114.16	1.454s
Gd-153	389.57	97.50	196.	14.	0.002	141.86	0.892s
Np-239	397.57	99.50	210.	3.	0.000	736.66	0.894
Gd-153	412.38	103.20	213.	0.	0.000	1000.00	0.898s
Np-239	414.38	103.70	213.	0.	0.000	1000.00	0.898s
Np-239	424.10	106.13	233.	-15.	-0.002	142.98	0.901s
EU-152	486.70	121.78	75.	12.	0.002	103.10	0.918
CO-57	487.83	122.06	93.	-15.	-0.002	92.62	0.918s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	491.98	123.10	107.	-16.	-0.002	94.95	0.919s
PA-234	524.77	131.29	150.	-14.	-0.002	122.11	0.928s
HF-181	531.68	133.02	164.	0.	0.000	1000.00	0.930s
CE-144	533.74	133.54	164.	0.	0.000	1000.00	0.930s
HF-181	544.79	136.30	181.	-13.	-0.002	147.17	0.933
CO-57	545.48	136.47	194.	0.	0.000	1000.00	0.933
Tc-99m	561.63	140.51	105.	11.	0.001	139.47	0.938s
U-235	574.73	143.79	241.	10.	0.001	214.69	0.941s
CE-141	581.35	145.44	244.	14.	0.002	156.88	0.943s
Ba-140	650.24	162.66	108.	14.	0.002	109.83	0.961s
U-235	653.11	163.38	122.	-12.	-0.002	185.56	0.962s
CE-139	663.01	165.85	169.	-18.	-0.003	102.65	0.965s
Cf-251	706.00	176.60	77.	3.	0.000	550.25	0.976s
U-235	742.49	185.72	77.	14.	0.002	120.27	0.986s
TH-229	773.64	193.51	61.	10.	0.001	153.67	0.994s
U-235	820.94	205.33	66.	15.	0.002	105.60	1.007
TH-229	843.01	210.85	77.	-2.	0.000	823.86	1.012s
Cf-251	907.62	227.00	88.	-18.	-0.002	102.91	1.029s
TH-227	943.50	235.97	243.	-16.	-0.002	138.75	1.039s
PB-212	954.79	238.79	36.	43.	0.006	31.80	0.712s
PB-214	967.61	242.00	211.	-15.	-0.002	142.44	1.045s
EU-152	978.39	244.69	138.	11.	0.001	161.61	1.048s
TH-227	1024.59	256.24	59.	-4.	-0.001	386.64	1.060s
Cd-113m	1054.43	263.70	104.	-16.	-0.002	92.78	1.067s
BI-210M	1062.96	265.83	84.	13.	0.002	108.22	1.070s
TL-208	1108.77	277.28	133.	-20.	-0.003	70.69	1.081s
Hg-203	1116.44	279.20	86.	14.	0.002	96.85	1.083s
I-131	1136.83	284.30	48.	-10.	-0.001	139.42	1.089s
PB-214	1180.00	295.09	305.	5.	0.001	495.98	1.100s
TL-210	1183.64	296.00	310.	0.	0.000	1000.00	1.101s
PB-212	1199.76	300.03	310.	0.	0.000	1000.00	1.105s
PA-231	1199.92	300.07	310.	0.	0.000	1000.00	1.105s
PA-233	1200.36	300.18	310.	0.	0.000	1000.00	1.105s
PA-231	1210.24	302.65	310.	0.	0.000	1000.00	1.107s
BA-133	1211.05	302.85	310.	0.	0.000	1000.00	1.108s
Ba-140	1219.04	304.85	310.	0.	0.000	1000.00	1.110
BI-210M	1219.23	304.90	310.	0.	0.000	1000.00	1.110
Ir-192	1233.41	308.44	310.	0.	0.000	1000.00	1.113s
PA-233	1247.69	312.01	310.	0.	0.000	1000.00	1.117s
Ir-192	1265.61	316.49	310.	0.	0.000	1000.00	1.122s
La-140	1314.69	328.76	81.	13.	0.002	100.99	1.134
Cf-249	1333.41	333.44	68.	11.	0.002	108.17	1.139
AC-228	1352.93	338.32	84.	12.	0.002	112.45	1.144s
Cs-136	1361.93	340.57	96.	12.	0.002	119.44	1.146s
EU-152	1376.80	344.29	108.	3.	0.000	474.27	1.150s
HF-181	1382.97	345.83	93.	8.	0.001	177.89	1.151s
PB-214	1407.39	351.93	48.	19.	0.003	56.66	1.157s
BA-133	1423.66	356.00	108.	-5.	-0.001	314.16	1.162

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	1457.59	364.48	60.	-11.	-0.002	141.13	1.170s
BA-133	1535.03	383.84	76.	-2.	0.000	828.65	1.189s
Cf-249	1551.47	387.95	88.	-13.	-0.002	104.82	1.193s
SN-113	1566.43	391.69	88.	12.	0.002	116.38	1.197s
SB-125	1711.18	427.88	61.	-18.	-0.002	79.81	1.233s
AG-108M	1735.43	433.94	36.	-5.	-0.001	239.17	1.239s
PM-146	1815.20	453.88	52.	-16.	-0.002	92.97	1.258s
SB-125	1853.15	463.37	87.	-17.	-0.002	86.62	1.268s
Ir-192	1871.93	468.06	101.	-5.	-0.001	304.29	1.272s
BE-7	1910.07	477.60	42.	1.	0.000	777.24	1.282s
HF-181	1927.68	482.00	39.	8.	0.001	115.51	1.286s
La-140	1947.77	487.02	42.	8.	0.001	128.53	1.291s
RU-103	1987.91	497.05	35.	2.	0.000	519.22	1.301s
RH-106	2047.15	511.86	93.	114.	0.016	15.25	2.565
Kr-85	2055.62	513.98	198.	12.	0.002	163.71	1.317
Nd-147	2123.70	531.00	48.	-15.	-0.002	95.16	1.333s
Ba-140	2148.74	537.26	22.	9.	0.001	109.39	1.339s
CS-134	2252.65	563.24	35.	8.	0.001	148.32	1.364s
CS-134	2276.99	569.32	30.	6.	0.001	143.73	1.369s
BI-207	2278.51	569.70	24.	10.	0.001	79.85	1.370s
TL-208	2331.79	583.02	62.	-26.	-0.004	47.52	1.382s
SB-125	2401.71	600.50	170.	2.	0.000	739.19	1.399s
SB-124	2410.64	602.73	174.	-2.	0.000	794.22	1.401s
CS-134	2418.55	604.71	172.	0.	0.000	1000.00	1.403s
BI-214	2436.96	609.31	176.	-4.	-0.001	299.12	1.407
RH-106	2487.38	621.92	37.	-3.	0.000	396.98	1.419s
SB-125	2543.28	635.89	27.	7.	0.001	117.56	1.432s
I-131	2547.62	636.97	50.	-13.	-0.002	78.57	1.433s
AG-110M	2630.77	657.76	27.	5.	0.001	143.61	1.452s
CS-137	2646.36	661.66	53.	-13.	-0.002	83.02	1.455s
NB-94	2810.25	702.63	37.	-12.	-0.002	108.88	1.493s
SB-124	2890.87	722.79	30.	8.	0.001	103.08	1.511s
AG-108M	2891.48	722.94	38.	0.	0.000	1000.00	1.511s
EU-154	2893.17	723.36	38.	0.	0.000	1000.00	1.511s
ZR-95	2896.52	724.20	38.	0.	0.000	1000.00	1.512s
BI-212	2908.41	727.17	60.	-14.	-0.002	83.37	1.515s
PM-146	2942.61	735.72	14.	7.	0.001	119.52	1.523
PM-146	2988.37	747.16	19.	1.	0.000	692.82	1.533s
ZR-95	3026.65	756.73	39.	-16.	-0.002	50.09	1.541s
AG-110M	3055.51	763.94	20.	9.	0.001	74.58	1.548s
PA-234M	3065.38	766.41	16.	5.	0.001	112.47	1.550s
EU-152	3115.41	778.92	37.	-15.	-0.002	88.22	1.561s
BI-212	3141.41	785.42	39.	-16.	-0.002	53.60	1.567s
CS-134	3183.22	795.87	53.	-8.	-0.001	133.46	1.576s
TL-210	3198.14	799.60	61.	0.	0.000	1000.00	1.579s
CS-134	3207.54	801.95	61.	0.	0.000	1000.00	1.581s
CO-58	3242.84	810.78	48.	-3.	0.000	300.00	1.589
La-140	3262.82	815.77	52.	0.	0.000	1000.00	1.593s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cs-136	3273.74	818.50	43.	9.	0.001	107.92	1.596s
Co-56	3386.82	846.77	5.	5.	0.001	102.31	1.620s
TL-208	3442.00	860.56	38.	-13.	-0.002	47.52	1.632s
NB-94	3484.13	871.10	24.	1.	0.000	700.00	1.641s
EU-154	3492.66	873.23	8.	6.	0.001	79.67	1.643s
PA-234	3521.86	880.53	21.	8.	0.001	86.72	1.649s
PA-234	3532.70	883.24	29.	8.	0.001	99.80	1.652s
AG-110M	3538.47	884.68	37.	1.	0.000	803.47	1.653s
Sc-46	3556.86	889.28	51.	-11.	-0.001	84.38	1.657s
Y-88	3591.90	898.04	15.	8.	0.001	112.15	1.664
AC-228	3644.02	911.07	15.	10.	0.001	90.83	1.675
AG-110M	3749.71	937.49	10.	8.	0.001	93.82	1.697
PA-234	3783.82	946.02	0.	13.	0.002	27.74	1.704s
EU-152	3856.18	964.11	31.	-4.	-0.001	188.89	1.719s
AC-228	3875.62	968.97	21.	8.	0.001	83.84	1.724s
EU-154	3985.06	996.33	51.	-6.	-0.001	177.74	1.746s
PA-234M	4003.73	1001.00	66.	-10.	-0.001	109.58	1.750s
EU-154	4018.84	1004.77	38.	11.	0.001	87.97	1.753s
Co-56	4151.10	1037.84	22.	-4.	0.000	306.89	1.780s
Cs-136	4192.02	1048.07	39.	-15.	-0.002	63.41	1.788s
RH-106	4201.18	1050.36	63.	-10.	-0.001	121.27	1.790s
BI-207	4254.38	1063.66	27.	-8.	-0.001	137.09	1.801s
Ga-68	4309.34	1077.40	16.	1.	0.000	914.69	1.812
FE-59	4396.74	1099.25	21.	-3.	0.000	319.69	1.829s
EU-152	4448.04	1112.07	55.	-12.	-0.002	92.04	1.839s
ZN-65	4461.92	1115.55	67.	0.	0.000	1000.00	1.842s
BI-214	4480.88	1120.29	68.	-1.	0.000	771.29	1.845s
Sc-46	4481.94	1120.55	67.	0.	0.000	1000.00	1.846s
Ta-182	4484.94	1121.30	104.	-18.	-0.003	82.84	1.846s
CO-60	4692.68	1173.24	12.	3.	0.000	265.74	1.886s
Ta-182	4755.93	1189.05	0.	15.	0.002	27.37	1.899s
Ta-182	4885.37	1221.41	11.	3.	0.000	229.35	1.923s
Co-56	4952.84	1238.28	7.	5.	0.001	120.99	1.936s
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	23.	-5.	-0.001	243.70	1.975s
TL-210	5251.71	1313.00	0.	7.	0.001	37.80	1.991s
CO-60	5329.71	1332.50	2.	8.	0.001	43.58	2.005s
AG-110M	5536.89	1384.30	0.	8.	0.001	35.36	2.042s
K-40	5843.01	1460.83	27.	-14.	-0.002	46.32	2.095s
La-140	6384.49	1596.21	12.	-4.	-0.001	215.06	2.185s
SB-124	6763.55	1690.98	24.	-12.	-0.002	102.74	2.245s
BI-214	7057.56	1764.49	10.	2.	0.000	234.52	2.290s
Co-56	7084.99	1771.35	13.	-1.	0.000	617.74	2.294s
Y-88	7343.81	1836.06	0.	6.	0.001	40.82	2.332s

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   1.0031E-01                                     5.31E+01
                          477.60 1.003E-01 ?(P 2.744E+00 7.77E+02 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  -3.1458E+00                                     4.66E+11
                         1460.83-3.146E+00 ?(P 5.952E+00 4.63E+01 1.07E+01 G

Sc-46    F  -1.5791E-01                                     8.38E+01
                          889.28-1.579E-01 ?(P 5.363E-01 8.44E+01 1.00E+02 G
                         1120.55 0.000E+00 &   7.519E-01 1.00E+03 1.00E+02 G

CR-51    F  -5.5164E-02                                     2.77E+01
                          320.08-5.516E-02 %(P 5.412E+00 1.64E+03 9.94E+00 G

MN-54    C   9.4340E-03                                     3.12E+02
                          834.85 9.434E-03 %(  3.569E-01 1.54E+03 1.00E+02 G

FE-59    F  -1.0670E-01                                     4.45E+01
                         1099.25-1.067E-01 ?(  7.757E-01 3.20E+02 5.65E+01 G
                         1291.60-2.263E-01 +   1.207E+00 2.44E+02 4.32E+01 G

Co-56    C   1.0648E-01                                     7.73E+01
                          846.77 7.522E-02 ?(P 1.907E-01 1.02E+02 9.99E+01 G
                         1238.28 1.538E-01 ?(P 4.594E-01 1.21E+02 6.61E+01 G
                         1037.84-4.331E-01 + P 2.959E+00 3.07E+02 1.41E+01 G
                         1771.35-1.514E-01 +   3.525E+00 6.18E+02 1.55E+01  A

CO-57    C  -5.8947E-02                                     2.72E+02
                          122.06-5.895E-02 ?(  1.833E-01 9.26E+01 8.56E+01 G
                          136.47 0.000E+00 +   2.181E+00 1.00E+03 1.07E+01 G

CO-58    C  -4.6213E-02                                     7.09E+01
                          810.78-4.621E-02 &(  4.867E-01 3.00E+02 9.95E+01 G

CO-60    F   1.7719E-01                                     1.93E+03
                         1332.50 1.772E-01 ?(P 1.926E-01 4.36E+01 1.00E+02 G
                         1173.24 5.692E-02 - P 3.625E-01 2.66E+02 9.99E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	I	-1.5335E-01					7.41E+06	
			702.63	-1.533E-01	?(	3.877E-01	1.09E+02	9.79E+01 G
			871.10	1.470E-02	+	3.756E-01	7.00E+02	9.99E+01 G
ZR-95	I	-3.9285E-01					6.40E+01	
			756.73	-3.928E-01	&(P	7.553E-01	5.01E+01	5.45E+01 G
			724.20	0.000E+00	+	8.897E-01	1.00E+03	4.42E+01 G
NB-95	I	2.3606E-03					6.40E+01	
			765.79	2.361E-03	%(	3.645E-01	4.23E+03	9.98E+01 G
RU-103	I	2.3286E-02					3.93E+01	
			497.05	2.329E-02	?(	3.009E-01	5.19E+02	9.09E+01 G
			610.30	-4.472E-08	%	1.197E+01	7.78E+09	5.75E+00 GA
RH-106	I	-3.4953E-01					3.74E+02	
			621.92	-3.495E-01	?(	3.435E+00	3.97E+02	9.93E+00 G
			1050.36	-1.069E+01	&	4.419E+01	1.21E+02	1.56E+00 G
			511.86	5.284E+00		2.219E+00	1.52E+01	2.00E+01 GA
AG-108M	C	-4.4797E-02					1.53E+05	
			433.94	-4.480E-02	?(	2.748E-01	2.39E+02	9.05E+01 G
			722.94	0.000E+00	+	4.318E-01	1.00E+03	9.08E+01 G
			614.28	2.878E-09	%	7.704E-01	7.78E+09	8.98E+01 G
AG-110M	F	2.0283E-01					2.50E+02	
			884.68	2.220E-02	?(P	6.356E-01	8.03E+02	7.27E+01 G
			657.76	6.480E-02	&(	3.253E-01	1.44E+02	9.46E+01 G
			937.49	3.650E-01	?(	7.960E-01	9.38E+01	3.44E+01 G
			1384.30	7.355E-01	?(	6.775E-01	3.54E+01	2.43E+01 G
			763.94	5.476E-01	?(	1.368E+00	7.46E+01	2.23E+01 G
SN-113	F	1.3713E-01					1.15E+02	
			391.69	1.371E-01	&(	5.407E-01	1.16E+02	6.40E+01 G
SB-124	F	7.5922E-02					6.02E+01	
			602.73	-1.729E-02	?(P	6.962E-01	7.94E+02	9.83E+01 G
			1690.98	-6.759E-01	+	1.439E+00	1.03E+02	4.78E+01 G
			722.79	9.232E-01	?(	3.258E+00	1.03E+02	1.08E+01 G
SB-125	I	-4.8063E-01					1.01E+03	
			427.88	-4.806E-01	?(P	1.060E+00	7.98E+01	2.96E+01 G
			600.50	1.489E-01	+	3.775E+00	7.39E+02	1.79E+01 G
			635.89	6.672E-01	+ P	2.670E+00	1.18E+02	1.13E+01 G
			463.37	-1.364E+00	+ P	3.783E+00	8.66E+01	1.05E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	I -9.5038E-02					8.02E+00	
		364.48	-9.504E-02	?(	3.353E-01	1.41E+02	8.17E+01 G
		284.30	-9.463E-01	+ P	3.302E+00	1.39E+02	6.14E+00 G
		636.97	-2.114E+00	+	5.559E+00	7.86E+01	7.17E+00 G
Gd-153	F 1.4944E-01					2.42E+02	
		97.50	1.494E-01	?(	7.147E-01	1.42E+02	3.00E+01 G
		103.20	0.000E+00	-	1.029E+00	1.00E+03	2.18E+01 G
Ga-68	C 9.4111E-01					4.71E-02	
		1077.40	9.411E-01	?(	2.009E+01	9.15E+02	3.30E+00 G
Tc-99m	I 4.6649E-02					2.51E-01	
		140.51	4.665E-02	?(	2.210E-01	1.39E+02	8.93E+01 G
BA-133	F -5.2528E-02					3.85E+03	
		356.00	-5.253E-02	(	5.680E-01	3.14E+02	6.20E+01 G
		302.85	0.000E+00	+	2.805E+00	1.00E+03	1.83E+01 G
		383.84	-1.230E-01	+	3.566E+00	8.29E+02	8.94E+00 GA
		80.99	-1.620E-01	+ P	4.685E-01	1.16E+02	3.41E+01 GA
CS-134	I 3.0243E-02					7.54E+02	
		795.87	-1.269E-01	?(	5.811E-01	1.33E+02	8.55E+01 G
		604.71	0.000E+00	+	6.997E-01	1.00E+03	9.76E+01 G
		569.32	3.746E-01	?(	1.876E+00	1.44E+02	1.54E+01 G
		801.95	0.000E+00	&	6.146E+00	1.00E+03	8.69E+00 G
		563.24	1.006E+00	?(	3.638E+00	1.48E+02	8.35E+00 G
CS-137	I -1.7859E-01					1.10E+04	
		661.66	-1.786E-01	&(	4.976E-01	8.30E+01	8.52E+01 G
CE-139	F -8.8073E-02					1.38E+02	
		165.85	-8.807E-02	?(	3.031E-01	1.03E+02	7.99E+01 G
Ba-140	I 4.6230E-01					1.28E+01	
		537.26	3.660E-01	?(P	9.709E-01	1.09E+02	2.44E+01 G
		162.66	8.400E-01	?(	3.112E+00	1.10E+02	6.22E+00 G
		304.85	0.000E+00	-	1.205E+01	1.00E+03	4.29E+00 G
La-140	I 3.0912E-02					1.28E+01	
		1596.21	-1.069E-01	?(	5.039E-01	2.15E+02	9.54E+01 G
		487.02	1.476E-01	?(P	6.451E-01	1.29E+02	4.55E+01 G
		328.76	4.171E-01	&(	1.421E+00	1.01E+02	2.03E+01 G
		815.77	0.000E+00	-	2.156E+00	1.00E+03	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	1.0525E-01					3.25E+01	
			145.44	1.053E-01	?(	5.562E-01	1.57E+02	4.82E+01 G
PM-144	C	4.0677E-03					3.63E+02	
			696.54	4.068E-03	%(	3.581E-01	3.64E+03	9.90E+01 G
			618.06	5.619E-03	% P	7.012E-01	3.64E+03	9.91E+01 G
EU-152	F	1.8456E-01					4.94E+03	
			121.78	1.424E-01	?(	4.963E-01	1.03E+02	2.86E+01 G
			344.29	7.908E-02	?(	1.296E+00	4.74E+02	2.65E+01 G
			1112.07	-1.607E+00	+	4.992E+00	9.20E+01	1.36E+01 G
			778.92	-1.579E+00	+	3.208E+00	8.82E+01	1.29E+01 G
			964.11	-4.769E-01	+	3.169E+00	1.89E+02	1.46E+01 G
			244.69	7.122E-01	?(P	3.890E+00	1.62E+02	7.58E+00 G
			1408.00	3.600E-02	%	1.491E+00	1.68E+03	2.10E+01 GA
EU-154	I	2.9172E-01					3.14E+03	
			123.10	-1.295E-01	?(	4.128E-01	9.50E+01	4.08E+01 G
			1274.54	0.000E+00	+	1.068E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	1.941E+00	1.00E+03	2.02E+01 G
			873.23	6.853E-01	?(	1.856E+00	7.97E+01	1.23E+01 G
			1004.77	9.776E-01	?(	2.905E+00	8.80E+01	1.80E+01 G
			996.33	-9.110E-01	+	5.612E+00	1.78E+02	1.06E+01 G
EU-155	I	-1.0587E-02					1.81E+03	
			105.31	-1.059E-02	%(P	1.063E+00	3.24E+03	2.12E+01 G
			86.54	-1.573E-01	+	8.956E-01	1.69E+02	3.07E+01 G
HF-181	F	1.3037E-01					4.24E+01	
			482.00	8.897E-02	?(P	3.480E-01	1.16E+02	8.05E+01 G
			133.02	0.000E+00	-	4.903E-01	1.00E+03	4.33E+01 G
			345.83	3.515E-01	*(P	2.129E+00	1.78E+02	1.51E+01 G
			136.30	-7.741E-01	&	3.847E+00	1.47E+02	5.85E+00 G
Ta-182	F	-9.5391E-02					1.14E+02	
			1121.30	-9.578E-01	&(	2.650E+00	8.28E+01	3.49E+01 G
			1221.41	2.457E-01	+	1.322E+00	2.29E+02	2.70E+01 G
			1189.05	1.762E+00	?(P	8.835E-01	2.74E+01	1.62E+01 G
Hg-203	F	9.8430E-02					4.66E+01	
			279.20	9.843E-02	(	3.209E-01	9.69E+01	8.15E+01 G
TL-208	N	-3.1819E-01					6.98E+02	
			583.02	-3.182E-01	&(P	4.835E-01	4.75E+01	8.45E+01 G
			277.28	-1.752E+00	+ P	5.065E+00	7.07E+01	6.31E+00 G
			860.56	-1.504E+00	+ P	3.672E+00	4.75E+01	1.24E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PM-146	C	-5.0330E-02					2.02E+03	
			453.88	-2.042E-01	&(	4.700E-01	9.30E+01	6.50E+01 G
			747.16	5.035E-02	+	8.626E-01	6.93E+02	3.40E+01 G
			735.72	3.941E-01	?(	1.134E+00	1.20E+02	2.25E+01 G
Y-88	F	1.5309E-01					1.07E+02	
			1836.06	1.760E-01	?(	2.162E-01	4.08E+01	9.92E+01 G
			898.04	1.288E-01	?(	3.343E-01	1.12E+02	9.37E+01 G
Cd-113m		-1.4669E+03					5.33E+03	
			263.70	-1.467E+03	?(	4.566E+03	9.28E+01	6.00E-03 K
Cf-251	T	7.0801E-02					3.28E+05	
			176.60	7.080E-02	*(	1.029E+00	5.50E+02	1.70E+01 G
			227.00	-1.349E+00	+	3.572E+00	1.03E+02	6.30E+00 GA
Cf-249	T	-2.9125E-02					1.28E+05	
			387.95	-1.471E-01	?(	5.203E-01	1.05E+02	6.60E+01 G
			333.44	4.727E-01	(	1.734E+00	1.08E+02	1.55E+01 G
Sn-126		5.7918E-01					3.65E+07	
			87.57	1.156E-01	-	6.836E-01	1.76E+02	3.75E+01 GA
			64.28	5.792E-01	?(	2.027E+00	1.04E+02	9.70E+00 G
			86.94	1.715E-01	}	2.773E+00	1.92E+02	9.04E+00 GA
PB-210	N	-4.8710E-01					8.14E+03	
			46.54	-4.871E-01	*(P	7.434E+00	4.58E+02	4.25E+00 G
PB-212	N	5.0023E-01					6.98E+02	
			238.63	5.002E-01	(P	3.568E-01	3.18E+01	4.33E+01 G
			300.03	0.000E+00	+	1.556E+01	1.00E+03	3.28E+00 GA
PB-214	N	3.4350E-01					5.84E+05	
			351.93	3.435E-01	(	6.354E-01	5.67E+01	3.76E+01 G
			295.09	1.540E-01	-	2.589E+00	4.96E+02	1.93E+01 G
			242.00	-1.005E+00	-	4.821E+00	1.42E+02	7.43E+00 GA
BI-207	C	-1.9026E-01					1.18E+04	
			1063.66	-1.903E-01	?(P	6.352E-01	1.37E+02	7.45E+01 G
			569.70	9.915E-02	+	2.666E-01	7.99E+01	9.77E+01 G
BI-212	N	-2.3142E+00					6.98E+02	
			727.17	-2.314E+00	?(	6.470E+00	8.34E+01	7.55E+00 G
			785.42	-1.689E+01	+ P	3.338E+01	5.36E+01	1.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
U-235	N	6.4691E-01					2.57E+11	
			143.79	3.341E-01	*(P	2.417E+00	2.15E+02	1.10E+01 G
			205.33	1.331E+00	&(	3.637E+00	1.06E+02	5.01E+00 G
			163.38	-9.083E-01	+ P	4.057E+00	1.86E+02	5.08E+00 G
			185.72	1.080E-01	-	3.363E-01	1.20E+02	5.40E+01 GA
BI-214	N	1.3806E-02					5.84E+05	
			609.31	-1.032E-01	?(P	1.510E+00	2.99E+02	4.61E+01 G
			1120.29	-1.794E-01	& P	5.028E+00	7.71E+02	1.51E+01 G
			1764.49	3.639E-01	?(	3.174E+00	2.35E+02	1.54E+01 G
BI-210M	T	1.3696E-01					1.10E+09	
			265.83	1.370E-01	?(P	4.981E-01	1.08E+02	5.00E+01 G
			304.90	0.000E+00	&	1.846E+00	1.00E+03	2.80E+01 G
AC-228	N	6.3056E-01					2.10E+03	
			911.07	5.270E-01	?(	1.094E+00	9.08E+01	2.90E+01 G
			968.97	7.836E-01	?(	2.225E+00	8.38E+01	1.75E+01 G
			338.32	6.579E-01	&(	2.505E+00	1.12E+02	1.20E+01 G
			93.35	8.643E-07	%	4.710E+00	1.60E+08	5.56E+00 XA
TH-227	N	1.0786E-01					7.95E+03	
			256.24	-3.379E-01	?(P	2.938E+00	3.87E+02	7.00E+00 G
			235.97	-6.557E-01	&	3.059E+00	1.39E+02	1.23E+01 G
			50.14	4.979E-01	?(	3.752E+00	2.23E+02	8.00E+00 G
TH-229	N	9.4899E-01					2.68E+06	
			193.51	9.490E-01	&(P	3.826E+00	1.54E+02	4.40E+00 G
			210.85	-3.065E-01	-	6.683E+00	8.24E+02	2.99E+00 G
TH-234	N	1.1215E+00					1.63E+12	
			92.59	1.122E+00	*(P	3.510E+00	1.14E+02	5.58E+00 G
			63.29	-5.431E+00	+ P	6.275E+00	3.28E+01	3.81E+00 G
PA-234	N	6.7591E-01					1.63E+12	
			131.29	-2.727E-01	&(	1.122E+00	1.22E+02	1.80E+01 G
			946.02	1.533E+00	?(	8.693E-01	2.77E+01	1.34E+01 G
			569.47	-2.067E-02	%	3.859E+00	5.18E+03	8.20E+00 G
			883.24	1.258E+00	?(	4.292E+00	9.98E+01	9.60E+00 G
			880.53	2.004E+00	?	5.906E+00	8.67E+01	6.00E+00 GA
PA-234M	N	-8.0765E+00					1.63E+12	
			1001.00	-1.936E+01	?(P	8.081E+01	1.10E+02	8.37E-01 G
			766.41	2.406E+01	?(	9.445E+01	1.12E+02	2.94E-01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AM-241   T   4.5663E-02                                      1.58E+05
                           59.54 4.566E-02  (  4.428E-01 3.51E+02 3.59E+01 G

Cs-136   F   1.3937E-01                                      1.30E+01
                          818.50 1.251E-01 ?(  4.609E-01 1.08E+02 1.00E+02 G
                         1048.07-3.297E-01 +   6.889E-01 6.34E+01 8.00E+01 G
                          340.57 1.697E-01 ?(  6.866E-01 1.19E+02 4.69E+01 G

Np-239   T  -2.1806E-01                                      2.36E+00
                          103.70 0.000E+00 +   9.473E-01 1.00E+03 2.40E+01 X
                          106.13-2.181E-01 ?(  1.049E+00 1.43E+02 2.27E+01 G
                           99.50 5.957E-02 +   1.499E+00 7.37E+02 1.50E+01 X

Nd-147      -1.1337E+00                                      1.11E+01
                          531.00-1.134E+00 &(  2.573E+00 9.52E+01 1.30E+01 G
                           91.10 0.000E+00 +   9.255E-01 1.00E+03 2.83E+01 G

Kr-85    I   2.6757E+01                                      3.92E+03
                          513.98 2.676E+01 ?(  1.480E+02 1.64E+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
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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	253.	-5.	-0.001	458.25	-4.871E-01	P
TH-227	50.14	255.	10.	0.001	222.81	4.979E-01	
AM-241	59.54	83.	5.	0.001	351.16	4.566E-02	
BA-133	80.99	104.	-17.	-0.002	115.88	-1.620E-01	P
EU-155	86.54	328.	-15.	-0.002	169.40	-1.573E-01	
Gd-153	97.50	196.	14.	0.002	141.86	1.494E-01	
Np-239	99.50	210.	3.	0.000	736.66	5.957E-02	
Np-239	106.13	233.	-15.	-0.002	142.98	-2.181E-01	
EU-152	121.78	75.	12.	0.002	103.10	1.424E-01	
CO-57	122.06	93.	-15.	-0.002	92.62	-5.895E-02	
EU-154	123.10	107.	-16.	-0.002	94.95	-1.295E-01	
PA-234	131.29	150.	-14.	-0.002	122.11	-2.727E-01	
HF-181	136.30	181.	-13.	-0.002	147.17	-7.741E-01	
Tc-99m	140.51	105.	11.	0.001	139.47	4.665E-02	
U-235	143.79	241.	10.	0.001	214.69	3.341E-01	P
CE-141	145.44	244.	14.	0.002	156.88	1.053E-01	
Ba-140	162.66	108.	14.	0.002	109.83	8.400E-01	
U-235	163.38	122.	-12.	-0.002	185.56	-9.083E-01	P
CE-139	165.85	169.	-18.	-0.003	102.65	-8.807E-02	
Cf-251	176.60	77.	3.	0.000	550.25	7.080E-02	
U-235	185.72	77.	14.	0.002	120.27	1.080E-01	
TH-229	193.51	61.	10.	0.001	153.67	9.490E-01	P
U-235	205.33	66.	15.	0.002	105.60	1.331E+00	
TH-229	210.85	77.	-2.	0.000	823.86	-3.065E-01	
Cf-251	227.00	88.	-18.	-0.002	102.91	-1.349E+00	
TH-227	235.97	243.	-16.	-0.002	138.75	-6.557E-01	
PB-214	242.00	211.	-15.	-0.002	142.44	-1.005E+00	
EU-152	244.69	138.	11.	0.001	161.61	7.122E-01	P
TH-227	256.24	59.	-4.	-0.001	386.64	-3.379E-01	P
Cd-113m	263.70	104.	-16.	-0.002	92.78	-1.467E+03	
BI-210M	265.83	84.	13.	0.002	108.22	1.370E-01	P
TL-208	277.28	133.	-20.	-0.003	70.69	-1.752E+00	P
Hg-203	279.20	86.	14.	0.002	96.85	9.843E-02	
I-131	284.30	48.	-10.	-0.001	139.42	-9.463E-01	P
PB-214	295.09	305.	5.	0.001	495.98	1.540E-01	
La-140	328.76	81.	13.	0.002	100.99	4.171E-01	
Cf-249	333.44	68.	11.	0.002	108.17	4.727E-01	
AC-228	338.32	84.	12.	0.002	112.45	6.579E-01	
Cs-136	340.57	96.	12.	0.002	119.44	1.697E-01	
EU-152	344.29	108.	3.	0.000	474.27	7.908E-02	
HF-181	345.83	93.	8.	0.001	177.89	3.515E-01	P
PB-214	351.93	48.	19.	0.003	56.66	3.435E-01	
BA-133	356.00	108.	-5.	-0.001	314.16	-5.253E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	364.48	60.	-11.	-0.002	141.13	-9.504E-02	
BA-133	383.84	76.	-2.	0.000	828.65	-1.230E-01	
Cf-249	387.95	88.	-13.	-0.002	104.82	-1.471E-01	
SB-125	427.88	61.	-18.	-0.002	79.81	-4.806E-01	P
AG-108M	433.94	36.	-5.	-0.001	239.17	-4.480E-02	
PM-146	453.88	52.	-16.	-0.002	92.97	-2.042E-01	
SB-125	463.37	87.	-17.	-0.002	86.62	-1.364E+00	P
Ir-192	468.06	101.	-5.	-0.001	304.29	-7.889E-02	
BE-7	477.60	42.	1.	0.000	777.24	1.003E-01	P
HF-181	482.00	39.	8.	0.001	115.51	8.897E-02	P
La-140	487.02	42.	8.	0.001	128.53	1.476E-01	P
RU-103	497.05	35.	2.	0.000	519.22	2.329E-02	
RH-106	511.86	93.	114.	0.016	15.25	5.284E+00	
Kr-85	513.98	198.	12.	0.002	163.71	2.676E+01	
Nd-147	531.00	48.	-15.	-0.002	95.16	-1.134E+00	
Ba-140	537.26	22.	9.	0.001	109.39	3.660E-01	P
CS-134	563.24	35.	8.	0.001	148.32	1.006E+00	
CS-134	569.32	30.	6.	0.001	143.73	3.746E-01	
BI-207	569.70	24.	10.	0.001	79.85	9.915E-02	
TL-208	583.02	62.	-26.	-0.004	47.52	-3.182E-01	P
SB-125	600.50	170.	2.	0.000	739.19	1.489E-01	
SB-124	602.73	174.	-2.	0.000	794.22	-1.729E-02	P
BI-214	609.31	176.	-4.	-0.001	299.12	-1.032E-01	P
RH-106	621.92	37.	-3.	0.000	396.98	-3.495E-01	
SB-125	635.89	27.	7.	0.001	117.56	6.672E-01	P
I-131	636.97	50.	-13.	-0.002	78.57	-2.114E+00	
AG-110M	657.76	27.	5.	0.001	143.61	6.480E-02	
CS-137	661.66	53.	-13.	-0.002	83.02	-1.786E-01	
NB-94	702.63	37.	-12.	-0.002	108.88	-1.533E-01	
SB-124	722.79	30.	8.	0.001	103.08	9.232E-01	
BI-212	727.17	60.	-14.	-0.002	83.37	-2.314E+00	
PM-146	735.72	14.	7.	0.001	119.52	3.941E-01	
PM-146	747.16	19.	1.	0.000	692.82	5.035E-02	
ZR-95	756.73	39.	-16.	-0.002	50.09	-3.928E-01	P
AG-110M	763.94	20.	9.	0.001	74.58	5.476E-01	
PA-234M	766.41	16.	5.	0.001	112.47	2.406E+01	
EU-152	778.92	37.	-15.	-0.002	88.22	-1.579E+00	
BI-212	785.42	39.	-16.	-0.002	53.60	-1.689E+01	P
CS-134	795.87	53.	-8.	-0.001	133.46	-1.269E-01	
CO-58	810.78	48.	-3.	0.000	300.00	-4.621E-02	
Cs-136	818.50	43.	9.	0.001	107.92	1.251E-01	
Co-56	846.77	5.	5.	0.001	102.31	7.522E-02	P
TL-208	860.56	38.	-13.	-0.002	47.52	-1.504E+00	P
NB-94	871.10	24.	1.	0.000	700.00	1.470E-02	
EU-154	873.23	8.	6.	0.001	79.67	6.853E-01	
PA-234	880.53	21.	8.	0.001	86.72	2.004E+00	
PA-234	883.24	29.	8.	0.001	99.80	1.258E+00	
AG-110M	884.68	37.	1.	0.000	803.47	2.220E-02	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Sc-46	889.28	51.	-11.	-0.001	84.38	-1.579E-01	P
Y-88	898.04	15.	8.	0.001	112.15	1.288E-01	
AC-228	911.07	15.	10.	0.001	90.83	5.270E-01	
AG-110M	937.49	10.	8.	0.001	93.82	3.650E-01	
PA-234	946.02	0.	13.	0.002	27.74	1.533E+00	
EU-152	964.11	31.	-4.	-0.001	188.89	-4.769E-01	
AC-228	968.97	21.	8.	0.001	83.84	7.836E-01	
EU-154	996.33	51.	-6.	-0.001	177.74	-9.110E-01	
PA-234M	1001.00	66.	-10.	-0.001	109.58	-1.936E+01	P
EU-154	1004.77	38.	11.	0.001	87.97	9.776E-01	
Co-56	1037.84	22.	-4.	0.000	306.89	-4.331E-01	P
Cs-136	1048.07	39.	-15.	-0.002	63.41	-3.297E-01	
RH-106	1050.36	63.	-10.	-0.001	121.27	-1.069E+01	
BI-207	1063.66	27.	-8.	-0.001	137.09	-1.903E-01	P
Ga-68	1077.40	16.	1.	0.000	914.69	9.411E-01	
FE-59	1099.25	21.	-3.	0.000	319.69	-1.067E-01	
EU-152	1112.07	55.	-12.	-0.002	92.04	-1.607E+00	
BI-214	1120.29	68.	-1.	0.000	771.29	-1.794E-01	P
Ta-182	1121.30	104.	-18.	-0.003	82.84	-9.578E-01	
CO-60	1173.24	12.	3.	0.000	265.74	5.692E-02	P
Ta-182	1189.05	0.	15.	0.002	27.37	1.762E+00	P
Ta-182	1221.41	11.	3.	0.000	229.35	2.457E-01	
Co-56	1238.28	7.	5.	0.001	120.99	1.538E-01	P
NA-22	1274.53	6.	5.	0.001	76.55	1.104E-01	
FE-59	1291.60	23.	-5.	-0.001	243.70	-2.263E-01	
TL-210	1313.00	0.	7.	0.001	37.80	7.089E-01	
CO-60	1332.50	2.	8.	0.001	43.58	1.772E-01	P
AG-110M	1384.30	0.	8.	0.001	35.36	7.355E-01	
K-40	1460.83	27.	-14.	-0.002	46.32	-3.146E+00	P
La-140	1596.21	12.	-4.	-0.001	215.06	-1.069E-01	
SB-124	1690.98	24.	-12.	-0.002	102.74	-6.759E-01	
BI-214	1764.49	10.	2.	0.000	234.52	3.639E-01	
Co-56	1771.35	13.	-1.	0.000	617.74	-1.514E-01	
Y-88	1836.06	0.	6.	0.001	40.82	1.760E-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	1.0031E-01	1.0031E-01	7.772E+02%	2.74E+00
NA-22	#A	1.1043E-01	1.1043E-01	7.655E+01%	2.86E-01
K-40	#A	-3.1458E+00	-3.1458E+00	4.632E+01%	5.95E+00
Sc-46	#A	-1.5791E-01	-1.5791E-01	8.438E+01%	5.36E-01
CR-51	#A	-5.5163E-02	-5.5164E-02	1.642E+03%	5.41E+00
MN-54	#A	9.4340E-03	9.4340E-03	1.542E+03%	3.57E-01

FE-59	#A	-1.0669E-01	-1.0670E-01	3.197E+02%	7.76E-01
Co-56	#A	1.0648E-01	1.0648E-01	7.922E+01%	1.91E-01
CO-57	#A	-5.8947E-02	-5.8947E-02	9.262E+01%	1.83E-01
CO-58	#A	-4.6213E-02	-4.6213E-02	3.000E+02%	4.87E-01
CO-60	#A	1.7719E-01	1.7719E-01	4.358E+01%	1.93E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.48E+00
NB-94	#A	-1.5335E-01	-1.5335E-01	1.089E+02%	3.88E-01
ZR-95	#A	-3.9284E-01	-3.9285E-01	5.009E+01%	7.55E-01
NB-95	#A	2.3606E-03	2.3606E-03	4.234E+03%	3.64E-01
RU-103	#A	2.3286E-02	2.3286E-02	5.192E+02%	3.01E-01
RH-106	#A	-3.4953E-01	-3.4953E-01	3.970E+02%	3.43E+00
AG-108M	#A	-4.4797E-02	-4.4797E-02	2.392E+02%	2.75E-01
AG-110M	#A	2.0283E-01	2.0283E-01	3.536E+01%	6.36E-01
SN-113	#A	1.3713E-01	1.3713E-01	1.164E+02%	5.41E-01
SB-124	#A	7.5922E-02	7.5922E-02	1.031E+02%	6.96E-01
SB-125	#A	-4.8063E-01	-4.8063E-01	7.981E+01%	1.06E+00
I-131	#A	-9.5034E-02	-9.5038E-02	1.411E+02%	3.35E-01
Gd-153	#A	1.4944E-01	1.4944E-01	1.419E+02%	7.15E-01
Ga-68	#A	9.3551E-01	9.4111E-01	9.147E+02%	2.01E+01
Tc-99m	#A	4.6597E-02	4.6649E-02	1.395E+02%	2.21E-01
BA-133	#A	-5.2528E-02	-5.2528E-02	3.142E+02%	5.68E-01
CS-134	#A	3.0243E-02	3.0243E-02	8.197E+01%	5.81E-01
CS-137	#A	-1.7859E-01	-1.7859E-01	8.302E+01%	4.98E-01
CE-139	#A	-8.8073E-02	-8.8073E-02	1.026E+02%	3.03E-01
Ba-140	#A	4.6229E-01	4.6230E-01	7.751E+01%	9.71E-01
La-140	#A	3.0911E-02	3.0912E-02	9.004E+01%	5.04E-01
CE-141	#A	1.0525E-01	1.0525E-01	1.569E+02%	5.56E-01
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.92E+00
PM-144	#A	4.0677E-03	4.0677E-03	3.641E+03%	3.58E-01
EU-152	#A	1.8456E-01	1.8456E-01	1.031E+02%	4.96E-01
EU-154	#A	2.9172E-01	2.9172E-01	5.066E+01%	4.13E-01
EU-155	#A	-1.0587E-02	-1.0587E-02	3.243E+03%	1.06E+00
HF-181	#A	1.3037E-01	1.3037E-01	1.061E+02%	3.48E-01
Ta-182	#A	-9.5391E-02	-9.5391E-02	2.737E+01%	2.65E+00
Hg-203	#A	9.8429E-02	9.8430E-02	9.685E+01%	3.21E-01
TL-208	#A	-3.1819E-01	-3.1819E-01	4.752E+01%	4.83E-01
PM-146	#A	-5.0330E-02	-5.0330E-02	7.571E+01%	4.70E-01
Y-88	#A	1.5309E-01	1.5309E-01	4.082E+01%	2.16E-01
Cd-113m	#A	-1.4669E+03	-1.4669E+03	9.278E+01%	4.57E+03
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.92E+00
Cf-251	#A	7.0801E-02	7.0801E-02	5.503E+02%	1.03E+00
Cf-249	#A	-2.9125E-02	-2.9125E-02	7.531E+01%	5.20E-01
Sn-126	#A	5.7918E-01	5.7918E-01	1.042E+02%	2.03E+00
PB-210	#A	-4.8710E-01	-4.8710E-01	4.583E+02%	7.43E+00
PB-212	#	5.0023E-01	5.0023E-01	3.180E+01%	3.57E-01
PB-214	#A	3.4350E-01	3.4350E-01	5.666E+01%	6.35E-01
BI-207	#A	-1.9026E-01	-1.9026E-01	1.371E+02%	6.35E-01
BI-212	#A	-2.3142E+00	-2.3142E+00	8.337E+01%	6.47E+00
U-235	#A	6.4691E-01	6.4691E-01	1.056E+02%	2.42E+00

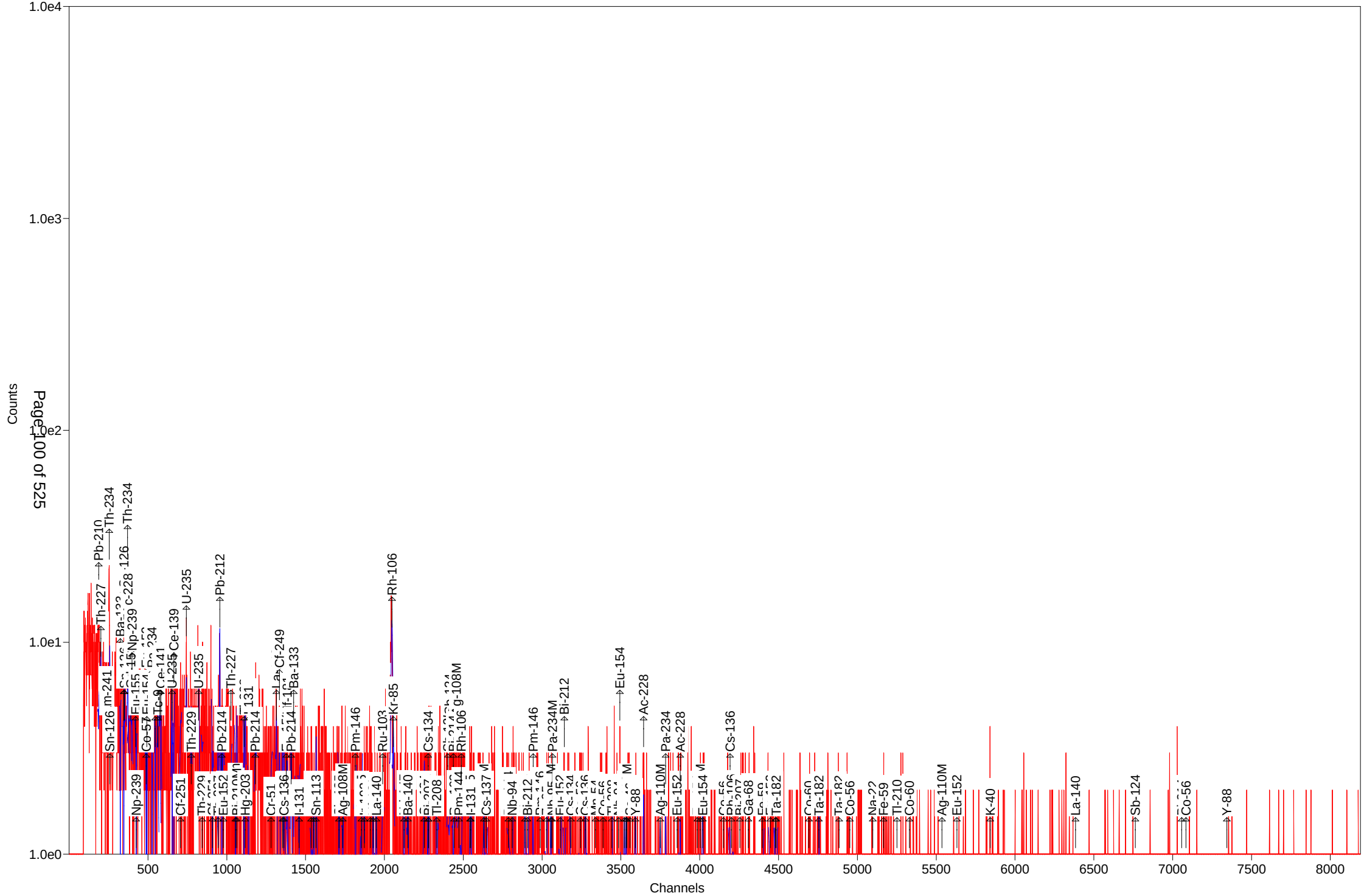
BI-214 #A	1.3806E-02	1.3806E-02	1.900E+02%	1.51E+00
BI-210M#A	1.3696E-01	1.3696E-01	1.082E+02%	4.98E-01
AC-228 #A	6.3056E-01	6.3056E-01	5.570E+01%	1.09E+00
TH-227 #A	1.0786E-01	1.0786E-01	2.228E+02%	2.94E+00
TH-229 #A	9.4899E-01	9.4899E-01	1.537E+02%	3.83E+00
TH-234 #A	1.1215E+00	1.1215E+00	1.142E+02%	3.51E+00
PA-231 #A	0.0000E+00	0.0000E+00	7.071E+02%	1.78E+01
PA-233 #A	0.0000E+00	0.0000E+00	7.071E+02%	1.46E+00
PA-234 #A	6.7591E-01	6.7591E-01	2.774E+01%	1.12E+00
PA-234M#A	-8.0765E+00	-8.0765E+00	7.851E+01%	8.08E+01
AM-241 #A	4.5663E-02	4.5663E-02	3.512E+02%	4.43E-01
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	2.15E+00
Ir-192 #A	0.0000E+00	0.0000E+00	7.071E+02%	6.12E-01
Cs-136 #A	1.3937E-01	1.3937E-01	8.049E+01%	4.61E-01
Np-239 #A	-2.1803E-01	-2.1806E-01	1.430E+02%	1.05E+00
Nd-147 #A	-1.1337E+00	-1.1337E+00	9.516E+01%	2.57E+00
TL-210 #A	0.0000E+00	0.0000E+00	7.071E+02%	5.38E-01
Kr-85 #A	2.6757E+01	2.6757E+01	1.637E+02%	1.48E+02

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

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

Total Activity (37.6 to 2000.1 keV) 5.002E-01 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 5.0023478E-01 Bq/Sample

404676_Gamma_MB 160-404676~1-A. 7_Gamma_20183404.spc.



Test America St. Louis Spectrum ID: 14_Gamma_20184340

Sample Description: 404676_Gamma_LCS 160-404676~2-A
Detector: Detector #14
Batch ID: 404676
Work Order Number: Gamma
Lot Number: LCS 160-404676~2-A

Decay to Time: 12/29/2018 11:05 Live Time: 7200 sec
Acquisition Time: 12/29/2018 11:05:58 Real Time: 7325 sec
Analysis Time: 12/29/2018 13:08 Dead Time: 1.70 %
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	-1.338E+01	92.9	1.243E+01	1.245E+01	4.101E+01
NA-22	0.000E+00	1.#INF	6.749E-01	6.749E-01	2.239E+00
K-40	-1.661E+00	385.8	6.407E+00	6.408E+00	1.343E+01
Sc-46	-2.011E+00	91.9	1.848E+00	1.851E+00	6.101E+00
CR-51	-9.696E+00	98.8	9.583E+00	9.597E+00	3.163E+01
MN-54	4.338E+00	27.1	1.174E+00	1.194E+00	2.776E+00
FE-59	2.238E+00	167.2	3.741E+00	3.743E+00	7.983E+00
Co-56	9.546E-01	87.4	8.340E-01	8.354E-01	3.680E+00
CO-57	5.168E-01	1273.1	6.580E+00	6.580E+00	2.175E+01
CO-58	-1.868E+00	74.6	1.393E+00	1.396E+00	5.205E+00
CO-60	1.123E+03	0.3	3.271E+00	5.550E+01	1.984E+00
ZN-65	4.720E+00	94.9	4.481E+00	4.487E+00	1.479E+01
NB-94	-1.395E+00	296.4	4.134E+00	4.135E+00	2.863E+00
ZR-95	2.451E+00	94.0	2.303E+00	2.306E+00	5.286E+00
NB-95	1.325E+00	79.2	1.050E+00	1.052E+00	3.466E+00
RU-103	-8.845E-01	151.2	1.338E+00	1.338E+00	3.200E+00
RH-106	2.551E+01	63.7	1.625E+01	1.630E+01	5.876E+01
AG-108M	1.165E+00	113.4	1.322E+00	1.323E+00	3.305E+00
AG-110M	1.080E+00	69.1	7.467E-01	7.486E-01	7.818E+00
SN-113	1.753E+00	111.7	1.958E+00	1.961E+00	6.465E+00
SB-124	-1.286E+00	135.7	1.746E+00	1.747E+00	5.765E+00
SB-125	3.964E+00	72.4	2.869E+00	2.876E+00	9.945E+00
I-131	2.889E-01	61.4	1.773E-01	1.779E-01	3.180E+00
Gd-153	-9.743E-01	158.5	1.544E+00	1.545E+00	5.103E+00
Ga-68	2.307E+02	44.0	1.015E+02	1.023E+02	2.083E+02
Tc-99m	-3.811E-01	239.6	9.130E-01	9.133E-01	3.016E+00
BA-133	1.271E+00	139.2	1.769E+00	1.770E+00	5.308E+00
CS-134	8.490E-01	134.7	1.144E+00	1.145E+00	5.205E+00
CS-137	1.631E+03	0.3	4.522E+00	8.168E+01	3.248E+00
CE-139	-7.738E-01	120.9	9.356E-01	9.382E-01	3.089E+00
Ba-140	-2.107E+00	108.6	2.289E+00	2.292E+00	1.134E+01
La-140	1.871E+00	69.4	1.297E+00	1.301E+00	1.315E+00
CE-141	6.199E-01	210.2	1.303E+00	1.303E+00	3.426E+00

CE-144	-5.018E+00	131.0	6.572E+00	6.577E+00	2.170E+01
PM-144	6.910E-01	129.7	8.964E-01	8.971E-01	2.727E+00
EU-152	1.363E+01	24.0	3.276E+00	3.352E+00	7.149E+00
EU-154	7.504E+00	18.1	1.360E+00	1.421E+00	4.434E+00
EU-155	2.281E+00	147.3	3.361E+00	3.363E+00	1.109E+01
HF-181	-1.025E+00	79.9	8.183E-01	8.199E-01	5.378E+00
Ta-182	5.203E+00	36.3	1.890E+00	1.907E+00	2.184E+01
Hg-203	1.081E+00	92.8	1.003E+00	1.005E+00	3.310E+00
TL-208	-3.317E-02	259.2	8.597E-02	8.599E-02	3.138E+00
PM-146	-2.120E+00	89.5	1.898E+00	1.901E+00	6.263E+00
Y-88	1.646E+00	55.2	9.080E-01	9.129E-01	1.504E+00
Cd-113m	1.416E+04	95.6	1.354E+04	1.357E+04	4.469E+04
Cd-109	8.546E+02	2.2	1.856E+01	5.229E+01	3.846E+01
Cf-251	-3.781E+00	106.2	4.015E+00	4.027E+00	1.054E+01
Cf-249	2.533E+00	75.9	1.924E+00	1.928E+00	6.330E+00
Sn-126	-5.142E+00	102.5	5.273E+00	5.281E+00	1.741E+01
PB-210	9.161E+02	6.5	5.940E+01	1.018E+02	1.938E+02
PB-212	1.763E+00	68.1	1.200E+00	1.205E+00	3.955E+00
PB-214	1.946E+00	104.6	2.035E+00	2.038E+00	7.901E+00
BI-207	5.716E-01	80.0	4.576E-01	4.584E-01	5.817E+00
BI-212	1.854E+01	80.4	1.490E+01	1.493E+01	4.918E+01
U-235	-1.905E-01	3757.8	7.158E+00	7.158E+00	2.215E+01
BI-214	8.381E-01	70.9	5.945E-01	5.960E-01	1.241E+01
BI-210M	8.369E-01	190.8	1.597E+00	1.598E+00	5.279E+00
AC-228	-8.026E+00	69.8	5.605E+00	5.619E+00	1.848E+01
TH-227	1.011E+01	118.4	1.198E+01	1.199E+01	3.147E+01
TH-229	6.251E+00	107.7	6.734E+00	6.752E+00	4.637E+01
TH-234	-1.361E+01	260.0	3.539E+01	3.540E+01	4.681E+01
PA-231	0.000E+00	1.#INF	1.735E+01	1.735E+01	1.345E+02
PA-233	-2.650E+00	154.8	4.104E+00	4.106E+00	1.355E+01
PA-234	2.129E+00	101.9	2.169E+00	2.172E+00	1.320E+01
PA-234M	-2.934E+02	90.0	2.642E+02	2.645E+02	7.376E+02
AM-241	4.938E+03	0.2	7.895E+00	2.852E+02	1.074E+01
Np-237	-3.662E+00	173.7	6.363E+00	6.367E+00	2.101E+01
Ir-192	3.649E-01	68.2	2.487E-01	2.497E-01	3.625E+00
Cs-136	-1.842E+00	87.0	1.603E+00	1.606E+00	5.292E+00
Np-239	-2.181E+00	151.1	3.296E+00	3.299E+00	1.088E+01
Nd-147	3.378E+00	257.6	8.699E+00	8.701E+00	2.084E+01
TL-210	1.525E+00	75.5	1.152E+00	1.155E+00	3.802E+00
Kr-85	4.156E+01	626.0	2.602E+02	2.602E+02	8.617E+02
Total	2.403E+04				

Analyst: Joey Sausto

Sample description
404676_Gamma_LCS 160-404676~2-A

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20184340.An1

Acquisition information
Start time: 12/29/2018 11:05:58 AM
Live time: 7200
Real time: 7325
Dead time: 1.70 %
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	12/29/2018 11:05:00 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. 38 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1804

***** 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
26.44	5674.	4.65	0.69	2.161E-02				
32.11	17896.	1.77	1.00	2.738E-02				
36.53	3702.	7.03	0.98	3.133E-02				
42.53	495.	54.18	0.63	3.609E-02				
46.54	10788.	6.48	0.75	3.849E-02	46.54	4.250	9.161E+02	PB210
48.79	9230.	4.43	0.75	3.970E-02				
49.81	12720.	3.50	0.75	4.025E-02	50.14	8.000	5.454E+02	TH227
59.59	568101.	0.16	0.87	4.453E-02	59.54	35.900	4.938E+03	AM241
88.00	11518.	2.16	0.95	4.914E-02	87.57	37.500	8.683E+01	Sn126
					88.04	3.790	8.589E+02	Cd109
98.74	424.	30.24	0.45	4.906E-02				
102.95	382.	33.62	0.98	4.886E-02	103.20	21.800	4.987E+00	Gd153
					103.70	24.000	4.590E+00	Np239
105.31	170.	147.31	0.81	4.871E-02	105.31	21.200	PBC<MDA	EU155
121.84	714.	17.96	0.83	4.717E-02	121.78	28.580	7.351E+00	EU152
					122.06	85.600	2.456E+00	CO57
122.96	857.	14.37	0.83	4.704E-02	123.10	40.790	6.207E+00	EU154
136.30	176.	130.54	0.84	4.532E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	5.063E+00	CO57
145.44	95.	210.19	0.85	4.401E-02	145.44	48.200	PBC<MDA	CE141
168.33	60.	138.76	0.38	4.054E-02				
185.72	144.	142.53	0.89	3.800E-02	185.72	54.000	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
210.85	190.	107.73	0.92	3.489E-02	210.85	2.990	PBC<MDA	TH229
235.80	101.	94.89	0.43	3.232E-02	235.97	12.300	3.531E+00	TH227
238.42	176.	68.09	0.94	3.205E-02	238.63	43.300	PBC<MDA	PB212
249.33	124.	65.62	0.40	3.109E-02				
256.24	155.	118.45	0.96	3.050E-02	256.24	7.000	PBC<MDA	TH227
263.70	183.	95.64	0.97	2.989E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	90.	190.80	0.97	2.972E-02	265.83	50.000	PBC<MDA	BI210M
278.29	39.	431.76	0.98	2.884E-02	277.28	6.310	PBC<MDA	TL208
279.20	182.	92.77	0.99	2.870E-02	279.20	81.460	PBC<MDA	Hg203
295.09	49.	466.34	1.00	2.759E-02	295.09	19.300	PBC<MDA	PB214
298.32	122.	59.57	0.37	2.737E-02				
299.98	84.	271.47	1.01	2.726E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
302.80	60.	383.77	1.01	2.708E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.666E+00	BA133
304.85	130.	177.99	1.01	2.695E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	2.399E+00	BI210M
317.05	196.	44.11	0.80	2.619E-02	316.49	87.040	1.195E+00	Ir192
328.76	176.	100.39	1.03	2.551E-02	328.76	20.300	PBC<MDA	La140
333.44	175.	99.52	1.04	2.524E-02	333.44	15.510	PBC<MDA	Cf249
337.88	142.	73.87	1.04	2.498E-02	338.32	12.010	PBC<MDA	AC228
341.59	93.	64.90	0.23	2.480E-02				
343.85	430.	24.03	1.05	2.466E-02	344.29	26.500	9.144E+00	EU152
351.93	150.	104.59	1.06	2.426E-02	351.93	37.600	PBC<MDA	PB214
355.56	124.	139.17	1.06	2.405E-02	356.00	62.050	PBC<MDA	BA133
369.69	166.	60.23	0.37	2.339E-02				
383.96	201.	101.99	1.09	2.274E-02	383.84	8.940	PBC<MDA	BA133
387.95	179.	114.70	1.09	2.256E-02	387.95	66.000	PBC<MDA	Cf249
391.69	181.	111.75	1.09	2.240E-02	391.69	64.000	PBC<MDA	SN113
433.94	157.	113.44	1.13	2.072E-02	433.94	90.480	PBC<MDA	AG108M
457.89	262.	40.98	0.38	1.988E-02				
463.37	167.	120.46	1.16	1.970E-02	463.37	10.470	PBC<MDA	SB125
468.06	206.	92.93	1.17	1.955E-02	468.06	51.750	PBC<MDA	Ir192
510.75	337.	43.08	2.46	1.823E-02	511.86	20.000	PBC<MDA	RH106
513.98	23.	626.04	1.21	1.817E-02	513.98	0.430	PBC<MDA	Kr85
531.00	56.	257.55	1.23	1.771E-02	531.00	13.000	PBC<MDA	Nd147
563.24	97.	134.75	1.25	1.691E-02	563.24	8.350	PBC<MDA	CS134
569.47	125.	80.05	1.26	1.675E-02	569.32	15.380	6.717E+00	CS134
					569.47	8.200	1.260E+01	PA234
					569.70	97.740	1.057E+00	BI207
614.17	151.	43.88	0.29	1.577E-02	614.28	89.850	1.483E+00	AG108M
618.06	145.	129.72	1.30	1.569E-02	618.06	99.100	PBC<MDA	PM144
620.78	63.	316.54	1.31	1.561E-02	621.92	9.930	PBC<MDA	RH106
635.89	139.	72.38	1.32	1.534E-02	635.89	11.310	PBC<MDA	SB125
636.97	142.	70.37	1.32	1.531E-02	636.97	7.170	PBC<MDA	I131
645.96	155.	49.57	1.33	1.514E-02				
647.30	112.	61.76	1.33	1.511E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
657.76	141.	393.64	1.34	1.492E-02	657.76	94.640	PBC<MDA	AG110M
661.42	148575.	0.28	1.39	1.485E-02	661.66	85.210	1.631E+03	CS137
722.86	270.	33.05	0.91	1.380E-02	722.79	10.810	2.509E+01	SB124
					722.94	90.840	2.986E+00	AG108M
					723.36	20.220	1.342E+01	EU154
727.17	138.	80.37	1.40	1.374E-02	727.17	7.550	PBC<MDA	BI212
756.73	128.	93.97	1.43	1.329E-02	756.73	54.460	PBC<MDA	ZR95
763.94	142.	69.12	1.43	1.319E-02	763.94	22.280	PBC<MDA	AG110M
765.79	125.	79.23	1.43	1.316E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	4.500E+02	PA234M
778.92	225.	55.58	1.44	1.298E-02	778.92	12.940	PBC<MDA	EU152
799.60	138.	75.52	1.46	1.270E-02	799.60	98.960	PBC<MDA	TL210
815.77	78.	163.68	1.48	1.249E-02	815.77	23.280	PBC<MDA	La140
834.88	382.	27.07	1.29	1.224E-02	834.85	99.980	4.338E+00	MN54
873.23	172.	67.81	1.52	1.179E-02	873.23	12.270	PBC<MDA	EU154
880.53	175.	85.14	1.53	1.171E-02	880.53	6.000	PBC<MDA	PA234
883.24	96.	156.46	1.53	1.167E-02	883.24	9.600	PBC<MDA	PA234
898.04	278.	55.18	1.54	1.151E-02	898.04	93.700	PBC<MDA	Y88
909.22	168.	53.05	1.55	1.139E-02				
914.09	106.	68.09	1.56	1.134E-02				
922.98	144.	62.74	0.29	1.124E-02				
937.49	176.	92.15	1.58	1.110E-02	937.49	34.360	PBC<MDA	AG110M
955.87	134.	62.31	0.27	1.091E-02				
993.39	212.	41.42	0.37	1.056E-02				
1037.84	159.	87.37	1.65	1.016E-02	1037.84	14.130	PBC<MDA	Co56
1051.01	172.	63.69	1.66	1.006E-02	1050.36	1.560	PBC<MDA	RH106
1077.59	305.	43.99	0.47	9.838E-03	1077.40	3.300	2.307E+02	Ga68
1099.25	88.	167.18	1.70	9.666E-03	1099.25	56.500	PBC<MDA	FE59
1106.12	267.	41.71	3.36	9.614E-03				
1112.07	166.	93.41	1.71	9.569E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	164.	94.92	1.71	9.543E-03	1115.55	50.600	PBC<MDA	ZN65
1120.29	99.	158.82	1.72	9.507E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1122.05	34.	460.94	1.72	9.500E-03	1121.30	34.900	PBC<MDA	Ta182
1173.12	73280.	0.42	1.78	9.129E-03	1173.24	99.900	1.116E+03	CO60
1191.79	56.	155.39	1.77	9.021E-03	1189.05	16.200	PBC<MDA	Ta182
1207.71	47.	64.17	0.36	8.897E-03				
1221.82	171.	36.33	2.42	8.808E-03	1221.41	27.000	1.001E+01	Ta182
1238.28	11.	594.60	1.80	8.702E-03	1238.28	66.070	PBC<MDA	Co56
1274.55	161.	18.20	1.83	8.481E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	7.749E+00	EU154
1332.47	66250.	0.40	1.91	8.149E-03	1332.50	99.980	1.129E+03	CO60
1344.69	26.	42.02	0.67	8.083E-03				
1384.30	6.	626.13	1.91	7.874E-03	1384.30	24.290	PBC<MDA	AG110M
1407.59	167.	22.91	2.46	7.754E-03	1408.00	21.005	1.428E+01	EU152
1460.83	-10.	385.84	1.96	7.499E-03	1460.83	10.670	PBC<MDA	K40
1596.21	38.	80.14	2.04	6.915E-03	1596.21	95.400	PBC<MDA	La140
1690.98	12.	241.21	2.10	6.556E-03	1690.98	47.790	PBC<MDA	SB124

pk energy area uncert fwhm corr nuclide brnch. act. nuc

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
105.20	26.44	25562.	5674.	2.625E+05	4.65	0.686	-	s
127.86	32.11	23665.	17896.	6.537E+05	1.77	1.003	-	s
145.56	36.53	22600.	3702.	1.181E+05	7.03	0.979	-	s
169.55	42.79	30608.	495.	1.372E+04	54.18	0.630	-	
194.57	48.66	79124.	9230.	2.325E+05	4.43	0.750	-	sD
198.66	49.68	92761.	12720.	3.160E+05	3.50	0.751	-	sD
394.30	98.74	6017.	424.	8.650E+03	30.24	0.455	-	sM
411.21	102.95	6690.	419.	8.584E+03	28.01	0.807	-	D
672.61	168.33	3436.	60.	1.480E+03	138.76	0.384	-	c
941.56	235.80	5415.	126.	3.886E+03	83.34	0.942	-	c
996.53	249.33	3248.	124.	3.989E+03	65.62	0.401	-	c
1192.26	298.32	3863.	175.	6.386E+03	50.85	1.004	-	sD
1267.38	317.05	3131.	196.	7.496E+03	44.11	0.802	-	sM
1363.78	341.59	5549.	74.	2.977E+03	143.17	1.046	-	sc
1477.92	369.69	3702.	166.	7.112E+03	60.23	0.365	-	s
1831.07	457.89	5046.	311.	1.562E+04	32.83	1.158	-	sD
2455.79	614.17	1597.	151.	9.595E+03	43.88	0.293	-	s
2582.95	646.22	2875.	155.	1.024E+04	49.57	1.329	-	sD
2588.31	647.56	2347.	112.	7.429E+03	61.76	1.330	-	sc
3635.99	908.96	3883.	159.	1.394E+04	56.04	1.553	-	sD
3655.44	913.83	2570.	106.	9.349E+03	68.30	1.557	-	sc
3691.22	922.98	2544.	144.	1.284E+04	62.74	0.287	-	sM
3822.82	955.87	2407.	134.	1.226E+04	62.31	0.266	-	sM
3972.96	993.39	2242.	212.	2.005E+04	41.42	0.369	-	sM
4424.02	1106.12	2793.	267.	2.774E+04	41.71	3.362	-	sM
4830.57	1207.71	345.	47.	5.283E+03	64.17	0.360	-	s
5378.73	1344.69	40.	26.	3.217E+03	42.02	0.668	-	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	185.58	46.54	239242.	10788.	1.498	6.48	0.750s
TH-227	199.98	50.14	250030.	0.	0.000	1000.00	0.751s
AM-241	237.76	59.59	70048.	568101.	78.903	0.16	0.873
TH-234	252.55	63.29	11101.	-228.	-0.032	306.50	0.765s
Sn-126	256.52	64.28	14245.	-165.	-0.023	102.55	0.766
BA-133	323.33	80.99	11775.	-38.	-0.005	480.94	0.784s
Np-237	345.33	86.49	43321.	-170.	-0.024	173.74	0.789
EU-155	345.54	86.54	43152.	-102.	-0.014	289.38	0.790
Sn-126	347.13	86.94	43050.	0.	0.000	1000.00	0.790
Sn-126	349.65	87.57	43050.	0.	0.000	1000.00	0.791
Cd-109	351.44	88.02	12119.	11460.	1.592	2.17	0.950s
Nd-147	363.77	91.10	43050.	0.	0.000	1000.00	0.794s
TH-234	369.72	92.59	39226.	-269.	-0.037	259.99	0.796
AC-228	372.76	93.35	40916.	-173.	-0.024	165.61	0.797s
Gd-153	389.36	97.50	13353.	-103.	-0.014	158.46	0.801s
Np-239	397.36	99.50	34171.	-169.	-0.024	154.64	0.803
Gd-153	412.15	103.20	34002.	-170.	-0.024	153.51	0.807s
Np-239	414.15	103.70	33677.	151.	0.021	171.66	0.807
EU-155	420.60	105.31	31134.	170.	0.024	147.31	0.809s
Np-239	423.87	106.13	33414.	-171.	-0.024	151.15	0.810
EU-152	486.45	121.78	7422.	640.	0.089	19.65	0.826D
CO-57	487.58	122.06	15641.	150.	0.021	87.57	0.826D
EU-154	491.73	123.10	17115.	1036.	0.144	18.12	0.828s
PA-234	524.50	131.29	28326.	-183.	-0.025	130.54	0.836s
HF-181	531.42	133.02	28473.	-183.	-0.025	130.64	0.838s
CE-144	533.47	133.54	28656.	-183.	-0.025	130.97	0.838s
HF-181	544.52	136.30	26404.	176.	0.024	130.54	0.841s
Tc-99m	561.35	140.51	27240.	-98.	-0.014	239.61	0.845
CE-141	581.07	145.44	12473.	95.	0.013	210.19	0.850s
Ba-140	649.93	162.66	25308.	-108.	-0.015	208.22	0.868s
U-235	652.81	163.38	25296.	0.	0.000	1000.00	0.869s
CE-139	662.70	165.85	24175.	-182.	-0.025	120.90	0.871s
Cf-251	705.68	176.60	11710.	-182.	-0.025	106.19	0.882s
U-235	742.15	185.72	13231.	144.	0.020	142.53	0.892s
TH-229	773.30	193.51	13450.	-78.	-0.011	264.83	0.899s
U-235	820.58	205.33	13043.	-37.	-0.005	544.62	0.912s
TH-229	842.65	210.85	13126.	190.	0.026	107.73	0.917s
Cf-251	907.23	227.00	13160.	-204.	-0.028	100.41	0.933s
TH-227	943.11	235.97	23563.	-160.	-0.022	135.90	0.942s
PB-212	953.75	238.63	7094.	176.	0.024	68.09	0.945D
PB-214	967.21	242.00	26645.	-198.	-0.028	116.79	0.948s
EU-152	977.99	244.69	32705.	-90.	-0.013	283.93	0.951
TH-227	1024.17	256.24	10652.	155.	0.022	118.45	0.962s
Cd-113m	1054.01	263.70	15190.	183.	0.025	95.64	0.970s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	1062.53	265.83	14547.	90.	0.012	190.80	0.972s
TL-208	1108.33	277.28	14407.	39.	0.005	431.76	0.983
Hg-203	1115.99	279.20	14161.	182.	0.025	92.77	0.985s
PB-214	1179.54	295.09	26064.	49.	0.007	466.34	1.001s
TL-210	1183.18	296.00	26113.	0.	0.000	1000.00	1.002s
PB-212	1199.30	300.03	26029.	84.	0.012	271.47	1.006s
PA-231	1199.46	300.07	26113.	0.	0.000	1000.00	1.006s
PA-233	1199.90	300.18	26113.	0.	0.000	1000.00	1.006s
PA-231	1209.78	302.65	26113.	0.	0.000	1000.00	1.008s
BA-133	1210.59	302.85	26053.	60.	0.008	383.77	1.009s
Ba-140	1218.57	304.85	26843.	130.	0.018	177.99	1.011s
BI-210M	1218.76	304.90	26973.	0.	0.000	1000.00	1.011s
Ir-192	1232.94	308.44	39807.	-181.	-0.025	155.70	1.014s
PA-233	1247.22	312.01	39625.	-182.	-0.025	154.82	1.018s
Ir-192	1265.13	316.49	16199.	-181.	-0.025	99.75	1.022
CR-51	1279.51	320.08	15821.	-180.	-0.025	98.84	1.026s
La-140	1314.21	328.76	8903.	176.	0.024	100.39	1.034s
Cf-249	1332.92	333.44	8595.	175.	0.024	99.52	1.039s
AC-228	1352.44	338.32	5422.	142.	0.020	73.87	1.043D
Cs-136	1361.44	340.57	19376.	-178.	-0.025	111.07	1.045
EU-152	1376.30	344.29	5126.	430.	0.060	24.03	1.049D
HF-181	1382.47	345.83	22023.	-86.	-0.012	244.14	1.050s
PB-214	1406.88	351.93	12270.	150.	0.021	104.59	1.056s
BA-133	1423.15	356.00	14843.	124.	0.017	139.17	1.060s
I-131	1457.08	364.48	8829.	-175.	-0.024	100.55	1.069s
BA-133	1534.50	383.84	20835.	201.	0.028	101.99	1.087s
Cf-249	1550.94	387.95	21036.	179.	0.025	114.70	1.091s
SN-113	1565.90	391.69	20337.	181.	0.025	111.75	1.095s
SB-125	1710.63	427.88	8965.	-60.	-0.008	295.51	1.129
AG-108M	1734.87	433.94	9057.	157.	0.022	113.44	1.135s
PM-146	1814.64	453.88	15711.	-199.	-0.028	89.52	1.154s
SB-125	1852.59	463.37	10487.	167.	0.023	120.46	1.163s
Ir-192	1871.36	468.06	18251.	206.	0.029	92.93	1.167
BE-7	1909.50	477.60	16311.	-195.	-0.027	92.89	1.176
HF-181	1927.10	482.00	16190.	-196.	-0.027	92.04	1.180s
RU-103	1987.33	497.05	6932.	-108.	-0.015	151.24	1.194s
RH-106	2046.57	511.86	10367.	337.	0.047	43.08	2.458
Kr-85	2055.03	513.98	10704.	23.	0.003	626.04	1.210s
Nd-147	2123.11	531.00	5412.	56.	0.008	257.55	1.225s
Ba-140	2148.15	537.26	5534.	-161.	-0.022	124.60	1.231s
CS-134	2252.06	563.24	4412.	97.	0.013	134.75	1.255
CS-134	2276.40	569.32	4578.	-27.	-0.004	352.74	1.260s
PA-234	2276.99	569.47	4837.	-45.	-0.006	218.28	1.261s
BI-207	2277.92	569.70	4917.	125.	0.017	80.05	1.261s
TL-208	2331.20	583.02	4461.	-26.	-0.004	286.92	1.273s
SB-125	2401.12	600.50	19627.	-147.	-0.020	50.94	1.289s
SB-124	2410.04	602.73	19480.	-146.	-0.020	135.69	1.291s
CS-134	2417.96	604.71	19349.	-146.	-0.020	135.05	1.292s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	2436.36	609.31	19520.	-106.	-0.015	70.93	1.296
PM-144	2471.37	618.06	17557.	145.	0.020	129.72	1.304
RH-106	2486.79	621.92	19647.	63.	0.009	316.54	1.308s
SB-125	2542.69	635.89	4989.	139.	0.019	72.38	1.320
I-131	2547.03	636.97	4908.	142.	0.020	70.37	1.321s
AG-110M	2630.18	657.76	155038.	141.	0.020	393.64	1.339s
CS-137	2644.82	661.42	3958.	148575.	20.635	0.28	1.392
NB-94	2809.67	702.63	3676.	-139.	-0.019	296.44	1.379s
SB-124	2890.31	722.79	6648.	-78.	-0.011	147.64	1.396s
AG-108M	2890.91	722.94	6570.	0.	0.000	1000.00	1.397s
EU-154	2890.60	722.86	2093.	270.	0.037	33.05	0.914s
ZR-95	2895.96	724.20	6570.	0.	0.000	1000.00	1.398s
BI-212	2907.84	727.17	6124.	138.	0.019	80.37	1.400s
PM-146	2942.05	735.72	3732.	-111.	-0.015	49.42	1.408
PM-146	2987.81	747.16	3702.	-62.	-0.009	88.86	1.417s
ZR-95	3026.09	756.73	3428.	128.	0.018	93.97	1.426s
AG-110M	3054.96	763.94	4725.	142.	0.020	69.12	1.432s
NB-95	3062.34	765.79	4867.	125.	0.017	79.23	1.433
PA-234M	3064.83	766.41	5241.	-100.	-0.014	102.87	1.434
EU-152	3114.87	778.92	3707.	225.	0.031	55.58	1.444
BI-212	3140.88	785.42	4026.	-154.	-0.021	81.34	1.450
TL-210	3197.61	799.60	5361.	138.	0.019	75.52	1.462s
CS-134	3207.01	801.95	5898.	-67.	-0.009	162.96	1.464s
CO-58	3242.31	810.77	9961.	-168.	-0.023	74.60	1.471s
La-140	3262.30	815.77	8159.	78.	0.011	163.68	1.475s
Cs-136	3273.22	818.50	10244.	-165.	-0.023	87.01	1.478s
MN-54	3338.77	834.88	2696.	382.	0.053	27.07	1.290
Co-56	3386.32	846.77	4648.	-55.	-0.008	263.30	1.501
NB-94	3483.65	871.10	5358.	-180.	-0.025	82.12	1.522s
EU-154	3492.19	873.23	6737.	172.	0.024	67.81	1.523
PA-234	3521.39	880.53	11000.	175.	0.024	85.14	1.529
PA-234	3532.24	883.24	11175.	96.	0.013	156.46	1.531s
AG-110M	3538.01	884.68	10358.	-180.	-0.025	80.26	1.533s
Sc-46	3556.40	889.28	11840.	-168.	-0.023	91.89	1.536s
Y-88	3591.45	898.04	5177.	278.	0.039	55.18	1.543s
AC-228	3643.58	911.07	8759.	-191.	-0.026	69.83	1.554s
AG-110M	3749.30	937.49	5829.	176.	0.024	92.15	1.576s
EU-152	3855.80	964.11	5825.	-44.	-0.006	383.34	1.597
AC-228	3875.25	968.97	9405.	-194.	-0.027	86.08	1.601
EU-154	3984.71	996.33	11545.	-47.	-0.007	323.64	1.622
PA-234M	4003.39	1001.00	9892.	-185.	-0.026	90.02	1.626s
EU-154	4018.51	1004.77	12149.	-110.	-0.015	142.48	1.629
Co-56	4150.81	1037.84	3971.	159.	0.022	87.37	1.655s
Cs-136	4191.74	1048.07	6269.	-176.	-0.024	64.21	1.663s
RH-106	4200.91	1050.36	5909.	172.	0.024	63.69	1.665
Ga-68	4309.86	1077.59	3425.	305.	0.042	43.99	0.474s
FE-59	4396.54	1099.25	4460.	88.	0.012	167.18	1.702s
EU-152	4447.85	1112.07	11883.	166.	0.023	93.41	1.712

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZN-65	4461.74	1115.55	12050.	164.	0.023	94.92	1.714s
BI-214	4480.72	1120.29	12216.	99.	0.014	158.82	1.718s
Sc-46	4481.77	1120.55	12315.	0.	0.000	1000.00	1.718
Ta-182	4484.77	1121.30	12384.	34.	0.005	460.94	1.719s
CO-60	4692.15	1173.12	2836.	73280.	10.178	0.42	1.781
Ta-182	4755.88	1189.05	1555.	56.	0.008	155.39	1.769s
Ta-182	4887.03	1221.82	717.	171.	0.024	36.33	2.417s
Co-56	4952.89	1238.28	823.	11.	0.002	594.60	1.805
NA-22	5097.96	1274.53	826.	0.	0.000	92.09	1.831A
EU-154	5098.00	1274.54	382.	161.	0.022	18.20	1.829A
FE-59	5166.25	1291.60	619.	-6.	-0.001	998.60	1.843s
TL-210	5251.92	1313.00	592.	-28.	-0.004	198.42	1.858s
CO-60	5329.83	1332.47	595.	66250.	9.201	0.40	1.911
AG-110M	5537.26	1384.30	272.	6.	0.001	626.13	1.907s
EU-152	5630.47	1407.59	187.	167.	0.023	22.91	2.464s
K-40	5843.58	1460.83	257.	-10.	-0.001	385.84	1.958s
La-140	6385.44	1596.21	164.	38.	0.005	80.14	2.044
SB-124	6764.81	1690.98	159.	12.	0.002	241.21	2.102s
BI-214	7059.07	1764.49	307.	-52.	-0.007	71.64	2.145
Co-56	7086.53	1771.35	471.	-47.	-0.007	66.55	2.149s
Y-88	7345.59	1836.06	180.	-8.	-0.001	406.59	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	-1.3378E+01				5.31E+01	
			477.60	-1.338E+01	?(	4.101E+01 9.29E+01 1.05E+01	G
K-40	N	-1.6605E+00				4.66E+11	
			1460.83	-1.661E+00	&(P	1.343E+01 3.86E+02 1.07E+01	G
Sc-46	F	-2.0113E+00				8.38E+01	
			889.28	-2.011E+00	?(	6.101E+00 9.19E+01 1.00E+02	G
			1120.55	0.000E+00	+	7.597E+00 1.00E+03 1.00E+02	G
CR-51	F	-9.6957E+00				2.77E+01	
			320.08	-9.696E+00	&(	3.163E+01 9.88E+01 9.94E+00	G
MN-54	C	4.3376E+00				3.12E+02	
			834.85	4.338E+00	(P	2.776E+00 2.71E+01 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F	2.2379E+00					4.45E+01	
			1099.25	2.238E+00	@(	7.983E+00	1.67E+02	5.65E+01 G
			1291.60	-2.174E-01	-	4.551E+00	9.99E+02	4.32E+01 G
Co-56	C	9.5462E-01					7.73E+01	
			846.77	-6.318E-01	&(	3.680E+00	2.63E+02	9.99E+01 G
			1238.28	2.652E-01	?(P	3.295E+00	5.95E+02	6.61E+01 G
			1037.84	1.540E+01	@(P	2.866E+01	8.74E+01	1.41E+01 G
			1771.35	-6.756E+00	&	1.484E+01	6.65E+01	1.55E+01 A
CO-57	C	5.1684E-01					2.72E+02	
			122.06	5.168E-01	}	2.015E+00	8.76E+01	8.56E+01 G
			136.47	5.168E-01	%(	2.175E+01	1.27E+03	1.07E+01 G
CO-58	C	-1.8678E+00					7.09E+01	
			810.78	-1.868E+00	?(P	5.205E+00	7.46E+01	9.95E+01 G
CO-60	F	1.1227E+03					1.93E+03	
			1332.50	1.129E+03	(	1.984E+00	4.01E-01	1.00E+02 G
			1173.24	1.116E+03	(P	3.821E+00	4.23E-01	9.99E+01 G
ZN-65	F	4.7205E+00					2.44E+02	
			1115.55	4.720E+00	(P	1.479E+01	9.49E+01	5.06E+01 G
NB-94	I	-1.3946E+00					7.41E+06	
			702.63	-1.395E+00	?(P	2.863E+00	2.96E+02	9.79E+01 G
			871.10	-2.121E+00	+ P	4.047E+00	8.21E+01	9.99E+01 G
ZR-95	I	2.4507E+00					6.40E+01	
			756.73	2.451E+00	*(P	5.286E+00	9.40E+01	5.45E+01 G
			724.20	0.000E+00	&	8.680E+00	1.00E+03	4.42E+01 G
NB-95	I	1.3250E+00					6.40E+01	
			765.79	1.325E+00	&(	3.466E+00	7.92E+01	9.98E+01 G
RU-103	I	-8.8449E-01					3.93E+01	
			497.05	-8.845E-01	&(	3.200E+00	1.51E+02	9.09E+01 G
			610.30	4.650E-06	%	9.975E+01	6.48E+08	5.75E+00 GA
RH-106	I	2.5513E+01					3.74E+02	
			621.92	5.614E+00	&(P	5.876E+01	3.17E+02	9.93E+00 G
			1050.36	1.522E+02	&(	3.195E+02	6.37E+01	1.56E+00 G
			511.86	1.283E+01	?	1.817E+01	4.31E+01	2.00E+01 GA
AG-108M	C	1.1655E+00					1.53E+05	
			433.94	1.165E+00	@(	3.305E+00	1.13E+02	9.05E+01 G
			722.94	0.000E+00	-	4.213E+00	1.00E+03	9.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			614.28	-5.983E-07	%	6.417E+00	3.24E+08	8.98E+01 G
AG-110M	F	1.0802E+00					2.50E+02	
			884.68	-2.952E+00	&(	7.818E+00	8.03E+01	7.27E+01 G
			657.76	1.392E+00	&	1.807E+01	3.94E+02	9.46E+01 G
			937.49	6.424E+00	&(	1.306E+01	9.22E+01	3.44E+01 G
			1384.30	4.357E-01	&(	5.778E+00	6.26E+02	2.43E+01 G
			763.94	6.696E+00	(	1.527E+01	6.91E+01	2.23E+01 G
SN-113	F	1.7526E+00					1.15E+02	
			391.69	1.753E+00	&(	6.465E+00	1.12E+02	6.40E+01 G
SB-124	F	-1.2864E+00					6.02E+01	
			602.73	-1.286E+00	&(	5.765E+00	1.36E+02	9.83E+01 G
			1690.98	5.467E-01	+	2.722E+00	2.41E+02	4.78E+01 G
			722.79	-7.288E+00	+	3.560E+01	1.48E+02	1.08E+01 G
SB-125	I	3.9639E+00					1.01E+03	
			427.88	-1.344E+00	?(	9.945E+00	2.96E+02	2.96E+01 G
			600.50	-7.096E+00	+ P	3.174E+01	5.09E+01	1.79E+01 G
			635.89	1.113E+01	&(P	2.658E+01	7.24E+01	1.13E+01 G
			463.37	1.123E+01	(P	3.231E+01	1.20E+02	1.05E+01 G
I-131	I	2.8888E-01					8.02E+00	
			364.48	-1.266E+00	?(	3.180E+00	1.01E+02	8.17E+01 G
			284.30	-1.282E+00	&	3.827E+01	1.19E+03	6.14E+00 G
			636.97	1.800E+01	&(	4.179E+01	7.04E+01	7.17E+00 G
Gd-153	F	-9.7433E-01					2.42E+02	
			97.50	-9.743E-01	&(	5.103E+00	1.58E+02	3.00E+01 G
			103.20	-2.219E+00	+	1.124E+01	1.54E+02	2.18E+01 G
Ga-68	C	2.3069E+02					4.71E-02	
			1077.40	2.307E+02	(	2.083E+02	4.40E+01	3.30E+00 G
Tc-99m	I	-3.8105E-01					2.51E-01	
			140.51	-3.811E-01	?(	3.016E+00	2.40E+02	8.93E+01 G
BA-133	F	1.2710E+00					3.85E+03	
			356.00	1.154E+00	?(	5.308E+00	1.39E+02	6.20E+01 G
			302.85	1.666E+00	&(	2.113E+01	3.84E+02	1.83E+01 G
			383.84	1.371E+01	? P	4.614E+01	1.02E+02	8.94E+00 GA
			80.99	-3.177E-01	&	4.250E+00	4.81E+02	3.41E+01 GA
CS-134	I	8.4902E-01					7.54E+02	
			795.87	2.121E-03	&(	5.205E+00	7.40E+04	8.55E+01 G
			604.71	-1.300E+00	+	5.799E+00	1.35E+02	9.76E+01 G
			569.32	-1.464E+00	+	1.713E+01	3.53E+02	1.54E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			801.95	-8.434E+00	&	4.550E+01	1.63E+02	8.69E+00 G
			563.24	9.524E+00	?(P	3.072E+01	1.35E+02	8.35E+00 G
CS-137	I	1.6310E+03						1.10E+04
			661.66	1.631E+03	(P	3.248E+00	2.77E-01	8.52E+01 G
CE-139	F	-7.7384E-01						1.38E+02
			165.85	-7.738E-01	?(	3.089E+00	1.21E+02	7.99E+01 G
Ba-140	I	-2.1072E+00						1.28E+01
			537.26	-5.232E+00	?(P	1.134E+01	1.25E+02	2.44E+01 G
			162.66	-5.834E+00	+	4.013E+01	2.08E+02	6.22E+00 G
			304.85	1.566E+01	(	9.206E+01	1.78E+02	4.29E+00 G
La-140	I	1.8706E+00						1.28E+01
			1596.21	8.064E-01	?(	1.315E+00	8.01E+01	9.54E+01 G
			487.02	-6.441E-02	%	6.527E+00	4.23E+03	4.55E+01 G
			328.76	4.730E+00	&(	1.187E+01	1.00E+02	2.03E+01 G
			815.77	3.738E+00	?(P	2.024E+01	1.64E+02	2.33E+01 G
CE-141	I	6.1987E-01						3.25E+01
			145.44	6.199E-01	?(	3.426E+00	2.10E+02	4.82E+01 G
CE-144	I	-5.0178E+00						2.85E+02
			133.54	-5.018E+00	?(	2.170E+01	1.31E+02	1.11E+01 G
PM-144	C	6.9102E-01						3.63E+02
			696.54	8.869E-02	%(	2.727E+00	1.33E+03	9.90E+01 G
			618.06	1.293E+00	&(	5.539E+00	1.30E+02	9.91E+01 G
EU-152	F	1.3634E+01						4.94E+03
			121.78	6.590E+00	}	4.163E+00	1.96E+01	2.86E+01 G
			344.29	9.144E+00	(P	7.149E+00	2.40E+01	2.65E+01 G
			1112.07	1.762E+01	(	5.433E+01	9.34E+01	1.36E+01 G
			778.92	1.863E+01	(P	2.369E+01	5.56E+01	1.29E+01 G
			964.11	-3.822E+00	- P	3.146E+01	3.83E+02	1.46E+01 G
			244.69	-5.244E+00	-	4.918E+01	2.84E+02	7.58E+00 G
			1408.00	1.428E+01	P	5.658E+00	2.29E+01	2.10E+01 GA
EU-154	I	7.5036E+00						3.14E+03
			123.10	7.504E+00	?(	4.434E+00	1.81E+01	4.08E+01 G
			1274.54	7.504E+00	}	4.362E+00	1.82E+01	3.52E+01 G
			723.36	1.342E+01	+	1.075E+01	3.31E+01	2.02E+01 G
			873.23	1.654E+01	+	3.699E+01	6.78E+01	1.23E+01 G
			1004.77	-8.090E+00	-	3.809E+01	1.42E+02	1.80E+01 G
			996.33	-5.849E+00	-	6.264E+01	3.24E+02	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	2.2813E+00					1.81E+03	
			105.31	2.281E+00	&(P	1.109E+01	1.47E+02	2.12E+01 G
			86.54	-9.361E-01	-	8.945E+00	2.89E+02	3.07E+01 G
HF-181	F	-1.0247E+00					4.24E+01	
			482.00	-1.771E+00	?(	5.378E+00	9.20E+01	8.05E+01 G
			133.02	-1.282E+00	&	5.531E+00	1.31E+02	4.33E+01 G
			345.83	-3.227E+00	+	2.604E+01	2.44E+02	1.51E+01 G
			136.30	9.239E+00	?(	3.981E+01	1.31E+02	5.85E+00 G
Ta-182	F	5.2027E+00					1.14E+02	
			1121.30	1.431E+00	?(	2.184E+01	4.61E+02	3.49E+01 G
			1221.41	1.001E+01	(	7.444E+00	3.63E+01	2.70E+01 G
			1189.05	5.322E+00	&(	1.772E+01	1.55E+02	1.62E+01 G
Hg-203	F	1.0811E+00					4.66E+01	
			279.20	1.081E+00	?(	3.310E+00	9.28E+01	8.15E+01 G
TL-208	N	-3.3168E-02					6.98E+02	
			583.02	-2.599E-01	?(P	3.138E+00	2.87E+02	8.45E+01 G
			277.28	3.002E+00	&(P	4.289E+01	4.32E+02	6.31E+00 G
			860.56	1.082E-02	& P	3.071E+01	1.28E+05	1.24E+01 G
PM-146	C	-2.1202E+00					2.02E+03	
			453.88	-2.120E+00	?(	6.263E+00	8.95E+01	6.50E+01 G
			747.16	-1.871E+00	+ P	8.702E+00	8.89E+01	3.40E+01 G
			735.72	-5.013E+00	+ P	1.304E+01	4.94E+01	2.25E+01 G
Y-88	F	1.6456E+00					1.07E+02	
			1836.06	-1.845E-01	?(	1.504E+00	4.07E+02	9.92E+01 G
			898.04	3.583E+00	*(P	4.353E+00	5.52E+01	9.37E+01 G
Cd-113m		1.4158E+04					5.33E+03	
			263.70	1.416E+04	?(	4.469E+04	9.56E+01	6.00E-03 K
Cd-109	F	8.5463E+02					4.53E+02	
			88.04	8.546E+02	@(	3.846E+01	2.17E+00	3.79E+00 G
Cf-251	T	-3.7806E+00					3.28E+05	
			176.60	-3.781E+00	?(	1.054E+01	1.06E+02	1.70E+01 G
			227.00	-1.354E+01	+	3.570E+01	1.00E+02	6.30E+00 GA
Cf-249	T	2.5333E+00					1.28E+05	
			387.95	1.672E+00	&(	6.330E+00	1.15E+02	6.60E+01 G
			333.44	6.200E+00	&(	1.542E+01	9.95E+01	1.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sn-126		-5.1421E+00					3.65E+07	
			87.57	0.000E+00	+	7.310E+00	1.00E+03	3.75E+01 GA
			64.28	-5.142E+00	(	1.741E+01	1.03E+02	9.70E+00 G
			86.94	0.000E+00	+	3.033E+01	1.00E+03	9.04E+00 GA
PB-210	N	9.1608E+02					8.14E+03	
			46.54	9.161E+02	?(P	1.938E+02	6.48E+00	4.25E+00 G
PB-212	N	1.7627E+00					6.98E+02	
			238.63	1.763E+00	(P	3.955E+00	6.81E+01	4.33E+01 G
			300.03	1.307E+01	& P	1.172E+02	2.71E+02	3.28E+00 GA
PB-214	N	1.9457E+00					5.84E+05	
			351.93	2.289E+00	&(P	7.901E+00	1.05E+02	3.76E+01 G
			295.09	1.278E+00	&(P	1.970E+01	4.66E+02	1.93E+01 G
			242.00	-1.166E+01	+	4.496E+01	1.17E+02	7.43E+00 GA
BI-207	C	5.7165E-01					1.18E+04	
			1063.66	-6.573E-02	&(P	5.817E+00	2.00E+03	7.45E+01 G
			569.70	1.057E+00	?(	2.795E+00	8.00E+01	9.77E+01 G
BI-212	N	1.8538E+01					6.98E+02	
			727.17	1.854E+01	(	4.918E+01	8.04E+01	7.55E+00 G
			785.42	-1.296E+02	+ P	2.512E+02	8.13E+01	1.28E+00 GA
U-235	N	-1.9047E-01					2.57E+11	
			143.79	-1.905E-01	%(P	2.215E+01	3.76E+03	1.10E+01 G
			205.33	-2.913E+00	&	4.174E+01	5.45E+02	5.01E+00 G
			163.38	0.000E+00	&	4.925E+01	1.00E+03	5.08E+00 G
			185.72	9.735E-01	& P	3.647E+00	1.43E+02	5.40E+01 GA
BI-214	N	8.3811E-01					5.84E+05	
			609.31	-2.013E+00	(P	1.241E+01	7.09E+01	4.61E+01 G
			1120.29	9.541E+00	&(P	5.009E+01	1.59E+02	1.51E+01 G
			1764.49	-7.426E+00	& P	1.207E+01	7.16E+01	1.54E+01 G
BI-210M	T	8.3687E-01					1.10E+09	
			265.83	8.369E-01	?(	5.279E+00	1.91E+02	5.00E+01 G
			304.90	0.000E+00	-	1.414E+01	1.00E+03	2.80E+01 G
AC-228	N	-8.0263E+00					2.10E+03	
			911.07	-8.026E+00	?(	1.848E+01	6.98E+01	2.90E+01 G
			968.97	-1.430E+01	+ P	3.353E+01	8.61E+01	1.75E+01 G
			338.32	6.571E+00	+ P	1.601E+01	7.39E+01	1.20E+01 G
			93.35	-8.781E+00	+	4.800E+01	1.66E+02	5.56E+00 XA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	N	1.0111E+01					7.95E+03	
			256.24	1.011E+01	@(P	3.147E+01	1.18E+02	7.00E+00 G
			235.97	-5.594E+00	-	2.510E+01	1.36E+02	1.23E+01 G
			50.14	0.000E+00	-	1.000E+02	1.00E+03	8.00E+00 G
TH-229	N	6.2514E+00					2.68E+06	
			193.51	-6.660E+00	&(	4.637E+01	2.65E+02	4.40E+00 G
			210.85	2.525E+01	&(P	7.143E+01	1.08E+02	2.99E+00 G
TH-234	N	-1.3612E+01					1.63E+12	
			92.59	-1.361E+01	?(P	4.681E+01	2.60E+02	5.58E+00 G
			63.29	-1.821E+01	+ P	3.939E+01	3.07E+02	3.81E+00 G
PA-233	C	-2.6505E+00					7.82E+08	
			312.01	-2.650E+00	?(	1.355E+01	1.55E+02	3.60E+01 G
			300.18	0.000E+00	+	6.213E+01	1.00E+03	6.20E+00 G
PA-234	N	2.1293E+00					1.63E+12	
			131.29	-3.064E+00	?(	1.320E+01	1.31E+02	1.80E+01 G
			946.02	4.657E-01	% P	3.477E+01	3.37E+03	1.34E+01 G
			569.47	-4.565E+00	+	3.303E+01	2.18E+02	8.20E+00 G
			883.24	1.187E+01	?(	6.138E+01	1.56E+02	9.60E+00 G
			880.53	3.459E+01	?	9.719E+01	8.51E+01	6.00E+00 GA
PA-234M	N	-2.9343E+02					1.63E+12	
			1001.00	-2.934E+02	?(P	7.376E+02	9.00E+01	8.37E-01 G
			766.41	-3.591E+02	&	1.221E+03	1.03E+02	2.94E-01 G
AM-241	T	4.9379E+03					1.58E+05	
			59.54	4.938E+03	(	1.074E+01	1.60E-01	3.59E+01 G
Np-237	F	-3.6625E+00					2.14E+06	
			86.49	-3.662E+00	?(	2.101E+01	1.74E+02	1.31E+01 G
Ir-192	F	3.6491E-01					7.40E+01	
			316.49	-1.101E+00	&(	3.625E+00	9.97E+01	8.70E+01 G
			468.06	2.831E+00	(	8.680E+00	9.29E+01	5.18E+01 G
			308.44	-2.970E+00	+	1.527E+01	1.56E+02	3.18E+01 G
Cs-136	F	-1.8424E+00					1.30E+01	
			818.50	-1.842E+00	?(	5.292E+00	8.70E+01	1.00E+02 G
			1048.07	-3.025E+00	+	6.403E+00	6.42E+01	8.00E+01 G
			340.57	-2.117E+00	+	7.761E+00	1.11E+02	4.69E+01 G
Np-239	T	-2.1808E+00					2.36E+00	
			103.70	1.817E+00	&	1.030E+01	1.72E+02	2.40E+01 X
			106.13	-2.181E+00	?(	1.088E+01	1.51E+02	2.27E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                           99.50-3.237E+00 &   1.653E+01 1.55E+02 1.50E+01 X

Nd-147       3.3777E+00                                      1.11E+01
                          531.00 3.378E+00 ?(  2.084E+01 2.58E+02 1.30E+01 G
                           91.10 0.000E+00 -   9.675E+00 1.00E+03 2.83E+01 G

TL-210   N   1.5254E+00                                      5.84E+05
                          799.60 1.525E+00 &(  3.802E+00 7.55E+01 9.90E+01 G
                          296.00 0.000E+00 -   4.827E+00 1.00E+03 7.90E+01 G
                         1313.00-2.243E+00 -   9.298E+00 1.98E+02 2.10E+01 GA

Kr-85    I   4.1559E+01                                      3.92E+03
                          513.98 4.156E+01 &(  8.617E+02 6.26E+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-234	63.29	11101.	-228.	-0.032	306.50	-1.821E+01	P
Sn-126	64.28	14245.	-165.	-0.023	102.55	-5.142E+00	
Np-237	86.49	43321.	-170.	-0.024	173.74	-3.662E+00	
EU-155	86.54	43152.	-102.	-0.014	289.38	-9.361E-01	
TH-234	92.59	39226.	-269.	-0.037	259.99	-1.361E+01	P
Gd-153	97.50	13353.	-103.	-0.014	158.46	-9.743E-01	
Gd-153	103.20	34002.	-170.	-0.024	153.51	-2.219E+00	
EU-155	105.31	31134.	170.	0.024	147.31	2.281E+00	P
PA-234	131.29	28326.	-183.	-0.025	130.54	-3.064E+00	
HF-181	133.02	28473.	-183.	-0.025	130.64	-1.282E+00	
CE-144	133.54	28656.	-183.	-0.025	130.97	-5.018E+00	
HF-181	136.30	26404.	176.	0.024	130.54	9.239E+00	
Tc-99m	140.51	27240.	-98.	-0.014	239.61	-3.811E-01	
CE-141	145.44	12473.	95.	0.013	210.19	6.199E-01	
Ba-140	162.66	25308.	-108.	-0.015	208.22	-5.834E+00	
CE-139	165.85	24175.	-182.	-0.025	120.90	-7.738E-01	
Cf-251	176.60	11710.	-182.	-0.025	106.19	-3.781E+00	
U-235	185.72	13231.	144.	0.020	142.53	9.735E-01	P
TH-229	193.51	13450.	-78.	-0.011	264.83	-6.660E+00	
U-235	205.33	13043.	-37.	-0.005	544.62	-2.913E+00	
TH-229	210.85	13126.	190.	0.026	107.73	2.525E+01	P
Cf-251	227.00	13160.	-204.	-0.028	100.41	-1.354E+01	
TH-227	235.97	23563.	-160.	-0.022	135.90	-5.594E+00	
PB-214	242.00	26645.	-198.	-0.028	116.79	-1.166E+01	
TH-227	256.24	10652.	155.	0.022	118.45	1.011E+01	P
Cd-113m	263.70	15190.	183.	0.025	95.64	1.416E+04	
BI-210M	265.83	14547.	90.	0.012	190.80	8.369E-01	
Hg-203	279.20	14161.	182.	0.025	92.77	1.081E+00	
PB-214	295.09	26064.	49.	0.007	466.34	1.278E+00	P
Ba-140	304.85	26843.	130.	0.018	177.99	1.566E+01	
PA-233	312.01	39625.	-182.	-0.025	154.82	-2.650E+00	
CR-51	320.08	15821.	-180.	-0.025	98.84	-9.696E+00	
Cf-249	333.44	8595.	175.	0.024	99.52	6.200E+00	
Cs-136	340.57	19376.	-178.	-0.025	111.07	-2.117E+00	
HF-181	345.83	22023.	-86.	-0.012	244.14	-3.227E+00	
PB-214	351.93	12270.	150.	0.021	104.59	2.289E+00	P
I-131	364.48	8829.	-175.	-0.024	100.55	-1.266E+00	
Cf-249	387.95	21036.	179.	0.025	114.70	1.672E+00	
SN-113	391.69	20337.	181.	0.025	111.75	1.753E+00	
SB-125	427.88	8965.	-60.	-0.008	295.51	-1.344E+00	
AG-108M	433.94	9057.	157.	0.022	113.44	1.165E+00	
PM-146	453.88	15711.	-199.	-0.028	89.52	-2.120E+00	
SB-125	463.37	10487.	167.	0.023	120.46	1.123E+01	P
BE-7	477.60	16311.	-195.	-0.027	92.89	-1.338E+01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
HF-181	482.00	16190.	-196.	-0.027	92.04	-1.771E+00		
RU-103	497.05	6932.	-108.	-0.015	151.24	-8.845E-01		
Kr-85	513.98	10704.	23.	0.003	626.04	4.156E+01		
Nd-147	531.00	5412.	56.	0.008	257.55	3.378E+00		
Ba-140	537.26	5534.	-161.	-0.022	124.60	-5.232E+00		P
CS-134	563.24	4412.	97.	0.013	134.75	9.524E+00		P
CS-134	569.32	4578.	-27.	-0.004	352.74	-1.464E+00		
PA-234	569.47	4837.	-45.	-0.006	218.28	-4.565E+00		
SB-125	600.50	19627.	-147.	-0.020	50.94	-7.096E+00		P
SB-124	602.73	19480.	-146.	-0.020	135.69	-1.286E+00		
CS-134	604.71	19349.	-146.	-0.020	135.05	-1.300E+00		
BI-214	609.31	19520.	-106.	-0.015	70.93	-2.013E+00		P
PM-144	618.06	17557.	145.	0.020	129.72	1.293E+00		
SB-125	635.89	4989.	139.	0.019	72.38	1.113E+01		P
I-131	636.97	4908.	142.	0.020	70.37	1.800E+01		
AG-110M	657.76	155038.	141.	0.020	393.64	1.392E+00		
NB-94	702.63	3676.	-139.	-0.019	296.44	-1.395E+00		P
SB-124	722.79	6648.	-78.	-0.011	147.64	-7.288E+00		
BI-212	727.17	6124.	138.	0.019	80.37	1.854E+01		
PM-146	735.72	3732.	-111.	-0.015	49.42	-5.013E+00		P
PM-146	747.16	3702.	-62.	-0.009	88.86	-1.871E+00		P
ZR-95	756.73	3428.	128.	0.018	93.97	2.451E+00		P
AG-110M	763.94	4725.	142.	0.020	69.12	6.696E+00		
NB-95	765.79	4867.	125.	0.017	79.23	1.325E+00		
PA-234M	766.41	5241.	-100.	-0.014	102.87	-3.591E+02		
BI-212	785.42	4026.	-154.	-0.021	81.34	-1.296E+02		P
TL-210	799.60	5361.	138.	0.019	75.52	1.525E+00		
CS-134	801.95	5898.	-67.	-0.009	162.96	-8.434E+00		
CO-58	810.77	9961.	-168.	-0.023	74.60	-1.868E+00		P
Cs-136	818.50	10244.	-165.	-0.023	87.01	-1.842E+00		
Co-56	846.77	4648.	-55.	-0.008	263.30	-6.318E-01		
NB-94	871.10	5358.	-180.	-0.025	82.12	-2.121E+00		P
PA-234	880.53	11000.	175.	0.024	85.14	3.459E+01		
PA-234	883.24	11175.	96.	0.013	156.46	1.187E+01		
AG-110M	884.68	10358.	-180.	-0.025	80.26	-2.952E+00		
Sc-46	889.28	11840.	-168.	-0.023	91.89	-2.011E+00		
AG-110M	937.49	5829.	176.	0.024	92.15	6.424E+00		
PA-234M	1001.00	9892.	-185.	-0.026	90.02	-2.934E+02		P
Co-56	1037.84	3971.	159.	0.022	87.37	1.540E+01		P
Cs-136	1048.07	6269.	-176.	-0.024	64.21	-3.025E+00		
FE-59	1099.25	4460.	88.	0.012	167.18	2.238E+00		
ZN-65	1115.55	12050.	164.	0.023	94.92	4.720E+00		P
BI-214	1120.29	12216.	99.	0.014	158.82	9.541E+00		P
Co-56	1238.28	823.	11.	0.002	594.60	2.652E-01		P
FE-59	1291.60	619.	-6.	-0.001	998.60	-2.174E-01		
TL-210	1313.00	592.	-28.	-0.004	198.42	-2.243E+00		
AG-110M	1384.30	272.	6.	0.001	626.13	4.357E-01		
K-40	1460.83	257.	-10.	-0.001	385.84	-1.661E+00		P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
SB-124	1690.98	159.	12.	0.002	241.21	5.467E-01		
BI-214	1764.49	307.	-52.	-0.007	71.64	-7.426E+00		P
Co-56	1771.35	471.	-47.	-0.007	66.55	-6.756E+00		

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
BE-7	#A	-1.3377E+01	-1.3378E+01	9.289E+01%	4.10E+01
NA-22	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.24E+00
K-40	#A	-1.6605E+00	-1.6605E+00	3.858E+02%	1.34E+01
Sc-46	#A	-2.0113E+00	-2.0113E+00	9.189E+01%	6.10E+00
CR-51	#A	-9.6955E+00	-9.6957E+00	9.884E+01%	3.16E+01
MN-54		4.3376E+00	4.3376E+00	2.707E+01%	2.78E+00
FE-59	#A	2.2379E+00	2.2379E+00	1.672E+02%	7.98E+00
Co-56	#A	9.5461E-01	9.5462E-01	8.737E+01%	3.68E+00
CO-57	#A	5.1684E-01	5.1684E-01	1.273E+03%	2.18E+01
CO-58	#A	-1.8678E+00	-1.8678E+00	7.460E+01%	5.21E+00
CO-60		1.1227E+03	1.1227E+03	2.914E-01%	1.98E+00
ZN-65	#A	4.7205E+00	4.7205E+00	9.492E+01%	1.48E+01
NB-94	#A	-1.3946E+00	-1.3946E+00	2.964E+02%	2.86E+00
ZR-95	#A	2.4507E+00	2.4507E+00	9.397E+01%	5.29E+00
NB-95	#A	1.3250E+00	1.3250E+00	7.923E+01%	3.47E+00
RU-103	#A	-8.8448E-01	-8.8449E-01	1.512E+02%	3.20E+00
RH-106	A	2.5513E+01	2.5513E+01	6.369E+01%	5.88E+01
AG-108M	#A	1.1655E+00	1.1655E+00	1.134E+02%	3.31E+00
AG-110M	#A	1.0802E+00	1.0802E+00	6.912E+01%	7.82E+00
SN-113	#A	1.7526E+00	1.7526E+00	1.117E+02%	6.47E+00
SB-124	#A	-1.2864E+00	-1.2864E+00	1.357E+02%	5.77E+00
SB-125	#A	3.9639E+00	3.9639E+00	7.238E+01%	9.94E+00
I-131	#A	2.8887E-01	2.8888E-01	6.136E+01%	3.18E+00
Gd-153	#A	-9.7432E-01	-9.7433E-01	1.585E+02%	5.10E+00
Ga-68		2.2842E+02	2.3069E+02	4.399E+01%	2.08E+02
Tc-99m	#A	-3.8035E-01	-3.8105E-01	2.396E+02%	3.02E+00
BA-133	A	1.2710E+00	1.2710E+00	1.392E+02%	5.31E+00
CS-134	#A	8.4902E-01	8.4902E-01	1.347E+02%	5.21E+00
CS-137		1.6310E+03	1.6310E+03	2.772E-01%	3.25E+00
CE-139	#A	-7.7384E-01	-7.7384E-01	1.209E+02%	3.09E+00
Ba-140	#A	-2.1072E+00	-2.1072E+00	1.086E+02%	1.13E+01
La-140	#	1.8706E+00	1.8706E+00	6.935E+01%	1.31E+00
CE-141	#A	6.1986E-01	6.1987E-01	2.102E+02%	3.43E+00
CE-144	#A	-5.0178E+00	-5.0178E+00	1.310E+02%	2.17E+01
PM-144	#A	6.9102E-01	6.9102E-01	1.297E+02%	2.73E+00
EU-152		1.3634E+01	1.3634E+01	2.403E+01%	7.15E+00
EU-154		7.5036E+00	7.5036E+00	1.812E+01%	4.43E+00

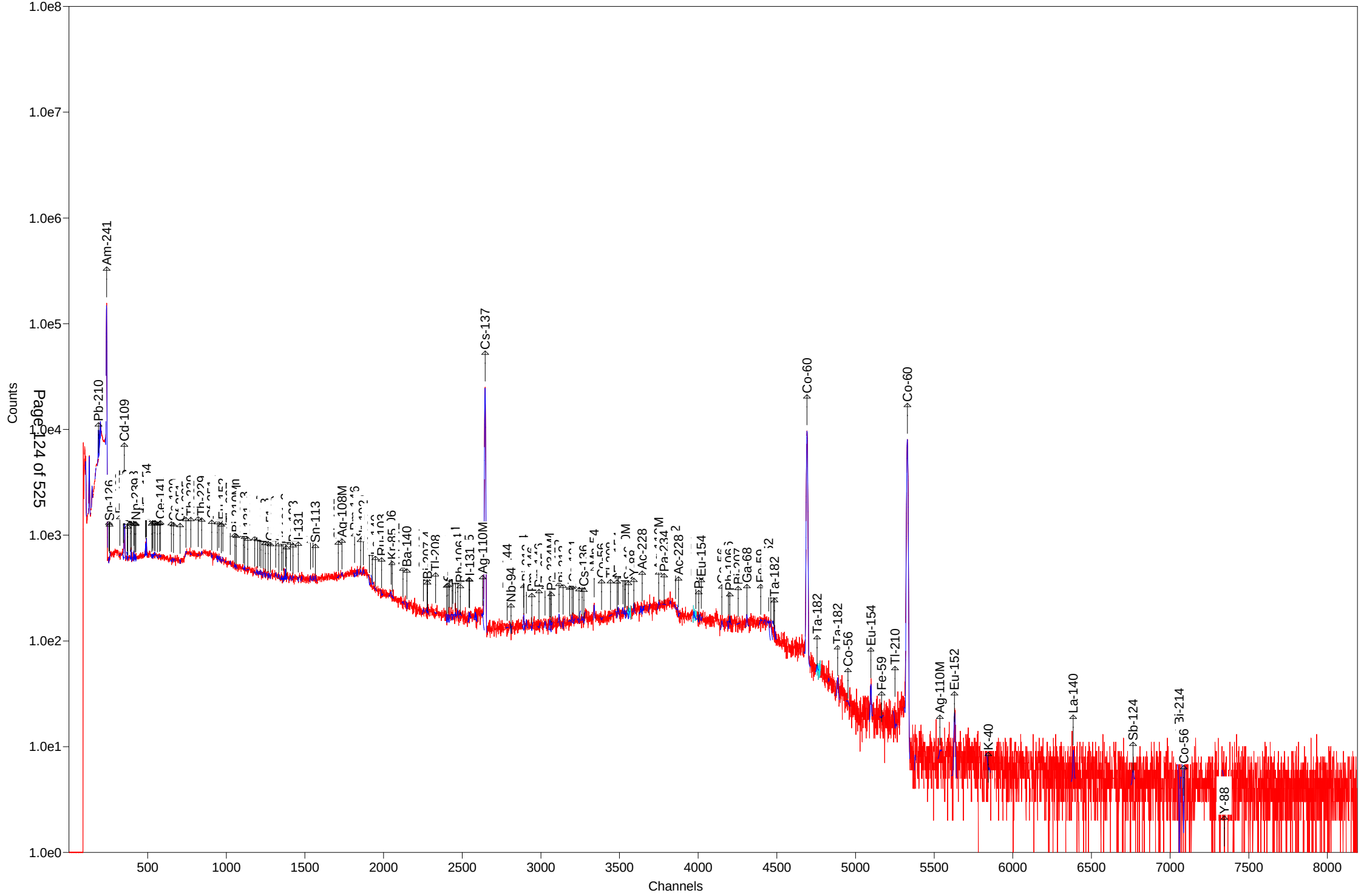
EU-155	#A	2.2813E+00	2.2813E+00	1.473E+02%	1.11E+01
HF-181	#A	-1.0247E+00	-1.0247E+00	7.986E+01%	5.38E+00
Ta-182	#A	5.2027E+00	5.2027E+00	3.633E+01%	2.18E+01
Hg-203	#A	1.0811E+00	1.0811E+00	9.277E+01%	3.31E+00
TL-208	#A	-3.3168E-02	-3.3168E-02	2.592E+02%	3.14E+00
PM-146	#A	-2.1202E+00	-2.1202E+00	8.952E+01%	6.26E+00
Y-88	#C	1.6456E+00	1.6456E+00	5.518E+01%	1.50E+00
Cd-113m	#A	1.4158E+04	1.4158E+04	9.564E+01%	4.47E+04
Cd-109	#	8.5463E+02	8.5463E+02	2.172E+00%	3.85E+01
Cf-251	#A	-3.7806E+00	-3.7806E+00	1.062E+02%	1.05E+01
Cf-249	#A	2.5333E+00	2.5333E+00	7.593E+01%	6.33E+00
Sn-126	#A	-5.1421E+00	-5.1421E+00	1.025E+02%	1.74E+01
PB-210	#	9.1608E+02	9.1608E+02	6.484E+00%	1.94E+02
PB-212	A	1.7627E+00	1.7627E+00	6.809E+01%	3.95E+00
PB-214	#A	1.9457E+00	1.9457E+00	1.046E+02%	7.90E+00
BI-207	#A	5.7165E-01	5.7165E-01	8.005E+01%	5.82E+00
BI-212	#A	1.8538E+01	1.8538E+01	8.037E+01%	4.92E+01
U-235	#A	-1.9047E-01	-1.9047E-01	3.758E+03%	2.21E+01
BI-214	#A	8.3811E-01	8.3811E-01	7.093E+01%	1.24E+01
BI-210M	#A	8.3687E-01	8.3687E-01	1.908E+02%	5.28E+00
AC-228	A	-8.0263E+00	-8.0263E+00	6.983E+01%	1.85E+01
TH-227	#A	1.0111E+01	1.0111E+01	1.184E+02%	3.15E+01
TH-229	#A	6.2514E+00	6.2514E+00	1.077E+02%	4.64E+01
TH-234	#A	-1.3612E+01	-1.3612E+01	2.600E+02%	4.68E+01
PA-231	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.35E+02
PA-233	#A	-2.6505E+00	-2.6505E+00	1.548E+02%	1.35E+01
PA-234	#A	2.1293E+00	2.1293E+00	1.019E+02%	1.32E+01
PA-234M	#A	-2.9343E+02	-2.9343E+02	9.002E+01%	7.38E+02
AM-241		4.9379E+03	4.9379E+03	1.599E-01%	1.07E+01
Np-237	#A	-3.6625E+00	-3.6625E+00	1.737E+02%	2.10E+01
Ir-192	A	3.6491E-01	3.6491E-01	6.816E+01%	3.63E+00
Cs-136	#A	-1.8424E+00	-1.8424E+00	8.701E+01%	5.29E+00
Np-239	#A	-2.1804E+00	-2.1808E+00	1.511E+02%	1.09E+01
Nd-147	#A	3.3775E+00	3.3777E+00	2.576E+02%	2.08E+01
TL-210	#A	1.5254E+00	1.5254E+00	7.552E+01%	3.80E+00
Kr-85	#A	4.1559E+01	4.1559E+01	6.260E+02%	8.62E+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) 8.800E+03 Bq/Sample
Total Decayed Activity (25.1 to 1999.5 keV) 8.8024082E+03 Bq/Sample

404676_Gamma_LCS 160-404676~2-A. 14_Gamma_20184340.spc.



Test America St. Louis Spectrum ID: 14_Gamma_20184341

Sample Description: 404676_Gamma_490-164296-C-1-B DU
Detector: Detector #14
Batch ID: 404676
Work Order Number: Gamma
Lot Number: 490-164296-C-1-B DU

Decay to Time: 12/29/2018 13:49 Live Time: 7200 sec
Acquisition Time: 12/29/2018 13:50:16 Real Time: 7202 sec
Analysis Time: 12/29/2018 15:50 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	-9.300E-01	86.7	8.065E-01	8.078E-01	2.710E+00
NA-22	1.043E-01	64.8	6.763E-02	6.783E-02	2.208E-01
K-40	-1.198E+00	157.7	1.889E+00	1.890E+00	4.893E+00
Sc-46	6.616E-02	171.6	1.136E-01	1.136E-01	5.736E-01
CR-51	2.686E-02	3043.0	8.174E-01	8.174E-01	2.836E+00
MN-54	-6.989E-02	155.3	1.085E-01	1.086E-01	3.162E-01
FE-59	-1.272E-01	201.7	2.564E-01	2.565E-01	5.989E-01
Co-56	-1.896E-01	91.2	1.729E-01	1.731E-01	3.968E-01
CO-57	0.000E+00	1.#INF	4.271E-02	4.271E-02	2.622E-01
CO-58	7.007E-02	132.8	9.308E-02	9.314E-02	3.192E-01
CO-60	1.830E-02	113.9	2.084E-02	2.086E-02	4.131E-01
ZN-65	1.917E-01	126.6	2.428E-01	2.430E-01	8.305E-01
NB-94	-4.307E-02	218.2	9.397E-02	9.399E-02	3.241E-01
ZR-95	1.504E-01	102.8	1.547E-01	1.549E-01	3.834E-01
NB-95	-1.234E-02	773.8	9.545E-02	9.546E-02	3.409E-01
RU-103	-9.009E-02	141.1	1.271E-01	1.272E-01	3.178E-01
RH-106	-5.320E-01	116.9	6.218E-01	6.224E-01	6.466E+00
AG-108M	3.428E-02	163.0	5.586E-02	5.589E-02	2.926E-01
AG-110M	1.196E-02	141.4	1.692E-02	1.693E-02	8.057E-01
SN-113	-2.781E-02	683.7	1.902E-01	1.902E-01	6.505E-01
SB-124	1.378E-01	95.4	1.316E-01	1.318E-01	4.764E-01
SB-125	5.025E-01	43.5	2.185E-01	2.199E-01	5.503E-01
I-131	-1.925E-02	588.8	1.133E-01	1.133E-01	3.003E-01
Gd-153	1.634E-01	101.7	1.662E-01	1.665E-01	5.577E-01
Ga-68	-5.267E+00	145.5	7.661E+00	7.666E+00	1.772E+01
Tc-99m	7.253E-02	133.5	9.679E-02	9.688E-02	3.246E-01
BA-133	5.048E-02	282.3	1.425E-01	1.425E-01	4.894E-01
CS-134	1.369E-01	78.3	1.072E-01	1.074E-01	3.738E-01
CS-137	8.517E-02	116.0	9.875E-02	9.884E-02	3.349E-01
CE-139	7.046E-02	119.6	8.426E-02	8.450E-02	2.833E-01
Ba-140	-3.921E-01	92.9	3.644E-01	3.649E-01	1.069E+00
La-140	2.917E-01	27.7	8.092E-02	8.235E-02	1.552E-01
CE-141	1.269E-01	126.7	1.608E-01	1.609E-01	5.390E-01

CE-144	-3.572E-01	205.0	7.325E-01	7.328E-01	2.466E+00
PM-144	-1.761E-01	92.1	1.621E-01	1.624E-01	3.844E-01
EU-152	3.039E-01	66.9	2.033E-01	2.040E-01	7.612E-01
EU-154	2.181E-01	87.4	1.907E-01	1.910E-01	5.288E-01
EU-155	2.047E-01	105.6	2.162E-01	2.166E-01	1.018E+00
HF-181	1.187E-01	118.2	1.403E-01	1.404E-01	4.091E-01
Ta-182	2.109E-01	127.4	2.687E-01	2.688E-01	1.494E+00
Hg-203	9.098E-02	96.7	8.797E-02	8.813E-02	2.957E-01
TL-208	1.801E-01	48.8	8.787E-02	8.833E-02	3.253E-01
PM-146	-1.765E-01	100.7	1.777E-01	1.779E-01	4.391E-01
Y-88	2.551E-02	110.1	2.810E-02	2.814E-02	4.347E-01
Cd-113m	2.194E+03	41.1	9.021E+02	9.130E+02	2.854E+03
Cd-109	-1.615E+00	166.5	2.688E+00	2.690E+00	8.987E+00
Cf-251	-6.932E-02	618.9	4.290E-01	4.291E-01	1.175E+00
Cf-249	-1.501E-01	119.9	1.800E-01	1.801E-01	6.053E-01
Sn-126	-6.209E-01	127.5	7.917E-01	7.924E-01	2.653E+00
PB-210	1.083E+00	179.1	1.939E+00	1.941E+00	5.439E+00
PB-212	-2.263E-01	110.5	2.501E-01	2.505E-01	8.530E-01
PB-214	-1.735E-01	124.0	2.151E-01	2.153E-01	7.291E-01
BI-207	2.716E-01	55.8	1.516E-01	1.522E-01	3.339E-01
BI-212	9.218E-01	98.7	9.102E-01	9.113E-01	3.129E+00
U-235	-4.581E-02	81.4	3.731E-02	3.738E-02	2.335E+00
BI-214	-5.023E-02	98.1	4.926E-02	4.932E-02	1.195E+00
BI-210M	6.543E-02	201.5	1.319E-01	1.319E-01	4.521E-01
AC-228	3.220E-01	92.2	2.968E-01	2.972E-01	7.138E-01
TH-227	7.017E-01	88.3	6.198E-01	6.212E-01	2.681E+00
TH-229	-2.846E-02	5429.5	1.545E+00	1.545E+00	4.276E+00
TH-234	1.058E+00	113.8	1.204E+00	1.205E+00	3.580E+00
PA-231	0.000E+00	1.#INF	7.553E-01	7.553E-01	1.659E+01
PA-233	0.000E+00	1.#INF	9.875E-02	9.875E-02	1.357E+00
PA-234	-3.342E-01	132.2	4.418E-01	4.422E-01	1.480E+00
PA-234M	7.859E+00	70.9	5.572E+00	5.585E+00	4.806E+01
AM-241	1.651E-01	113.0	1.866E-01	1.869E-01	5.295E-01
Np-237	4.062E-01	169.6	6.891E-01	6.895E-01	2.308E+00
Ir-192	5.762E-02	133.7	7.703E-02	7.711E-02	2.948E-01
Cs-136	1.445E-01	38.5	5.561E-02	5.619E-02	3.482E-01
Np-239	1.081E-01	275.1	2.974E-01	2.975E-01	1.007E+00
Nd-147	-2.413E-01	313.6	7.566E-01	7.567E-01	1.941E+00
TL-210	1.124E-01	96.3	1.082E-01	1.084E-01	3.670E-01
Kr-85	0.000E+00	1.#INF	9.404E+00	9.405E+00	1.248E+02
Total	2.211E+03				

Analyst: Joey Sausto

Sample description
404676_Gamma_490-164296-C-1-B DU

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20184341.An1

Acquisition information
Start time: 12/29/2018 1:50:16 PM
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	12/29/2018 1:49:00 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. 6 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0115

***** 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
46.41	13.	179.08	1.15	3.841E-02	46.54	4.250	PBC<MDA	PB210
59.54	19.	113.00	0.76	4.451E-02	59.54	35.900	PBC<MDA	AM241
63.30	22.	113.80	0.71	4.569E-02	63.29	3.810	PBC<MDA	TH234
80.99	18.	109.55	0.78	4.877E-02	80.99	34.060	PBC<MDA	BA133
86.49	19.	169.65	0.79	4.909E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.733E-01	EU155
86.54	19.	172.70	0.79	4.909E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.734E-01	EU155
86.94	8.	426.69	0.79	4.911E-02	86.94	9.040	PBC<MDA	Sn126
92.42	108.	20.25	1.01	4.919E-02	92.59	5.584	PBC<MDA	TH234
97.50	17.	101.69	0.80	4.910E-02	97.50	30.000	PBC<MDA	Gd153
105.31	19.	121.74	0.81	4.871E-02	105.31	21.200	PBC<MDA	EU155
106.13	8.	275.09	0.81	4.866E-02	106.13	22.700	PBC<MDA	Np239
123.10	6.	357.98	0.83	4.702E-02	123.10	40.790	PBC<MDA	EU154
139.82	19.	133.45	0.85	4.472E-02	140.51	89.300	PBC<MDA	Tc99m
145.08	19.	126.69	0.85	4.401E-02	145.44	48.200	PBC<MDA	CE141
162.66	7.	315.26	0.87	4.140E-02	162.66	6.220	PBC<MDA	Ba140
163.38	17.	114.79	0.87	4.129E-02	163.38	5.080	PBC<MDA	U235
165.85	17.	119.60	0.87	4.093E-02	165.85	79.900	PBC<MDA	CE139
185.24	90.	23.22	0.67	3.806E-02	185.72	54.000	PBC<MDA	U235
227.00	5.	329.81	0.93	3.318E-02	227.00	6.300	PBC<MDA	Cf251
235.97	17.	135.24	0.94	3.230E-02	235.97	12.300	PBC<MDA	TH227

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
238.63	-23.	110.52	0.94	3.205E-02	238.63	43.300	PBC<MDA	PB212
256.24	13.	113.63	0.96	3.050E-02	256.24	7.000	PBC<MDA	TH227
263.70	28.	41.11	0.97	2.989E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	7.	201.52	0.97	2.972E-02	265.83	50.000	PBC<MDA	BI210M
279.20	15.	96.69	0.99	2.870E-02	279.20	81.460	PBC<MDA	Hg203
316.49	11.	133.68	1.02	2.622E-02	316.49	87.040	PBC<MDA	Ir192
328.76	2.	823.86	1.03	2.551E-02	328.76	20.300	PBC<MDA	La140
345.83	15.	118.23	1.05	2.458E-02	345.83	15.070	PBC<MDA	HF181
351.93	-11.	124.04	1.06	2.426E-02	351.93	37.600	PBC<MDA	PB214
356.00	5.	282.30	1.06	2.405E-02	356.00	62.050	PBC<MDA	BA133
427.88	23.	43.48	1.13	2.095E-02	427.88	29.600	PBC<MDA	SB125
463.37	7.	145.60	1.16	1.970E-02	463.37	10.470	PBC<MDA	SB125
468.06	3.	371.38	1.17	1.955E-02	468.06	51.750	PBC<MDA	Ir192
482.00	4.	367.23	1.18	1.911E-02	482.00	80.500	PBC<MDA	HF181
487.02	4.	263.79	1.18	1.896E-02	487.02	45.500	PBC<MDA	La140
511.86	143.	11.60	2.46	1.823E-02	511.86	20.000	5.459E+00	RH106
563.24	7.	159.06	1.25	1.691E-02	563.24	8.350	PBC<MDA	CS134
569.70	13.	85.31	1.26	1.675E-02	569.32	15.380	7.004E-01	CS134
					569.47	8.200	1.314E+00	PA234
					569.70	97.740	1.103E-01	BI207
583.02	-2.	597.98	1.27	1.645E-02	583.02	84.500	PBC<MDA	TL208
600.50	10.	154.59	1.29	1.606E-02	600.50	17.860	PBC<MDA	SB125
602.73	11.	144.71	1.29	1.601E-02	602.73	98.260	PBC<MDA	SB124
604.71	11.	150.11	1.29	1.597E-02	604.71	97.620	PBC<MDA	CS134
609.31	-14.	129.40	1.30	1.587E-02	609.31	46.090	PBC<MDA	BI214
610.30	11.	161.18	1.30	1.585E-02	610.30	5.750	PBC<MDA	RU103
614.28	11.	166.24	1.30	1.577E-02	614.28	89.850	PBC<MDA	AG108M
618.06	8.	240.65	1.30	1.569E-02	618.06	99.100	PBC<MDA	PM144
657.76	6.	141.42	1.34	1.492E-02	657.76	94.640	PBC<MDA	AG110M
661.66	8.	115.95	1.34	1.485E-02	661.66	85.210	PBC<MDA	CS137
722.79	5.	173.21	1.40	1.381E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.537E-02	AG108M
					723.36	20.220	2.489E-01	EU154
727.17	7.	98.74	1.40	1.374E-02	727.17	7.550	PBC<MDA	BI212
756.73	8.	102.84	1.43	1.329E-02	756.73	54.460	PBC<MDA	ZR95
766.41	10.	70.89	1.43	1.315E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	3.581E+01	PA234M
785.42	7.	117.45	1.45	1.289E-02	785.42	1.280	PBC<MDA	BI212
795.87	10.	85.63	1.46	1.275E-02	795.87	85.530	PBC<MDA	CS134
799.60	10.	96.26	1.46	1.270E-02	799.60	98.960	PBC<MDA	TL210
810.78	6.	132.84	1.47	1.255E-02	810.78	99.460	PBC<MDA	CO58
815.77	8.	121.28	1.48	1.249E-02	815.77	23.280	PBC<MDA	La140
818.50	7.	124.68	1.48	1.245E-02	818.50	100.000	PBC<MDA	Cs136
860.56	16.	48.79	1.51	1.193E-02	860.56	12.420	PBC<MDA	TL208
873.23	5.	257.14	1.52	1.179E-02	873.23	12.270	PBC<MDA	EU154
889.28	8.	171.65	1.54	1.161E-02	889.28	99.984	PBC<MDA	Sc46
898.04	8.	110.13	1.54	1.151E-02	898.04	93.700	PBC<MDA	Y88
911.07	8.	92.18	1.55	1.137E-02	911.07	29.000	PBC<MDA	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
964.11	7.	112.07	1.60	1.083E-02	964.11	14.605	PBC<MDA	EU152
996.33	8.	87.41	1.62	1.053E-02	996.33	10.600	PBC<MDA	EU154
1001.00	-1.	678.90	1.63	1.049E-02	1001.00	0.837	PBC<MDA	PA234M
1048.07	13.	38.50	1.66	1.008E-02	1048.07	80.000	PBC<MDA	Cs136
1050.36	4.	186.33	1.66	1.006E-02	1050.36	1.560	PBC<MDA	RH106
1063.66	14.	55.82	1.67	9.948E-03	1063.66	74.500	PBC<MDA	BI207
1112.07	8.	84.90	1.71	9.569E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	7.	126.65	1.71	9.543E-03	1115.55	50.600	PBC<MDA	ZN65
1120.29	6.	147.38	1.72	9.507E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	2.	413.27	1.72	9.505E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	3.458E-02	Sc46
					1121.30	34.900	9.913E-02	Ta182
1173.24	5.	113.86	1.76	9.128E-03	1173.24	99.900	PBC<MDA	CO60
1189.05	7.	127.38	1.77	9.021E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	9.	107.06	1.80	8.702E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	6.	64.82	1.83	8.481E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	2.963E-01	EU154
1274.54	2.	220.50	1.83	8.481E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.070E-01	EU154
1460.83	-7.	157.75	1.96	7.499E-03	1460.83	10.670	PBC<MDA	K40
1596.21	13.	27.74	2.04	6.915E-03	1596.21	95.400	2.737E-01	La140
1690.98	3.	176.21	2.10	6.556E-03	1690.98	47.790	PBC<MDA	SB124
1764.49	-1.	628.37	2.14	6.302E-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
740.44	185.24	79.	90.	2.360E+03	22.80	0.664	- 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	185.08	46.41	173.	13.	0.002	179.08	1.147s
TH-227	199.98	50.14	159.	-19.	-0.003	114.04	0.751s
AM-241	237.55	59.54	156.	19.	0.003	113.00	0.761s
TH-234	252.58	63.30	192.	22.	0.003	113.80	0.710
Sn-126	256.52	64.28	313.	-20.	-0.003	127.51	0.766s
BA-133	323.33	80.99	138.	18.	0.003	109.55	0.784s
Np-237	345.33	86.49	500.	19.	0.003	169.65	0.789s
EU-155	345.54	86.54	518.	19.	0.003	172.70	0.790s
Sn-126	347.13	86.94	537.	8.	0.001	426.69	0.790s
Sn-126	349.65	87.57	545.	0.	0.000	1000.00	0.791s
Cd-109	351.53	88.04	639.	-22.	-0.003	166.50	0.791s
Nd-147	363.77	91.10	617.	-22.	-0.003	163.06	0.794s
TH-234	369.03	92.42	214.	11.	0.002	217.71	1.006s
AC-228	372.76	93.35	578.	-22.	-0.003	158.63	0.797s
Gd-153	389.36	97.50	147.	17.	0.002	101.69	0.801s
Gd-153	412.15	103.20	323.	-21.	-0.003	122.01	0.807s
Np-239	414.15	103.70	344.	-21.	-0.003	125.74	0.807s
EU-155	420.60	105.31	245.	19.	0.003	121.74	0.809s
Np-239	423.87	106.13	268.	8.	0.001	275.09	0.810s
EU-152	486.45	121.78	233.	-15.	-0.002	143.18	0.826s
CO-57	487.58	122.06	249.	0.	0.000	1000.00	0.826s
EU-154	491.73	123.10	228.	6.	0.001	357.98	0.828
PA-234	524.50	131.29	337.	-20.	-0.003	132.20	0.836s
HF-181	531.42	133.02	330.	-20.	-0.003	128.05	0.838s
CE-144	533.47	133.54	351.	-13.	-0.002	205.05	0.838s
HF-181	544.52	136.30	393.	-14.	-0.002	207.00	0.841s
CO-57	545.21	136.47	407.	0.	0.000	1000.00	0.841s
Tc-99m	561.35	140.51	298.	19.	0.003	133.45	0.845s
U-235	574.45	143.79	286.	-20.	-0.003	115.57	0.849s
CE-141	581.07	145.44	292.	19.	0.003	126.69	0.850s
Ba-140	649.93	162.66	240.	7.	0.001	315.26	0.868
U-235	652.81	163.38	172.	17.	0.002	114.79	0.869
CE-139	662.70	165.85	189.	17.	0.002	119.60	0.871s
Cf-251	705.68	176.60	133.	-3.	0.000	618.87	0.882s
U-235	742.15	185.72	253.	-57.	-0.008	46.59	0.892s
U-235	820.58	205.33	133.	-6.	-0.001	326.87	0.912s
TH-229	842.65	210.85	146.	-27.	-0.004	100.59	0.917s
Cf-251	907.23	227.00	73.	5.	0.001	329.81	0.933s
TH-227	943.11	235.97	266.	17.	0.002	135.24	0.942s
PB-212	953.75	238.63	314.	-23.	-0.003	110.52	0.945s
PB-214	967.21	242.00	291.	0.	0.000	1000.00	0.948s
EU-152	977.99	244.69	300.	-15.	-0.002	165.33	0.951s
TH-227	1024.17	256.24	68.	13.	0.002	113.63	0.962s
Cd-113m	1054.01	263.70	54.	28.	0.004	41.11	0.970

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	1062.53	265.83	96.	7.	0.001	201.52	0.972s
TL-208	1108.33	277.28	127.	-4.	-0.001	425.47	0.983
Hg-203	1115.99	279.20	102.	15.	0.002	96.69	0.985s
I-131	1136.39	284.30	88.	-13.	-0.002	137.82	0.990s
TL-210	1183.18	296.00	359.	-17.	-0.002	158.88	1.002s
PB-212	1199.30	300.03	348.	-19.	-0.003	127.79	1.006s
PA-231	1199.46	300.07	363.	-14.	-0.002	200.42	1.006s
PA-233	1199.90	300.18	377.	0.	0.000	1000.00	1.006s
PA-231	1209.78	302.65	377.	0.	0.000	1000.00	1.008s
BA-133	1210.59	302.85	377.	0.	0.000	1000.00	1.009s
Ba-140	1218.57	304.85	377.	0.	0.000	1000.00	1.011s
BI-210M	1218.76	304.90	377.	0.	0.000	1000.00	1.011s
Ir-192	1232.94	308.44	377.	0.	0.000	1000.00	1.014s
PA-233	1247.22	312.01	377.	0.	0.000	1000.00	1.018s
Ir-192	1265.13	316.49	96.	11.	0.001	133.68	1.022s
La-140	1314.21	328.76	77.	2.	0.000	823.86	1.034s
Cf-249	1332.92	333.44	81.	-3.	0.000	633.07	1.039s
AC-228	1352.44	338.32	194.	-9.	-0.001	288.01	1.043s
Cs-136	1361.44	340.57	193.	0.	0.000	1000.00	1.045s
EU-152	1376.30	344.29	197.	-4.	-0.001	583.76	1.049s
HF-181	1382.47	345.83	160.	15.	0.002	118.23	1.050
PB-214	1406.88	351.93	94.	-11.	-0.002	124.04	1.056s
BA-133	1423.15	356.00	115.	5.	0.001	282.30	1.060
I-131	1457.08	364.48	70.	-3.	0.000	588.76	1.069s
BA-133	1534.50	383.84	165.	-19.	-0.003	76.02	1.087s
Cf-249	1550.94	387.95	178.	-16.	-0.002	119.88	1.091s
SN-113	1565.90	391.69	191.	-3.	0.000	683.65	1.095s
SB-125	1710.63	427.88	22.	23.	0.003	43.48	1.129s
AG-108M	1734.87	433.94	62.	-5.	-0.001	280.31	1.135s
PM-146	1814.64	453.88	68.	-17.	-0.002	100.67	1.154s
SB-125	1852.59	463.37	55.	7.	0.001	145.60	1.163s
Ir-192	1871.36	468.06	74.	3.	0.000	371.38	1.167s
BE-7	1909.50	477.60	62.	-14.	-0.002	86.72	1.176s
HF-181	1927.10	482.00	84.	4.	0.000	367.23	1.180s
La-140	1947.19	487.02	28.	4.	0.001	263.79	1.185s
RU-103	1987.33	497.05	60.	-11.	-0.002	141.13	1.194s
RH-106	2046.57	511.86	67.	143.	0.020	11.60	2.458s
Kr-85	2055.03	513.98	210.	0.	0.000	1000.00	1.210s
Nd-147	2123.11	531.00	40.	-4.	-0.001	313.58	1.225s
Ba-140	2148.15	537.26	42.	-12.	-0.002	92.94	1.231s
CS-134	2252.06	563.24	28.	7.	0.001	159.06	1.255s
CS-134	2276.40	569.32	36.	-5.	-0.001	175.50	1.260s
PA-234	2276.99	569.47	55.	-11.	-0.002	100.00	1.261s
BI-207	2277.92	569.70	55.	13.	0.002	85.31	1.261s
TL-208	2331.20	583.02	41.	-2.	0.000	597.98	1.273s
SB-125	2401.12	600.50	111.	10.	0.001	154.59	1.289s
SB-124	2410.04	602.73	121.	11.	0.002	144.71	1.291
CS-134	2417.96	604.71	131.	11.	0.002	150.11	1.292s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	2436.36	609.31	167.	-14.	-0.002	129.40	1.296s
RU-103	2440.31	610.30	153.	11.	0.002	161.18	1.297s
AG-108M	2456.25	614.28	164.	11.	0.002	166.24	1.301s
PM-144	2471.37	618.06	175.	8.	0.001	240.65	1.304s
RH-106	2486.79	621.92	222.	-13.	-0.002	141.18	1.308s
SB-125	2542.69	635.89	39.	-5.	-0.001	407.60	1.320s
I-131	2547.03	636.97	41.	-5.	-0.001	186.55	1.321
AG-110M	2630.18	657.76	33.	6.	0.001	141.42	1.339s
CS-137	2645.77	661.66	36.	8.	0.001	115.95	1.343s
PM-144	2785.32	696.54	61.	-18.	-0.002	92.07	1.374s
NB-94	2809.67	702.63	40.	-4.	-0.001	218.18	1.379s
SB-124	2890.31	722.79	35.	5.	0.001	173.21	1.396s
AG-108M	2890.91	722.94	40.	0.	0.000	1000.00	1.397s
EU-154	2892.60	723.36	40.	0.	0.000	1000.00	1.397s
ZR-95	2895.96	724.20	40.	0.	0.000	1000.00	1.398s
BI-212	2907.84	727.17	20.	7.	0.001	98.74	1.400s
PM-146	2942.05	735.72	35.	-7.	-0.001	58.60	1.408s
PM-146	2987.81	747.16	53.	-18.	-0.002	26.68	1.417s
ZR-95	3026.09	756.73	14.	8.	0.001	102.84	1.426s
NB-95	3062.34	765.79	40.	-1.	0.000	773.81	1.433s
PA-234M	3064.83	766.41	20.	10.	0.001	70.89	1.434s
BI-212	3140.88	785.42	13.	7.	0.001	117.45	1.450s
CS-134	3182.68	795.87	33.	10.	0.001	85.63	1.459s
TL-210	3197.61	799.60	43.	10.	0.001	96.26	1.462s
CS-134	3207.01	801.95	71.	-12.	-0.002	99.88	1.464s
CO-58	3242.31	810.77	31.	6.	0.001	132.84	1.471
La-140	3262.30	815.77	39.	8.	0.001	121.28	1.475s
Cs-136	3273.22	818.50	37.	7.	0.001	124.68	1.478s
MN-54	3338.63	834.85	29.	-6.	-0.001	155.28	1.492s
Co-56	3386.32	846.77	47.	-17.	-0.002	91.16	1.501s
TL-208	3441.51	860.56	12.	16.	0.002	48.79	1.513s
NB-94	3483.65	871.10	58.	-17.	-0.002	50.11	1.522s
EU-154	3492.19	873.23	70.	5.	0.001	257.14	1.523s
PA-234	3521.39	880.53	71.	-14.	-0.002	88.89	1.529s
PA-234	3532.24	883.24	85.	-14.	-0.002	96.42	1.531s
AG-110M	3538.01	884.68	99.	-3.	0.000	472.02	1.533s
Sc-46	3556.40	889.28	94.	8.	0.001	171.65	1.536s
Y-88	3591.45	898.04	15.	8.	0.001	110.13	1.543s
AC-228	3643.58	911.07	9.	8.	0.001	92.18	1.554s
AG-110M	3749.30	937.49	37.	-14.	-0.002	94.21	1.576s
PA-234	3783.42	946.02	20.	-2.	0.000	517.15	1.582s
EU-152	3855.80	964.11	31.	7.	0.001	112.07	1.597s
AC-228	3875.25	968.97	56.	-15.	-0.002	57.70	1.601
EU-154	3984.71	996.33	20.	8.	0.001	87.41	1.622s
PA-234M	4003.39	1001.00	35.	-1.	0.000	678.90	1.626s
EU-154	4018.51	1004.77	50.	-9.	-0.001	116.00	1.629s
Co-56	4150.81	1037.84	26.	-5.	-0.001	189.18	1.655s
Cs-136	4191.74	1048.07	6.	13.	0.002	38.50	1.663s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RH-106	4200.91	1050.36	26.	4.	0.001	186.33	1.665s
BI-207	4254.12	1063.66	11.	14.	0.002	55.82	1.675s
Ga-68	4309.10	1077.40	20.	-7.	-0.001	145.45	1.685s
FE-59	4396.54	1099.25	20.	-5.	-0.001	201.66	1.702
EU-152	4447.85	1112.07	21.	8.	0.001	84.90	1.712s
ZN-65	4461.74	1115.55	32.	7.	0.001	126.65	1.714s
BI-214	4480.72	1120.29	40.	6.	0.001	147.38	1.718s
Sc-46	4481.77	1120.55	47.	2.	0.000	413.27	1.718s
Ta-182	4484.77	1121.30	50.	0.	0.000	1000.00	1.719s
CO-60	4692.60	1173.24	6.	5.	0.001	113.86	1.757s
Ta-182	4755.88	1189.05	15.	7.	0.001	127.38	1.769s
Ta-182	4885.38	1221.41	21.	-3.	0.000	319.69	1.792s
Co-56	4952.89	1238.28	18.	9.	0.001	107.06	1.805s
NA-22	5097.96	1274.53	5.	6.	0.001	64.82	1.831s
EU-154	5098.00	1274.54	12.	2.	0.000	220.50	1.831s
FE-59	5166.25	1291.60	32.	-16.	-0.002	85.70	1.843s
TL-210	5251.92	1313.00	32.	-16.	-0.002	85.03	1.858s
CO-60	5329.96	1332.50	21.	-2.	0.000	454.68	1.871s
EU-152	5632.13	1408.00	11.	-2.	0.000	451.91	1.923s
K-40	5843.58	1460.83	30.	-7.	-0.001	157.75	1.958s
La-140	6385.44	1596.21	0.	13.	0.002	27.74	2.044s
SB-124	6764.81	1690.98	6.	3.	0.000	176.21	2.102s
BI-214	7059.07	1764.49	17.	-1.	0.000	628.37	2.145s
Co-56	7086.53	1771.35	38.	-13.	-0.002	72.97	2.149s
Y-88	7345.59	1836.06	12.	-2.	0.000	424.26	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	-9.3001E-01				5.31E+01	
			477.60	-9.300E-01	&(	2.710E+00 8.67E+01	1.05E+01 G
NA-22	C	1.0435E-01				9.50E+02	
			1274.53	1.043E-01	?(	2.208E-01 6.48E+01	9.99E+01 G
K-40	N	-1.1977E+00				4.66E+11	
			1460.83	-1.198E+00	?(P	4.893E+00 1.58E+02	1.07E+01 G
Sc-46	F	6.6159E-02				8.38E+01	
			889.28	9.774E-02	?(	5.736E-01 1.72E+02	1.00E+02 G
			1120.55	3.458E-02	?(	5.047E-01 4.13E+02	1.00E+02 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	2.6861E-02					2.77E+01	
			320.08	2.686E-02	%(	2.836E+00	3.04E+03	9.94E+00 G
MN-54	C	-6.9894E-02					3.12E+02	
			834.85	-6.989E-02	?(P	3.162E-01	1.55E+02	1.00E+02 G
FE-59	F	-1.2715E-01					4.45E+01	
			1099.25	-1.272E-01	&(	5.989E-01	2.02E+02	5.65E+01 G
			1291.60	-6.023E-01	+	1.115E+00	8.57E+01	4.32E+01 G
Co-56	C	-1.8963E-01					7.73E+01	
			846.77	-1.896E-01	?(	3.968E-01	9.12E+01	9.99E+01 G
			1238.28	2.218E-01	+ P	5.390E-01	1.07E+02	6.61E+01 G
			1037.84	-4.401E-01	+ P	2.540E+00	1.89E+02	1.41E+01 G
			1771.35	-1.850E+00	+	4.501E+00	7.30E+01	1.55E+01 A
CO-58	C	7.0068E-02					7.09E+01	
			810.78	7.007E-02	?(P	3.192E-01	1.33E+02	9.95E+01 G
CO-60	F	1.8303E-02					1.93E+03	
			1332.50	-3.978E-02	&(	4.131E-01	4.55E+02	1.00E+02 G
			1173.24	7.643E-02	?(P	2.165E-01	1.14E+02	9.99E+01 G
ZN-65	F	1.9174E-01					2.44E+02	
			1115.55	1.917E-01	?(P	8.305E-01	1.27E+02	5.06E+01 G
NB-94	I	-4.3068E-02					7.41E+06	
			702.63	-4.307E-02	?(P	3.241E-01	2.18E+02	9.79E+01 G
			871.10	-1.951E-01	+ P	4.481E-01	5.01E+01	9.99E+01 G
ZR-95	I	1.5043E-01					6.40E+01	
			756.73	1.504E-01	?(P	3.834E-01	1.03E+02	5.45E+01 G
			724.20	0.000E+00	-	7.343E-01	1.00E+03	4.42E+01 G
NB-95	I	-1.2336E-02					6.40E+01	
			765.79	-1.234E-02	(	3.409E-01	7.74E+02	9.98E+01 G
RU-103	I	-9.0088E-02					3.93E+01	
			497.05	-9.009E-02	?(	3.178E-01	1.41E+02	9.09E+01 G
			610.30	1.683E+00	?	9.196E+00	1.61E+02	5.75E+00 GA
RH-106	I	-5.3199E-01					3.74E+02	
			621.92	-1.174E+00	?(P	6.466E+00	1.41E+02	9.93E+00 G
			1050.36	3.554E+00	?(	2.343E+01	1.86E+02	1.56E+00 G
			511.86	5.459E+00	?	1.552E+00	1.16E+01	2.00E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-108M	C	3.4282E-02					1.53E+05	
			433.94	-3.951E-02	?(	2.926E-01	2.80E+02	9.05E+01 G
			722.94	0.000E+00	&	3.564E-01	1.00E+03	9.08E+01 G
			614.28	1.086E-01	?(	6.116E-01	1.66E+02	8.98E+01 G
AG-110M	F	1.1961E-02					2.50E+02	
			884.68	-4.931E-02	?(	8.057E-01	4.72E+02	7.27E+01 G
			657.76	5.902E-02	?(	2.900E-01	1.41E+02	9.46E+01 G
			937.49	-5.222E-01	+	1.136E+00	9.42E+01	3.44E+01 G
			1384.30	-4.841E-02	%	1.302E+00	1.12E+03	2.43E+01 G
			763.94	2.363E-02	&	1.495E+00	1.76E+03	2.23E+01 G
SN-113	F	-2.7814E-02					1.15E+02	
			391.69	-2.781E-02	?(	6.505E-01	6.84E+02	6.40E+01 G
SB-124	F	1.3785E-01					6.02E+01	
			602.73	9.701E-02	(	4.764E-01	1.45E+02	9.83E+01 G
			1690.98	1.478E-01	?(	6.119E-01	1.76E+02	4.78E+01 G
			722.79	4.652E-01	?(	2.817E+00	1.73E+02	1.08E+01 G
SB-125	I	5.0250E-01					1.01E+03	
			427.88	5.152E-01	&(	5.503E-01	4.35E+01	2.96E+01 G
			600.50	4.805E-01	?(P	2.509E+00	1.55E+02	1.79E+01 G
			635.89	-3.693E-01	- P	2.536E+00	4.08E+02	1.13E+01 G
			463.37	5.039E-01	?(P	2.500E+00	1.46E+02	1.05E+01 G
I-131	I	-1.9249E-02					8.02E+00	
			364.48	-1.925E-02	&(	3.003E-01	5.89E+02	8.17E+01 G
			284.30	-1.042E+00	+	3.720E+00	1.38E+02	6.14E+00 G
			636.97	-6.348E-01	+	4.132E+00	1.87E+02	7.17E+00 G
Gd-153	F	1.6344E-01					2.42E+02	
			97.50	1.634E-01	(	5.577E-01	1.02E+02	3.00E+01 G
			103.20	-2.761E-01	+	1.128E+00	1.22E+02	2.18E+01 G
Ga-68	C	-5.2668E+00					4.71E-02	
			1077.40	-5.267E+00	?(	1.772E+01	1.45E+02	3.30E+00 G
Tc-99m	I	7.2526E-02					2.51E-01	
			140.51	7.253E-02	&(	3.246E-01	1.33E+02	8.93E+01 G
BA-133	F	5.0485E-02					3.85E+03	
			356.00	5.048E-02	&(	4.894E-01	2.82E+02	6.20E+01 G
			302.85	0.000E+00	-	2.608E+00	1.00E+03	1.83E+01 G
			383.84	-1.304E+00	+ P	4.275E+00	7.60E+01	8.94E+00 GA
			80.99	1.544E-01	?	4.803E-01	1.10E+02	3.41E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	I	1.3686E-01					7.54E+02	
			795.87	1.292E-01	?(	3.738E-01	8.56E+01	8.55E+01 G
			604.71	9.804E-02	?(	4.992E-01	1.50E+02	9.76E+01 G
			569.32	-2.694E-01	+	1.652E+00	1.75E+02	1.54E+01 G
			801.95	-1.573E+00	&	5.308E+00	9.99E+01	8.69E+00 G
			563.24	6.687E-01	?(P	2.702E+00	1.59E+02	8.35E+00 G
CS-137	I	8.5166E-02					1.10E+04	
			661.66	8.517E-02	&(P	3.349E-01	1.16E+02	8.52E+01 G
CE-139	F	7.0456E-02					1.38E+02	
			165.85	7.046E-02	(	2.833E-01	1.20E+02	7.99E+01 G
Ba-140	I	-3.9207E-01					1.28E+01	
			537.26	-3.921E-01	?(P	1.069E+00	9.29E+01	2.44E+01 G
			162.66	3.775E-01	+	4.040E+00	3.15E+02	6.22E+00 G
			304.85	0.000E+00	+	1.120E+01	1.00E+03	4.29E+00 G
La-140	I	2.9175E-01					1.28E+01	
			1596.21	2.737E-01	?(	1.552E-01	2.77E+01	9.54E+01 G
			487.02	6.442E-02	-	4.407E-01	2.64E+02	4.55E+01 G
			328.76	5.365E-02	&	1.170E+00	8.24E+02	2.03E+01 G
			815.77	3.657E-01	?(P	1.513E+00	1.21E+02	2.33E+01 G
CE-141	I	1.2692E-01					3.25E+01	
			145.44	1.269E-01	?(	5.390E-01	1.27E+02	4.82E+01 G
CE-144	I	-3.5725E-01					2.85E+02	
			133.54	-3.572E-01	(	2.466E+00	2.05E+02	1.11E+01 G
PM-144	C	-1.7608E-01					3.63E+02	
			696.54	-1.761E-01	&(	3.844E-01	9.21E+01	9.90E+01 G
			618.06	7.023E-02	+	5.750E-01	2.41E+02	9.91E+01 G
EU-152	F	3.0392E-01					4.94E+03	
			121.78	-1.580E-01	(	7.612E-01	1.43E+02	2.86E+01 G
			344.29	-9.032E-02	+ P	1.449E+00	5.84E+02	2.65E+01 G
			1112.07	8.956E-01	?(	2.578E+00	8.49E+01	1.36E+01 G
			778.92	1.880E-02	% P	2.255E+00	4.69E+03	1.29E+01 G
			964.11	6.550E-01	?(P	2.499E+00	1.12E+02	1.46E+01 G
			244.69	-8.726E-01	+	4.853E+00	1.65E+02	7.58E+00 G
			1408.00	-1.883E-01	+ P	1.561E+00	4.52E+02	2.10E+01 GA
EU-154	I	2.1812E-01					3.14E+03	
			123.10	4.345E-02	(	5.288E-01	3.58E+02	4.08E+01 G
			1274.54	1.070E-01	?(	8.680E-01	2.21E+02	3.52E+01 G
			723.36	0.000E+00	-	1.602E+00	1.00E+03	2.02E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			873.23	4.481E-01	?(	3.995E+00	2.57E+02	1.23E+01 G
			1004.77	-6.640E-01	+	2.631E+00	1.16E+02	1.80E+01 G
			996.33	9.929E-01	?(	2.952E+00	8.74E+01	1.06E+01 G
EU-155	I	2.0468E-01					1.81E+03	
			105.31	2.500E-01	&(P	1.018E+00	1.22E+02	2.12E+01 G
			86.54	1.734E-01	?(	1.003E+00	1.73E+02	3.07E+01 G
HF-181	F	1.1866E-01					4.24E+01	
			482.00	3.212E-02	&(	4.091E-01	3.67E+02	8.05E+01 G
			133.02	-1.428E-01	+	6.126E-01	1.28E+02	4.33E+01 G
			345.83	5.810E-01	&(	2.312E+00	1.18E+02	1.51E+01 G
			136.30	-7.160E-01	&	4.984E+00	2.07E+02	5.85E+00 G
Ta-182	F	2.1091E-01					1.14E+02	
			1121.30	0.000E+00	?(	1.494E+00	1.00E+03	3.49E+01 G
			1221.41	-1.947E-01	+	1.415E+00	3.20E+02	2.70E+01 G
			1189.05	6.653E-01	?(	1.973E+00	1.27E+02	1.62E+01 G
Hg-203	F	9.0984E-02					4.66E+01	
			279.20	9.098E-02	&(	2.957E-01	9.67E+01	8.15E+01 G
TL-208	N	1.8008E-01					6.98E+02	
			583.02	-1.999E-02	(P	3.253E-01	5.98E+02	8.45E+01 G
			277.28	-2.790E-01	+ P	4.209E+00	4.25E+02	6.31E+00 G
			860.56	1.541E+00	*(P	1.738E+00	4.88E+01	1.24E+01 G
PM-146	C	-1.7652E-01					2.02E+03	
			453.88	-1.765E-01	?(	4.391E-01	1.01E+02	6.50E+01 G
			747.16	-5.452E-01	+ P	1.112E+00	2.67E+01	3.40E+01 G
			735.72	-3.262E-01	+ P	1.377E+00	5.86E+01	2.25E+01 G
Y-88	F	2.5514E-02					1.07E+02	
			1836.06	-4.612E-02	?(	4.347E-01	4.24E+02	9.92E+01 G
			898.04	1.013E-01	?(P	2.706E-01	1.10E+02	9.37E+01 G
Cd-113m		2.1944E+03					5.33E+03	
			263.70	2.194E+03	(	2.854E+03	4.11E+01	6.00E-03 K
Cd-109	F	-1.6147E+00					4.53E+02	
			88.04	-1.615E+00	?(	8.987E+00	1.66E+02	3.79E+00 G
Cf-251	T	-6.9325E-02					3.28E+05	
			176.60	-6.932E-02	?(	1.175E+00	6.19E+02	1.70E+01 G
			227.00	3.101E-01	?	2.832E+00	3.30E+02	6.30E+00 GA

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
Cf-249	T	-1.5012E-01						1.28E+05	
			387.95	-1.501E-01	?(	6.053E-01	1.20E+02	6.60E+01	G
			333.44	-9.459E-02	+	1.581E+00	6.33E+02	1.55E+01	G
Sn-126		-6.2088E-01						3.65E+07	
			87.57	0.000E+00	+	8.406E-01	1.00E+03	3.75E+01	GA
			64.28	-6.209E-01	&(	2.653E+00	1.28E+02	9.70E+00	G
			86.94	2.412E-01	&	3.464E+00	4.27E+02	9.04E+00	GA
PB-210	N	1.0827E+00						8.14E+03	
			46.54	1.083E+00	*(P	5.439E+00	1.79E+02	4.25E+00	G
PB-212	N	-2.2630E-01						6.98E+02	
			238.63	-2.263E-01	(P	8.530E-01	1.11E+02	4.33E+01	G
			300.03	-2.941E+00	& P	1.393E+01	1.28E+02	3.28E+00	GA
PB-214	N	-1.7346E-01						5.84E+05	
			351.93	-1.735E-01	(P	7.291E-01	1.24E+02	3.76E+01	G
			295.09	2.599E-02	% P	2.108E+00	2.41E+03	1.93E+01	G
			242.00	0.000E+00	+	4.841E+00	1.00E+03	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	1.103E-01	-	3.161E-01	8.53E+01	9.77E+01	G
BI-212	N	9.2175E-01						6.98E+02	
			727.17	9.218E-01	?(	3.129E+00	9.87E+01	7.55E+00	G
			785.42	5.694E+00	? P	1.656E+01	1.17E+02	1.28E+00	GA
U-235	N	-4.5809E-02						2.57E+11	
			143.79	-5.747E-01	?(P	2.335E+00	1.16E+02	1.10E+01	G
			205.33	-4.942E-01	+	4.410E+00	3.27E+02	5.01E+00	G
			163.38	1.095E+00	(	4.226E+00	1.15E+02	5.08E+00	G
			185.72	-3.883E-01	+ P	5.204E-01	4.66E+01	5.40E+01	GA
BI-214	N	-5.0229E-02						5.84E+05	
			609.31	-2.694E-01	?(P	1.195E+00	1.29E+02	4.61E+01	G
			1120.29	6.189E-01	?(P	3.122E+00	1.47E+02	1.51E+01	G
			1764.49	-1.360E-01	+ P	3.133E+00	6.28E+02	1.54E+01	G
BI-210M	T	6.5428E-02						1.10E+09	
			265.83	6.543E-02	?(	4.521E-01	2.02E+02	5.00E+01	G
			304.90	0.000E+00	-	1.716E+00	1.00E+03	2.80E+01	G
AC-228	N	3.2196E-01						2.10E+03	
			911.07	3.220E-01	?(	7.138E-01	9.22E+01	2.90E+01	G
			968.97	-1.116E+00	+ P	2.783E+00	5.77E+01	1.75E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			338.32	-3.942E-01	+ P	3.127E+00	2.88E+02	1.20E+01 G
			93.35	-1.098E+00	+	5.825E+00	1.59E+02	5.56E+00 XA
TH-227	N	7.0174E-01					7.95E+03	
			256.24	8.703E-01	?(P	2.681E+00	1.14E+02	7.00E+00 G
			235.97	6.058E-01	(	2.752E+00	1.35E+02	1.23E+01 G
			50.14	-8.147E-01	+	2.636E+00	1.14E+02	8.00E+00 G
TH-229	N	-2.8460E-02					2.68E+06	
			193.51	-2.846E-02	%(	4.276E+00	5.43E+03	4.40E+00 G
			210.85	-3.591E+00	+ P	7.865E+00	1.01E+02	2.99E+00 G
TH-234	N	1.0577E+00					1.63E+12	
			92.59	5.798E-01	@(P	3.580E+00	2.18E+02	5.58E+00 G
			63.29	1.758E+00	(P	5.368E+00	1.14E+02	3.81E+00 G
PA-234	N	-3.3421E-01					1.63E+12	
			131.29	-3.342E-01	?(	1.480E+00	1.32E+02	1.80E+01 G
			946.02	-1.619E-01	+ P	2.203E+00	5.17E+02	1.34E+01 G
			569.47	-1.112E+00	+	3.767E+00	1.00E+02	8.20E+00 G
			883.24	-1.746E+00	+	5.667E+00	9.64E+01	9.60E+00 G
			880.53	-2.782E+00	+	8.310E+00	8.89E+01	6.00E+00 GA
PA-234M	N	7.8595E+00					1.63E+12	
			1001.00	-1.958E+00	&(P	4.806E+01	6.79E+02	8.37E-01 G
			766.41	3.581E+01	&(	8.457E+01	7.09E+01	2.94E-01 G
AM-241	T	1.6515E-01					1.58E+05	
			59.54	1.651E-01	(	5.295E-01	1.13E+02	3.59E+01 G
Np-237	F	4.0619E-01					2.14E+06	
			86.49	4.062E-01	&(	2.308E+00	1.70E+02	1.31E+01 G
Ir-192	F	5.7623E-02					7.40E+01	
			316.49	6.490E-02	&(	2.948E-01	1.34E+02	8.70E+01 G
			468.06	4.538E-02	?(	5.864E-01	3.71E+02	5.18E+01 G
			308.44	0.000E+00	-	1.526E+00	1.00E+03	3.18E+01 G
Cs-136	F	1.4446E-01					1.30E+01	
			818.50	8.107E-02	?(	3.482E-01	1.25E+02	1.00E+02 G
			1048.07	2.237E-01	?(	2.434E-01	3.85E+01	8.00E+01 G
			340.57	0.000E+00	&	8.037E-01	1.00E+03	4.69E+01 G
Np-239	T	1.0810E-01					2.36E+00	
			103.70	-2.543E-01	+	1.070E+00	1.26E+02	2.40E+01 X
			106.13	1.081E-01	?(	1.007E+00	2.75E+02	2.27E+01 G
			99.50	1.275E-02	%	1.310E+00	3.00E+03	1.50E+01 X

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Nd-147      -2.4127E-01                                      1.11E+01
                           531.00-2.413E-01 &(  1.941E+00 3.14E+02 1.30E+01 G
                            91.10-2.169E-01 &   1.182E+00 1.63E+02 2.83E+01 G

TL-210   N   1.1239E-01                                      5.84E+05
                           799.60 1.124E-01 ?(  3.670E-01 9.63E+01 9.90E+01 G
                           296.00-1.090E-01 -   5.811E-01 1.59E+02 7.90E+01 G
                          1313.00-1.268E+00 +   2.328E+00 8.50E+01 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

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

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
TH-227	50.14	159.	-19.	-0.003	114.04	-8.147E-01
AM-241	59.54	156.	19.	0.003	113.00	1.651E-01
Sn-126	64.28	313.	-20.	-0.003	127.51	-6.209E-01
BA-133	80.99	138.	18.	0.003	109.55	1.544E-01
Np-237	86.49	500.	19.	0.003	169.65	4.062E-01
EU-155	86.54	518.	19.	0.003	172.70	1.734E-01

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Sn-126	86.94	537.	8.	0.001	426.69	2.412E-01		
Cd-109	88.04	639.	-22.	-0.003	166.50	-1.615E+00		
Nd-147	91.10	617.	-22.	-0.003	163.06	-2.169E-01		
AC-228	93.35	578.	-22.	-0.003	158.63	-1.098E+00		
Gd-153	97.50	147.	17.	0.002	101.69	1.634E-01		
Gd-153	103.20	323.	-21.	-0.003	122.01	-2.761E-01		
Np-239	103.70	344.	-21.	-0.003	125.74	-2.543E-01		
EU-155	105.31	245.	19.	0.003	121.74	2.500E-01		P
Np-239	106.13	268.	8.	0.001	275.09	1.081E-01		
EU-152	121.78	233.	-15.	-0.002	143.18	-1.580E-01		
EU-154	123.10	228.	6.	0.001	357.98	4.345E-02		
PA-234	131.29	337.	-20.	-0.003	132.20	-3.342E-01		
HF-181	133.02	330.	-20.	-0.003	128.05	-1.428E-01		
CE-144	133.54	351.	-13.	-0.002	205.05	-3.572E-01		
HF-181	136.30	393.	-14.	-0.002	207.00	-7.160E-01		
U-235	143.79	286.	-20.	-0.003	115.57	-5.747E-01		P
Ba-140	162.66	240.	7.	0.001	315.26	3.775E-01		
U-235	163.38	172.	17.	0.002	114.79	1.095E+00		
CE-139	165.85	189.	17.	0.002	119.60	7.046E-02		
Cf-251	176.60	133.	-3.	0.000	618.87	-6.932E-02		
U-235	185.72	253.	-57.	-0.008	46.59	-3.883E-01		P
U-235	205.33	133.	-6.	-0.001	326.87	-4.942E-01		
TH-229	210.85	146.	-27.	-0.004	100.59	-3.591E+00		P
Cf-251	227.00	73.	5.	0.001	329.81	3.101E-01		
TH-227	235.97	266.	17.	0.002	135.24	6.058E-01		
PB-212	238.63	314.	-23.	-0.003	110.52	-2.263E-01		P
EU-152	244.69	300.	-15.	-0.002	165.33	-8.726E-01		
TH-227	256.24	68.	13.	0.002	113.63	8.703E-01		P
Cd-113m	263.70	54.	28.	0.004	41.11	2.194E+03		
BI-210M	265.83	96.	7.	0.001	201.52	6.543E-02		
TL-208	277.28	127.	-4.	-0.001	425.47	-2.790E-01		P
Hg-203	279.20	102.	15.	0.002	96.69	9.098E-02		
I-131	284.30	88.	-13.	-0.002	137.82	-1.042E+00		
TL-210	296.00	359.	-17.	-0.002	158.88	-1.090E-01		
PB-212	300.03	348.	-19.	-0.003	127.79	-2.941E+00		P
PA-231	300.07	363.	-14.	-0.002	200.42	-2.812E+00		
Ir-192	316.49	96.	11.	0.001	133.68	6.490E-02		
Cf-249	333.44	81.	-3.	0.000	633.07	-9.459E-02		
AC-228	338.32	194.	-9.	-0.001	288.01	-3.942E-01		P
EU-152	344.29	197.	-4.	-0.001	583.76	-9.032E-02		P
HF-181	345.83	160.	15.	0.002	118.23	5.810E-01		
PB-214	351.93	94.	-11.	-0.002	124.04	-1.735E-01		P
BA-133	356.00	115.	5.	0.001	282.30	5.048E-02		
I-131	364.48	70.	-3.	0.000	588.76	-1.925E-02		
BA-133	383.84	165.	-19.	-0.003	76.02	-1.304E+00		P
Cf-249	387.95	178.	-16.	-0.002	119.88	-1.501E-01		
SN-113	391.69	191.	-3.	0.000	683.65	-2.781E-02		
SB-125	427.88	22.	23.	0.003	43.48	5.152E-01		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-108M	433.94	62.	-5.	-0.001	280.31	-3.951E-02	
PM-146	453.88	68.	-17.	-0.002	100.67	-1.765E-01	
SB-125	463.37	55.	7.	0.001	145.60	5.039E-01	P
Ir-192	468.06	74.	3.	0.000	371.38	4.538E-02	
BE-7	477.60	62.	-14.	-0.002	86.72	-9.300E-01	
HF-181	482.00	84.	4.	0.000	367.23	3.212E-02	
RU-103	497.05	60.	-11.	-0.002	141.13	-9.009E-02	
RH-106	511.86	67.	143.	0.020	11.60	5.459E+00	
Nd-147	531.00	40.	-4.	-0.001	313.58	-2.413E-01	
Ba-140	537.26	42.	-12.	-0.002	92.94	-3.921E-01	P
CS-134	563.24	28.	7.	0.001	159.06	6.687E-01	P
CS-134	569.32	36.	-5.	-0.001	175.50	-2.694E-01	
PA-234	569.47	55.	-11.	-0.002	100.00	-1.112E+00	
BI-207	569.70	55.	13.	0.002	85.31	1.103E-01	
TL-208	583.02	41.	-2.	0.000	597.98	-1.999E-02	P
SB-125	600.50	111.	10.	0.001	154.59	4.805E-01	P
SB-124	602.73	121.	11.	0.002	144.71	9.701E-02	
CS-134	604.71	131.	11.	0.002	150.11	9.804E-02	
BI-214	609.31	167.	-14.	-0.002	129.40	-2.694E-01	P
RU-103	610.30	153.	11.	0.002	161.18	1.683E+00	
AG-108M	614.28	164.	11.	0.002	166.24	1.086E-01	
PM-144	618.06	175.	8.	0.001	240.65	7.023E-02	
RH-106	621.92	222.	-13.	-0.002	141.18	-1.174E+00	P
SB-125	635.89	39.	-5.	-0.001	407.60	-3.693E-01	P
I-131	636.97	41.	-5.	-0.001	186.55	-6.348E-01	
AG-110M	657.76	33.	6.	0.001	141.42	5.902E-02	
CS-137	661.66	36.	8.	0.001	115.95	8.517E-02	P
PM-144	696.54	61.	-18.	-0.002	92.07	-1.761E-01	
NB-94	702.63	40.	-4.	-0.001	218.18	-4.307E-02	P
SB-124	722.79	35.	5.	0.001	173.21	4.652E-01	
BI-212	727.17	20.	7.	0.001	98.74	9.218E-01	
PM-146	735.72	35.	-7.	-0.001	58.60	-3.262E-01	P
PM-146	747.16	53.	-18.	-0.002	26.68	-5.452E-01	P
ZR-95	756.73	14.	8.	0.001	102.84	1.504E-01	P
NB-95	765.79	40.	-1.	0.000	773.81	-1.234E-02	
PA-234M	766.41	20.	10.	0.001	70.89	3.581E+01	
BI-212	785.42	13.	7.	0.001	117.45	5.694E+00	P
CS-134	795.87	33.	10.	0.001	85.63	1.292E-01	
TL-210	799.60	43.	10.	0.001	96.26	1.124E-01	
CS-134	801.95	71.	-12.	-0.002	99.88	-1.573E+00	
CO-58	810.77	31.	6.	0.001	132.84	7.007E-02	P
Cs-136	818.50	37.	7.	0.001	124.68	8.107E-02	
MN-54	834.85	29.	-6.	-0.001	155.28	-6.989E-02	P
Co-56	846.77	47.	-17.	-0.002	91.16	-1.896E-01	
TL-208	860.56	12.	16.	0.002	48.79	1.541E+00	P
NB-94	871.10	58.	-17.	-0.002	50.11	-1.951E-01	P
EU-154	873.23	70.	5.	0.001	257.14	4.481E-01	
PA-234	880.53	71.	-14.	-0.002	88.89	-2.782E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PA-234	883.24	85.	-14.	-0.002	96.42	-1.746E+00		
AG-110M	884.68	99.	-3.	0.000	472.02	-4.931E-02		
Sc-46	889.28	94.	8.	0.001	171.65	9.774E-02		
Y-88	898.04	15.	8.	0.001	110.13	1.013E-01		P
AC-228	911.07	9.	8.	0.001	92.18	3.220E-01		
AG-110M	937.49	37.	-14.	-0.002	94.21	-5.222E-01		
PA-234	946.02	20.	-2.	0.000	517.15	-1.619E-01		P
EU-152	964.11	31.	7.	0.001	112.07	6.550E-01		P
AC-228	968.97	56.	-15.	-0.002	57.70	-1.116E+00		P
EU-154	996.33	20.	8.	0.001	87.41	9.929E-01		
PA-234M	1001.00	35.	-1.	0.000	678.90	-1.958E+00		P
EU-154	1004.77	50.	-9.	-0.001	116.00	-6.640E-01		
Co-56	1037.84	26.	-5.	-0.001	189.18	-4.401E-01		P
Cs-136	1048.07	6.	13.	0.002	38.50	2.237E-01		
RH-106	1050.36	26.	4.	0.001	186.33	3.554E+00		
BI-207	1063.66	11.	14.	0.002	55.82	2.716E-01		P
Ga-68	1077.40	20.	-7.	-0.001	145.45	-5.267E+00		
FE-59	1099.25	20.	-5.	-0.001	201.66	-1.272E-01		
EU-152	1112.07	21.	8.	0.001	84.90	8.956E-01		
ZN-65	1115.55	32.	7.	0.001	126.65	1.917E-01		P
BI-214	1120.29	40.	6.	0.001	147.38	6.189E-01		P
Sc-46	1120.55	47.	2.	0.000	413.27	3.458E-02		
CO-60	1173.24	6.	5.	0.001	113.86	7.643E-02		P
Ta-182	1189.05	15.	7.	0.001	127.38	6.653E-01		
Ta-182	1221.41	21.	-3.	0.000	319.69	-1.947E-01		
Co-56	1238.28	18.	9.	0.001	107.06	2.218E-01		P
NA-22	1274.53	5.	6.	0.001	64.82	1.043E-01		
EU-154	1274.54	12.	2.	0.000	220.50	1.070E-01		
FE-59	1291.60	32.	-16.	-0.002	85.70	-6.023E-01		
TL-210	1313.00	32.	-16.	-0.002	85.03	-1.268E+00		
CO-60	1332.50	21.	-2.	0.000	454.68	-3.978E-02		
EU-152	1408.00	11.	-2.	0.000	451.91	-1.883E-01		P
K-40	1460.83	30.	-7.	-0.001	157.75	-1.198E+00		P
SB-124	1690.98	6.	3.	0.000	176.21	1.478E-01		
BI-214	1764.49	17.	-1.	0.000	628.37	-1.360E-01		P
Co-56	1771.35	38.	-13.	-0.002	72.97	-1.850E+00		
Y-88	1836.06	12.	-2.	0.000	424.26	-4.612E-02		

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-9.3000E-01	-9.3001E-01	8.672E+01%	2.71E+00
NA-22	#A	1.0435E-01	1.0435E-01	6.482E+01%	2.21E-01
K-40	#A	-1.1977E+00	-1.1977E+00	1.577E+02%	4.89E+00
Sc-46	#A	6.6158E-02	6.6159E-02	1.716E+02%	5.74E-01
CR-51	#A	2.6860E-02	2.6861E-02	3.043E+03%	2.84E+00
MN-54	#A	-6.9893E-02	-6.9894E-02	1.553E+02%	3.16E-01
FE-59	#A	-1.2715E-01	-1.2715E-01	2.017E+02%	5.99E-01
Co-56	#A	-1.8963E-01	-1.8963E-01	9.116E+01%	3.97E-01
CO-57	#A	0.0000E+00	0.0000E+00	7.071E+02%	2.62E-01
CO-58	#A	7.0067E-02	7.0068E-02	1.328E+02%	3.19E-01
CO-60	#A	1.8303E-02	1.8303E-02	1.139E+02%	4.13E-01
ZN-65	#A	1.9173E-01	1.9174E-01	1.266E+02%	8.30E-01
NB-94	#A	-4.3068E-02	-4.3068E-02	2.182E+02%	3.24E-01
ZR-95	#A	1.5042E-01	1.5043E-01	1.028E+02%	3.83E-01
NB-95	#A	-1.2336E-02	-1.2336E-02	7.738E+02%	3.41E-01
RU-103	#A	-9.0086E-02	-9.0088E-02	1.411E+02%	3.18E-01
RH-106	#A	-5.3199E-01	-5.3199E-01	1.169E+02%	6.47E+00
AG-108M	#A	3.4282E-02	3.4282E-02	1.630E+02%	2.93E-01
AG-110M	#A	1.1961E-02	1.1961E-02	1.414E+02%	8.06E-01
SN-113	#A	-2.7814E-02	-2.7814E-02	6.837E+02%	6.50E-01
SB-124	#A	1.3785E-01	1.3785E-01	9.545E+01%	4.76E-01
SB-125	#A	5.0250E-01	5.0250E-01	4.348E+01%	5.50E-01
I-131	#A	-1.9248E-02	-1.9249E-02	5.888E+02%	3.00E-01
Gd-153	#A	1.6343E-01	1.6344E-01	1.017E+02%	5.58E-01
Ga-68	#A	-5.1991E+00	-5.2668E+00	1.455E+02%	1.77E+01
Tc-99m	A	7.2350E-02	7.2526E-02	1.335E+02%	3.25E-01
BA-133	#A	5.0485E-02	5.0485E-02	2.823E+02%	4.89E-01
CS-134	#A	1.3686E-01	1.3686E-01	7.829E+01%	3.74E-01
CS-137	#A	8.5166E-02	8.5166E-02	1.160E+02%	3.35E-01
CE-139	#A	7.0456E-02	7.0456E-02	1.196E+02%	2.83E-01
Ba-140	#A	-3.9205E-01	-3.9207E-01	9.294E+01%	1.07E+00
La-140	#	2.9173E-01	2.9175E-01	2.774E+01%	1.55E-01
CE-141	#A	1.2692E-01	1.2692E-01	1.267E+02%	5.39E-01
CE-144	#A	-3.5725E-01	-3.5725E-01	2.050E+02%	2.47E+00
PM-144	#A	-1.7608E-01	-1.7608E-01	9.207E+01%	3.84E-01
EU-152	#A	3.0392E-01	3.0392E-01	6.689E+01%	7.61E-01
EU-154	#A	2.1812E-01	2.1812E-01	8.741E+01%	5.29E-01
EU-155	#A	2.0468E-01	2.0468E-01	1.056E+02%	1.02E+00
HF-181	#A	1.1866E-01	1.1866E-01	1.182E+02%	4.09E-01
Ta-182	#A	2.1091E-01	2.1091E-01	1.274E+02%	1.49E+00
Hg-203	#A	9.0982E-02	9.0984E-02	9.669E+01%	2.96E-01
TL-208	#A	1.8008E-01	1.8008E-01	4.879E+01%	3.25E-01
PM-146	#A	-1.7652E-01	-1.7652E-01	1.007E+02%	4.39E-01

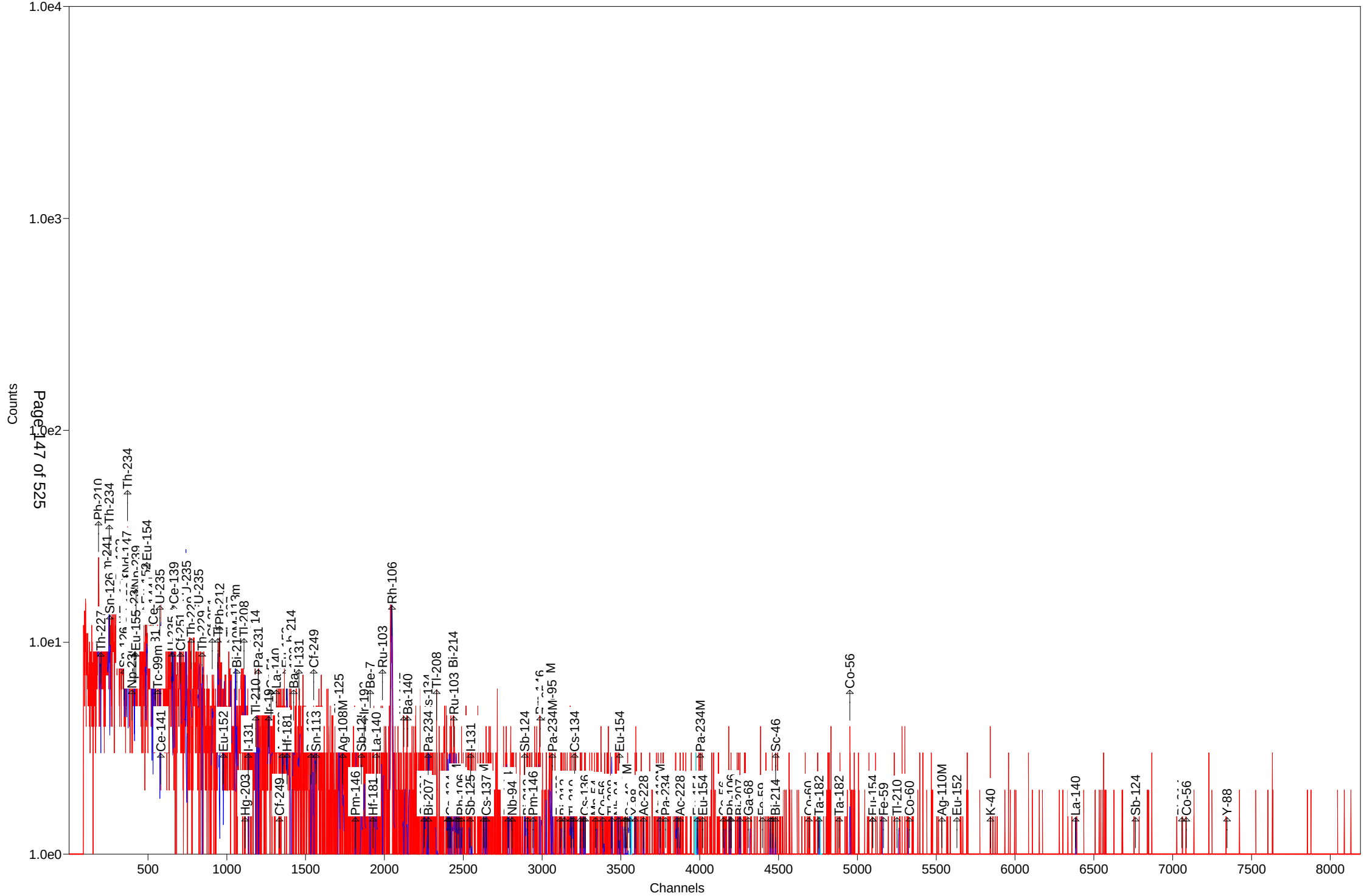
Y-88	#A	2.5513E-02	2.5514E-02	1.101E+02%	4.35E-01
Cd-113m	#A	2.1944E+03	2.1944E+03	4.111E+01%	2.85E+03
Cd-109	#A	-1.6147E+00	-1.6147E+00	1.665E+02%	8.99E+00
Cf-251	#A	-6.9325E-02	-6.9325E-02	6.189E+02%	1.18E+00
Cf-249	#A	-1.5012E-01	-1.5012E-01	1.199E+02%	6.05E-01
Sn-126	#A	-6.2088E-01	-6.2088E-01	1.275E+02%	2.65E+00
PB-210	#A	1.0827E+00	1.0827E+00	1.791E+02%	5.44E+00
PB-212	#A	-2.2630E-01	-2.2630E-01	1.105E+02%	8.53E-01
PB-214	#A	-1.7346E-01	-1.7346E-01	1.240E+02%	7.29E-01
BI-207	#A	2.7157E-01	2.7157E-01	5.582E+01%	3.34E-01
BI-212	#A	9.2175E-01	9.2175E-01	9.874E+01%	3.13E+00
U-235	#A	-4.5809E-02	-4.5809E-02	8.145E+01%	2.33E+00
BI-214	#A	-5.0229E-02	-5.0229E-02	9.806E+01%	1.20E+00
BI-210M	#A	6.5428E-02	6.5428E-02	2.015E+02%	4.52E-01
AC-228	#A	3.2196E-01	3.2196E-01	9.218E+01%	7.14E-01
TH-227	#A	7.0174E-01	7.0174E-01	8.832E+01%	2.68E+00
TH-229	#A	-2.8460E-02	-2.8460E-02	5.430E+03%	4.28E+00
TH-234	A	1.0577E+00	1.0577E+00	1.138E+02%	3.58E+00
PA-231	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.66E+01
PA-233	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.36E+00
PA-234	#A	-3.3421E-01	-3.3421E-01	1.322E+02%	1.48E+00
PA-234M	#A	7.8595E+00	7.8595E+00	7.089E+01%	4.81E+01
AM-241	#A	1.6515E-01	1.6515E-01	1.130E+02%	5.29E-01
Np-237	#A	4.0619E-01	4.0619E-01	1.696E+02%	2.31E+00
Ir-192	#A	5.7623E-02	5.7623E-02	1.337E+02%	2.95E-01
Cs-136	#A	1.4446E-01	1.4446E-01	3.850E+01%	3.48E-01
Np-239	#A	1.0807E-01	1.0810E-01	2.751E+02%	1.01E+00
Nd-147	#A	-2.4125E-01	-2.4127E-01	3.136E+02%	1.94E+00
TL-210	#A	1.1239E-01	1.1239E-01	9.626E+01%	3.67E-01
Kr-85	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.25E+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

404676_Gamma_490-164296-C-1-B DU. 14_Gamma_20184341.spc.



Test America St. Louis Spectrum ID: 7_Gamma_20183405

Sample Description: 404676_Gamma_490-164387-B-1-A
Detector: Detector # 7
Batch ID: 404676
Work Order Number: Gamma
Lot Number: 490-164387-B-1-A

Decay to Time: 12/29/2018 13:51 Live Time: 7200 sec
Acquisition Time: 12/29/2018 13:51:34 Real Time: 7218 sec
Analysis Time: 12/29/2018 15:52 Dead Time: 0.25 %
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	1.997E+00	39.3	7.844E-01	7.908E-01	2.394E+00
NA-22	-8.283E-02	154.1	1.276E-01	1.277E-01	4.540E-01
K-40	-1.679E+00	117.6	1.974E+00	1.976E+00	5.364E+00
Sc-46	-1.902E-01	80.7	1.535E-01	1.538E-01	5.702E-01
CR-51	-8.537E-02	951.7	8.125E-01	8.125E-01	2.322E+00
MN-54	4.717E-03	2755.0	1.300E-01	1.300E-01	3.233E-01
FE-59	-5.385E-01	86.1	4.635E-01	4.643E-01	9.981E-01
Co-56	6.711E-02	81.1	5.444E-02	5.454E-02	4.236E-01
CO-57	0.000E+00	1.#INF	2.178E-02	2.178E-02	2.464E-01
CO-58	1.327E-01	85.9	1.140E-01	1.142E-01	3.855E-01
CO-60	-1.678E-01	84.1	1.411E-01	1.414E-01	4.939E-01
ZN-65	0.000E+00	1.#INF	1.620E-01	1.620E-01	1.125E+00
NB-94	1.152E-01	59.2	6.827E-02	6.852E-02	2.505E-01
ZR-95	-4.740E-01	37.6	1.783E-01	1.799E-01	9.056E-01
NB-95	-1.358E-01	89.2	1.212E-01	1.214E-01	4.099E-01
RU-103	9.025E-02	99.7	8.996E-02	9.008E-02	2.207E-01
RH-106	0.000E+00	1.#INF	2.704E-01	2.704E-01	6.141E+00
AG-108M	-5.376E-02	238.8	1.284E-01	1.284E-01	3.254E-01
AG-110M	3.373E-01	37.8	1.275E-01	1.286E-01	6.938E-01
SN-113	1.084E-01	112.2	1.216E-01	1.217E-01	4.148E-01
SB-124	1.980E-01	92.5	1.832E-01	1.835E-01	5.480E-01
SB-125	3.022E-01	129.4	3.909E-01	3.912E-01	8.827E-01
I-131	1.286E-01	102.5	1.319E-01	1.320E-01	3.137E-01
Gd-153	-1.845E-01	145.0	2.675E-01	2.678E-01	8.980E-01
Ga-68	8.378E+00	89.8	7.527E+00	7.541E+00	1.687E+01
Tc-99m	7.283E-02	121.3	8.832E-02	8.842E-02	2.969E-01
BA-133	-1.909E-01	97.9	1.868E-01	1.871E-01	6.267E-01
CS-134	1.037E-01	127.0	1.317E-01	1.318E-01	5.249E-01
CS-137	-1.356E-02	953.9	1.294E-01	1.294E-01	4.608E-01
CE-139	-8.953E-02	110.6	9.900E-02	9.933E-02	3.320E-01
Ba-140	-7.913E-02	86.2	6.824E-02	6.836E-02	1.327E+00
La-140	1.943E-02	152.4	2.961E-02	2.963E-02	5.039E-01
CE-141	1.133E-01	170.7	1.934E-01	1.935E-01	6.500E-01

CE-144	0.000E+00	1.#INF	1.684E-01	1.684E-01	1.967E+00
PM-144	1.261E-01	94.0	1.185E-01	1.187E-01	2.788E-01
EU-152	2.224E-01	72.9	1.621E-01	1.625E-01	7.105E-01
EU-154	2.852E-01	93.4	2.665E-01	2.669E-01	4.450E-01
EU-155	-1.059E-02	3194.2	3.382E-01	3.382E-01	1.340E+00
HF-181	1.032E-01	95.6	9.865E-02	9.878E-02	4.125E-01
Ta-182	-1.208E-01	70.5	8.522E-02	8.543E-02	1.881E+00
Hg-203	-6.636E-02	145.3	9.641E-02	9.648E-02	3.286E-01
TL-208	-3.427E-01	54.7	1.876E-01	1.884E-01	5.285E-01
PM-146	-2.588E-02	623.2	1.613E-01	1.613E-01	4.165E-01
Y-88	2.962E-02	161.5	4.784E-02	4.787E-02	5.660E-01
Cd-113m	-1.542E+03	92.6	1.428E+03	1.432E+03	4.788E+03
Cd-109	0.000E+00	1.#INF	1.194E+00	1.194E+00	7.643E+00
Cf-251	3.757E-01	108.5	4.076E-01	4.088E-01	1.052E+00
Cf-249	-1.260E-02	73.6	9.271E-03	9.293E-03	5.850E-01
Sn-126	-5.828E-01	144.0	8.393E-01	8.399E-01	2.820E+00
PB-210	-3.118E+00	66.1	2.062E+00	2.081E+00	7.065E+00
PB-212	-3.909E-01	62.7	2.453E-01	2.465E-01	9.117E-01
PB-214	-4.849E-02	508.7	2.467E-01	2.467E-01	8.562E-01
BI-207	7.295E-02	149.4	1.090E-01	1.091E-01	5.759E-01
BI-212	1.237E+00	90.5	1.120E+00	1.121E+00	3.824E+00
U-235	7.713E-01	89.8	6.926E-01	6.937E-01	2.924E+00
BI-214	6.733E-01	25.8	1.738E-01	1.771E-01	1.303E+00
BI-210M	-5.913E-02	115.3	6.820E-02	6.829E-02	6.035E-01
AC-228	1.220E-01	120.2	1.466E-01	1.467E-01	1.371E+00
TH-227	-3.126E-01	369.8	1.156E+00	1.156E+00	3.256E+00
TH-229	3.016E-01	237.5	7.165E-01	7.169E-01	4.682E+00
TH-234	6.560E-01	145.5	9.544E-01	9.552E-01	3.606E+00
PA-231	3.138E+00	122.9	3.857E+00	3.861E+00	1.749E+01
PA-233	3.957E-01	108.5	4.294E-01	4.299E-01	1.016E+00
PA-234	6.527E-01	69.8	4.557E-01	4.570E-01	1.109E+00
PA-234M	-1.936E+01	121.4	2.350E+01	2.352E+01	6.589E+01
AM-241	-9.785E-03	2031.4	1.988E-01	1.988E-01	5.464E-01
Np-237	4.017E-03	16667.1	6.695E-01	6.695E-01	2.271E+00
Ir-192	7.020E-02	124.2	8.721E-02	8.731E-02	4.434E-01
Cs-136	1.543E-01	86.3	1.332E-01	1.335E-01	4.492E-01
Np-239	2.226E-01	146.3	3.256E-01	3.259E-01	1.095E+00
Nd-147	-1.057E+00	97.4	1.030E+00	1.031E+00	2.462E+00
TL-210	4.619E-02	171.7	7.929E-02	7.933E-02	4.676E-01
Kr-85	2.433E+01	159.3	3.876E+01	3.879E+01	1.313E+02
Total	4.616E+01				

Analyst: Joey Sausto

Sample description
404676_Gamma_490-164387-B-1-A

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20183405.An1

Acquisition information
Start time: 12/29/2018 1:51:34 PM
Live time: 7200
Real time: 7218
Dead time: 0.25 %
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	12/29/2018 1:51:00 PM
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. 5 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 1.0000

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	-32.	66.14	0.84	3.376E-02	46.54	4.250	PBC<MDA	PB210
63.18	16.	145.49	1.13	4.068E-02	63.29	3.810	PBC<MDA	TH234
86.94	17.	156.97	0.88	4.401E-02	86.54	30.700	PBC<MDA	EU155
					86.94	9.040	5.850E-01	Sn126
87.57	12.	231.91	0.88	4.403E-02	87.57	37.500	PBC<MDA	Sn126
92.40	102.	18.41	1.02	4.410E-02	92.59	5.584	PBC<MDA	TH234
106.13	16.	146.30	0.90	4.359E-02	106.13	22.700	PBC<MDA	Np239
123.10	17.	98.51	0.92	4.202E-02	123.10	40.790	PBC<MDA	EU154
131.29	15.	113.19	0.93	4.103E-02	131.29	18.000	PBC<MDA	PA234
133.02	12.	154.14	0.93	4.081E-02	133.02	43.300	PBC<MDA	HF181
140.51	17.	121.27	0.94	3.981E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	13.	209.38	0.94	3.936E-02	143.79	10.960	PBC<MDA	U235
145.44	15.	170.73	0.94	3.913E-02	145.44	48.200	PBC<MDA	CE141
162.66	18.	95.84	0.96	3.664E-02	162.66	6.220	PBC<MDA	Ba140
163.38	14.	132.47	0.96	3.653E-02	163.38	5.080	PBC<MDA	U235
176.60	16.	108.48	0.98	3.462E-02	176.60	17.000	PBC<MDA	Cf251
185.72	42.	49.20	0.99	3.334E-02	185.72	54.000	PBC<MDA	U235
193.51	-2.	792.98	0.99	3.233E-02	193.51	4.400	PBC<MDA	TH229
205.33	14.	105.70	1.01	3.092E-02	205.33	5.010	PBC<MDA	U235
210.85	7.	237.55	1.01	3.031E-02	210.85	2.990	PBC<MDA	TH229
227.00	3.	507.05	1.03	2.865E-02	227.00	6.300	PBC<MDA	Cf251
238.63	-34.	62.75	1.04	2.757E-02	238.63	43.300	PBC<MDA	PB212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
244.69	-2.	611.83	1.05	2.704E-02	244.69	7.580	PBC<MDA	EU152
277.28	2.	498.78	1.08	2.454E-02	277.28	6.310	PBC<MDA	TL208
284.30	12.	102.55	1.09	2.407E-02	284.30	6.140	PBC<MDA	I131
296.00	14.	171.67	1.10	2.331E-02	296.00	79.000	PBC<MDA	TL210
300.03	14.	166.78	1.10	2.307E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	3.390E+00	PA231
					300.18	6.200	1.345E+00	PA233
300.07	14.	169.85	1.10	2.306E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	3.390E+00	PA231
					300.18	6.200	1.345E+00	PA233
300.18	14.	174.05	1.10	2.306E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	3.390E+00	PA231
					300.18	6.200	1.345E+00	PA233
302.65	14.	177.74	1.11	2.291E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	4.594E-01	BA133
302.85	5.	532.20	1.11	2.290E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.557E-01	BA133
308.44	13.	124.23	1.11	2.257E-02	308.44	31.750	PBC<MDA	Ir192
312.01	13.	129.66	1.12	2.236E-02	312.01	36.000	PBC<MDA	PA233
333.44	15.	104.46	1.14	2.121E-02	333.44	15.510	PBC<MDA	Cf249
338.32	12.	120.19	1.14	2.097E-02	338.32	12.010	PBC<MDA	AC228
345.83	6.	182.00	1.15	2.060E-02	345.83	15.070	PBC<MDA	HF181
364.48	6.	238.82	1.17	1.975E-02	364.48	81.700	PBC<MDA	I131
383.84	11.	108.77	1.19	1.894E-02	383.84	8.940	PBC<MDA	BA133
391.69	9.	112.19	1.20	1.863E-02	391.69	64.000	PBC<MDA	SN113
463.37	6.	176.34	1.27	1.623E-02	463.37	10.470	PBC<MDA	SB125
477.60	24.	39.28	1.28	1.583E-02	477.60	10.520	PBC<MDA	BE7
482.00	7.	159.26	1.29	1.571E-02	482.00	80.500	PBC<MDA	HF181
487.02	9.	152.39	1.29	1.557E-02	487.02	45.500	PBC<MDA	La140
497.05	9.	99.69	1.30	1.531E-02	497.05	90.900	PBC<MDA	RU103
511.86	112.	13.60	2.56	1.494E-02	511.86	20.000	5.206E+00	RH106
513.98	11.	159.31	1.32	1.489E-02	513.98	0.430	PBC<MDA	Kr85
563.24	3.	426.01	1.36	1.378E-02	563.24	8.350	PBC<MDA	CS134
569.47	12.	81.78	1.37	1.366E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.447E+00	PA234
					569.70	97.740	1.214E-01	BI207
569.70	5.	158.69	1.37	1.365E-02	569.32	15.380	3.307E-01	CS134
					569.47	8.200	6.203E-01	PA234
					569.70	97.740	5.206E-02	BI207
600.50	11.	129.35	1.40	1.306E-02	600.50	17.860	PBC<MDA	SB125
602.38	9.	160.12	1.40	1.301E-02	602.73	98.260	PBC<MDA	SB124
604.71	11.	141.89	1.40	1.298E-02	604.71	97.620	PBC<MDA	CS134
618.06	-2.	825.72	1.42	1.274E-02	618.06	99.100	PBC<MDA	PM144
635.89	5.	144.95	1.43	1.243E-02	635.89	11.310	PBC<MDA	SB125
696.54	10.	93.99	1.49	1.150E-02	696.54	99.000	PBC<MDA	PM144
702.63	9.	94.39	1.49	1.141E-02	702.63	97.900	PBC<MDA	NB94
722.79	4.	200.00	1.51	1.113E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.494E-02	AG108M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					723.36	20.220	2.469E-01	EU154
727.17	7.	90.52	1.51	1.108E-02	727.17	7.550	PBC<MDA	BI212
763.94	1.	512.35	1.55	1.061E-02	763.94	22.280	PBC<MDA	AG110M
801.95	7.	126.99	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
818.50	11.	86.33	1.60	9.989E-03	818.50	100.000	PBC<MDA	Cs136
871.10	8.	71.63	1.64	9.456E-03	871.10	99.890	PBC<MDA	NB94
884.68	11.	87.94	1.65	9.327E-03	884.68	72.680	PBC<MDA	AG110M
898.04	7.	161.52	1.66	9.204E-03	898.04	93.700	PBC<MDA	Y88
964.11	6.	72.88	1.72	8.641E-03	964.11	14.605	PBC<MDA	EU152
996.33	2.	318.75	1.75	8.390E-03	996.33	10.600	PBC<MDA	EU154
1004.77	6.	93.44	1.75	8.327E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	5.	140.17	1.78	8.089E-03	1037.84	14.130	PBC<MDA	Co56
1063.66	4.	253.26	1.80	7.912E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	9.	89.84	1.81	7.820E-03	1077.40	3.300	PBC<MDA	Ga68
1112.07	4.	209.17	1.84	7.600E-03	1112.07	13.644	PBC<MDA	EU152
1189.05	6.	94.34	1.90	7.151E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	5.	120.99	1.94	6.891E-03	1238.28	66.070	PBC<MDA	Co56
1384.30	7.	37.80	2.04	6.220E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	7.	86.50	2.06	6.123E-03	1408.00	21.005	PBC<MDA	EU152
1460.83	-8.	117.56	2.10	5.917E-03	1460.83	10.670	PBC<MDA	K40
1690.29	6.	106.72	2.25	5.160E-03	1690.98	47.790	PBC<MDA	SB124
1764.49	15.	25.82	2.29	4.957E-03	1764.49	15.400	2.729E+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	185.71	46.54	227.	-32.	-0.004	66.14	0.836s
TH-234	252.29	63.18	165.	16.	0.002	145.49	1.131s
Sn-126	256.68	64.28	280.	-17.	-0.002	144.00	0.856s
EU-155	345.74	86.54	386.	0.	0.000	1000.00	0.880s
Sn-126	347.33	86.94	338.	17.	0.002	156.97	0.880s
Sn-126	349.85	87.57	354.	12.	0.002	231.91	0.881s
Cd-109	351.73	88.04	366.	0.	0.000	1000.00	0.881s
Nd-147	363.97	91.10	366.	0.	0.000	1000.00	0.885s
TH-234	369.16	92.40	173.	2.	0.000	937.74	1.023s
AC-228	372.97	93.35	366.	0.	0.000	1000.00	0.887s
Gd-153	389.57	97.50	315.	-18.	-0.002	145.02	0.892
Np-239	397.57	99.50	332.	-12.	-0.002	214.45	0.894s
Gd-153	412.38	103.20	344.	0.	0.000	1000.00	0.898s
Np-239	414.38	103.70	344.	0.	0.000	1000.00	0.898s
Np-239	424.10	106.13	255.	16.	0.002	146.30	0.901s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	486.70	121.78	160.	-13.	-0.002	140.37	0.918s
CO-57	487.83	122.06	173.	0.	0.000	1000.00	0.918s
EU-154	491.98	123.10	126.	17.	0.002	98.51	0.919s
PA-234	524.77	131.29	146.	15.	0.002	113.19	0.928s
HF-181	531.68	133.02	161.	12.	0.002	154.14	0.930s
CE-144	533.74	133.54	173.	0.	0.000	1000.00	0.930s
CO-57	545.48	136.47	179.	0.	0.000	1000.00	0.933s
Tc-99m	561.63	140.51	195.	17.	0.002	121.27	0.938s
U-235	574.73	143.79	357.	13.	0.002	209.38	0.941
CE-141	581.35	145.44	337.	15.	0.002	170.73	0.943s
Ba-140	650.24	162.66	136.	18.	0.002	95.84	0.961s
U-235	653.11	163.38	155.	14.	0.002	132.47	0.962s
CE-139	663.01	165.85	204.	-19.	-0.003	110.58	0.965
Cf-251	706.00	176.60	81.	16.	0.002	108.48	0.976s
U-235	742.49	185.72	110.	42.	0.006	49.20	0.986s
TH-229	773.64	193.51	94.	-2.	0.000	792.98	0.994s
U-235	820.94	205.33	62.	14.	0.002	105.70	1.007s
TH-229	843.01	210.85	77.	7.	0.001	237.55	1.012
Cf-251	907.62	227.00	81.	3.	0.000	507.05	1.029s
TH-227	943.50	235.97	230.	0.	0.000	1000.00	1.039s
PB-212	954.15	238.63	264.	-34.	-0.005	62.75	1.041s
EU-152	978.39	244.69	65.	-2.	0.000	611.83	1.048s
TH-227	1024.59	256.24	74.	-4.	-0.001	369.83	1.060s
Cd-113m	1054.43	263.70	116.	-17.	-0.002	92.62	1.067s
BI-210M	1062.96	265.83	126.	-5.	-0.001	115.34	1.070s
TL-208	1108.77	277.28	69.	2.	0.000	498.78	1.081s
Hg-203	1116.44	279.20	90.	-10.	-0.001	145.29	1.083s
I-131	1136.83	284.30	41.	12.	0.002	102.55	1.089
PB-214	1180.00	295.09	351.	-16.	-0.002	170.04	1.100s
TL-210	1183.64	296.00	274.	14.	0.002	171.67	1.101s
PB-212	1199.76	300.03	260.	14.	0.002	166.78	1.105s
PA-231	1199.92	300.07	270.	14.	0.002	169.85	1.105s
PA-233	1200.36	300.18	284.	14.	0.002	174.05	1.105s
PA-231	1210.24	302.65	297.	14.	0.002	177.74	1.107
BA-133	1211.05	302.85	311.	5.	0.001	532.20	1.108
Ir-192	1233.41	308.44	132.	13.	0.002	124.23	1.113s
PA-233	1247.69	312.01	145.	13.	0.002	129.66	1.117s
CR-51	1279.99	320.08	52.	-1.	0.000	951.67	1.125
La-140	1314.69	328.76	116.	-18.	-0.003	87.35	1.134s
Cf-249	1333.41	333.44	121.	15.	0.002	104.46	1.139s
AC-228	1352.93	338.32	101.	12.	0.002	120.19	1.144s
Cs-136	1361.93	340.57	113.	0.	0.000	1000.00	1.146s
EU-152	1376.80	344.29	113.	0.	0.000	1000.00	1.150s
HF-181	1382.97	345.83	60.	6.	0.001	182.00	1.151s
PB-214	1407.39	351.93	91.	-3.	0.000	508.68	1.157
BA-133	1423.66	356.00	133.	-17.	-0.002	97.85	1.162s
I-131	1457.59	364.48	52.	6.	0.001	238.82	1.170s
BA-133	1535.03	383.84	65.	11.	0.002	108.77	1.189

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-249	1551.47	387.95	113.	-15.	-0.002	103.67	1.193
SN-113	1566.43	391.69	50.	9.	0.001	112.19	1.197s
AG-108M	1735.43	433.94	52.	-6.	-0.001	238.82	1.239
PM-146	1815.20	453.88	40.	-2.	0.000	623.16	1.258s
SB-125	1853.15	463.37	44.	6.	0.001	176.34	1.268s
Ir-192	1871.93	468.06	72.	-13.	-0.002	94.19	1.272s
BE-7	1910.07	477.60	31.	24.	0.003	39.28	1.282s
HF-181	1927.68	482.00	56.	7.	0.001	159.26	1.286s
La-140	1947.77	487.02	84.	9.	0.001	152.39	1.291s
RU-103	1987.91	497.05	17.	9.	0.001	99.69	1.301s
RH-106	2047.15	511.86	60.	112.	0.016	13.60	2.565
Kr-85	2055.62	513.98	154.	11.	0.002	159.31	1.317s
Nd-147	2123.70	531.00	43.	-14.	-0.002	97.40	1.333s
Ba-140	2148.74	537.26	43.	-9.	-0.001	143.40	1.339s
CS-134	2252.65	563.24	30.	3.	0.000	426.01	1.364s
CS-134	2276.99	569.32	47.	-13.	-0.002	81.28	1.369s
PA-234	2277.59	569.47	40.	12.	0.002	81.78	1.370s
BI-207	2278.51	569.70	29.	5.	0.001	158.69	1.370s
TL-208	2331.79	583.02	75.	-28.	-0.004	54.73	1.382s
SB-125	2401.71	600.50	94.	11.	0.002	129.35	1.399s
SB-124	2410.64	602.73	105.	9.	0.001	160.12	1.401s
CS-134	2418.55	604.71	114.	11.	0.002	141.89	1.403s
RU-103	2440.91	610.30	129.	0.	0.000	1000.00	1.408s
AG-108M	2456.84	614.28	129.	0.	0.000	1000.00	1.412s
PM-144	2471.96	618.06	131.	-2.	0.000	825.72	1.415s
RH-106	2487.38	621.92	129.	0.	0.000	1000.00	1.419s
SB-125	2543.28	635.89	22.	5.	0.001	144.95	1.432s
I-131	2547.62	636.97	32.	-5.	-0.001	161.35	1.433s
AG-110M	2630.77	657.76	32.	-4.	-0.001	206.16	1.452s
CS-137	2646.36	661.66	45.	-1.	0.000	953.94	1.455s
PM-144	2785.90	696.54	19.	10.	0.001	93.99	1.487s
NB-94	2810.25	702.63	14.	9.	0.001	94.39	1.493s
SB-124	2890.87	722.79	30.	4.	0.001	200.00	1.511
AG-108M	2891.48	722.94	34.	0.	0.000	1000.00	1.511s
EU-154	2893.17	723.36	34.	0.	0.000	1000.00	1.511s
ZR-95	2896.52	724.20	34.	0.	0.000	1000.00	1.512s
BI-212	2908.41	727.17	19.	7.	0.001	90.52	1.515s
PM-146	2942.61	735.72	28.	-2.	0.000	565.69	1.523s
PM-146	2988.37	747.16	19.	-3.	0.000	349.11	1.533s
ZR-95	3026.65	756.73	57.	-20.	-0.003	37.62	1.541s
AG-110M	3055.51	763.94	23.	1.	0.000	512.35	1.548s
NB-95	3062.89	765.79	37.	-10.	-0.001	89.22	1.549s
PA-234M	3065.38	766.41	52.	-5.	-0.001	202.53	1.550s
EU-152	3115.41	778.92	37.	-9.	-0.001	142.68	1.561s
BI-212	3141.41	785.42	58.	-21.	-0.003	38.27	1.567s
CS-134	3183.22	795.87	42.	-2.	0.000	374.17	1.576s
TL-210	3198.14	799.60	45.	0.	0.000	1000.00	1.579s
CS-134	3207.54	801.95	38.	7.	0.001	126.99	1.581s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-58	3242.84	810.78	29.	10.	0.001	85.91	1.589s
La-140	3262.82	815.77	59.	-9.	-0.001	130.85	1.593s
Cs-136	3273.74	818.50	40.	11.	0.002	86.33	1.596s
Co-56	3386.82	846.77	33.	-5.	-0.001	157.91	1.620s
TL-208	3442.00	860.56	33.	-16.	-0.002	54.66	1.632s
NB-94	3484.13	871.10	13.	8.	0.001	71.63	1.641s
PA-234	3521.86	880.53	52.	-9.	-0.001	122.11	1.649s
PA-234	3532.70	883.24	60.	0.	0.000	1000.00	1.652s
AG-110M	3538.47	884.68	45.	11.	0.002	87.94	1.653s
Sc-46	3556.86	889.28	58.	-13.	-0.002	80.70	1.657s
Y-88	3591.90	898.04	25.	7.	0.001	161.52	1.664s
AC-228	3644.02	911.07	25.	-2.	0.000	554.15	1.675s
AG-110M	3749.71	937.49	20.	0.	0.000	1000.00	1.697s
PA-234	3783.82	946.02	25.	-3.	0.000	370.93	1.704s
EU-152	3856.18	964.11	6.	6.	0.001	72.88	1.719s
AC-228	3875.62	968.97	31.	-10.	-0.001	81.95	1.724s
EU-154	3985.06	996.33	30.	2.	0.000	318.75	1.746s
PA-234M	4003.73	1001.00	43.	-10.	-0.001	121.39	1.750s
EU-154	4018.84	1004.77	13.	6.	0.001	93.44	1.753s
Co-56	4151.10	1037.84	12.	5.	0.001	140.17	1.780s
Cs-136	4192.02	1048.07	26.	-6.	-0.001	126.93	1.788s
BI-207	4254.38	1063.66	22.	4.	0.001	253.26	1.801s
Ga-68	4309.34	1077.40	11.	9.	0.001	89.84	1.812s
FE-59	4396.74	1099.25	37.	-17.	-0.002	86.09	1.829s
EU-152	4448.04	1112.07	33.	4.	0.001	209.17	1.839s
ZN-65	4461.92	1115.55	37.	0.	0.000	1000.00	1.842s
BI-214	4480.88	1120.29	38.	-1.	0.000	752.59	1.845s
Sc-46	4481.94	1120.55	37.	0.	0.000	1000.00	1.846s
Ta-182	4484.94	1121.30	50.	-10.	-0.001	104.88	1.846
CO-60	4692.68	1173.24	17.	-3.	0.000	335.78	1.886s
Ta-182	4755.93	1189.05	6.	6.	0.001	94.34	1.899s
Ta-182	4885.37	1221.41	16.	-2.	0.000	460.07	1.923s
Co-56	4952.84	1238.28	7.	5.	0.001	120.99	1.936s
NA-22	5097.84	1274.53	17.	-4.	-0.001	154.11	1.963s
EU-154	5097.88	1274.54	21.	0.	0.000	1000.00	1.963s
FE-59	5166.10	1291.60	17.	-8.	-0.001	125.93	1.975s
TL-210	5251.71	1313.00	23.	-11.	-0.001	109.06	1.991s
CO-60	5329.71	1332.50	19.	-8.	-0.001	84.10	2.005s
AG-110M	5536.89	1384.30	0.	7.	0.001	37.80	2.042s
EU-152	5631.70	1408.00	6.	7.	0.001	86.50	2.059s
K-40	5843.01	1460.83	22.	-8.	-0.001	117.56	2.095s
La-140	6384.49	1596.21	12.	-2.	0.000	424.26	2.185s
SB-124	6763.55	1690.98	6.	6.	0.001	106.72	2.245s
BI-214	7057.56	1764.49	0.	15.	0.002	25.82	2.290s
Co-56	7084.99	1771.35	15.	0.	0.000	1000.00	2.294s
Y-88	7343.81	1836.06	13.	-2.	0.000	535.91	2.332s

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   1.9970E+00                                      5.31E+01
                           477.60 1.997E+00 &(P 2.394E+00 3.93E+01 1.05E+01 G

NA-22    C  -8.2826E-02                                      9.50E+02
                          1274.53-8.283E-02 ?(  4.540E-01 1.54E+02 9.99E+01 G

K-40     N  -1.6792E+00                                      4.66E+11
                          1460.83-1.679E+00 ?(P 5.364E+00 1.18E+02 1.07E+01 G

Sc-46    F  -1.9019E-01                                      8.38E+01
                           889.28-1.902E-01 ?(P 5.702E-01 8.07E+01 1.00E+02 G
                          1120.55 0.000E+00 +   5.716E-01 1.00E+03 1.00E+02 G

CR-51    F  -8.5371E-02                                      2.77E+01
                           320.08-8.537E-02 ?(P 2.322E+00 9.52E+02 9.94E+00 G

MN-54    C   4.7170E-03                                      3.12E+02
                           834.85 4.717E-03 &(  3.233E-01 2.76E+03 1.00E+02 G

FE-59    F  -5.3845E-01                                      4.45E+01
                          1099.25-5.385E-01 ?(  9.981E-01 8.61E+01 5.65E+01 G
                          1291.60-3.879E-01 +   1.063E+00 1.26E+02 4.32E+01 G

Co-56    C   6.7112E-02                                      7.73E+01
                           846.77-7.410E-02 ?(P 4.236E-01 1.58E+02 9.99E+01 G
                          1238.28 1.538E-01 ?(P 4.594E-01 1.21E+02 6.61E+01 G
                          1037.84 6.606E-01 ?(P 2.255E+00 1.40E+02 1.41E+01 G
                          1771.35 0.000E+00 -   3.771E+00 1.00E+03 1.55E+01  A

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  -1.6780E-01                                      1.93E+03
                          1332.50-1.678E-01 ?(P 4.939E-01 8.41E+01 1.00E+02 G
                          1173.24-6.471E-02 + P 4.250E-01 3.36E+02 9.99E+01 G

NB-94    I   1.1524E-01                                      7.41E+06
                           702.63 1.118E-01 &(  2.505E-01 9.44E+01 9.79E+01 G
                           871.10 1.186E-01 ?(  2.837E-01 7.16E+01 9.99E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZR-95	I	-4.7405E-01					6.40E+01	
			756.73	-4.740E-01	?(P	9.056E-01	3.76E+01	5.45E+01 G
			724.20	0.000E+00	+	8.457E-01	1.00E+03	4.42E+01 G
NB-95	I	-1.3583E-01					6.40E+01	
			765.79	-1.358E-01	&(	4.099E-01	8.92E+01	9.98E+01 G
RU-103	I	9.0246E-02					3.93E+01	
			497.05	9.025E-02	?(	2.207E-01	9.97E+01	9.09E+01 G
			610.30	0.000E+00	-	1.044E+01	1.00E+03	5.75E+00 GA
AG-108M	C	-5.3757E-02					1.53E+05	
			433.94	-5.376E-02	?(	3.254E-01	2.39E+02	9.05E+01 G
			722.94	0.000E+00	+	4.104E-01	1.00E+03	9.08E+01 G
			614.28	0.000E+00	+	6.716E-01	1.00E+03	8.98E+01 G
AG-110M	F	3.3733E-01					2.50E+02	
			884.68	2.350E-01	?(P	6.938E-01	8.79E+01	7.27E+01 G
			657.76	-4.860E-02	-	3.532E-01	2.06E+02	9.46E+01 G
			937.49	0.000E+00	-	1.075E+00	1.00E+03	3.44E+01 G
			1384.30	6.435E-01	?(	6.775E-01	3.78E+01	2.43E+01 G
			763.94	7.833E-02	-	1.463E+00	5.12E+02	2.23E+01 G
SN-113	F	1.0841E-01					1.15E+02	
			391.69	1.084E-01	?(	4.148E-01	1.12E+02	6.40E+01 G
SB-124	F	1.9804E-01					6.02E+01	
			602.73	1.010E-01	?(P	5.480E-01	1.60E+02	9.83E+01 G
			1690.98	3.380E-01	?(	7.956E-01	1.07E+02	4.78E+01 G
			722.79	4.616E-01	(	3.258E+00	2.00E+02	1.08E+01 G
SB-125	I	3.0219E-01					1.01E+03	
			427.88	-3.116E-02	%(P	8.827E-01	1.00E+03	2.96E+01 G
			600.50	6.477E-01	?(	2.845E+00	1.29E+02	1.79E+01 G
			635.89	4.861E-01	?(P	2.430E+00	1.45E+02	1.13E+01 G
			463.37	4.566E-01	?(P	2.760E+00	1.76E+02	1.05E+01 G
I-131	I	1.2859E-01					8.02E+00	
			364.48	5.184E-02	?(	3.137E-01	2.39E+02	8.17E+01 G
			284.30	1.150E+00	&(P	3.060E+00	1.03E+02	6.14E+00 G
			636.97	-8.091E-01	+	4.563E+00	1.61E+02	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	+	1.298E+00	1.00E+03	2.18E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ga-68	C 8.3784E+00					4.71E-02	
		1077.40	8.378E+00	?(	1.687E+01	8.98E+01	3.30E+00 G
Tc-99m	I 7.2826E-02					2.51E-01	
		140.51	7.283E-02	(	2.969E-01	1.21E+02	8.93E+01 G
BA-133	F -1.9092E-01					3.85E+03	
		356.00	-1.909E-01	?(	6.267E-01	9.79E+01	6.20E+01 G
		302.85	1.557E-01	+	2.811E+00	5.32E+02	1.83E+01 G
		383.84	8.975E-01	?	3.312E+00	1.09E+02	8.94E+00 GA
		80.99	2.111E-03	% P	4.466E-01	7.67E+03	3.41E+01 GA
CS-134	I 1.0367E-01					7.54E+02	
		795.87	-3.965E-02	&(	5.249E-01	3.74E+02	8.55E+01 G
		604.71	1.196E-01	?(	5.758E-01	1.42E+02	9.76E+01 G
		569.32	-8.374E-01	&	2.284E+00	8.13E+01	1.54E+01 G
		801.95	1.126E+00	?(	4.931E+00	1.27E+02	8.69E+00 G
		563.24	3.218E-01	&(	3.424E+00	4.26E+02	8.35E+00 G
CS-137	I -1.3564E-02					1.10E+04	
		661.66	-1.356E-02	&(	4.608E-01	9.54E+02	8.52E+01 G
CE-139	F -8.9529E-02					1.38E+02	
		165.85	-8.953E-02	(	3.320E-01	1.11E+02	7.99E+01 G
Ba-140	I -7.9130E-02					1.28E+01	
		537.26	-3.750E-01	(P	1.327E+00	1.43E+02	2.44E+01 G
		162.66	1.081E+00	?(	3.473E+00	9.58E+01	6.22E+00 G
		304.85	5.422E-07	&	1.216E+01	6.59E+08	4.29E+00 G
La-140	I 1.9432E-02					1.28E+01	
		1596.21	-5.345E-02	?(	5.039E-01	4.24E+02	9.54E+01 G
		487.02	1.723E-01	?(P	8.914E-01	1.52E+02	4.55E+01 G
		328.76	-5.763E-01	+	1.684E+00	8.73E+01	2.03E+01 G
		815.77	-5.103E-01	+	2.285E+00	1.31E+02	2.33E+01 G
CE-141	I 1.1326E-01					3.25E+01	
		145.44	1.133E-01	?(	6.500E-01	1.71E+02	4.82E+01 G
PM-144	C 1.2610E-01					3.63E+02	
		696.54	1.261E-01	?(	2.788E-01	9.40E+01	9.90E+01 G
		618.06	-2.188E-02	- P	6.166E-01	8.26E+02	9.91E+01 G
EU-152	F 2.2237E-01					4.94E+03	
		121.78	-1.498E-01	?(	7.105E-01	1.40E+02	2.86E+01 G
		344.29	0.000E+00	+	1.324E+00	1.00E+03	2.65E+01 G
		1112.07	5.358E-01	?(	3.949E+00	2.09E+02	1.36E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			778.92	-9.603E-01	+	3.208E+00	1.43E+02	1.29E+01 G
			964.11	6.579E-01	&(	1.606E+00	7.29E+01	1.46E+01 G
			244.69	-1.659E-01	+ P	2.738E+00	6.12E+02	7.58E+00 G
			1408.00	7.729E-01	?	1.491E+00	8.65E+01	2.10E+01 GA
EU-154	I	2.8518E-01					3.14E+03	
			123.10	1.346E-01	&(	4.450E-01	9.85E+01	4.08E+01 G
			1274.54	0.000E+00	-	1.415E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	1.845E+00	1.00E+03	2.02E+01 G
			873.23	-6.821E-02	&	3.261E+00	1.31E+03	1.23E+01 G
			1004.77	5.644E-01	?(	1.817E+00	9.34E+01	1.80E+01 G
			996.33	3.904E-01	?(	4.442E+00	3.19E+02	1.06E+01 G
EU-155	I	-1.0587E-02					1.81E+03	
			105.31	-1.059E-02	%(P	1.340E+00	3.19E+03	2.12E+01 G
			86.54	0.000E+00	+	9.692E-01	1.00E+03	3.07E+01 G
HF-181	F	1.0319E-01					4.24E+01	
			482.00	7.581E-02	?(P	4.125E-01	1.59E+02	8.05E+01 G
			133.02	9.321E-02	?(	4.862E-01	1.54E+02	4.33E+01 G
			345.83	2.781E-01	*(P	1.735E+00	1.82E+02	1.51E+01 G
			136.30	-9.799E-02	%	3.842E+00	1.14E+03	5.85E+00 G
Ta-182	F	-1.2083E-01					1.14E+02	
			1121.30	-5.276E-01	?(	1.881E+00	1.05E+02	3.49E+01 G
			1221.41	-1.474E-01	+	1.574E+00	4.60E+02	2.70E+01 G
			1189.05	7.555E-01	?(P	1.651E+00	9.43E+01	1.62E+01 G
Hg-203	F	-6.6359E-02					4.66E+01	
			279.20	-6.636E-02	&(	3.286E-01	1.45E+02	8.15E+01 G
TL-208	N	-3.4274E-01					6.98E+02	
			583.02	-3.427E-01	&(P	5.285E-01	5.47E+01	8.45E+01 G
			277.28	2.144E-01	+ P	3.705E+00	4.99E+02	6.31E+00 G
			860.56	-1.855E+00	+ P	3.442E+00	5.47E+01	1.24E+01 G
PM-146	C	-2.5884E-02					2.02E+03	
			453.88	-2.588E-02	?(	4.165E-01	6.23E+02	6.50E+01 G
			747.16	-1.007E-01	+	8.626E-01	3.49E+02	3.40E+01 G
			735.72	-1.126E-01	+	1.541E+00	5.66E+02	2.25E+01 G
Y-88	F	2.9619E-02					1.07E+02	
			1836.06	-4.889E-02	?(	5.660E-01	5.36E+02	9.92E+01 G
			898.04	1.127E-01	?(	4.189E-01	1.62E+02	9.37E+01 G
Cd-113m		-1.5422E+03					5.33E+03	
			263.70	-1.542E+03	?(	4.788E+03	9.26E+01	6.00E-03 K

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-251	T	3.7572E-01					3.28E+05	
			176.60	3.757E-01	?(	1.052E+00	1.08E+02	1.70E+01 G
			227.00	2.565E-01	&	3.429E+00	5.07E+02	6.30E+00 GA
Cf-249	T	-1.2599E-02					1.28E+05	
			387.95	-1.677E-01	&(	5.850E-01	1.04E+02	6.60E+01 G
			333.44	6.473E-01	&(	2.275E+00	1.04E+02	1.55E+01 G
Sn-126		-5.8282E-01					3.65E+07	
			87.57	9.735E-02	+	7.607E-01	2.32E+02	3.75E+01 GA
			64.28	-5.828E-01	?(	2.820E+00	1.44E+02	9.70E+00 G
			86.94	5.850E-01		3.084E+00	1.57E+02	9.04E+00 GA
PB-210	N	-3.1180E+00					8.14E+03	
			46.54	-3.118E+00	*(P	7.065E+00	6.61E+01	4.25E+00 G
PB-212	N	-3.9088E-01					6.98E+02	
			238.63	-3.909E-01	*(P	9.117E-01	6.27E+01	4.33E+01 G
			300.03	2.542E+00		1.429E+01	1.67E+02	3.28E+00 GA
PB-214	N	-4.8492E-02					5.84E+05	
			351.93	-4.849E-02	(	8.562E-01	5.09E+02	3.76E+01 G
			295.09	-4.854E-01	+	2.773E+00	1.70E+02	1.93E+01 G
			242.00	-2.247E-08	&	5.029E+00	6.54E+09	7.43E+00 GA
BI-207	C	7.2954E-02					1.18E+04	
			1063.66	1.004E-01	?(P	5.759E-01	2.53E+02	7.45E+01 G
			569.70	5.206E-02	?(	2.894E-01	1.59E+02	9.77E+01 G
BI-212	N	1.2370E+00					6.98E+02	
			727.17	1.237E+00	?(	3.824E+00	9.05E+01	7.55E+00 G
			785.42	-2.164E+01	+ P	3.995E+01	3.83E+01	1.28E+00 GA
U-235	N	7.7132E-01					2.57E+11	
			143.79	4.159E-01	(P	2.924E+00	2.09E+02	1.10E+01 G
			205.33	1.294E+00	*(	3.542E+00	1.06E+02	5.01E+00 G
			163.38	1.023E+00	?(P	4.551E+00	1.32E+02	5.08E+00 G
			185.72	3.240E-01		3.979E-01	4.92E+01	5.40E+01 GA
BI-214	N	6.7329E-01					5.84E+05	
			609.31	-1.370E-02	%(P	1.303E+00	2.76E+03	4.61E+01 G
			1120.29	-1.794E-01	+ P	3.852E+00	7.53E+02	1.51E+01 G
			1764.49	2.729E+00	?(	1.341E+00	2.58E+01	1.54E+01 G
BI-210M	T	-5.9129E-02					1.10E+09	
			265.83	-5.913E-02	?(P	6.035E-01	1.15E+02	5.00E+01 G
			304.90	-8.308E-08	%	1.863E+00	6.59E+08	2.80E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AC-228	N 1.2199E-01					2.10E+03	
		911.07	-1.054E-01	?(	1.371E+00	5.54E+02	2.90E+01 G
		968.97	-9.598E-01	+	2.649E+00	8.19E+01	1.75E+01 G
		338.32	6.711E-01	&(	2.731E+00	1.20E+02	1.20E+01 G
		93.35	0.000E+00	-	5.203E+00	1.00E+03	5.56E+00 XA
TH-227	N -3.1260E-01					7.95E+03	
		256.24	-3.126E-01	&(P	3.256E+00	3.70E+02	7.00E+00 G
		235.97	0.000E+00	+	2.979E+00	1.00E+03	1.23E+01 G
		50.14	-9.350E-02	%	3.637E+00	1.14E+03	8.00E+00 G
TH-229	N 3.0162E-01					2.68E+06	
		193.51	-2.225E-01	(P	4.682E+00	7.93E+02	4.40E+00 G
		210.85	1.073E+00	?(	6.683E+00	2.38E+02	2.99E+00 G
TH-234	N 6.5599E-01					1.63E+12	
		92.59	1.344E-01	(P	3.606E+00	9.38E+02	5.58E+00 G
		63.29	1.420E+00	(P	5.610E+00	1.45E+02	3.81E+00 G
PA-231	N 3.1377E+00					1.20E+07	
		302.65	2.922E+00	?(	1.749E+01	1.78E+02	2.88E+00 G
		300.07	3.390E+00	(	1.940E+01	1.70E+02	2.46E+00 G
PA-233	C 3.9567E-01					7.82E+08	
		312.01	2.321E-01	&(	1.016E+00	1.30E+02	3.60E+01 G
		300.18	1.345E+00	(	7.887E+00	1.74E+02	6.20E+00 G
PA-234	N 6.5268E-01					1.63E+12	
		131.29	2.910E-01	(	1.109E+00	1.13E+02	1.80E+01 G
		946.02	-3.538E-01	+	3.068E+00	3.71E+02	1.34E+01 G
		569.47	1.447E+00	&(	3.976E+00	8.18E+01	8.20E+00 G
		883.24	0.000E+00	-	6.026E+00	1.00E+03	9.60E+00 G
		880.53	-2.142E+00	+	8.948E+00	1.22E+02	6.00E+00 GA
PA-234M	N -1.9364E+01					1.63E+12	
		1001.00	-1.936E+01	?(P	6.589E+01	1.21E+02	8.37E-01 G
		766.41	-2.307E+01	+	1.624E+02	2.03E+02	2.94E-01 G
AM-241	T -9.7848E-03					1.58E+05	
		59.54	-9.785E-03	&(	5.464E-01	2.03E+03	3.59E+01 G
Np-237	F 4.0168E-03					2.14E+06	
		86.49	4.017E-03	%(	2.271E+00	1.67E+04	1.31E+01 G
Ir-192	F 7.0202E-02					7.40E+01	
		316.49	1.013E-03	%(	4.434E-01	1.27E+04	8.70E+01 G
		468.06	-2.213E-01	+	7.022E-01	9.42E+01	5.18E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          308.44 2.599E-01 ?(  1.090E+00 1.24E+02 3.18E+01 G

Cs-136   F   1.5428E-01                                     1.30E+01
                          818.50 1.543E-01 ?(  4.492E-01 8.63E+01 1.00E+02 G
                         1048.07-1.299E-01 -   5.732E-01 1.27E+02 8.00E+01 G
                          340.57 0.000E+00 -   7.419E-01 1.00E+03 4.69E+01 G

Np-239   T   2.2255E-01                                     2.36E+00
                          103.70 0.000E+00 &   1.195E+00 1.00E+03 2.40E+01 X
                          106.13 2.226E-01 *(  1.095E+00 1.46E+02 2.27E+01 G
                           99.50-2.587E-01 &   1.870E+00 2.14E+02 1.50E+01 X

Nd-147      -1.0571E+00                                     1.11E+01
                          531.00-1.057E+00 ?(  2.462E+00 9.74E+01 1.30E+01 G
                           91.10 0.000E+00 +   1.022E+00 1.00E+03 2.83E+01 G

TL-210   N   4.6188E-02                                     5.84E+05
                          799.60 0.000E+00 ?(  4.676E-01 1.00E+03 9.90E+01 G
                          296.00 1.040E-01 ?(  6.017E-01 1.72E+02 7.90E+01 G
                         1313.00-1.080E+00 +   2.521E+00 1.09E+02 2.10E+01 GA

Kr-85    I   2.4330E+01                                     3.92E+03
                          513.98 2.433E+01 ?(  1.313E+02 1.59E+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

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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	227.	-32.	-0.004	66.14	-3.118E+00	P
Sn-126	64.28	280.	-17.	-0.002	144.00	-5.828E-01	
Sn-126	86.94	338.	17.	0.002	156.97	5.850E-01	
Sn-126	87.57	354.	12.	0.002	231.91	9.735E-02	
Gd-153	97.50	315.	-18.	-0.002	145.02	-1.845E-01	
Np-239	99.50	332.	-12.	-0.002	214.45	-2.587E-01	
Np-239	106.13	255.	16.	0.002	146.30	2.226E-01	
EU-152	121.78	160.	-13.	-0.002	140.37	-1.498E-01	
EU-154	123.10	126.	17.	0.002	98.51	1.346E-01	
PA-234	131.29	146.	15.	0.002	113.19	2.910E-01	
HF-181	133.02	161.	12.	0.002	154.14	9.321E-02	
Tc-99m	140.51	195.	17.	0.002	121.27	7.283E-02	
U-235	143.79	357.	13.	0.002	209.38	4.159E-01	P
CE-141	145.44	337.	15.	0.002	170.73	1.133E-01	
Ba-140	162.66	136.	18.	0.002	95.84	1.081E+00	
U-235	163.38	155.	14.	0.002	132.47	1.023E+00	P
CE-139	165.85	204.	-19.	-0.003	110.58	-8.953E-02	
Cf-251	176.60	81.	16.	0.002	108.48	3.757E-01	
U-235	185.72	110.	42.	0.006	49.20	3.240E-01	
TH-229	193.51	94.	-2.	0.000	792.98	-2.225E-01	P
U-235	205.33	62.	14.	0.002	105.70	1.294E+00	
TH-229	210.85	77.	7.	0.001	237.55	1.073E+00	
Cf-251	227.00	81.	3.	0.000	507.05	2.565E-01	
PB-212	238.63	264.	-34.	-0.005	62.75	-3.909E-01	P
EU-152	244.69	65.	-2.	0.000	611.83	-1.659E-01	P
TH-227	256.24	74.	-4.	-0.001	369.83	-3.126E-01	P
Cd-113m	263.70	116.	-17.	-0.002	92.62	-1.542E+03	
BI-210M	265.83	126.	-5.	-0.001	115.34	-5.913E-02	P
TL-208	277.28	69.	2.	0.000	498.78	2.144E-01	P
Hg-203	279.20	90.	-10.	-0.001	145.29	-6.636E-02	
I-131	284.30	41.	12.	0.002	102.55	1.150E+00	P
PB-214	295.09	351.	-16.	-0.002	170.04	-4.854E-01	
TL-210	296.00	274.	14.	0.002	171.67	1.040E-01	
PB-212	300.03	260.	14.	0.002	166.78	2.542E+00	
PA-231	300.07	270.	14.	0.002	169.85	3.390E+00	
PA-233	300.18	284.	14.	0.002	174.05	1.345E+00	
PA-231	302.65	297.	14.	0.002	177.74	2.922E+00	
BA-133	302.85	311.	5.	0.001	532.20	1.557E-01	
Ir-192	308.44	132.	13.	0.002	124.23	2.599E-01	
PA-233	312.01	145.	13.	0.002	129.66	2.321E-01	
CR-51	320.08	52.	-1.	0.000	951.67	-8.537E-02	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
La-140	328.76	116.	-18.	-0.003	87.35	-5.763E-01		
Cf-249	333.44	121.	15.	0.002	104.46	6.473E-01		
AC-228	338.32	101.	12.	0.002	120.19	6.711E-01		
HF-181	345.83	60.	6.	0.001	182.00	2.781E-01		P
PB-214	351.93	91.	-3.	0.000	508.68	-4.849E-02		
BA-133	356.00	133.	-17.	-0.002	97.85	-1.909E-01		
I-131	364.48	52.	6.	0.001	238.82	5.184E-02		
BA-133	383.84	65.	11.	0.002	108.77	8.975E-01		
Cf-249	387.95	113.	-15.	-0.002	103.67	-1.677E-01		
SN-113	391.69	50.	9.	0.001	112.19	1.084E-01		
AG-108M	433.94	52.	-6.	-0.001	238.82	-5.376E-02		
PM-146	453.88	40.	-2.	0.000	623.16	-2.588E-02		
SB-125	463.37	44.	6.	0.001	176.34	4.566E-01		P
Ir-192	468.06	72.	-13.	-0.002	94.19	-2.213E-01		
BE-7	477.60	31.	24.	0.003	39.28	1.997E+00		P
HF-181	482.00	56.	7.	0.001	159.26	7.581E-02		P
La-140	487.02	84.	9.	0.001	152.39	1.723E-01		P
RU-103	497.05	17.	9.	0.001	99.69	9.025E-02		
RH-106	511.86	60.	112.	0.016	13.60	5.206E+00		
Kr-85	513.98	154.	11.	0.002	159.31	2.433E+01		
Nd-147	531.00	43.	-14.	-0.002	97.40	-1.057E+00		
Ba-140	537.26	43.	-9.	-0.001	143.40	-3.750E-01		P
CS-134	563.24	30.	3.	0.000	426.01	3.218E-01		
CS-134	569.32	47.	-13.	-0.002	81.28	-8.374E-01		
PA-234	569.47	40.	12.	0.002	81.78	1.447E+00		
BI-207	569.70	29.	5.	0.001	158.69	5.206E-02		
TL-208	583.02	75.	-28.	-0.004	54.73	-3.427E-01		P
SB-125	600.50	94.	11.	0.002	129.35	6.477E-01		
CS-134	604.71	114.	11.	0.002	141.89	1.196E-01		
PM-144	618.06	131.	-2.	0.000	825.72	-2.188E-02		P
SB-125	635.89	22.	5.	0.001	144.95	4.861E-01		P
I-131	636.97	32.	-5.	-0.001	161.35	-8.091E-01		
AG-110M	657.76	32.	-4.	-0.001	206.16	-4.860E-02		
CS-137	661.66	45.	-1.	0.000	953.94	-1.356E-02		
PM-144	696.54	19.	10.	0.001	93.99	1.261E-01		
NB-94	702.63	14.	9.	0.001	94.39	1.118E-01		
BI-212	727.17	19.	7.	0.001	90.52	1.237E+00		
PM-146	735.72	28.	-2.	0.000	565.69	-1.126E-01		
PM-146	747.16	19.	-3.	0.000	349.11	-1.007E-01		
ZR-95	756.73	57.	-20.	-0.003	37.62	-4.740E-01		P
AG-110M	763.94	23.	1.	0.000	512.35	7.833E-02		
NB-95	765.79	37.	-10.	-0.001	89.22	-1.358E-01		
PA-234M	766.41	52.	-5.	-0.001	202.53	-2.307E+01		
EU-152	778.92	37.	-9.	-0.001	142.68	-9.603E-01		
BI-212	785.42	58.	-21.	-0.003	38.27	-2.164E+01		P
CS-134	795.87	42.	-2.	0.000	374.17	-3.965E-02		
CS-134	801.95	38.	7.	0.001	126.99	1.126E+00		
CO-58	810.78	29.	10.	0.001	85.91	1.327E-01		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
La-140	815.77	59.	-9.	-0.001	130.85	-5.103E-01		
Cs-136	818.50	40.	11.	0.002	86.33	1.543E-01		
Co-56	846.77	33.	-5.	-0.001	157.91	-7.410E-02		P
TL-208	860.56	33.	-16.	-0.002	54.66	-1.855E+00		P
NB-94	871.10	13.	8.	0.001	71.63	1.186E-01		
PA-234	880.53	52.	-9.	-0.001	122.11	-2.142E+00		
AG-110M	884.68	45.	11.	0.002	87.94	2.350E-01		P
Sc-46	889.28	58.	-13.	-0.002	80.70	-1.902E-01		P
Y-88	898.04	25.	7.	0.001	161.52	1.127E-01		
AC-228	911.07	25.	-2.	0.000	554.15	-1.054E-01		
PA-234	946.02	25.	-3.	0.000	370.93	-3.538E-01		
EU-152	964.11	6.	6.	0.001	72.88	6.579E-01		
AC-228	968.97	31.	-10.	-0.001	81.95	-9.598E-01		
EU-154	996.33	30.	2.	0.000	318.75	3.904E-01		
PA-234M	1001.00	43.	-10.	-0.001	121.39	-1.936E+01		P
EU-154	1004.77	13.	6.	0.001	93.44	5.644E-01		
Co-56	1037.84	12.	5.	0.001	140.17	6.606E-01		P
Cs-136	1048.07	26.	-6.	-0.001	126.93	-1.299E-01		
BI-207	1063.66	22.	4.	0.001	253.26	1.004E-01		P
Ga-68	1077.40	11.	9.	0.001	89.84	8.378E+00		
FE-59	1099.25	37.	-17.	-0.002	86.09	-5.385E-01		
EU-152	1112.07	33.	4.	0.001	209.17	5.358E-01		
BI-214	1120.29	38.	-1.	0.000	752.59	-1.794E-01		P
Ta-182	1121.30	50.	-10.	-0.001	104.88	-5.276E-01		
CO-60	1173.24	17.	-3.	0.000	335.78	-6.471E-02		P
Ta-182	1189.05	6.	6.	0.001	94.34	7.555E-01		P
Ta-182	1221.41	16.	-2.	0.000	460.07	-1.474E-01		
Co-56	1238.28	7.	5.	0.001	120.99	1.538E-01		P
NA-22	1274.53	17.	-4.	-0.001	154.11	-8.283E-02		
FE-59	1291.60	17.	-8.	-0.001	125.93	-3.879E-01		
TL-210	1313.00	23.	-11.	-0.001	109.06	-1.080E+00		
CO-60	1332.50	19.	-8.	-0.001	84.10	-1.678E-01		P
AG-110M	1384.30	0.	7.	0.001	37.80	6.435E-01		
EU-152	1408.00	6.	7.	0.001	86.50	7.729E-01		
K-40	1460.83	22.	-8.	-0.001	117.56	-1.679E+00		P
La-140	1596.21	12.	-2.	0.000	424.26	-5.345E-02		
BI-214	1764.49	0.	15.	0.002	25.82	2.729E+00		
Y-88	1836.06	13.	-2.	0.000	535.91	-4.889E-02		

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	1.9970E+00	1.9970E+00	3.928E+01%	2.39E+00
NA-22	#A	-8.2826E-02	-8.2826E-02	1.541E+02%	4.54E-01
K-40	#A	-1.6792E+00	-1.6792E+00	1.176E+02%	5.36E+00
Sc-46	#A	-1.9019E-01	-1.9019E-01	8.070E+01%	5.70E-01
CR-51	#A	-8.5370E-02	-8.5371E-02	9.517E+02%	2.32E+00
MN-54	#A	4.7170E-03	4.7170E-03	2.755E+03%	3.23E-01
FE-59	#A	-5.3845E-01	-5.3845E-01	8.609E+01%	9.98E-01
Co-56	#A	6.7112E-02	6.7112E-02	8.112E+01%	4.24E-01
CO-57	#A	0.0000E+00	0.0000E+00	7.071E+02%	2.46E-01
CO-58	#A	1.3265E-01	1.3265E-01	8.591E+01%	3.85E-01
CO-60	#A	-1.6780E-01	-1.6780E-01	8.410E+01%	4.94E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.12E+00
NB-94	#A	1.1524E-01	1.1524E-01	5.925E+01%	2.50E-01
ZR-95	#A	-4.7404E-01	-4.7405E-01	3.762E+01%	9.06E-01
NB-95	#A	-1.3583E-01	-1.3583E-01	8.922E+01%	4.10E-01
RU-103	#A	9.0246E-02	9.0246E-02	9.969E+01%	2.21E-01
RH-106	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.14E+00
AG-108M	#A	-5.3757E-02	-5.3757E-02	2.388E+02%	3.25E-01
AG-110M	#A	3.3733E-01	3.3733E-01	3.780E+01%	6.94E-01
SN-113	#A	1.0841E-01	1.0841E-01	1.122E+02%	4.15E-01
SB-124	A	1.9804E-01	1.9804E-01	9.251E+01%	5.48E-01
SB-125	#A	3.0219E-01	3.0219E-01	1.294E+02%	8.83E-01
I-131	#A	1.2859E-01	1.2859E-01	1.025E+02%	3.14E-01
Gd-153	#A	-1.8447E-01	-1.8447E-01	1.450E+02%	8.98E-01
Ga-68	#A	8.3301E+00	8.3784E+00	8.984E+01%	1.69E+01
Tc-99m	#A	7.2747E-02	7.2826E-02	1.213E+02%	2.97E-01
BA-133	#A	-1.9092E-01	-1.9092E-01	9.785E+01%	6.27E-01
CS-134	#A	1.0367E-01	1.0367E-01	1.270E+02%	5.25E-01
CS-137	#A	-1.3564E-02	-1.3564E-02	9.539E+02%	4.61E-01
CE-139	#A	-8.9528E-02	-8.9529E-02	1.106E+02%	3.32E-01
Ba-140	#A	-7.9128E-02	-7.9130E-02	8.624E+01%	1.33E+00
La-140	#A	1.9432E-02	1.9432E-02	1.524E+02%	5.04E-01
CE-141	#A	1.1326E-01	1.1326E-01	1.707E+02%	6.50E-01
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.97E+00
PM-144	#A	1.2610E-01	1.2610E-01	9.399E+01%	2.79E-01
EU-152	#A	2.2237E-01	2.2237E-01	7.288E+01%	7.11E-01
EU-154	#A	2.8518E-01	2.8518E-01	9.344E+01%	4.45E-01
EU-155	#A	-1.0587E-02	-1.0587E-02	3.194E+03%	1.34E+00
HF-181	#A	1.0319E-01	1.0319E-01	9.559E+01%	4.12E-01
Ta-182	#A	-1.2082E-01	-1.2083E-01	7.054E+01%	1.88E+00
Hg-203	#A	-6.6359E-02	-6.6359E-02	1.453E+02%	3.29E-01
TL-208	#A	-3.4274E-01	-3.4274E-01	5.473E+01%	5.28E-01
PM-146	#A	-2.5884E-02	-2.5884E-02	6.232E+02%	4.17E-01

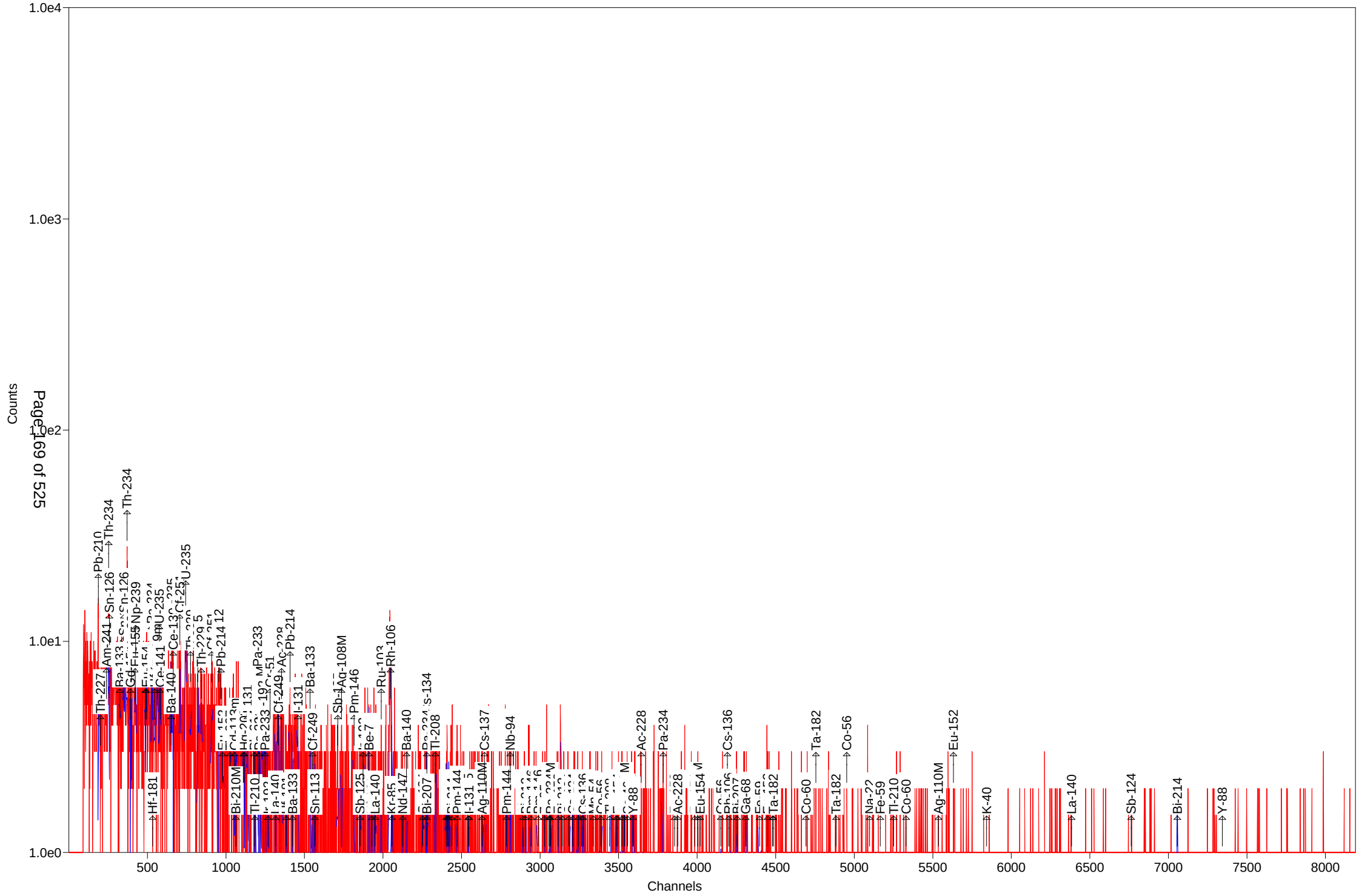
Y-88	#A	2.9619E-02	2.9619E-02	1.615E+02%	5.66E-01
Cd-113m	#A	-1.5422E+03	-1.5422E+03	9.262E+01%	4.79E+03
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.64E+00
Cf-251	#A	3.7572E-01	3.7572E-01	1.085E+02%	1.05E+00
Cf-249	#A	-1.2599E-02	-1.2599E-02	7.358E+01%	5.85E-01
Sn-126	#A	-5.8282E-01	-5.8282E-01	1.440E+02%	2.82E+00
PB-210	#A	-3.1180E+00	-3.1180E+00	6.614E+01%	7.07E+00
PB-212	#A	-3.9088E-01	-3.9088E-01	6.275E+01%	9.12E-01
PB-214	#A	-4.8492E-02	-4.8492E-02	5.087E+02%	8.56E-01
BI-207	#A	7.2954E-02	7.2954E-02	1.494E+02%	5.76E-01
BI-212	#A	1.2370E+00	1.2370E+00	9.052E+01%	3.82E+00
U-235	#A	7.7132E-01	7.7132E-01	8.979E+01%	2.92E+00
BI-214	#A	6.7329E-01	6.7329E-01	2.582E+01%	1.30E+00
BI-210M	#A	-5.9129E-02	-5.9129E-02	1.153E+02%	6.04E-01
AC-228	#A	1.2199E-01	1.2199E-01	1.202E+02%	1.37E+00
TH-227	#A	-3.1260E-01	-3.1260E-01	3.698E+02%	3.26E+00
TH-229	#A	3.0162E-01	3.0162E-01	2.375E+02%	4.68E+00
TH-234	#A	6.5599E-01	6.5599E-01	1.455E+02%	3.61E+00
PA-231	#A	3.1377E+00	3.1377E+00	1.229E+02%	1.75E+01
PA-233	#A	3.9567E-01	3.9567E-01	1.085E+02%	1.02E+00
PA-234	#A	6.5268E-01	6.5268E-01	6.982E+01%	1.11E+00
PA-234M	#A	-1.9364E+01	-1.9364E+01	1.214E+02%	6.59E+01
AM-241	#A	-9.7848E-03	-9.7848E-03	2.031E+03%	5.46E-01
Np-237	#A	4.0168E-03	4.0168E-03	1.667E+04%	2.27E+00
Ir-192	#A	7.0202E-02	7.0202E-02	1.242E+02%	4.43E-01
Cs-136	#A	1.5428E-01	1.5428E-01	8.633E+01%	4.49E-01
Np-239	#A	2.2253E-01	2.2255E-01	1.463E+02%	1.10E+00
Nd-147	#A	-1.0571E+00	-1.0571E+00	9.740E+01%	2.46E+00
TL-210	#A	4.6188E-02	4.6188E-02	1.717E+02%	4.68E-01
Kr-85	#A	2.4330E+01	2.4330E+01	1.593E+02%	1.31E+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) 0.000E+00 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 0.0000000E+00 Bq/Sample

404676_Gamma_490-164387-B-1-A. 7_Gamma_20183405.spc.



Prep Batch: 404682

Fill Geometry, 21-Day In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 404682

Lab Id: MB 160-404682/1-A | Analyzed: 12/29/18 11:14 | Ts: 30 | Sigma: 2
Client ID: | Detector: GV2 | Decay Corrected: No | Ingrowth:

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	-0.1053	0.129	0.129	U	pCi/g	1.00	0.381	408256
Radium-228	0.1088	0.108	0.108	U	pCi/g		0.155	408256
Radium 226 and 228 (positive only)	0.1088	0.108	0.108	U	pCi/g		0.381	408256

Lab Id: LCS 160-404682/2-A | Analyzed: 12/29/18 11:12 | Ts: 30 | Sigma: 2
Client ID: | Detector: GV5 | Decay Corrected: No | Ingrowth:

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	99.67	1.69	10.5		pCi/g		1.19	408257
Cesium-137	27.67	0.788	2.99		pCi/g		0.225	408257
Cobalt-60	12.30	0.440	1.31		pCi/g		0.0587	408257

Lab Id: 490-164296-A-2-B DU | Analyzed: 12/29/18 11:58 | Ts: 30 | Sigma: 2
Client ID: | Detector: GV2 | Decay Corrected: No | Ingrowth:

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	11.64	0.942	1.51		pCi/g	1.00	0.443	408256
Radium-228	1.233	0.637	0.649	U	pCi/g		1.25	408256
Radium 226 and 228 (positive only)	12.87	1.14	1.64		pCi/g		1.25	408256

Lab Id: 490-164387-2 | Analyzed: 12/29/18 11:55 | Ts: 30 | Sigma: 2
Client ID: CUF-BS-BG10-0.0/0.5-20181205 | Detector: GV9 | Decay Corrected: No | Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.729	0.174	0.190		pCi/g	1.00	0.145	408261
Radium-228	0.993	0.238	0.259		pCi/g		0.113	408261
Radium 226 and 228 (positive only)	1.72	0.295	0.321		pCi/g		0.145	408261

Lab Id: 490-164387-3 | Analyzed: 12/29/18 11:56 | Ts: 30 | Sigma: 2
Client ID: CUF-BS-BG10-1.0/3.0-20181205 | Detector: GV12 | Decay Corrected: No | Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	1.31	0.276	0.306		pCi/g	1.00	0.174	408260
Radium-228	1.14	0.344	0.362		pCi/g		0.223	408260

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 404682

Lab Id: 490-164387-3 Analyzed: 12/29/18 11:56 Ts: 30 Sigma: 2
Client ID: CUF-BS-BG10-1.0/3.0-20181205 Detector: GV12 Decay Corrected: Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium 226 and 228 (positive only)	2.45	0.441	0.474		pCi/g		0.223	408260

Lab Id: 490-164387-4 Analyzed: 12/29/18 11:56 Ts: 30 Sigma: 2
Client ID: CUF-BS-DUP02-20181205 Detector: GV19 Decay Corrected: No Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.833	0.254	0.271		pCi/g	1.00	0.245	408263
Radium-228	1.28	0.559	0.578		pCi/g		0.522	408263
Radium 226 and 228 (positive only)	2.11	0.614	0.638		pCi/g		0.522	408263

Lab Id: 490-164387-5 Analyzed: 12/29/18 12:50 Ts: 30 Sigma: 2
Client ID: CUF-BS-BG10-5.6/7.6-20181205 Detector: GV2 Decay Corrected: No Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.852	0.237	0.252		pCi/g	1.00	0.198	408256
Radium-228	1.60	0.325	0.363		pCi/g		0.194	408256
Radium 226 and 228 (positive only)	2.45	0.402	0.442		pCi/g		0.198	408256

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 404682

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 160-404682/1-A	Radium-226			-0.1053	U	pCi/g							-1.62731928
MB 160-404682/1-A	Radium-228			0.1088	U	pCi/g							2.00747198
MB 160-404682/1-A	Radium 226 and 228 (positive only)			0.1088	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 160-404682/2-A	Americium-241		96.7	99.67		pCi/g	103	87 - 116					.5319236525
LCS 160-404682/2-A	Cesium-137		28.0	27.67		pCi/g	99	87 - 120					-.1821019641
LCS 160-404682/2-A	Cobalt-60		12.2	12.30		pCi/g	100	87 - 115					.0764467806

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
490-164296-A-2-B DU	Radium-226	9.68		11.64		pCi/g			18	0.70	1.96	1	1.96461731
490-164296-A-2-B DU	Radium-228	1.53		1.233	U	pCi/g			22	0.27	0.75	1	.74749642
490-164296-A-2-B DU	Radium 226 and 228 (positive only)	11.2		12.87		pCi/g			14	0.55	1.55		

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: Eurofins TestAmerica, St. Loui Job No.: 490-164387-1

SDG No.:

Batch Number: 404682 Batch Start Date: 12/08/18 11:54 Batch Analyst: Tucker, Michael P

Batch Method: Fill_Geo-21 Batch End Date: 12/08/18 13:07

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-404682/1		Fill_Geo-21, 901.1				291.18 g	12/8/18	12/29/18	Tuna Can
LCS 160-404682/2		Fill_Geo-21, 901.1				341.9 g	12/8/18	12/29/18	Tuna Can
490-164296-A-2 DU		Fill_Geo-21, 901.1	T	46.9 g	279.3 g	232.4 g	12/8/18 13:05	12/29/18	Tuna Can
490-164387-A-2	CUF-BS-BG10-0.0/ 0.5-20181205	Fill_Geo-21, 901.1	T	46.9 g	358.3 g	311.4 g	12/8/18 13:05	12/29/18	Tuna Can
490-164387-A-3	CUF-BS-BG10-1.0/ 3.0-20181205	Fill_Geo-21, 901.1	T	46.9 g	334.8 g	287.9 g	12/8/18 13:05	12/29/18	Tuna Can
490-164387-B-4	CUF-BS-DUP02-201 81205	Fill_Geo-21, 901.1	T	46.8 g	357.2 g	310.4 g	12/8/18 13:05	12/29/18	Tuna Can
490-164387-B-5	CUF-BS-BG10-5.6/ 7.6-20181205	Fill_Geo-21, 901.1	T	46.5 g	336.3 g	289.8 g	12/8/18 13:05	12/29/18	Tuna Can

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00008					
MB 160-404682/1		Fill_Geo-21, 901.1							
LCS 160-404682/2		Fill_Geo-21, 901.1		# g					
490-164296-A-2 DU		Fill_Geo-21, 901.1	T						
490-164387-A-2	CUF-BS-BG10-0.0/ 0.5-20181205	Fill_Geo-21, 901.1	T						
490-164387-A-3	CUF-BS-BG10-1.0/ 3.0-20181205	Fill_Geo-21, 901.1	T						
490-164387-B-4	CUF-BS-DUP02-201 81205	Fill_Geo-21, 901.1	T						
490-164387-B-5	CUF-BS-BG10-5.6/ 7.6-20181205	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: 2_Gamma_20180266

Sample Description: 404682_Gamma_MB 160-404682~1-A
Detector: Detector # 2
Batch ID: 404682
Work Order Number: Gamma
Lot Number: MB 160-404682~1-A

Decay to Time: 12/29/2018 11:14 Live Time: 1800 sec
Acquisition Time: 12/29/2018 11:14:19 Real Time: 1804 sec
Analysis Time: 12/29/2018 11:44 Dead Time: 0.19 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 2_Soil_TunaCan.Clb
Efficiency Cal Desc: 2_Soil_TunaCan_101407
Efficiency Cal Date: 4/20/2018 13:56
Energy Cal Date: 4/20/2018 13:54
Library: Client_Long_Rev15.lib
Bkgd Correction File: 2_2018-12-22_1400.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	-2.517E+00	100.0	2.518E+00	2.522E+00	8.655E+00
NA-22	-1.760E-01	173.2	3.048E-01	3.049E-01	1.155E+00
K-40	-6.594E+00	81.1	5.348E+00	5.359E+00	1.488E+01
Sc-46	3.163E-01	121.3	3.836E-01	3.840E-01	1.346E+00
CR-51	-1.083E+00	269.2	2.915E+00	2.916E+00	6.474E+00
MN-54	1.017E-01	266.5	2.710E-01	2.710E-01	7.573E-01
FE-59	-4.490E-02	1519.6	6.823E-01	6.823E-01	1.007E+00
Co-56	2.439E-01	163.9	3.997E-01	3.999E-01	8.133E-01
CO-57	2.664E-02	133.7	3.561E-02	3.564E-02	6.237E-01
CO-58	-3.988E-02	670.8	2.676E-01	2.676E-01	1.029E+00
CO-60	0.000E+00	1.#INF	9.153E-02	9.153E-02	6.746E-01
ZN-65	-1.743E+00	96.8	1.687E+00	1.689E+00	5.707E+00
NB-94	1.434E-01	170.7	2.448E-01	2.449E-01	6.673E-01
ZR-95	4.176E-01	157.6	6.580E-01	6.583E-01	1.715E+00
NB-95	0.000E+00	1.#INF	5.679E-02	5.679E-02	8.541E-01
RU-103	-1.086E-01	235.1	2.552E-01	2.552E-01	8.205E-01
RH-106	2.720E+00	85.1	2.314E+00	2.318E+00	7.582E+00
AG-108M	-1.896E-01	142.8	2.707E-01	2.709E-01	7.147E-01
AG-110M	-7.033E-02	37.8	2.658E-02	2.682E-02	2.092E+00
SN-113	2.108E-01	202.2	4.262E-01	4.263E-01	1.495E+00
SB-124	-1.745E-03	16677.0	2.910E-01	2.910E-01	1.457E+00
SB-125	2.251E-01	189.2	4.259E-01	4.260E-01	1.874E+00
I-131	1.748E-01	146.9	2.567E-01	2.569E-01	5.597E-01
Gd-153	3.549E-01	151.3	5.368E-01	5.373E-01	1.840E+00
Ga-68	1.340E+01	44.7	5.991E+00	6.038E+00	1.975E+01
Tc-99m	-1.509E-01	126.7	1.911E-01	1.913E-01	6.519E-01
BA-133	-3.867E-01	104.2	4.030E-01	4.035E-01	1.378E+00
CS-134	-2.751E-01	164.1	4.514E-01	4.516E-01	1.422E+00
CS-137	0.000E+00	1.#INF	5.865E-02	5.865E-02	9.320E-01
CE-139	5.008E-02	363.6	1.821E-01	1.821E-01	6.422E-01
Ba-140	-1.408E+00	73.1	1.029E+00	1.032E+00	3.668E+00
La-140	-5.157E-01	127.1	6.553E-01	6.558E-01	1.553E+00
CE-141	-3.194E-01	107.9	3.446E-01	3.450E-01	9.450E-01

CE-144	2.034E-01	641.6	1.305E+00	1.305E+00	4.600E+00
PM-144	4.222E-01	35.4	1.493E-01	1.508E-01	3.889E-01
EU-152	5.095E-01	69.1	3.522E-01	3.532E-01	1.724E+00
EU-154	4.267E-01	171.0	7.296E-01	7.299E-01	1.217E+00
EU-155	1.925E-01	146.6	2.822E-01	2.824E-01	2.761E+00
HF-181	3.393E-01	94.4	3.203E-01	3.207E-01	1.122E+00
Ta-182	0.000E+00	1.#INF	2.251E-01	2.251E-01	6.418E+00
Hg-203	1.719E-01	106.8	1.836E-01	1.839E-01	6.361E-01
TL-208	2.513E-01	130.1	3.269E-01	3.271E-01	8.943E-01
PM-146	3.299E-01	40.8	1.347E-01	1.357E-01	4.053E-01
Y-88	0.000E+00	1.#INF	1.255E-01	1.255E-01	9.247E-01
Cd-113m	-1.261E+03	218.5	2.756E+03	2.757E+03	9.782E+03
Cd-109	2.655E+00	171.9	4.564E+00	4.567E+00	1.567E+01
Cf-251	-1.531E-01	442.7	6.780E-01	6.780E-01	1.997E+00
Cf-249	-4.029E-01	127.8	5.149E-01	5.153E-01	1.762E+00
Sn-126	5.186E-01	360.6	1.870E+00	1.870E+00	6.551E+00
PB-210	6.132E+00	135.3	8.297E+00	8.306E+00	2.513E+01
PB-212	-2.850E-01	234.5	6.682E-01	6.684E-01	1.817E+00
PB-214	-7.123E-03	187.2	1.334E-02	1.334E-02	1.806E+00
BI-207	8.812E-02	98.2	8.652E-02	8.663E-02	7.423E-01
BI-212	3.390E+00	116.1	3.937E+00	3.941E+00	1.386E+01
U-235	-1.286E-01	1230.0	1.581E+00	1.581E+00	5.538E+00
BI-214	-1.135E+00	61.2	6.949E-01	6.973E-01	4.101E+00
BI-210M	-4.328E-01	100.4	4.347E-01	4.353E-01	1.477E+00
AC-228	1.172E+00	49.6	5.809E-01	5.840E-01	1.670E+00
TH-227	5.532E+00	17.4	9.635E-01	1.005E+00	6.187E+00
TH-229	-3.549E+00	103.4	3.670E+00	3.674E+00	1.014E+01
TH-234	-9.696E+00	34.2	3.317E+00	3.360E+00	1.429E+01
PA-231	2.188E+00	242.2	5.300E+00	5.301E+00	3.552E+01
PA-233	-3.343E-08	2669238856.5	8.924E-01	8.924E-01	3.130E+00
PA-234	-6.635E-01	128.0	8.491E-01	8.498E-01	2.903E+00
PA-234M	-2.008E+01	130.6	2.623E+01	2.625E+01	2.349E+02
AM-241	2.305E-01	210.0	4.840E-01	4.842E-01	1.377E+00
Np-237	3.862E-01	279.0	1.077E+00	1.078E+00	3.772E+00
Ir-192	4.702E-01	25.0	1.175E-01	1.205E-01	2.166E-01
Cs-136	2.000E-02	1352.8	2.705E-01	2.705E-01	1.047E+00
Np-239	3.536E-01	163.3	5.773E-01	5.777E-01	2.000E+00
Nd-147	1.267E+00	109.9	1.393E+00	1.395E+00	3.812E+00
TL-210	8.411E-02	169.7	1.427E-01	1.428E-01	1.347E+00
Kr-85	5.498E+01	164.6	9.048E+01	9.053E+01	3.139E+02
Total	1.007E+02				

Analyst: Joey Sausto

TestAmerica Inc Spectrum name: 2_Gamma_20180266.An1

Sample description
404682_Gamma_MB 160-404682~1-A

Spectrum Filename: C:\User\SPC\Det2\2_Gamma_20180266.An1

Acquisition information
Start time: 12/29/2018 11:14:19 AM
Live time: 1800
Real time: 1804
Dead time: 0.19 %
Detector ID: 2

Detector system
Ge 2 SN/164

Calibration
Filename: 2_Soil_TunaCan.Clb
2_Soil_TunaCan_101407

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

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

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

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.60keV)
Stop channel: 8000 (2000.01keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	12/29/2018 11:14:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	2_2018-12-22_1400.PBC 12/22/2018 2:00:23 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 1 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0065

***** 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
39.63	7.	159.20	0.81	1.194E-02				
46.54	9.	135.32	0.86	1.824E-02	46.54	4.250	PBC<MDA	PB210
59.54	5.	210.01	0.84	3.048E-02	59.54	35.900	PBC<MDA	AM241
63.29	-18.	64.32	0.85	3.262E-02	63.29	3.810	PBC<MDA	TH234
64.28	3.	360.56	0.85	3.313E-02	64.28	9.700	PBC<MDA	Sn126
86.49	4.	278.99	0.87	4.046E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.648E-01	EU155
86.54	7.	146.61	0.87	4.047E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	3.295E-01	EU155
					86.94	9.040	1.117E+00	Sn126
86.94	7.	155.55	0.87	4.055E-02	86.54	30.700	PBC<MDA	EU155
					86.94	9.040	1.117E+00	Sn126
87.57	7.	163.93	0.87	4.066E-02	87.57	37.500	PBC<MDA	Sn126
88.04	7.	171.92	0.87	4.075E-02	88.04	3.790	PBC<MDA	Cd109
93.35	9.	146.35	0.87	4.154E-02	93.35	5.561	PBC<MDA	AC228
97.50	8.	151.27	0.87	4.197E-02	97.50	30.000	PBC<MDA	Gd153
99.50	3.	426.57	0.88	4.213E-02	99.50	15.000	PBC<MDA	Np239
106.13	6.	163.27	0.88	4.242E-02	106.13	22.700	PBC<MDA	Np239
123.10	4.	248.19	0.90	4.194E-02	123.10	40.790	PBC<MDA	EU154
133.54	2.	641.56	0.90	4.105E-02	133.54	11.090	PBC<MDA	CE144
136.30	5.	146.74	0.91	4.076E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	6.968E-01	CO57
136.47	5.	133.67	0.91	4.074E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	6.968E-01	CO57
165.85	3.	363.58	0.93	3.703E-02	165.85	79.900	PBC<MDA	CE139
185.72	18.	43.80	0.95	3.435E-02	185.72	54.000	PBC<MDA	U235
227.00	6.	112.96	0.98	2.931E-02	227.00	6.300	PBC<MDA	Cf251

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
235.97	47.	17.42	0.99	2.836E-02	235.97	12.300	7.486E+00	TH227
256.24	7.	109.52	1.00	2.637E-02	256.24	7.000	PBC<MDA	TH227
279.20	6.	106.85	1.02	2.439E-02	279.20	81.460	PBC<MDA	Hg203
284.30	4.	173.55	1.03	2.399E-02	284.30	6.140	PBC<MDA	I131
295.09	3.	307.28	1.03	2.318E-02	295.09	19.300	PBC<MDA	PB214
296.00	6.	169.70	1.03	2.311E-02	296.00	79.000	PBC<MDA	TL210
300.03	6.	179.34	1.04	2.283E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	5.	242.18	1.04	2.282E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	4.751E+00	PA231
					300.18	6.200	1.886E+00	PA233
316.49	16.	25.00	1.05	2.172E-02	316.49	87.040	4.702E-01	Ir192
338.32	5.	158.94	1.07	2.041E-02	338.32	12.010	PBC<MDA	AC228
351.93	-3.	213.99	1.08	1.967E-02	351.93	37.600	PBC<MDA	PB214
364.48	2.	236.97	1.09	1.904E-02	364.48	81.700	PBC<MDA	I131
391.69	4.	202.20	1.11	1.780E-02	391.69	64.000	PBC<MDA	SN113
453.88	6.	40.82	1.16	1.554E-02	453.88	65.000	PBC<MDA	PM146
463.37	3.	189.19	1.16	1.525E-02	463.37	10.470	PBC<MDA	SB125
482.00	6.	118.73	1.18	1.472E-02	482.00	80.500	PBC<MDA	HF181
511.86	31.	27.56	2.45	1.394E-02	511.86	20.000	6.178E+00	RH106
513.98	6.	164.57	1.20	1.389E-02	513.98	0.430	PBC<MDA	Kr85
531.00	4.	109.92	1.21	1.349E-02	531.00	13.000	PBC<MDA	Nd147
569.70	4.	98.19	1.24	1.267E-02	569.32	15.380	1.092E+00	CS134
					569.47	8.200	2.049E+00	PA234
					569.70	97.740	1.720E-01	BI207
583.02	5.	130.07	1.25	1.241E-02	583.02	84.500	PBC<MDA	TL208
657.76	8.	35.36	1.31	1.117E-02	657.76	94.640	4.203E-01	AG110M
696.54	8.	35.36	1.34	1.063E-02	696.54	99.000	4.222E-01	PM144
702.63	3.	170.71	1.34	1.055E-02	702.63	97.900	PBC<MDA	NB94
727.17	5.	116.12	1.36	1.025E-02	727.17	7.550	PBC<MDA	BI212
756.73	4.	157.56	1.38	9.903E-03	756.73	54.460	PBC<MDA	ZR95
763.94	7.	37.80	1.38	9.823E-03	763.94	22.280	PBC<MDA	AG110M
834.85	2.	266.46	1.43	9.107E-03	834.85	99.980	PBC<MDA	MN54
846.77	2.	235.70	1.44	8.997E-03	846.77	99.935	PBC<MDA	Co56
873.23	3.	235.19	1.46	8.765E-03	873.23	12.270	PBC<MDA	EU154
880.53	2.	254.91	1.47	8.703E-03	880.53	6.000	PBC<MDA	PA234
889.28	5.	121.29	1.47	8.630E-03	889.28	99.984	PBC<MDA	Sc46
911.07	5.	49.56	1.49	8.453E-03	911.07	29.000	PBC<MDA	AC228
964.11	5.	88.34	1.52	8.055E-03	964.11	14.605	PBC<MDA	EU152
1037.84	2.	227.73	1.57	7.562E-03	1037.84	14.130	PBC<MDA	Co56
1050.36	5.	85.07	1.58	7.484E-03	1050.36	1.560	PBC<MDA	RH106
1077.40	5.	44.72	1.60	7.322E-03	1077.40	3.300	PBC<MDA	Ga68
1764.49	-1.	892.59	2.00	4.648E-03	1764.49	15.400	PBC<MDA	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
158.11	39.63	48.	7.	5.824E+02	159.20	0.814	- c

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	185.76	46.54	48.	9.	0.005	135.32	0.864
TH-227	200.14	50.14	107.	-10.	-0.005	155.52	0.835s
AM-241	237.72	59.54	27.	5.	0.003	210.01	0.843s
TH-234	252.72	63.29	72.	-18.	-0.010	64.32	0.846
Sn-126	256.69	64.28	57.	3.	0.002	360.56	0.847
BA-133	323.52	80.99	47.	-4.	-0.002	335.63	0.861s
Np-237	345.52	86.49	51.	4.	0.002	278.99	0.866s
EU-155	345.73	86.54	55.	7.	0.004	146.61	0.866s
Sn-126	347.32	86.94	62.	7.	0.004	155.55	0.866s
Sn-126	349.84	87.57	69.	7.	0.004	163.93	0.866s
Cd-109	351.72	88.04	77.	7.	0.004	171.92	0.867s
Nd-147	363.96	91.10	129.	-10.	-0.006	156.65	0.869s
TH-234	369.92	92.59	149.	-40.	-0.022	34.21	0.870s
AC-228	372.96	93.35	91.	9.	0.005	146.35	0.871s
Gd-153	389.56	97.50	70.	8.	0.004	151.27	0.875s
Np-239	397.56	99.50	78.	3.	0.002	426.57	0.876s
Gd-153	412.36	103.20	81.	0.	0.000	1000.00	0.879s
Np-239	414.35	103.70	81.	0.	0.000	1000.00	0.879s
Np-239	424.07	106.13	47.	6.	0.003	163.27	0.882s
EU-152	486.67	121.78	55.	-10.	-0.006	106.36	0.894s
CO-57	487.79	122.06	65.	-4.	-0.002	314.29	0.895s
EU-154	491.95	123.10	56.	4.	0.002	248.19	0.895s
PA-234	524.72	131.29	60.	-9.	-0.005	127.97	0.902s
HF-181	531.64	133.02	69.	-2.	-0.001	555.50	0.904s
CE-144	533.70	133.54	56.	2.	0.001	641.56	0.904s
HF-181	544.74	136.30	29.	5.	0.003	146.74	0.906s
CO-57	545.43	136.47	24.	5.	0.003	133.67	0.906s
Tc-99m	561.58	140.51	68.	-9.	-0.005	126.69	0.910s
CE-141	581.30	145.44	41.	-11.	-0.006	107.88	0.914s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ba-140	650.17	162.66	44.	-8.	-0.004	184.19	0.928s
CE-139	662.94	165.85	46.	3.	0.001	363.58	0.930s
Cf-251	705.93	176.60	17.	-2.	-0.001	442.72	0.939s
U-235	742.41	185.72	13.	18.	0.010	43.80	0.946s
TH-229	773.56	193.51	27.	-9.	-0.005	103.39	0.953s
U-235	820.85	205.33	24.	-7.	-0.004	209.44	0.962s
TH-229	842.92	210.85	17.	-2.	-0.001	591.66	0.967
Cf-251	907.51	227.00	11.	6.	0.003	112.96	0.980s
TH-227	943.39	235.97	10.	47.	0.026	17.42	0.987s
PB-212	954.04	238.63	63.	-6.	-0.003	234.47	0.989s
PB-214	967.50	242.00	57.	0.	0.000	1000.00	0.991s
EU-152	978.28	244.69	66.	-5.	-0.003	239.51	0.994s
TH-227	1024.46	256.24	15.	7.	0.004	109.52	1.003s
Cd-113m	1054.30	263.70	28.	-4.	-0.002	218.53	1.009
BI-210M	1062.83	265.83	45.	-10.	-0.006	100.44	1.011s
TL-208	1108.63	277.28	33.	-4.	-0.002	332.13	1.020
Hg-203	1116.30	279.20	18.	6.	0.003	106.85	1.021s
I-131	1136.69	284.30	11.	4.	0.002	173.55	1.025s
PB-214	1179.85	295.09	49.	3.	0.002	307.28	1.034s
TL-210	1183.49	296.00	53.	6.	0.003	169.70	1.034s
PB-212	1199.61	300.03	59.	6.	0.003	179.34	1.038s
PA-231	1199.77	300.07	65.	5.	0.003	242.18	1.038s
PA-233	1200.21	300.18	70.	0.	0.000	1000.00	1.038s
PA-231	1210.09	302.65	70.	0.	0.000	1000.00	1.040s
BA-133	1210.90	302.85	98.	-8.	-0.004	177.18	1.040s
Ba-140	1218.89	304.85	90.	-8.	-0.004	169.81	1.041s
BI-210M	1219.07	304.90	82.	-8.	-0.004	162.37	1.041s
Ir-192	1233.25	308.44	76.	-5.	-0.003	239.48	1.044s
Ir-192	1265.45	316.49	0.	16.	0.009	25.00	1.050s
CR-51	1279.82	320.08	23.	-4.	-0.002	269.23	1.053s
La-140	1314.53	328.76	16.	-2.	-0.001	748.45	1.060s
Cf-249	1333.24	333.44	18.	-2.	-0.001	349.49	1.064
AC-228	1352.76	338.32	28.	5.	0.003	158.94	1.068s
Cs-136	1361.76	340.57	33.	0.	0.000	1000.00	1.069s
EU-152	1376.62	344.29	33.	0.	0.000	1000.00	1.072
HF-181	1382.80	345.83	49.	-8.	-0.005	123.39	1.073s
PB-214	1407.21	351.93	21.	-3.	-0.002	213.99	1.078s
BA-133	1423.48	356.00	34.	-8.	-0.005	104.23	1.081s
I-131	1457.41	364.48	8.	2.	0.001	236.97	1.088
BA-133	1534.84	383.84	48.	-9.	-0.005	61.15	1.103s
Cf-249	1551.27	387.95	56.	-9.	-0.005	127.81	1.106s
SN-113	1566.23	391.69	36.	4.	0.002	202.20	1.109s
AG-108M	1735.21	433.94	12.	-5.	-0.003	142.83	1.141s
PM-146	1814.98	453.88	0.	6.	0.003	40.82	1.157s
SB-125	1852.93	463.37	15.	3.	0.002	189.19	1.164s
Ir-192	1871.70	468.06	32.	-8.	-0.005	104.62	1.167s
BE-7	1909.84	477.60	22.	-7.	-0.004	100.05	1.175s
HF-181	1927.44	482.00	21.	6.	0.003	118.73	1.178s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RU-103	1987.67	497.05	13.	-3.	-0.001	235.06	1.189s
RH-106	2046.91	511.86	21.	31.	0.017	27.56	2.450s
Kr-85	2055.37	513.98	44.	6.	0.003	164.57	1.202s
Nd-147	2123.45	531.00	4.	4.	0.002	109.92	1.215s
Ba-140	2148.49	537.26	16.	-8.	-0.005	73.13	1.219s
CS-134	2252.39	563.24	17.	-7.	-0.004	90.46	1.239s
CS-134	2276.73	569.32	8.	-1.	-0.001	412.31	1.243s
PA-234	2277.33	569.47	9.	0.	0.000	1000.00	1.243s
BI-207	2278.25	569.70	5.	4.	0.002	98.19	1.244s
TL-208	2331.53	583.02	9.	5.	0.003	130.07	1.254s
SB-125	2401.44	600.50	37.	0.	0.000	1000.00	1.266s
CS-134	2418.28	604.71	55.	-8.	-0.004	141.91	1.269
BI-214	2436.69	609.31	66.	-11.	-0.006	61.24	1.273s
RU-103	2440.64	610.30	70.	-3.	-0.001	444.61	1.274s
AG-108M	2456.57	614.28	73.	0.	0.000	1000.00	1.276s
RH-106	2487.11	621.92	8.	-2.	-0.001	345.45	1.282s
SB-125	2543.00	635.89	19.	-7.	-0.004	92.49	1.292s
AG-110M	2630.49	657.76	0.	8.	0.004	35.36	1.308s
CS-137	2646.08	661.66	8.	0.	0.000	1000.00	1.311s
PM-144	2785.61	696.54	0.	8.	0.004	35.36	1.336s
NB-94	2809.96	702.63	4.	3.	0.001	170.71	1.340s
SB-124	2890.59	722.79	22.	-6.	-0.003	129.21	1.355s
AG-108M	2891.19	722.94	28.	0.	0.000	1000.00	1.355s
EU-154	2892.88	723.36	28.	0.	0.000	1000.00	1.355s
ZR-95	2896.24	724.20	28.	0.	0.000	1000.00	1.356s
BI-212	2908.12	727.17	13.	5.	0.003	116.12	1.358s
PM-146	2942.32	735.72	13.	-4.	-0.002	180.37	1.364s
ZR-95	3026.36	756.73	9.	4.	0.002	157.56	1.379s
AG-110M	3055.21	763.94	0.	7.	0.004	37.80	1.384s
NB-95	3062.60	765.79	7.	0.	0.000	1000.00	1.385s
PA-234M	3065.09	766.41	13.	-2.	-0.001	261.46	1.386s
EU-152	3115.12	778.92	13.	-8.	-0.005	79.33	1.395s
BI-212	3141.12	785.42	9.	-3.	-0.001	233.52	1.399s
CS-134	3182.92	795.87	15.	-4.	-0.002	164.11	1.407s
CS-134	3207.25	801.95	0.	0.	0.000	1000.00	1.411s
CO-58	3242.54	810.77	10.	-1.	0.000	670.82	1.417s
La-140	3262.52	815.77	10.	0.	0.000	1000.00	1.421s
MN-54	3338.84	834.85	4.	2.	0.001	266.46	1.434s
Co-56	3386.53	846.77	5.	2.	0.001	235.70	1.442
TL-208	3441.70	860.56	0.	0.	0.000	1000.00	1.452s
NB-94	3483.84	871.10	13.	-7.	-0.004	82.07	1.459s
EU-154	3492.37	873.23	18.	3.	0.001	235.19	1.460s
PA-234	3521.57	880.53	11.	2.	0.001	254.91	1.465s
AG-110M	3538.19	884.68	20.	-7.	-0.004	95.86	1.468s
Sc-46	3556.57	889.28	15.	5.	0.003	121.29	1.471s
Y-88	3591.61	898.04	14.	-6.	-0.003	138.44	1.477s
AC-228	3643.73	911.07	1.	5.	0.003	49.56	1.486s
AG-110M	3749.43	937.49	5.	-3.	-0.001	182.43	1.504s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	3783.54	946.02	5.	-2.	-0.001	128.23	1.510s
EU-152	3855.90	964.11	8.	5.	0.003	88.34	1.522s
AC-228	3875.35	968.97	13.	0.	0.000	1000.00	1.525s
EU-154	3984.78	996.33	20.	-8.	-0.004	91.52	1.544s
PA-234M	4003.46	1001.00	29.	-2.	-0.001	130.63	1.547s
EU-154	4018.57	1004.77	30.	-1.	-0.001	587.37	1.549s
Co-56	4150.84	1037.84	5.	2.	0.001	227.73	1.571s
Cs-136	4191.76	1048.07	12.	-2.	-0.001	254.95	1.578s
RH-106	4200.92	1050.36	8.	5.	0.003	85.07	1.579s
Ga-68	4309.08	1077.40	0.	5.	0.003	44.72	1.597s
EU-152	4447.79	1112.07	43.	-11.	-0.006	87.26	1.620s
ZN-65	4461.68	1115.55	54.	-11.	-0.006	96.78	1.622s
BI-214	4480.64	1120.29	66.	-9.	-0.005	59.37	1.625s
Ta-182	4484.70	1121.30	31.	0.	0.000	1000.00	1.626s
CO-60	4692.46	1173.24	5.	-2.	-0.001	255.77	1.659s
Ta-182	4755.72	1189.05	0.	0.	0.000	1000.00	1.669s
Ta-182	4885.17	1221.41	0.	0.	0.000	1000.00	1.689s
Co-56	4952.65	1238.28	10.	-7.	-0.004	71.58	1.700s
NA-22	5097.66	1274.53	5.	-2.	-0.001	173.21	1.723s
EU-154	5097.70	1274.54	7.	0.	0.000	1000.00	1.723s
FE-59	5165.93	1291.60	5.	-3.	-0.002	173.74	1.733s
TL-210	5251.56	1313.00	0.	0.	0.000	1000.00	1.746s
CO-60	5329.57	1332.50	0.	0.	0.000	1000.00	1.758s
AG-110M	5536.78	1384.30	5.	-4.	-0.002	130.32	1.789s
EU-152	5631.60	1408.00	5.	-1.	-0.001	403.11	1.804s
K-40	5842.95	1460.83	8.	-7.	-0.004	81.11	1.834s
La-140	6384.53	1596.21	6.	-5.	-0.003	127.07	1.912s
SB-124	6763.68	1690.98	11.	-6.	-0.004	130.84	1.965s
BI-214	7057.76	1764.49	1.	-1.	0.000	892.59	2.005s
Co-56	7085.20	1771.35	0.	0.	0.000	1000.00	2.008s
Y-88	7344.09	1836.06	0.	0.	0.000	1000.00	2.042s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-2.5173E+00				5.31E+01	
			477.60	-2.517E+00	?(	8.655E+00 1.00E+02 1.05E+01	G
NA-22	C	-1.7596E-01				9.50E+02	
			1274.53	-1.760E-01	?(	1.155E+00 1.73E+02 9.99E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	N	-6.5941E+00					4.66E+11	
			1460.83	-6.594E+00	?(P	1.488E+01	8.11E+01	1.07E+01 G
Sc-46	F	3.1628E-01					8.38E+01	
			889.28	3.163E-01	?(P	1.346E+00	1.21E+02	1.00E+02 G
			1120.55	1.498E-07	%	3.346E+00	6.35E+08	1.00E+02 G
CR-51	F	-1.0828E+00					2.77E+01	
			320.08	-1.083E+00	?(P	6.474E+00	2.69E+02	9.94E+00 G
MN-54	C	1.0170E-01					3.12E+02	
			834.85	1.017E-01	?(	7.573E-01	2.66E+02	1.00E+02 G
FE-59	F	-4.4896E-02					4.45E+01	
			1099.25	-4.490E-02	%(P	1.007E+00	1.52E+03	5.65E+01 G
			1291.60	-6.179E-01	+	2.704E+00	1.74E+02	4.32E+01 G
Co-56	C	2.4391E-01					7.73E+01	
			846.77	1.216E-01	?(P	8.133E-01	2.36E+02	9.99E+01 G
			1238.28	-9.337E-01	+ P	2.282E+00	7.16E+01	6.61E+01 G
			1037.84	1.109E+00	?(P	6.754E+00	2.28E+02	1.41E+01 G
			1771.35	0.000E+00	-	5.713E+00	1.00E+03	1.55E+01 A
CO-57	C	2.6642E-02					2.72E+02	
			122.06	-5.697E-02	&(	6.237E-01	3.14E+02	8.56E+01 G
			136.47	6.968E-01	?(	3.253E+00	1.34E+02	1.07E+01 G
CO-58	C	-3.9884E-02					7.09E+01	
			810.78	-3.988E-02	?(	1.029E+00	6.71E+02	9.95E+01 G
ZN-65	F	-1.7430E+00					2.44E+02	
			1115.55	-1.743E+00	?(	5.707E+00	9.68E+01	5.06E+01 G
NB-94	I	1.4338E-01					7.41E+06	
			702.63	1.434E-01	?(	6.673E-01	1.71E+02	9.79E+01 G
			871.10	-4.433E-01	+	1.236E+00	8.21E+01	9.99E+01 G
ZR-95	I	4.1759E-01					6.40E+01	
			756.73	4.176E-01	?(P	1.715E+00	1.58E+02	5.45E+01 G
			724.20	0.000E+00	-	3.349E+00	1.00E+03	4.42E+01 G
RU-103	I	-1.0856E-01					3.93E+01	
			497.05	-1.086E-01	?(P	8.205E-01	2.35E+02	9.09E+01 G
			610.30	-2.181E+00	+	3.385E+01	4.45E+02	5.75E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RH-106	I	2.7196E+00					3.74E+02	
			621.92	-9.583E-01	?(P	7.582E+00	3.45E+02	9.93E+00 G
			1050.36	2.613E+01	?(	7.626E+01	8.51E+01	1.56E+00 G
			511.86	6.178E+00	?	4.796E+00	2.76E+01	2.00E+01 GA
AG-108M	C	-1.8956E-01					1.53E+05	
			433.94	-1.896E-01	?(	7.147E-01	1.43E+02	9.05E+01 G
			722.94	0.000E+00	+	1.625E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	+	2.217E+00	1.00E+03	8.98E+01 G
AG-110M	F	-7.0332E-02					2.50E+02	
			884.68	-6.366E-01	?(	2.092E+00	9.59E+01	7.27E+01 G
			657.76	4.203E-01	+	3.872E-01	3.54E+01	9.46E+01 G
			937.49	-5.226E-01	+	2.504E+00	1.82E+02	3.44E+01 G
			1384.30	-1.690E+00	+	5.255E+00	1.30E+02	2.43E+01 G
			763.94	1.777E+00	?(	1.871E+00	3.78E+01	2.23E+01 G
SN-113	F	2.1076E-01					1.15E+02	
			391.69	2.108E-01	?(P	1.495E+00	2.02E+02	6.40E+01 G
SB-124	F	-1.7448E-03					6.02E+01	
			602.73	-1.745E-03	%(P	1.457E+00	1.67E+04	9.83E+01 G
			1690.98	-1.518E+00	+	4.410E+00	1.31E+02	4.78E+01 G
			722.79	-2.744E+00	+	1.238E+01	1.29E+02	1.08E+01 G
SB-125	I	2.2510E-01					1.01E+03	
			427.88	-6.931E-02	%(P	1.874E+00	1.46E+03	2.96E+01 G
			600.50	0.000E+00	+	7.986E+00	1.00E+03	1.79E+01 G
			635.89	-3.131E+00	+	9.904E+00	9.25E+01	1.13E+01 G
			463.37	1.057E+00	?(P	7.214E+00	1.89E+02	1.05E+01 G
I-131	I	1.7482E-01					8.02E+00	
			364.48	8.098E-02	?(P	5.597E-01	2.37E+02	8.17E+01 G
			284.30	1.423E+00	?(P	6.911E+00	1.74E+02	6.14E+00 G
			636.97	3.737E-01	% P	1.789E+01	1.31E+03	7.17E+00 G
Gd-153	F	3.5489E-01					2.42E+02	
			97.50	3.549E-01	?(	1.840E+00	1.51E+02	3.00E+01 G
			103.20	0.000E+00	-	2.688E+00	1.00E+03	2.18E+01 G
Ga-68	C	1.3396E+01					4.71E-02	
			1077.40	1.340E+01	?(	1.975E+01	4.47E+01	3.30E+00 G
Tc-99m	I	-1.5086E-01					2.51E-01	
			140.51	-1.509E-01	&(	6.519E-01	1.27E+02	8.93E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BA-133	F	-3.8667E-01					3.85E+03	
			356.00	-3.867E-01	&(	1.378E+00	1.04E+02	6.20E+01 G
			302.85	-1.083E+00	+	6.557E+00	1.77E+02	1.83E+01 G
			383.84	-3.061E+00	+ P	1.197E+01	6.12E+01	8.94E+00 GA
			80.99	-1.524E-01	+	1.436E+00	3.36E+02	3.41E+01 GA
CS-134	I	-2.7506E-01					7.54E+02	
			795.87	-2.751E-01	?(P	1.422E+00	1.64E+02	8.55E+01 G
			604.71	-3.618E-01	+	1.764E+00	1.42E+02	9.76E+01 G
			569.32	-2.849E-01	+	4.527E+00	4.12E+02	1.54E+01 G
			801.95	0.000E+00	+	5.000E+00	1.00E+03	8.69E+00 G
			563.24	-3.552E+00	+ P	1.135E+01	9.05E+01	8.35E+00 G
CE-139	F	5.0076E-02					1.38E+02	
			165.85	5.008E-02	?(	6.422E-01	3.64E+02	7.99E+01 G
Ba-140	I	-1.4076E+00					1.28E+01	
			537.26	-1.408E+00	?(P	3.668E+00	7.31E+01	2.44E+01 G
			162.66	-1.798E+00	+ P	7.978E+00	1.84E+02	6.22E+00 G
			304.85	-4.661E+00	+	2.707E+01	1.70E+02	4.29E+00 G
La-140	I	-5.1567E-01					1.28E+01	
			1596.21	-5.157E-01	?(P	1.553E+00	1.27E+02	9.54E+01 G
			487.02	-4.745E-02	% P	1.061E+00	1.04E+03	4.55E+01 G
			328.76	-1.971E-01	+ P	2.750E+00	7.48E+02	2.03E+01 G
			815.77	0.000E+00	+	4.545E+00	1.00E+03	2.33E+01 G
CE-141	I	-3.1940E-01					3.25E+01	
			145.44	-3.194E-01	&(	9.450E-01	1.08E+02	4.82E+01 G
CE-144	I	2.0342E-01					2.85E+02	
			133.54	2.034E-01	?(	4.600E+00	6.42E+02	1.11E+01 G
PM-144	C	4.2219E-01					3.63E+02	
			696.54	4.222E-01	?(	3.889E-01	3.54E+01	9.90E+01 G
			618.06	-3.993E-03	% P	2.022E+00	8.24E+03	9.91E+01 G
EU-152	F	5.0950E-01					4.94E+03	
			121.78	-4.770E-01	?(	1.724E+00	1.06E+02	2.86E+01 G
			344.29	0.000E+00	+	3.078E+00	1.00E+03	2.65E+01 G
			1112.07	-6.438E+00	+	1.895E+01	8.73E+01	1.36E+01 G
			778.92	-3.656E+00	+ P	8.736E+00	7.93E+01	1.29E+01 G
			964.11	2.440E+00	?(	7.439E+00	8.83E+01	1.46E+01 G
			244.69	-1.303E+00	+	1.082E+01	2.40E+02	7.58E+00 G
			1408.00	-6.108E-01	+	6.172E+00	4.03E+02	2.10E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	4.2675E-01					3.14E+03	
			123.10	1.407E-01	*(	1.217E+00	2.48E+02	4.08E+01 G
			1274.54	0.000E+00	-	3.758E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	7.305E+00	1.00E+03	2.02E+01 G
			873.23	1.378E+00	?(	1.171E+01	2.35E+02	1.23E+01 G
			1004.77	-5.290E-01	+	1.120E+01	5.87E+02	1.80E+01 G
			996.33	-5.080E+00	+	1.588E+01	9.15E+01	1.06E+01 G
EU-155	I	1.9247E-01					1.81E+03	
			105.31	-5.974E-03	%(P	2.761E+00	1.43E+04	2.12E+01 G
			86.54	3.295E-01	?(	1.662E+00	1.47E+02	3.07E+01 G
HF-181	F	3.3932E-01					4.24E+01	
			482.00	2.716E-01	?(	1.122E+00	1.19E+02	8.05E+01 G
			133.02	-6.647E-02	-	1.292E+00	5.56E+02	4.33E+01 G
			345.83	-1.538E+00	+	6.503E+00	1.23E+02	1.51E+01 G
			136.30	1.271E+00	?(	6.512E+00	1.47E+02	5.85E+00 G
Hg-203	F	1.7188E-01					4.66E+01	
			279.20	1.719E-01	?(	6.361E-01	1.07E+02	8.15E+01 G
TL-208	N	2.5129E-01					6.98E+02	
			583.02	2.513E-01	?(P	8.943E-01	1.30E+02	8.45E+01 G
			277.28	-1.584E+00	& P	1.063E+01	3.32E+02	6.31E+00 G
			860.56	0.000E+00	-	3.715E+00	1.00E+03	1.24E+01 G
PM-146	C	3.2995E-01					2.02E+03	
			453.88	3.299E-01	?(	4.053E-01	4.08E+01	6.50E+01 G
			747.16	2.015E-02	% P	2.122E+00	3.56E+03	3.40E+01 G
			735.72	-9.841E-01	- P	4.756E+00	1.80E+02	2.25E+01 G
Cd-113m		-1.2612E+03					5.33E+03	
			263.70	-1.261E+03	?(	9.782E+03	2.19E+02	6.00E-03 K
Cd-109	F	2.6549E+00					4.53E+02	
			88.04	2.655E+00	?(	1.567E+01	1.72E+02	3.79E+00 G
Cf-251	T	-1.5313E-01					3.28E+05	
			176.60	-1.531E-01	?(	1.997E+00	4.43E+02	1.70E+01 G
			227.00	1.774E+00	?	5.465E+00	1.13E+02	6.30E+00 GA
Cf-249	T	-4.0288E-01					1.28E+05	
			387.95	-4.029E-01	?(	1.762E+00	1.28E+02	6.60E+01 G
			333.44	-4.040E-01	+	3.924E+00	3.49E+02	1.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sn-126		5.1864E-01					3.65E+07	
			87.57	2.687E-01		1.513E+00	1.64E+02	3.75E+01 GA
			64.28	5.186E-01	?(	6.551E+00	3.61E+02	9.70E+00 G
			86.94	1.117E+00	?	5.974E+00	1.56E+02	9.04E+00 GA
PB-210	N	6.1315E+00					8.14E+03	
			46.54	6.132E+00	(P	2.513E+01	1.35E+02	4.25E+00 G
PB-212	N	-2.8500E-01					6.98E+02	
			238.63	-2.850E-01	?(P	1.817E+00	2.34E+02	4.33E+01 G
			300.03	4.614E+00	? P	2.857E+01	1.79E+02	3.28E+00 GA
PB-214	N	-7.1231E-03					5.84E+05	
			351.93	-2.216E-01	&(P	1.806E+00	2.14E+02	3.76E+01 G
			295.09	4.107E-01	?(P	4.404E+00	3.07E+02	1.93E+01 G
			242.00	0.000E+00	&	1.021E+01	1.00E+03	7.43E+00 GA
BI-207	C	8.8117E-02					1.18E+04	
			1063.66	-2.188E-02	%(P	7.423E-01	2.26E+03	7.45E+01 G
			569.70	1.720E-01	?(	5.967E-01	9.82E+01	9.77E+01 G
BI-212	N	3.3903E+00					6.98E+02	
			727.17	3.390E+00	?(	1.386E+01	1.16E+02	7.55E+00 G
			785.42	-1.207E+01	+	7.433E+01	2.34E+02	1.28E+00 GA
U-235	N	-1.2857E-01					2.57E+11	
			143.79	-1.286E-01	%(	5.538E+00	1.23E+03	1.10E+01 G
			205.33	-2.334E+00	& P	8.846E+00	2.09E+02	5.01E+00 G
			163.38	-3.038E-01	& P	1.057E+01	1.35E+03	5.08E+00 G
			185.72	5.292E-01	?	5.909E-01	4.38E+01	5.40E+01 GA
BI-214	N	-1.1348E+00					5.84E+05	
			609.31	-1.135E+00	?(P	4.101E+00	6.12E+01	4.61E+01 G
			1120.29	-4.466E+00	+ P	2.104E+01	5.94E+01	1.51E+01 G
			1764.49	-5.127E-01	+ P	5.720E+00	8.93E+02	1.54E+01 G
BI-210M	T	-4.3278E-01					1.10E+09	
			265.83	-4.328E-01	?(	1.477E+00	1.00E+02	5.00E+01 G
			304.90	-7.142E-01	+	3.969E+00	1.62E+02	2.80E+01 G
AC-228	N	1.1723E+00					2.10E+03	
			911.07	1.196E+00	?(P	1.670E+00	4.96E+01	2.90E+01 G
			968.97	0.000E+00	-	7.741E+00	1.00E+03	1.75E+01 G
			338.32	1.116E+00	?(P	6.211E+00	1.59E+02	1.20E+01 G
			93.35	2.269E+00	&	1.132E+01	1.46E+02	5.56E+00 XA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	N	5.5323E+00					7.95E+03	
			256.24	2.098E+00	?(	6.187E+00	1.10E+02	7.00E+00 G
			235.97	7.486E+00	?(	2.779E+00	1.74E+01	1.23E+01 G
			50.14	-2.942E+00	-	1.558E+01	1.56E+02	8.00E+00 G
TH-229	N	-3.5492E+00					2.68E+06	
			193.51	-3.549E+00	?(	1.014E+01	1.03E+02	4.40E+00 G
			210.85	-1.421E+00	+ P	1.320E+01	5.92E+02	2.99E+00 G
TH-234	N	-9.6958E+00					1.63E+12	
			92.59	-9.696E+00	(P	1.429E+01	3.42E+01	5.58E+00 G
			63.29	-7.856E+00	+ P	1.883E+01	6.43E+01	3.81E+00 G
PA-231	N	2.1885E+00					1.20E+07	
			302.65	0.000E+00	?(	3.552E+01	1.00E+03	2.88E+00 G
			300.07	4.751E+00	?(	3.991E+01	2.42E+02	2.46E+00 G
PA-233	C	-3.3431E-08					7.82E+08	
			312.01	-3.343E-08	%(	3.130E+00	2.67E+09	3.60E+01 G
			300.18	0.000E+00	+	1.638E+01	1.00E+03	6.20E+00 G
PA-234	N	-6.6351E-01					1.63E+12	
			131.29	-6.635E-01	?(	2.903E+00	1.28E+02	1.80E+01 G
			946.02	-1.122E+00	+ P	6.762E+00	1.28E+02	1.34E+01 G
			569.47	0.000E+00	+	8.921E+00	1.00E+03	8.20E+00 G
			883.24	-2.382E-01	% P	1.316E+01	1.40E+03	9.60E+00 G
			880.53	2.051E+00	? P	1.938E+01	2.55E+02	6.00E+00 GA
PA-234M	N	-2.0081E+01					1.63E+12	
			1001.00	-2.008E+01	?(P	2.349E+02	1.31E+02	8.37E-01 G
			766.41	-4.780E+01	+ P	3.823E+02	2.61E+02	2.94E-01 G
AM-241	T	2.3048E-01					1.58E+05	
			59.54	2.305E-01	?(P	1.377E+00	2.10E+02	3.59E+01 G
Np-237	F	3.8620E-01					2.14E+06	
			86.49	3.862E-01	?(	3.772E+00	2.79E+02	1.31E+01 G
Ir-192	F	4.7017E-01					7.40E+01	
			316.49	4.702E-01	?(	2.166E-01	2.50E+01	8.70E+01 G
			468.06	-5.766E-01	-	2.065E+00	1.05E+02	5.18E+01 G
			308.44	-4.112E-01	&	3.403E+00	2.39E+02	3.18E+01 G
Cs-136	F	1.9996E-02					1.30E+01	
			818.50	2.000E-02	%(	1.047E+00	1.35E+03	1.00E+02 G
			1048.07	-1.852E-01	+	1.746E+00	2.55E+02	8.00E+01 G
			340.57	0.000E+00	-	1.722E+00	1.00E+03	4.69E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Np-239   T   3.5362E-01                                      2.36E+00
                          103.70 0.000E+00 -   2.441E+00 1.00E+03 2.40E+01 X
                          106.13 3.536E-01 ?(  2.000E+00 1.63E+02 2.27E+01 G
                           99.50 2.599E-01 ?   3.858E+00 4.27E+02 1.50E+01 X

Nd-147       1.2674E+00                                      1.11E+01
                          531.00 1.267E+00 ?(  3.812E+00 1.10E+02 1.30E+01 G
                           91.10-4.983E-01 -   2.650E+00 1.57E+02 2.83E+01 G

TL-210   N   8.4105E-02                                      5.84E+05
                          799.60-1.417E-08 %(  1.347E+00 2.54E+09 9.90E+01 G
                          296.00 1.895E-01 ?(  1.112E+00 1.70E+02 7.90E+01 G
                         1313.00 0.000E+00 -   3.169E+00 1.00E+03 2.10E+01 GA

Kr-85    I   5.4978E+01                                      3.92E+03
                          513.98 5.498E+01 &(  3.139E+02 1.65E+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	107.	-10.	-0.005	155.52	-2.942E+00	
AM-241	59.54	27.	5.	0.003	210.01	2.305E-01	P
TH-234	63.29	72.	-18.	-0.010	64.32	-7.856E+00	P
Sn-126	64.28	57.	3.	0.002	360.56	5.186E-01	
BA-133	80.99	47.	-4.	-0.002	335.63	-1.524E-01	
Np-237	86.49	51.	4.	0.002	278.99	3.862E-01	
EU-155	86.54	55.	7.	0.004	146.61	3.295E-01	
Sn-126	86.94	62.	7.	0.004	155.55	1.117E+00	
Sn-126	87.57	69.	7.	0.004	163.93	2.687E-01	
Cd-109	88.04	77.	7.	0.004	171.92	2.655E+00	
Nd-147	91.10	129.	-10.	-0.006	156.65	-4.983E-01	
TH-234	92.59	149.	-40.	-0.022	34.21	-9.696E+00	P
AC-228	93.35	91.	9.	0.005	146.35	2.269E+00	
Gd-153	97.50	70.	8.	0.004	151.27	3.549E-01	
Np-239	99.50	78.	3.	0.002	426.57	2.599E-01	
Np-239	106.13	47.	6.	0.003	163.27	3.536E-01	
EU-152	121.78	55.	-10.	-0.006	106.36	-4.770E-01	
CO-57	122.06	65.	-4.	-0.002	314.29	-5.697E-02	
EU-154	123.10	56.	4.	0.002	248.19	1.407E-01	
PA-234	131.29	60.	-9.	-0.005	127.97	-6.635E-01	
HF-181	133.02	69.	-2.	-0.001	555.50	-6.647E-02	
CE-144	133.54	56.	2.	0.001	641.56	2.034E-01	
HF-181	136.30	29.	5.	0.003	146.74	1.271E+00	
CO-57	136.47	24.	5.	0.003	133.67	6.968E-01	
Tc-99m	140.51	68.	-9.	-0.005	126.69	-1.509E-01	
CE-141	145.44	41.	-11.	-0.006	107.88	-3.194E-01	
Ba-140	162.66	44.	-8.	-0.004	184.19	-1.798E+00	P
CE-139	165.85	46.	3.	0.001	363.58	5.008E-02	
Cf-251	176.60	17.	-2.	-0.001	442.72	-1.531E-01	
U-235	185.72	13.	18.	0.010	43.80	5.292E-01	
TH-229	193.51	27.	-9.	-0.005	103.39	-3.549E+00	
U-235	205.33	24.	-7.	-0.004	209.44	-2.334E+00	P
TH-229	210.85	17.	-2.	-0.001	591.66	-1.421E+00	P
Cf-251	227.00	11.	6.	0.003	112.96	1.774E+00	
TH-227	235.97	10.	47.	0.026	17.42	7.486E+00	
PB-212	238.63	63.	-6.	-0.003	234.47	-2.850E-01	P
EU-152	244.69	66.	-5.	-0.003	239.51	-1.303E+00	
TH-227	256.24	15.	7.	0.004	109.52	2.098E+00	
Cd-113m	263.70	28.	-4.	-0.002	218.53	-1.261E+03	
BI-210M	265.83	45.	-10.	-0.006	100.44	-4.328E-01	
TL-208	277.28	33.	-4.	-0.002	332.13	-1.584E+00	P
Hg-203	279.20	18.	6.	0.003	106.85	1.719E-01	
I-131	284.30	11.	4.	0.002	173.55	1.423E+00	P
PB-214	295.09	49.	3.	0.002	307.28	4.107E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-210	296.00	53.	6.	0.003	169.70	1.895E-01	
PB-212	300.03	59.	6.	0.003	179.34	4.614E+00	P
PA-231	300.07	65.	5.	0.003	242.18	4.751E+00	
BA-133	302.85	98.	-8.	-0.004	177.18	-1.083E+00	
Ba-140	304.85	90.	-8.	-0.004	169.81	-4.661E+00	
BI-210M	304.90	82.	-8.	-0.004	162.37	-7.142E-01	
CR-51	320.08	23.	-4.	-0.002	269.23	-1.083E+00	P
La-140	328.76	16.	-2.	-0.001	748.45	-1.971E-01	P
Cf-249	333.44	18.	-2.	-0.001	349.49	-4.040E-01	
AC-228	338.32	28.	5.	0.003	158.94	1.116E+00	P
HF-181	345.83	49.	-8.	-0.005	123.39	-1.538E+00	
PB-214	351.93	21.	-3.	-0.002	213.99	-2.216E-01	P
BA-133	356.00	34.	-8.	-0.005	104.23	-3.867E-01	
I-131	364.48	8.	2.	0.001	236.97	8.098E-02	P
BA-133	383.84	48.	-9.	-0.005	61.15	-3.061E+00	P
Cf-249	387.95	56.	-9.	-0.005	127.81	-4.029E-01	
SN-113	391.69	36.	4.	0.002	202.20	2.108E-01	P
AG-108M	433.94	12.	-5.	-0.003	142.83	-1.896E-01	
PM-146	453.88	0.	6.	0.003	40.82	3.299E-01	
SB-125	463.37	15.	3.	0.002	189.19	1.057E+00	P
BE-7	477.60	22.	-7.	-0.004	100.05	-2.517E+00	
HF-181	482.00	21.	6.	0.003	118.73	2.716E-01	
RU-103	497.05	13.	-3.	-0.001	235.06	-1.086E-01	P
RH-106	511.86	21.	31.	0.017	27.56	6.178E+00	
Kr-85	513.98	44.	6.	0.003	164.57	5.498E+01	
Nd-147	531.00	4.	4.	0.002	109.92	1.267E+00	
Ba-140	537.26	16.	-8.	-0.005	73.13	-1.408E+00	P
CS-134	563.24	17.	-7.	-0.004	90.46	-3.552E+00	P
CS-134	569.32	8.	-1.	-0.001	412.31	-2.849E-01	
BI-207	569.70	5.	4.	0.002	98.19	1.720E-01	
TL-208	583.02	9.	5.	0.003	130.07	2.513E-01	P
CS-134	604.71	55.	-8.	-0.004	141.91	-3.618E-01	
BI-214	609.31	66.	-11.	-0.006	61.24	-1.135E+00	P
RU-103	610.30	70.	-3.	-0.001	444.61	-2.181E+00	
RH-106	621.92	8.	-2.	-0.001	345.45	-9.583E-01	P
SB-125	635.89	19.	-7.	-0.004	92.49	-3.131E+00	
AG-110M	657.76	0.	8.	0.004	35.36	4.203E-01	
NB-94	702.63	4.	3.	0.001	170.71	1.434E-01	
SB-124	722.79	22.	-6.	-0.003	129.21	-2.744E+00	
BI-212	727.17	13.	5.	0.003	116.12	3.390E+00	
PM-146	735.72	13.	-4.	-0.002	180.37	-9.841E-01	P
ZR-95	756.73	9.	4.	0.002	157.56	4.176E-01	P
AG-110M	763.94	0.	7.	0.004	37.80	1.777E+00	
PA-234M	766.41	13.	-2.	-0.001	261.46	-4.780E+01	P
EU-152	778.92	13.	-8.	-0.005	79.33	-3.656E+00	P
BI-212	785.42	9.	-3.	-0.001	233.52	-1.207E+01	
CS-134	795.87	15.	-4.	-0.002	164.11	-2.751E-01	P
CO-58	810.77	10.	-1.	0.000	670.82	-3.988E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
MN-54	834.85	4.	2.	0.001	266.46	1.017E-01		
Co-56	846.77	5.	2.	0.001	235.70	1.216E-01		P
NB-94	871.10	13.	-7.	-0.004	82.07	-4.433E-01		
EU-154	873.23	18.	3.	0.001	235.19	1.378E+00		
PA-234	880.53	11.	2.	0.001	254.91	2.051E+00		P
AG-110M	884.68	20.	-7.	-0.004	95.86	-6.366E-01		
Sc-46	889.28	15.	5.	0.003	121.29	3.163E-01		P
Y-88	898.04	14.	-6.	-0.003	138.44	-4.157E-01		
AC-228	911.07	1.	5.	0.003	49.56	1.196E+00		P
AG-110M	937.49	5.	-3.	-0.001	182.43	-5.226E-01		
PA-234	946.02	5.	-2.	-0.001	128.23	-1.122E+00		P
EU-152	964.11	8.	5.	0.003	88.34	2.440E+00		
EU-154	996.33	20.	-8.	-0.004	91.52	-5.080E+00		
PA-234M	1001.00	29.	-2.	-0.001	130.63	-2.008E+01		P
EU-154	1004.77	30.	-1.	-0.001	587.37	-5.290E-01		
Co-56	1037.84	5.	2.	0.001	227.73	1.109E+00		P
Cs-136	1048.07	12.	-2.	-0.001	254.95	-1.852E-01		
RH-106	1050.36	8.	5.	0.003	85.07	2.613E+01		
Ga-68	1077.40	0.	5.	0.003	44.72	1.340E+01		
EU-152	1112.07	43.	-11.	-0.006	87.26	-6.438E+00		
ZN-65	1115.55	54.	-11.	-0.006	96.78	-1.743E+00		
BI-214	1120.29	66.	-9.	-0.005	59.37	-4.466E+00		P
CO-60	1173.24	5.	-2.	-0.001	255.77	-1.636E-01		
Co-56	1238.28	10.	-7.	-0.004	71.58	-9.337E-01		P
NA-22	1274.53	5.	-2.	-0.001	173.21	-1.760E-01		
FE-59	1291.60	5.	-3.	-0.002	173.74	-6.179E-01		
AG-110M	1384.30	5.	-4.	-0.002	130.32	-1.690E+00		
EU-152	1408.00	5.	-1.	-0.001	403.11	-6.108E-01		
K-40	1460.83	8.	-7.	-0.004	81.11	-6.594E+00		P
La-140	1596.21	6.	-5.	-0.003	127.07	-5.157E-01		P
SB-124	1690.98	11.	-6.	-0.004	130.84	-1.518E+00		
BI-214	1764.49	1.	-1.	0.000	892.59	-5.127E-01		P

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-2.5173E+00	-2.5173E+00	1.000E+02%	8.65E+00
NA-22	#A	-1.7596E-01	-1.7596E-01	1.732E+02%	1.16E+00
K-40	#A	-6.5941E+00	-6.5941E+00	8.111E+01%	1.49E+01
Sc-46	#A	3.1628E-01	3.1628E-01	1.213E+02%	1.35E+00
CR-51	#A	-1.0828E+00	-1.0828E+00	2.692E+02%	6.47E+00
MN-54	#A	1.0170E-01	1.0170E-01	2.665E+02%	7.57E-01
FE-59	#A	-4.4896E-02	-4.4896E-02	1.520E+03%	1.01E+00
Co-56	#A	2.4391E-01	2.4391E-01	1.639E+02%	8.13E-01

CO-57	#A	2.6642E-02	2.6642E-02	1.337E+02%	6.24E-01
CO-58	#A	-3.9884E-02	-3.9884E-02	6.708E+02%	1.03E+00
CO-60	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.75E-01
ZN-65	#A	-1.7430E+00	-1.7430E+00	9.678E+01%	5.71E+00
NB-94	#A	1.4338E-01	1.4338E-01	1.707E+02%	6.67E-01
ZR-95	#A	4.1759E-01	4.1759E-01	1.576E+02%	1.71E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.54E-01
RU-103	#A	-1.0855E-01	-1.0856E-01	2.351E+02%	8.20E-01
RH-106	#A	2.7196E+00	2.7196E+00	8.507E+01%	7.58E+00
AG-108M	#A	-1.8956E-01	-1.8956E-01	1.428E+02%	7.15E-01
AG-110M	#A	-7.0332E-02	-7.0332E-02	3.780E+01%	2.09E+00
SN-113	#A	2.1076E-01	2.1076E-01	2.022E+02%	1.49E+00
SB-124	#A	-1.7448E-03	-1.7448E-03	1.668E+04%	1.46E+00
SB-125	#A	2.2510E-01	2.2510E-01	1.892E+02%	1.87E+00
I-131	#A	1.7481E-01	1.7482E-01	1.469E+02%	5.60E-01
Gd-153	#A	3.5489E-01	3.5489E-01	1.513E+02%	1.84E+00
Ga-68	#A	1.3353E+01	1.3396E+01	4.472E+01%	1.97E+01
Tc-99m	#A	-1.5077E-01	-1.5086E-01	1.267E+02%	6.52E-01
BA-133	#A	-3.8667E-01	-3.8667E-01	1.042E+02%	1.38E+00
CS-134	#A	-2.7506E-01	-2.7506E-01	1.641E+02%	1.42E+00
CS-137	#A	0.0000E+00	0.0000E+00	1.000E+03%	9.32E-01
CE-139	#A	5.0076E-02	5.0076E-02	3.636E+02%	6.42E-01
Ba-140	#A	-1.4076E+00	-1.4076E+00	7.313E+01%	3.67E+00
La-140	#A	-5.1566E-01	-5.1567E-01	1.271E+02%	1.55E+00
CE-141	#A	-3.1940E-01	-3.1940E-01	1.079E+02%	9.45E-01
CE-144	#A	2.0342E-01	2.0342E-01	6.416E+02%	4.60E+00
PM-144	#	4.2219E-01	4.2219E-01	3.536E+01%	3.89E-01
EU-152	#A	5.0950E-01	5.0950E-01	6.913E+01%	1.72E+00
EU-154	#A	4.2675E-01	4.2675E-01	1.710E+02%	1.22E+00
EU-155	#A	1.9247E-01	1.9247E-01	1.466E+02%	2.76E+00
HF-181	#A	3.3932E-01	3.3932E-01	9.438E+01%	1.12E+00
Ta-182	#A	0.0000E+00	0.0000E+00	5.774E+02%	6.42E+00
Hg-203	#A	1.7188E-01	1.7188E-01	1.068E+02%	6.36E-01
TL-208	#A	2.5129E-01	2.5129E-01	1.301E+02%	8.94E-01
PM-146	#A	3.2995E-01	3.2995E-01	4.082E+01%	4.05E-01
Y-88	#A	0.0000E+00	0.0000E+00	1.000E+03%	9.25E-01
Cd-113m	#A	-1.2612E+03	-1.2612E+03	2.185E+02%	9.78E+03
Cd-109	#A	2.6549E+00	2.6549E+00	1.719E+02%	1.57E+01
Cf-251	#A	-1.5313E-01	-1.5313E-01	4.427E+02%	2.00E+00
Cf-249	#A	-4.0288E-01	-4.0288E-01	1.278E+02%	1.76E+00
Sn-126	#A	5.1864E-01	5.1864E-01	3.606E+02%	6.55E+00
PB-210	A	6.1315E+00	6.1315E+00	1.353E+02%	2.51E+01
PB-212	#A	-2.8500E-01	-2.8500E-01	2.345E+02%	1.82E+00
PB-214	#A	-7.1231E-03	-7.1231E-03	1.872E+02%	1.81E+00
BI-207	#A	8.8117E-02	8.8117E-02	9.819E+01%	7.42E-01
BI-212	#A	3.3903E+00	3.3903E+00	1.161E+02%	1.39E+01
U-235	#A	-1.2857E-01	-1.2857E-01	1.230E+03%	5.54E+00
BI-214	#A	-1.1348E+00	-1.1348E+00	6.124E+01%	4.10E+00
BI-210M	#A	-4.3278E-01	-4.3278E-01	1.004E+02%	1.48E+00

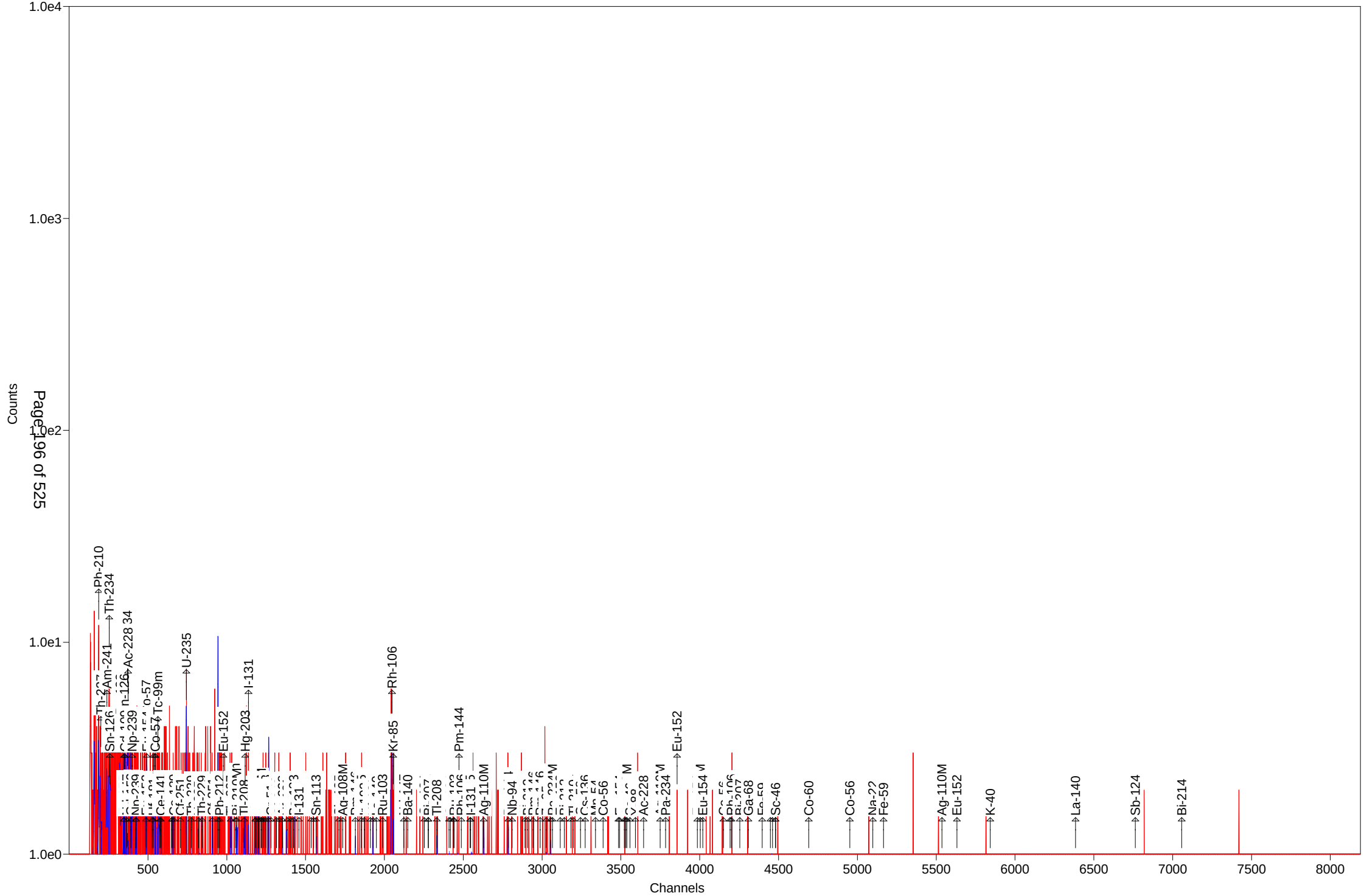
AC-228	#A	1.1723E+00	1.1723E+00	4.956E+01%	1.67E+00
TH-227	#A	5.5323E+00	5.5323E+00	1.742E+01%	6.19E+00
TH-229	#A	-3.5492E+00	-3.5492E+00	1.034E+02%	1.01E+01
TH-234	#A	-9.6958E+00	-9.6958E+00	3.421E+01%	1.43E+01
PA-231	#A	2.1885E+00	2.1885E+00	2.422E+02%	3.55E+01
PA-233	#A	-3.3431E-08	-3.3431E-08	2.669E+09%	3.13E+00
PA-234	#A	-6.6351E-01	-6.6351E-01	1.280E+02%	2.90E+00
PA-234M	#A	-2.0081E+01	-2.0081E+01	1.306E+02%	2.35E+02
AM-241	#A	2.3048E-01	2.3048E-01	2.100E+02%	1.38E+00
Np-237	#A	3.8620E-01	3.8620E-01	2.790E+02%	3.77E+00
Ir-192	#	4.7017E-01	4.7017E-01	2.500E+01%	2.17E-01
Cs-136	#A	1.9995E-02	1.9996E-02	1.353E+03%	1.05E+00
Np-239	#A	3.5360E-01	3.5362E-01	1.633E+02%	2.00E+00
Nd-147	#A	1.2674E+00	1.2674E+00	1.099E+02%	3.81E+00
TL-210	#A	8.4105E-02	8.4105E-02	1.697E+02%	1.35E+00
Kr-85	#A	5.4978E+01	5.4978E+01	1.646E+02%	3.14E+02

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

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

Total Activity (37.6 to 2000.0 keV) 0.000E+00 Bq/Sample
Total Decayed Activity (37.6 to 2000.0 keV) 0.0000000E+00 Bq/Sample

404682_Gamma_MB 160-404682~1-A. 2_Gamma_20180266.spc.



Test America St. Louis Spectrum ID: 5_Gamma_20184259

Sample Description: 404682_Gamma_LCS 160-404682~2-A
Detector: Detector # 5
Batch ID: 404682
Work Order Number: Gamma
Lot Number: LCS 160-404682~2-A

Decay to Time: 12/29/2018 11:11 Live Time: 1800 sec
Acquisition Time: 12/29/2018 11:12:05 Real Time: 1809 sec
Analysis Time: 12/29/2018 11:43 Dead Time: 0.51 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 5_Soil_TunaCan.Clb
Efficiency Cal Desc: 5_Soil_TunaCan_90099_032612
Efficiency Cal Date: 3/27/2012 17:20
Energy Cal Date: 2/28/2012 19:35
Library: Client_Long_Rev15.lib
Bkgd Correction File: 5_2018-12-22_1400.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	-1.169E+01	125.3	1.464E+01	1.465E+01	4.880E+01
NA-22	8.723E-01	64.6	5.633E-01	5.650E-01	1.852E+00
K-40	-3.758E+00	161.1	6.054E+00	6.057E+00	2.035E+01
Sc-46	1.972E+00	95.2	1.877E+00	1.879E+00	6.252E+00
CR-51	-5.332E+00	200.4	1.069E+01	1.069E+01	3.579E+01
MN-54	1.634E+00	89.8	1.467E+00	1.469E+00	3.322E+00
FE-59	2.704E+00	128.6	3.477E+00	3.480E+00	7.659E+00
Co-56	2.191E+00	21.4	4.685E-01	4.819E-01	3.370E+00
CO-57	-8.015E-01	90.3	7.234E-01	7.246E-01	2.399E+00
CO-58	-1.954E+00	86.9	1.698E+00	1.701E+00	5.650E+00
CO-60	1.556E+02	1.8	2.781E+00	8.291E+00	7.427E-01
ZN-65	2.543E+00	150.2	3.820E+00	3.822E+00	1.286E+01
NB-94	8.830E-01	104.7	9.244E-01	9.255E-01	2.960E+00
ZR-95	1.649E+00	135.2	2.229E+00	2.230E+00	5.301E+00
NB-95	9.168E-01	107.9	9.894E-01	9.905E-01	3.334E+00
RU-103	4.364E-01	330.2	1.441E+00	1.441E+00	3.544E+00
RH-106	1.090E+01	205.2	2.236E+01	2.236E+01	6.881E+01
AG-108M	1.399E-01	110.6	1.548E-01	1.550E-01	4.352E+00
AG-110M	3.053E+00	74.1	2.262E+00	2.267E+00	8.904E+00
SN-113	3.109E-01	777.1	2.416E+00	2.416E+00	8.101E+00
SB-124	9.703E-01	138.8	1.347E+00	1.348E+00	5.912E+00
SB-125	6.055E+00	51.7	3.130E+00	3.145E+00	1.236E+01
I-131	2.369E+00	68.5	1.623E+00	1.627E+00	3.418E+00
Gd-153	2.156E+00	111.6	2.406E+00	2.409E+00	7.991E+00
Ga-68	3.600E+01	198.6	7.148E+01	7.151E+01	1.580E+02
Tc-99m	-3.605E-01	266.7	9.616E-01	9.619E-01	3.208E+00
BA-133	-4.573E-01	397.1	1.816E+00	1.816E+00	6.108E+00
CS-134	1.770E+00	87.7	1.553E+00	1.555E+00	5.664E+00
CS-137	3.501E+02	1.4	4.986E+00	1.888E+01	2.849E+00
CE-139	-1.270E-01	817.6	1.038E+00	1.038E+00	3.477E+00
Ba-140	-1.230E+00	671.2	8.253E+00	8.254E+00	1.218E+01
La-140	3.935E-02	206.2	8.112E-02	8.115E-02	2.265E+00
CE-141	1.111E+00	150.1	1.668E+00	1.669E+00	5.552E+00

CE-144	5.787E+00	116.9	6.768E+00	6.774E+00	2.249E+01
PM-144	-4.525E-01	268.2	1.214E+00	1.214E+00	2.906E+00
EU-152	9.468E-01	221.3	2.095E+00	2.096E+00	8.104E+00
EU-154	3.769E-01	636.8	2.400E+00	2.400E+00	5.580E+00
EU-155	0.000E+00	1.#INF	1.729E+00	1.729E+00	1.207E+01
HF-181	1.665E+00	112.9	1.880E+00	1.882E+00	6.391E+00
Ta-182	-7.326E+00	81.3	5.957E+00	5.968E+00	1.979E+01
Hg-203	8.887E-01	130.2	1.157E+00	1.158E+00	3.861E+00
TL-208	3.533E+00	25.5	9.001E-01	9.186E-01	2.100E+00
PM-146	-5.752E-01	66.2	3.805E-01	3.817E-01	6.426E+00
Y-88	9.263E-01	41.3	3.828E-01	3.865E-01	9.809E-01
Cd-113m	-1.724E+04	84.1	1.450E+04	1.454E+04	4.809E+04
Cd-109	1.597E+01	171.1	2.731E+01	2.733E+01	9.074E+01
Cf-251	-4.345E+00	103.2	4.483E+00	4.499E+00	1.190E+01
Cf-249	-5.001E-01	75.5	3.776E-01	3.785E-01	8.452E+00
Sn-126	-1.001E+01	102.1	1.021E+01	1.022E+01	3.387E+01
PB-210	1.009E+04	1.0	1.025E+02	6.010E+02	1.863E+02
PB-212	5.946E+00	23.2	1.378E+00	1.431E+00	4.275E+00
PB-214	7.945E+00	31.0	2.463E+00	2.497E+00	5.836E+00
BI-207	-5.625E-01	462.1	2.600E+00	2.600E+00	6.361E+00
BI-212	1.634E+01	85.7	1.401E+01	1.403E+01	4.676E+01
U-235	5.844E+00	111.9	6.537E+00	6.544E+00	2.173E+01
BI-214	2.330E+00	113.5	2.644E+00	2.646E+00	1.332E+01
BI-210M	1.642E+00	105.2	1.728E+00	1.731E+00	6.314E+00
AC-228	5.403E+00	84.7	4.578E+00	4.586E+00	1.615E+01
TH-227	5.163E+00	161.6	8.346E+00	8.352E+00	3.587E+01
TH-229	5.493E+00	342.6	1.882E+01	1.882E+01	5.035E+01
TH-234	2.682E+01	41.3	1.107E+01	1.117E+01	2.854E+01
PA-231	-3.896E+01	156.3	6.089E+01	6.093E+01	2.023E+02
PA-233	3.166E+00	159.1	5.037E+00	5.040E+00	1.674E+01
PA-234	-3.633E+00	127.4	4.629E+00	4.632E+00	1.538E+01
PA-234M	-3.932E+00	6720.1	2.642E+02	2.642E+02	7.689E+02
AM-241	1.261E+03	0.8	1.069E+01	6.630E+01	1.503E+01
Np-237	-5.568E+00	153.2	8.528E+00	8.533E+00	2.830E+01
Ir-192	1.758E+00	93.0	1.635E+00	1.638E+00	3.949E+00
Cs-136	2.053E+00	75.4	1.547E+00	1.551E+00	5.849E+00
Np-239	2.220E+00	136.7	3.036E+00	3.039E+00	1.010E+01
Nd-147	-7.525E+00	133.6	1.006E+01	1.007E+01	2.458E+01
TL-210	6.629E-01	216.8	1.437E+00	1.438E+00	4.864E+00
Kr-85	8.960E+01	329.7	2.954E+02	2.955E+02	9.968E+02
Total	1.214E+04				

Analyst: Joey Sausto

Sample description
404682_Gamma_LCS 160-404682~2-A

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20184259.An1

Acquisition information
Start time: 12/29/2018 11:12:05 AM
Live time: 1800
Real time: 1809
Dead time: 0.51 %
Detector ID: 5

Detector system
Ge 5 SN/157

Calibration
Filename: 5_Soil_TunaCan.Clb
5_Soil_TunaCan_90099_032612

Energy Calibration
Created: 2/28/2012 7:35:48 PM
Zero offset: 0.158 keV
Gain: 0.250 keV/channel
Quadratic: 3.911E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 5:20:37 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.466115E-01 + (-7.830454E-01*Log(E)) + (-4.117504E-03*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.43 %
Log(Eff): -2.462251E+01 + (9.075211E+00*Log(E)) + (-9.664422E-01*Log(E)^2)

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

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.62keV)
Stop channel: 8000 (2000.81keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

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

Corrections	Status	Comments
Decay correct to date:	YES	12/29/2018 11:11:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2018-12-22_1400.PBC 12/22/2018 2:00:09 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 25 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1465

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.65	13796.	1.02	0.78	1.792E-02	46.54	4.250	1.009E+04	PB210
49.72	61.	123.69	0.79	1.984E-02	50.14	8.000	2.122E+01	TH227
59.55	20640.	0.85	0.75	2.534E-02	59.54	35.900	1.261E+03	AM241
64.07	77.	64.81	0.80	2.712E-02	63.29	3.810	PBC<MDA	TH234
					64.28	9.700	PBC<MDA	Sn126
75.03	86.	40.15	0.81	3.153E-02				
76.98	109.	29.14	0.81	3.211E-02				
87.94	84.	35.42	0.83	3.462E-02	87.57	37.500	3.585E+00	Sn126
					88.04	3.790	3.539E+01	Cd109
89.54	43.	65.72	0.83	3.487E-02				
92.55	60.	51.18	0.83	3.527E-02	92.59	5.584	PBC<MDA	TH234
93.35	32.	198.43	0.83	3.536E-02	93.35	5.561	PBC<MDA	AC228
97.50	42.	111.59	0.84	3.577E-02	97.50	30.000	PBC<MDA	Gd153
99.50	29.	155.81	0.84	3.592E-02	99.50	15.000	PBC<MDA	Np239
106.13	33.	136.75	0.84	3.620E-02	106.13	22.700	PBC<MDA	Np239
133.54	40.	116.95	0.87	3.487E-02	133.54	11.090	PBC<MDA	CE144
136.30	39.	122.15	0.88	3.458E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	5.889E+00	CO57
136.47	6.	782.22	0.88	3.457E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	9.405E-01	CO57
143.79	39.	111.87	0.88	3.371E-02	143.79	10.960	PBC<MDA	U235
145.44	32.	150.14	0.88	3.351E-02	145.44	48.200	PBC<MDA	CE141

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
169.18	45.	44.39	0.60	3.082E-02				
185.72	39.	102.17	0.93	2.854E-02	185.72	54.000	PBC<MDA	U235
193.51	12.	342.61	0.93	2.758E-02	193.51	4.400	PBC<MDA	TH229
235.97	31.	161.64	0.98	2.341E-02	235.97	12.300	PBC<MDA	TH227
238.47	96.	33.37	0.39	2.321E-02	238.63	43.300	5.329E+00	PB212
241.90	29.	170.83	0.98	2.293E-02	242.00	7.430	PBC<MDA	PB214
244.69	22.	231.37	0.98	2.272E-02	244.69	7.580	PBC<MDA	EU152
256.24	11.	363.01	1.00	2.186E-02	256.24	7.000	PBC<MDA	TH227
265.29	34.	105.25	1.00	2.121E-02	265.83	50.000	PBC<MDA	BI210M
279.20	27.	130.20	1.02	2.036E-02	279.20	81.460	PBC<MDA	Hg203
295.05	59.	52.90	1.83	1.945E-02	295.09	19.300	PBC<MDA	PB214
304.90	13.	481.52	1.04	1.893E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	1.354E+00	BI210M
308.44	10.	628.77	1.05	1.875E-02	308.44	31.750	PBC<MDA	Ir192
312.01	38.	159.09	1.05	1.857E-02	312.01	36.000	PBC<MDA	PA233
316.55	34.	99.88	1.05	1.835E-02	316.49	87.040	PBC<MDA	Ir192
328.76	10.	326.70	1.07	1.778E-02	328.76	20.300	PBC<MDA	La140
333.44	33.	97.84	1.07	1.757E-02	333.44	15.510	PBC<MDA	Cf249
338.32	35.	119.00	1.07	1.736E-02	338.32	12.010	PBC<MDA	AC228
340.57	36.	117.98	1.08	1.727E-02	340.57	46.900	PBC<MDA	Cs136
352.05	85.	32.31	2.27	1.680E-02	351.93	37.600	7.512E+00	PB214
363.35	34.	95.28	1.10	1.632E-02	364.48	81.700	PBC<MDA	I131
391.69	6.	777.11	1.12	1.537E-02	391.69	64.000	PBC<MDA	SN113
427.88	10.	384.97	1.16	1.428E-02	427.88	29.600	PBC<MDA	SB125
463.37	8.	439.67	1.19	1.336E-02	463.37	10.470	PBC<MDA	SB125
467.99	40.	92.98	1.20	1.325E-02	468.06	51.750	PBC<MDA	Ir192
482.00	19.	190.00	1.21	1.293E-02	482.00	80.500	PBC<MDA	HF181
497.05	9.	330.17	1.22	1.260E-02	497.05	90.900	PBC<MDA	RU103
511.86	54.	50.01	2.48	1.230E-02	511.86	20.000	PBC<MDA	RH106
513.98	8.	329.73	1.24	1.226E-02	513.98	0.430	PBC<MDA	Kr85
563.24	10.	237.42	1.28	1.135E-02	563.24	8.350	PBC<MDA	CS134
583.00	59.	25.47	2.04	1.103E-02	583.02	84.500	3.533E+00	TL208
600.50	24.	136.88	1.31	1.076E-02	600.50	17.860	PBC<MDA	SB125
602.73	24.	138.81	1.32	1.073E-02	602.73	98.260	PBC<MDA	SB124
604.71	24.	141.58	1.32	1.070E-02	604.71	97.620	PBC<MDA	CS134
609.31	18.	191.81	1.32	1.063E-02	609.31	46.090	PBC<MDA	BI214
610.30	24.	146.77	1.32	1.062E-02	610.30	5.750	PBC<MDA	RU103
614.28	24.	149.16	1.33	1.056E-02	614.28	89.850	PBC<MDA	AG108M
623.09	10.	389.06	1.33	1.045E-02	621.92	9.930	PBC<MDA	RH106
635.89	41.	51.70	1.34	1.026E-02	635.89	11.310	PBC<MDA	SB125
636.97	18.	98.40	1.34	1.025E-02	636.97	7.170	PBC<MDA	I131
661.51	5329.	1.42	1.29	9.926E-03	661.66	85.210	3.501E+02	CS137
702.63	12.	167.67	1.40	9.438E-03	702.63	97.900	PBC<MDA	NB94
727.17	20.	85.72	1.42	9.170E-03	727.17	7.550	PBC<MDA	BI212
735.72	21.	90.61	1.43	9.081E-03	735.72	22.500	PBC<MDA	PM146
756.73	14.	135.18	1.45	8.869E-03	756.73	54.460	PBC<MDA	ZR95
763.94	20.	74.09	1.45	8.799E-03	763.94	22.280	PBC<MDA	AG110M
765.79	14.	107.91	1.45	8.781E-03	765.79	99.790	PBC<MDA	NB95

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					766.41	0.294	3.114E+02	PA234M
795.87	5.	435.89	1.48	8.503E-03	795.87	85.530	PBC<MDA	CS134
799.71	10.	216.79	1.48	8.469E-03	799.60	98.960	PBC<MDA	TL210
801.95	22.	87.73	1.48	8.448E-03	801.95	8.690	PBC<MDA	CS134
818.50	28.	93.77	1.50	8.305E-03	818.50	100.000	PBC<MDA	Cs136
834.85	24.	89.75	1.51	8.168E-03	834.85	99.980	PBC<MDA	MN54
846.07	18.	121.61	1.52	8.072E-03	846.77	99.935	PBC<MDA	Co56
860.56	25.	88.91	1.53	7.963E-03	860.56	12.420	PBC<MDA	TL208
871.10	14.	125.38	1.54	7.882E-03	871.10	99.890	PBC<MDA	NB94
873.23	3.	636.83	1.54	7.866E-03	873.23	12.270	PBC<MDA	EU154
884.68	9.	299.48	1.55	7.781E-03	884.68	72.680	PBC<MDA	AG110M
889.28	27.	95.16	1.55	7.747E-03	889.28	99.984	PBC<MDA	Sc46
898.04	13.	196.84	1.56	7.684E-03	898.04	93.700	PBC<MDA	Y88
937.49	28.	86.57	1.59	7.411E-03	937.49	34.360	PBC<MDA	AG110M
968.97	26.	84.73	1.61	7.209E-03	968.97	17.460	PBC<MDA	AC228
1037.87	8.	291.37	1.66	6.805E-03	1037.84	14.130	PBC<MDA	Co56
1051.13	9.	205.18	1.67	6.736E-03	1050.36	1.560	PBC<MDA	RH106
1077.40	12.	198.58	1.69	6.594E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	18.	128.60	1.71	6.484E-03	1099.25	56.500	PBC<MDA	FE59
1116.13	15.	150.22	1.72	6.404E-03	1115.55	50.600	PBC<MDA	ZN65
1172.91	1680.	2.54	1.68	6.139E-03	1173.24	99.900	1.523E+02	CO60
1189.05	7.	161.52	1.77	6.069E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	12.	88.90	1.79	5.934E-03	1221.41	27.000	PBC<MDA	Ta182
1237.97	22.	21.39	1.80	5.866E-03	1238.28	66.070	3.152E+00	Co56
1274.53	9.	64.57	1.83	5.725E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	2.477E+00	EU154
1332.16	1577.	2.52	1.84	5.516E-03	1332.50	99.980	1.589E+02	CO60
1690.98	1.	427.57	2.08	4.511E-03	1690.98	47.790	PBC<MDA	SB124
1764.49	4.	121.21	2.11	4.351E-03	1764.49	15.400	PBC<MDA	BI214
1836.06	7.	41.33	2.15	4.208E-03	1836.06	99.200	PBC<MDA	Y88

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

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
198.70	49.68	2861.	73.	3.704E+03	103.60	0.787	- c
299.74	74.88	547.	83.	2.630E+03	41.39	0.813	- D
307.56	76.84	453.	107.	3.324E+03	29.81	0.815	- sD
358.01	89.62	381.	61.	1.753E+03	46.96	0.828	- sD
676.66	169.18	149.	45.	1.449E+03	44.39	0.597	- 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	185.69	46.54	2928.	13796.	7.664	1.02	0.783D
TH-227	200.11	50.14	23467.	-111.	-0.062	195.41	0.787s
AM-241	237.79	59.55	2726.	20640.	11.467	0.85	0.746
TH-234	252.74	63.29	845.	77.	0.043	64.81	0.801s
Sn-126	256.71	64.28	1184.	-48.	-0.027	102.05	0.802
BA-133	323.61	80.99	1041.	-51.	-0.028	67.39	0.819s
Np-237	345.63	86.49	2363.	-45.	-0.025	153.15	0.825s
EU-155	345.84	86.54	2242.	-46.	-0.025	147.46	0.825s
Sn-126	347.43	86.94	2168.	-46.	-0.025	144.99	0.825s
Sn-126	349.95	87.57	2113.	-46.	-0.025	143.03	0.826s
Cd-109	351.83	88.04	2062.	38.	0.021	171.06	0.826A
TH-234	370.05	92.59	447.	60.	0.034	51.18	0.831D
AC-228	373.09	93.35	1958.	32.	0.018	198.43	0.832s
Gd-153	389.70	97.50	1059.	42.	0.023	111.59	0.836s
Np-239	397.71	99.50	984.	29.	0.016	155.81	0.838s
Np-239	414.52	103.70	1237.	0.	0.000	1000.00	0.842s
EU-155	420.98	105.31	1237.	0.	0.000	1000.00	0.844
Np-239	424.25	106.13	991.	33.	0.018	136.75	0.845
EU-152	486.90	121.78	991.	-12.	-0.007	377.31	0.861s
CO-57	488.03	122.06	775.	-44.	-0.025	90.25	0.861s
PA-234	524.99	131.29	1364.	-41.	-0.023	127.40	0.871s
HF-181	531.91	133.02	1405.	-22.	-0.012	245.32	0.872s
CE-144	533.97	133.54	1090.	40.	0.022	116.95	0.873
HF-181	545.02	136.30	1123.	39.	0.022	122.15	0.876s
CO-57	545.72	136.47	1192.	6.	0.003	782.22	0.876s
Tc-99m	561.88	140.51	1297.	-19.	-0.011	266.73	0.880s
U-235	574.99	143.79	926.	39.	0.022	111.87	0.883s
CE-141	581.61	145.44	1160.	32.	0.018	150.14	0.885s
Ba-140	650.54	162.66	1230.	-39.	-0.022	126.68	0.902s
U-235	653.42	163.38	1191.	-40.	-0.022	76.86	0.903s
CE-139	663.32	165.85	1091.	-6.	-0.003	817.56	0.905s
Cf-251	706.34	176.60	513.	-40.	-0.022	103.16	0.916
U-235	742.85	185.72	497.	39.	0.022	102.17	0.925s
TH-229	774.03	193.51	530.	12.	0.007	342.61	0.933s
U-235	821.35	205.33	504.	-5.	-0.003	584.14	0.945s
Cf-251	908.08	227.00	480.	-17.	-0.009	230.62	0.966
TH-227	943.98	235.97	1205.	31.	0.017	161.64	0.975s
PB-212	954.64	238.63	256.	107.	0.060	23.18	0.978D
PB-214	968.10	242.00	1207.	29.	0.016	170.83	0.981s
EU-152	978.89	244.69	1226.	22.	0.012	231.37	0.984
TH-227	1025.11	256.24	425.	11.	0.006	363.01	0.995

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cd-113m	1054.97	263.70	539.	-40.	-0.022	84.08	1.002s
BI-210M	1063.50	265.83	639.	34.	0.019	105.25	1.005s
TL-208	1109.33	277.28	635.	-39.	-0.021	93.85	1.016
Hg-203	1117.00	279.20	584.	27.	0.015	130.20	1.017s
I-131	1137.41	284.30	411.	-33.	-0.018	36.29	1.022s
PB-214	1180.44	295.05	255.	59.	0.033	52.90	1.834s
TL-210	1184.24	296.00	1831.	-38.	-0.021	159.15	1.034
PB-212	1200.37	300.03	1793.	-39.	-0.022	80.75	1.038
PA-231	1200.53	300.07	1754.	-38.	-0.021	155.21	1.038s
PA-233	1200.97	300.18	1749.	-38.	-0.021	154.99	1.038s
PA-231	1210.86	302.65	1788.	-38.	-0.021	156.31	1.040s
BA-133	1211.66	302.85	1826.	-38.	-0.021	157.93	1.040s
Ba-140	1219.66	304.85	1865.	-39.	-0.021	159.27	1.042
BI-210M	1219.85	304.90	1928.	13.	0.007	481.52	1.042
Ir-192	1234.03	308.44	1925.	10.	0.005	628.77	1.046s
PA-233	1248.32	312.01	1818.	38.	0.021	159.09	1.049s
Ir-192	1266.25	316.49	566.	34.	0.019	99.88	1.053s
CR-51	1280.63	320.08	595.	-17.	-0.010	200.42	1.057s
La-140	1315.35	328.76	323.	10.	0.006	326.70	1.065s
Cf-249	1334.08	333.44	293.	33.	0.018	97.84	1.070
AC-228	1353.61	338.32	826.	35.	0.019	119.00	1.074
Cs-136	1362.62	340.57	860.	36.	0.020	117.98	1.077s
HF-181	1383.66	345.83	347.	-8.	-0.004	454.23	1.082s
PB-214	1408.55	352.05	187.	85.	0.047	32.31	2.270s
BA-133	1424.36	356.00	566.	-8.	-0.005	397.14	1.091s
I-131	1458.32	364.48	290.	34.	0.019	95.28	1.099s
BA-133	1535.78	383.84	1036.	-41.	-0.023	113.26	1.117s
Cf-249	1552.22	387.95	1076.	-41.	-0.023	115.03	1.121s
SN-113	1567.19	391.69	912.	6.	0.003	777.11	1.125s
SB-125	1711.99	427.88	384.	10.	0.006	384.97	1.158s
AG-108M	1736.25	433.94	436.	-26.	-0.015	163.46	1.164s
PM-146	1816.05	453.88	456.	-44.	-0.024	96.43	1.182s
SB-125	1854.01	463.37	589.	8.	0.004	439.67	1.191s
Ir-192	1872.79	468.06	667.	40.	0.022	92.98	1.195s
BE-7	1910.94	477.59	638.	-29.	-0.016	125.26	1.204
HF-181	1928.56	482.00	631.	19.	0.010	190.00	1.208s
RU-103	1988.80	497.05	228.	9.	0.005	330.17	1.221s
RH-106	2048.06	511.86	333.	54.	0.030	50.01	2.485
Kr-85	2056.53	513.98	388.	8.	0.005	329.73	1.237s
Nd-147	2124.62	531.00	200.	-21.	-0.012	133.64	1.252s
Ba-140	2149.67	537.26	168.	-6.	-0.004	671.23	1.258s
CS-134	2253.60	563.24	140.	10.	0.005	237.42	1.280s
CS-134	2277.94	569.32	204.	-31.	-0.017	66.99	1.286s
BI-207	2279.47	569.70	236.	0.	0.000	1000.00	1.286s
TL-208	2332.66	583.00	49.	59.	0.033	25.47	2.044s
SB-125	2402.69	600.50	528.	24.	0.013	136.88	1.313s
SB-124	2411.61	602.73	552.	24.	0.013	138.81	1.315s
CS-134	2419.53	604.71	576.	24.	0.013	141.58	1.317s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	2437.93	609.31	606.	18.	0.010	191.81	1.321s
RU-103	2441.89	610.30	625.	24.	0.014	146.77	1.322s
AG-108M	2457.82	614.28	649.	24.	0.014	149.16	1.325s
PM-144	2472.94	618.06	773.	-27.	-0.015	147.27	1.328s
RH-106	2488.37	621.92	729.	10.	0.005	389.06	1.332s
SB-125	2544.26	635.89	100.	41.	0.023	51.70	1.344
I-131	2548.61	636.97	140.	18.	0.010	98.40	1.345
AG-110M	2631.76	657.76	5486.	-22.	-0.012	483.04	1.362s
CS-137	2646.77	661.51	76.	5329.	2.960	1.42	1.286
PM-144	2786.90	696.54	100.	-8.	-0.004	268.25	1.395
NB-94	2811.25	702.63	100.	12.	0.007	167.67	1.400s
SB-124	2891.88	722.79	150.	-14.	-0.008	126.57	1.417s
AG-108M	2892.48	722.94	164.	0.	0.000	1000.00	1.417s
EU-154	2894.17	723.36	164.	0.	0.000	1000.00	1.418s
ZR-95	2897.53	724.20	161.	-6.	-0.004	286.40	1.418s
BI-212	2909.41	727.17	142.	20.	0.011	85.72	1.421s
PM-146	2943.61	735.72	83.	21.	0.012	90.61	1.428s
PM-146	2989.37	747.16	126.	-20.	-0.011	118.52	1.437s
ZR-95	3027.65	756.73	87.	14.	0.008	135.18	1.445s
AG-110M	3056.50	763.94	95.	20.	0.011	74.09	1.451s
NB-95	3063.89	765.79	115.	14.	0.008	107.91	1.453s
PA-234M	3066.38	766.41	133.	-12.	-0.007	137.16	1.453s
EU-152	3116.41	778.92	136.	-7.	-0.004	288.14	1.463s
BI-212	3142.41	785.42	140.	-4.	-0.002	629.48	1.468
CS-134	3184.20	795.87	235.	5.	0.003	435.89	1.477s
TL-210	3199.12	799.60	230.	10.	0.006	216.79	1.480s
CS-134	3208.53	801.95	183.	22.	0.012	87.73	1.482s
CO-58	3243.82	810.78	309.	-29.	-0.016	86.93	1.489s
La-140	3263.80	815.77	339.	-16.	-0.009	164.04	1.493s
Cs-136	3274.72	818.50	330.	28.	0.016	93.77	1.495s
MN-54	3340.10	834.85	98.	24.	0.013	89.75	1.508s
Co-56	3387.78	846.77	98.	18.	0.010	121.61	1.518s
TL-208	3442.95	860.56	103.	25.	0.014	88.91	1.529
NB-94	3485.08	871.10	158.	14.	0.008	125.38	1.537s
EU-154	3493.61	873.23	181.	3.	0.002	636.83	1.539
PA-234	3522.80	880.53	372.	-32.	-0.018	86.50	1.544s
PA-234	3533.64	883.24	404.	-32.	-0.018	89.89	1.547
AG-110M	3539.41	884.68	356.	9.	0.005	299.48	1.547
Sc-46	3557.79	889.28	328.	27.	0.015	95.16	1.551s
Y-88	3592.83	898.04	135.	13.	0.007	196.84	1.558s
AG-110M	3750.60	937.49	121.	28.	0.015	86.57	1.589s
PA-234	3784.70	946.02	191.	-7.	-0.004	401.83	1.595s
AC-228	3876.48	968.97	100.	26.	0.014	84.73	1.612s
EU-154	3985.88	996.33	264.	-19.	-0.011	121.08	1.633s
EU-154	4019.65	1004.77	120.	-6.	-0.003	403.46	1.639s
Co-56	4151.87	1037.84	110.	8.	0.004	291.37	1.664s
Cs-136	4192.77	1048.07	133.	-10.	-0.006	161.06	1.671s
RH-106	4201.93	1050.36	160.	9.	0.005	205.18	1.673s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-207	4255.11	1063.66	135.	-5.	-0.003	462.15	1.682s
Ga-68	4310.04	1077.40	115.	12.	0.007	198.58	1.692s
FE-59	4397.41	1099.25	105.	18.	0.010	128.60	1.708s
EU-152	4448.68	1112.07	239.	-17.	-0.009	132.10	1.717s
ZN-65	4462.56	1115.55	241.	15.	0.008	150.22	1.720s
BI-214	4481.51	1120.29	229.	-3.	-0.001	870.36	1.723s
Sc-46	4482.57	1120.55	226.	0.	0.000	1000.00	1.723s
Ta-182	4485.56	1121.30	270.	-29.	-0.016	81.31	1.724s
CO-60	4691.92	1172.91	22.	1680.	0.934	2.54	1.685
Ta-182	4756.42	1189.05	25.	7.	0.004	161.52	1.771s
Ta-182	4885.79	1221.41	21.	12.	0.007	88.90	1.793s
Co-56	4953.23	1238.28	0.	22.	0.012	21.39	1.804s
NA-22	5098.13	1274.53	12.	9.	0.005	64.57	1.828s
EU-154	5098.17	1274.54	41.	-15.	-0.008	65.71	1.828s
FE-59	5166.35	1291.60	16.	0.	0.000	1000.00	1.840s
TL-210	5251.91	1313.00	11.	-2.	-0.001	452.11	1.854s
CO-60	5328.48	1332.16	1.	1577.	0.876	2.52	1.840
AG-110M	5536.88	1384.30	11.	-4.	-0.002	209.09	1.899s
K-40	5842.75	1460.83	14.	-4.	-0.002	161.11	1.946s
La-140	6383.73	1596.21	11.	-2.	-0.001	251.55	2.024s
SB-124	6762.39	1690.98	6.	1.	0.001	427.57	2.076s
BI-214	7056.06	1764.49	8.	4.	0.002	121.21	2.114s
Co-56	7083.46	1771.35	4.	0.	0.000	1000.00	2.117s
Y-88	7341.96	1836.06	0.	7.	0.004	41.33	2.149s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.1686E+01				5.31E+01	
			477.60	-1.169E+01	?(	4.880E+01 1.25E+02 1.05E+01	G
NA-22	C	8.7230E-01				9.50E+02	
			1274.53	8.723E-01	?(	1.852E+00 6.46E+01 9.99E+01	G
K-40	N	-3.7580E+00				4.66E+11	
			1460.83	-3.758E+00	?(P	2.035E+01 1.61E+02 1.07E+01	G
Sc-46	F	1.9720E+00				8.38E+01	
			889.28	1.972E+00	?(	6.252E+00 9.52E+01 1.00E+02	G
			1120.55	0.000E+00	-	6.337E+00 1.00E+03 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	-5.3317E+00					2.77E+01	
			320.08	-5.332E+00	*(	3.579E+01	2.00E+02	9.94E+00 G
MN-54	C	1.6345E+00					3.12E+02	
			834.85	1.634E+00	&(	3.322E+00	8.98E+01	1.00E+02 G
FE-59	F	2.7040E+00					4.45E+01	
			1099.25	2.704E+00	?(P	7.659E+00	1.29E+02	5.65E+01 G
			1291.60	0.000E+00	-	4.850E+00	1.00E+03	4.32E+01 G
Co-56	C	2.1909E+00					7.73E+01	
			846.77	1.214E+00	?(P	3.370E+00	1.22E+02	9.99E+01 G
			1238.28	3.152E+00	?(P	1.057E+00	2.14E+01	6.61E+01 G
			1037.84	4.607E+00	?(P	2.981E+01	2.91E+02	1.41E+01 G
			1771.35	0.000E+00	-	9.792E+00	1.00E+03	1.55E+01 A
CO-57	C	-8.0151E-01					2.72E+02	
			122.06	-8.015E-01	&(	2.399E+00	9.03E+01	8.56E+01 G
			136.47	9.405E-01	&	2.462E+01	7.82E+02	1.07E+01 G
CO-58	C	-1.9539E+00					7.09E+01	
			810.78	-1.954E+00	?(	5.650E+00	8.69E+01	9.95E+01 G
CO-60	F	1.5559E+02					1.93E+03	
			1332.50	1.589E+02	(P	7.427E-01	2.52E+00	1.00E+02 G
			1173.24	1.523E+02	(P	2.205E+00	2.54E+00	9.99E+01 G
ZN-65	F	2.5431E+00					2.44E+02	
			1115.55	2.543E+00	?(	1.286E+01	1.50E+02	5.06E+01 G
NB-94	I	8.8302E-01					7.41E+06	
			702.63	7.416E-01	?(	2.960E+00	1.68E+02	9.79E+01 G
			871.10	1.022E+00	(P	4.318E+00	1.25E+02	9.99E+01 G
ZR-95	I	1.6486E+00					6.40E+01	
			756.73	1.649E+00	?(	5.301E+00	1.35E+02	5.45E+01 G
			724.20	-8.661E-01	-	8.465E+00	2.86E+02	4.42E+01 G
NB-95	I	9.1681E-01					6.40E+01	
			765.79	9.168E-01	?(	3.334E+00	1.08E+02	9.98E+01 G
RU-103	I	4.3645E-01					3.93E+01	
			497.05	4.364E-01	&(	3.544E+00	3.30E+02	9.09E+01 G
			610.30	2.213E+01	&	1.085E+02	1.47E+02	5.75E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RH-106	I	1.0896E+01					3.74E+02	
			621.92	5.272E+00	&(	6.881E+01	3.89E+02	9.93E+00 G
			1050.36	4.670E+01	?(	3.258E+02	2.05E+02	1.56E+00 G
			511.86	1.212E+01		1.983E+01	5.00E+01	2.00E+01 GA
AG-108M	C	1.3991E-01					1.53E+05	
			433.94	-1.139E+00	?(P	4.352E+00	1.63E+02	9.05E+01 G
			722.94	0.000E+00	+	4.140E+00	1.00E+03	9.08E+01 G
			614.28	1.427E+00	?(	7.110E+00	1.49E+02	8.98E+01 G
AG-110M	F	3.0526E+00					2.50E+02	
			884.68	8.808E-01	&(	8.904E+00	2.99E+02	7.27E+01 G
			657.76	-1.278E+00	+	2.048E+01	4.83E+02	9.46E+01 G
			937.49	6.036E+00	&(	1.179E+01	8.66E+01	3.44E+01 G
			1384.30	-1.570E+00	+	7.679E+00	2.09E+02	2.43E+01 G
			763.94	5.537E+00	?(	1.364E+01	7.41E+01	2.23E+01 G
SN-113	F	3.1087E-01					1.15E+02	
			391.69	3.109E-01	?(P	8.101E+00	7.77E+02	6.40E+01 G
SB-124	F	9.7029E-01					6.02E+01	
			602.73	1.275E+00	?(	5.912E+00	1.39E+02	9.83E+01 G
			1690.98	3.436E-01	?(	3.557E+00	4.28E+02	4.78E+01 G
			722.79	-7.806E+00	+	3.333E+01	1.27E+02	1.08E+01 G
SB-125	I	6.0546E+00					1.01E+03	
			427.88	1.314E+00	?(	1.236E+01	3.85E+02	2.96E+01 G
			600.50	6.939E+00	&(P	3.173E+01	1.37E+02	1.79E+01 G
			635.89	1.979E+01	&(	2.357E+01	5.17E+01	1.13E+01 G
			463.37	3.110E+00	(	4.599E+01	4.40E+02	1.05E+01 G
I-131	I	2.3694E+00					8.02E+00	
			364.48	1.416E+00	&(	3.418E+00	9.53E+01	8.17E+01 G
			284.30	-1.475E+01	+ P	4.382E+01	3.63E+01	6.14E+00 G
			636.97	1.324E+01	(	4.368E+01	9.84E+01	7.17E+00 G
Gd-153	F	2.1561E+00					2.42E+02	
			97.50	2.156E+00	?(	7.991E+00	1.12E+02	3.00E+01 G
			103.20	-4.704E-02	%	1.175E+01	7.46E+03	2.18E+01 G
Ga-68	C	3.5998E+01					4.71E-02	
			1077.40	3.600E+01	?(	1.580E+02	1.99E+02	3.30E+00 G
Tc-99m	I	-3.6054E-01					2.51E-01	
			140.51	-3.605E-01	?(	3.208E+00	2.67E+02	8.93E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BA-133	F	-4.5730E-01					3.85E+03	
			356.00	-4.573E-01	?(	6.108E+00	3.97E+02	6.20E+01 G
			302.85	-6.126E+00	+	3.214E+01	1.58E+02	1.83E+01 G
			383.84	-1.613E+01	+	6.069E+01	1.13E+02	8.94E+00 GA
			80.99	-2.504E+00	+ P	7.518E+00	6.74E+01	3.41E+01 GA
CS-134	I	1.7700E+00					7.54E+02	
			795.87	3.820E-01	(	5.664E+00	4.36E+02	8.55E+01 G
			604.71	1.289E+00	?(	6.093E+00	1.42E+02	9.76E+01 G
			569.32	-1.005E+01	+	2.224E+01	6.70E+01	1.54E+01 G
			801.95	1.699E+01	*(	4.973E+01	8.77E+01	8.69E+00 G
			563.24	5.772E+00	?(P	3.391E+01	2.37E+02	8.35E+00 G
CS-137	I	3.5008E+02					1.10E+04	
			661.66	3.501E+02	(P	2.849E+00	1.42E+00	8.52E+01 G
CE-139	F	-1.2698E-01					1.38E+02	
			165.85	-1.270E-01	&(	3.477E+00	8.18E+02	7.99E+01 G
Ba-140	I	-1.2296E+00					1.28E+01	
			537.26	-1.230E+00	?(P	1.218E+01	6.71E+02	2.44E+01 G
			162.66	-1.132E+01	+	4.767E+01	1.27E+02	6.22E+00 G
			304.85	-2.637E+01	+	1.395E+02	1.59E+02	4.29E+00 G
La-140	I	3.9350E-02					1.28E+01	
			1596.21	-2.907E-01	?(P	2.265E+00	2.52E+02	9.54E+01 G
			487.02	-1.905E-01	&	7.415E+00	1.58E+03	4.55E+01 G
			328.76	1.591E+00	&(	1.330E+01	3.27E+02	2.03E+01 G
			815.77	-4.599E+00	+	2.535E+01	1.64E+02	2.33E+01 G
CE-141	I	1.1111E+00					3.25E+01	
			145.44	1.111E+00	&(	5.552E+00	1.50E+02	4.82E+01 G
CE-144	I	5.7873E+00					2.85E+02	
			133.54	5.787E+00	(	2.249E+01	1.17E+02	1.11E+01 G
PM-144	C	-4.5255E-01					3.63E+02	
			696.54	-4.525E-01	&(	2.906E+00	2.68E+02	9.90E+01 G
			618.06	-1.437E+00	&	7.058E+00	1.47E+02	9.91E+01 G
EU-152	F	9.4683E-01					4.94E+03	
			121.78	-6.419E-01	(	8.104E+00	3.77E+02	2.86E+01 G
			344.29	2.483E-01	&	1.742E+01	2.09E+03	2.65E+01 G
			1112.07	-1.068E+01	+	4.739E+01	1.32E+02	1.36E+01 G
			778.92	-3.293E+00	+ P	2.826E+01	2.88E+02	1.29E+01 G
			964.11	-7.882E-01	%	3.302E+01	1.22E+03	1.46E+01 G
			244.69	6.937E+00	(	5.353E+01	2.31E+02	7.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1408.00	2.371E-01	% P	6.867E+00	1.13E+03	2.10E+01 GA
EU-154	I	3.7693E-01					3.14E+03	
			123.10	-2.911E-02	%(	5.580E+00	5.71E+03	4.08E+01 G
			1274.54	-4.132E+00	+	8.974E+00	6.57E+01	3.52E+01 G
			723.36	0.000E+00	+	1.861E+01	1.00E+03	2.02E+01 G
			873.23	1.727E+00	?(	3.765E+01	6.37E+02	1.23E+01 G
			1004.77	-2.647E+00	&	2.372E+01	4.03E+02	1.80E+01 G
			996.33	-1.439E+01	&	5.840E+01	1.21E+02	1.06E+01 G
HF-181	F	1.6650E+00					4.24E+01	
			482.00	1.005E+00	?(	6.391E+00	1.90E+02	8.05E+01 G
			133.02	-7.970E-01	+	6.518E+00	2.45E+02	4.33E+01 G
			345.83	-1.664E+00	+	1.935E+01	4.54E+02	1.51E+01 G
			136.30	1.075E+01	&(	4.362E+01	1.22E+02	5.85E+00 G
Ta-182	F	-7.3260E+00					1.14E+02	
			1121.30	-7.326E+00	?(	1.979E+01	8.13E+01	3.49E+01 G
			1221.41	4.320E+00	+	8.403E+00	8.89E+01	2.70E+01 G
			1189.05	3.955E+00	+	1.470E+01	1.62E+02	1.62E+01 G
Hg-203	F	8.8873E-01					4.66E+01	
			279.20	8.887E-01	&(	3.861E+00	1.30E+02	8.15E+01 G
TL-208	N	3.5335E+00					6.98E+02	
			583.02	3.533E+00	(P	2.100E+00	2.55E+01	8.45E+01 G
			277.28	-1.657E+01	-	5.164E+01	9.38E+01	6.31E+00 G
			860.56	1.394E+01	+ P	2.806E+01	8.89E+01	1.24E+01 G
PM-146	C	-5.7515E-01					2.02E+03	
			453.88	-2.760E+00	?(	6.426E+00	9.64E+01	6.50E+01 G
			747.16	-3.585E+00	&	1.002E+01	1.19E+02	3.40E+01 G
			735.72	5.736E+00	?(P	1.227E+01	9.06E+01	2.25E+01 G
Y-88	F	9.2633E-01					1.07E+02	
			1836.06	8.780E-01	?(P	9.809E-01	4.13E+01	9.92E+01 G
			898.04	9.774E-01	(	4.392E+00	1.97E+02	9.37E+01 G
Cd-113m		-1.7242E+04					5.33E+03	
			263.70	-1.724E+04	(	4.809E+04	8.41E+01	6.00E-03 K
Cd-109	F	1.5968E+01					4.53E+02	
							Derived Ave Activity	
			88.04	1.597E+01	}(	9.074E+01	1.71E+02	3.79E+00 G
Cf-251	T	-4.3452E+00					3.28E+05	
			176.60	-4.345E+00	(	1.190E+01	1.03E+02	1.70E+01 G
			227.00	-6.202E+00	+	3.823E+01	2.31E+02	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	-5.0012E-01					1.28E+05	
			387.95	-2.212E+00	?(	8.452E+00	1.15E+02	6.60E+01 G
			333.44	6.783E+00	&(	1.682E+01	9.78E+01	1.55E+01 G
Sn-126		-1.0006E+01					3.65E+07	
			87.57	-1.960E+00	}	9.305E+00	1.43E+02	3.75E+01 GA
			64.28	-1.001E+01	(	3.387E+01	1.02E+02	9.70E+00 G
			86.94	-8.150E+00	&	3.922E+01	1.45E+02	9.04E+00 GA
PB-210	N	1.0085E+04					8.14E+03	
			46.54	1.009E+04	(P	1.863E+02	1.02E+00	4.25E+00 G
PB-212	N	5.9462E+00					6.98E+02	
			238.63	5.946E+00	(P	4.275E+00	2.32E+01	4.33E+01 G
			300.03	-3.438E+01	- P	1.766E+02	8.07E+01	3.28E+00 GA
PB-214	N	7.9453E+00					5.84E+05	
			351.93	7.512E+00	*(P	5.836E+00	3.23E+01	3.76E+01 G
			295.09	8.790E+00	@(P	1.141E+01	5.29E+01	1.93E+01 G
			242.00	9.437E+00	?	5.369E+01	1.71E+02	7.43E+00 GA
BI-207	C	-5.6254E-01					1.18E+04	
			1063.66	-5.625E-01	&(P	6.361E+00	4.62E+02	7.45E+01 G
			569.70	0.000E+00	&	3.758E+00	1.00E+03	9.77E+01 G
BI-212	N	1.6340E+01					6.98E+02	
			727.17	1.634E+01	?(	4.676E+01	8.57E+01	7.55E+00 G
			785.42	-2.019E+01	-	2.920E+02	6.29E+02	1.28E+00 GA
U-235	N	5.8437E+00					2.57E+11	
			143.79	5.844E+00	&(	2.173E+01	1.12E+02	1.10E+01 G
			205.33	-2.239E+00	- P	4.533E+01	5.84E+02	5.01E+00 G
			163.38	-1.419E+01	& P	5.765E+01	7.69E+01	5.08E+00 G
			185.72	1.417E+00	-	3.842E+00	1.02E+02	5.40E+01 GA
BI-214	N	2.3302E+00					5.84E+05	
			609.31	2.075E+00	*(P	1.332E+01	1.92E+02	4.61E+01 G
			1120.29	-1.528E+00	+ P	4.219E+01	8.70E+02	1.51E+01 G
			1764.49	3.095E+00	?(P	1.335E+01	1.21E+02	1.54E+01 G
BI-210M	T	1.6422E+00					1.10E+09	
			265.83	1.803E+00	&(	6.314E+00	1.05E+02	5.00E+01 G
			304.90	1.354E+00	?(	2.173E+01	4.82E+02	2.80E+01 G
AC-228	N	5.4030E+00					2.10E+03	
			911.07	2.613E-01	%(P	1.615E+01	2.70E+03	2.90E+01 G
			968.97	1.133E+01	?(	2.171E+01	8.47E+01	1.75E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			338.32	9.195E+00	?(P	3.640E+01	1.19E+02	1.20E+01 G
			93.35	8.946E+00	&	5.902E+01	1.98E+02	5.56E+00 XA
TH-227	N	5.1633E+00					7.95E+03	
			256.24	3.872E+00	?(	3.587E+01	3.63E+02	7.00E+00 G
			235.97	5.898E+00	?(	3.174E+01	1.62E+02	1.23E+01 G
			50.14	-3.832E+01	+	2.474E+02	1.95E+02	8.00E+00 G
TH-229	N	5.4929E+00					2.68E+06	
			193.51	5.493E+00	*(	5.035E+01	3.43E+02	4.40E+00 G
			210.85	7.231E-01	&	7.579E+01	3.90E+03	2.99E+00 G
TH-234	N	2.6818E+01					1.63E+12	
			92.59	1.703E+01	(P	2.854E+01	5.12E+01	5.58E+00 G
			63.29	4.116E+01	&(P	7.430E+01	6.48E+01	3.81E+00 G
PA-231	N	-3.8956E+01					1.20E+07	
			302.65	-3.896E+01	?(	2.023E+02	1.56E+02	2.88E+00 G
			300.07	-4.518E+01	+	2.330E+02	1.55E+02	2.46E+00 G
PA-233	C	3.1661E+00					7.82E+08	
			312.01	3.166E+00	?(	1.674E+01	1.59E+02	3.60E+01 G
			300.18	-1.793E+01	+	9.235E+01	1.55E+02	6.20E+00 G
PA-234	N	-3.6331E+00					1.63E+12	
			131.29	-3.633E+00	?(	1.538E+01	1.27E+02	1.80E+01 G
			946.02	-4.134E+00	&	3.786E+01	4.02E+02	1.34E+01 G
			569.47	-5.233E-01	&	4.469E+01	2.50E+03	8.20E+00 G
			883.24	-2.396E+01	+	7.160E+01	8.99E+01	9.60E+00 G
			880.53	-3.818E+01	+	1.097E+02	8.65E+01	6.00E+00 GA
PA-234M	N	-3.9319E+00					1.63E+12	
			1001.00	-3.932E+00	&(P	7.689E+02	6.72E+03	8.37E-01 G
			766.41	-2.620E+02	+	1.216E+03	1.37E+02	2.94E-01 G
AM-241	T	1.2609E+03					1.58E+05	
			59.54	1.261E+03	(P	1.503E+01	8.48E-01	3.59E+01 G
Np-237	F	-5.5681E+00					2.14E+06	
			86.49	-5.568E+00	?(	2.830E+01	1.53E+02	1.31E+01 G
Ir-192	F	1.7585E+00					7.40E+01	
			316.49	1.189E+00	?(	3.949E+00	9.99E+01	8.70E+01 G
			468.06	3.230E+00	?(	9.971E+00	9.30E+01	5.18E+01 G
			308.44	9.223E-01	?(	1.934E+01	6.29E+02	3.18E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Cs-136   F   2.0528E+00                                     1.30E+01
                          818.50 1.873E+00 ?(  5.849E+00 9.38E+01 1.00E+02 G
                         1048.07-1.063E+00 -   5.816E+00 1.61E+02 8.00E+01 G
                          340.57 2.437E+00 &(  9.564E+00 1.18E+02 4.69E+01 G

Np-239   T   2.2201E+00                                     2.36E+00
                          103.70 0.000E+00 -   1.068E+01 1.00E+03 2.40E+01 X
                          106.13 2.220E+00 &(  1.010E+01 1.37E+02 2.27E+01 G
                           99.50 2.958E+00     1.536E+01 1.56E+02 1.50E+01 X

Nd-147      -7.5246E+00                                     1.11E+01
                          531.00-7.525E+00 &(  2.458E+01 1.34E+02 1.30E+01 G
                           91.10-4.270E-07 %   1.188E+01 8.34E+08 2.83E+01 G

TL-210   N   6.6286E-01                                     5.84E+05
                          799.60 6.629E-01 ?(  4.864E+00 2.17E+02 9.90E+01 G
                          296.00-1.386E+00 +   7.326E+00 1.59E+02 7.90E+01 G
                         1313.00-7.897E-01 +   8.495E+00 4.52E+02 2.10E+01 GA

Kr-85    I   8.9604E+01                                     3.92E+03
                          513.98 8.960E+01 ?(  9.968E+02 3.30E+02 4.30E-01 G
   ( - This peak used in the nuclide activity average.

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

   Nuclide Codes:                      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 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	23467.	-111.	-0.062	195.41	-3.832E+01	
Sn-126	64.28	1184.	-48.	-0.027	102.05	-1.001E+01	
BA-133	80.99	1041.	-51.	-0.028	67.39	-2.504E+00	P
Np-237	86.49	2363.	-45.	-0.025	153.15	-5.568E+00	
EU-155	86.54	2242.	-46.	-0.025	147.46	-2.404E+00	
Sn-126	86.94	2168.	-46.	-0.025	144.99	-8.150E+00	
Sn-126	87.57	2113.	-46.	-0.025	143.03	-1.960E+00	
AC-228	93.35	1958.	32.	0.018	198.43	8.946E+00	
Gd-153	97.50	1059.	42.	0.023	111.59	2.156E+00	
Np-239	99.50	984.	29.	0.016	155.81	2.958E+00	
Np-239	106.13	991.	33.	0.018	136.75	2.220E+00	
EU-152	121.78	991.	-12.	-0.007	377.31	-6.419E-01	
CO-57	122.06	775.	-44.	-0.025	90.25	-8.015E-01	
PA-234	131.29	1364.	-41.	-0.023	127.40	-3.633E+00	
HF-181	133.02	1405.	-22.	-0.012	245.32	-7.970E-01	
CE-144	133.54	1090.	40.	0.022	116.95	5.787E+00	
HF-181	136.30	1123.	39.	0.022	122.15	1.075E+01	
CO-57	136.47	1192.	6.	0.003	782.22	9.405E-01	
Tc-99m	140.51	1297.	-19.	-0.011	266.73	-3.605E-01	
U-235	143.79	926.	39.	0.022	111.87	5.844E+00	
CE-141	145.44	1160.	32.	0.018	150.14	1.111E+00	
Ba-140	162.66	1230.	-39.	-0.022	126.68	-1.132E+01	
U-235	163.38	1191.	-40.	-0.022	76.86	-1.419E+01	P
CE-139	165.85	1091.	-6.	-0.003	817.56	-1.270E-01	
Cf-251	176.60	513.	-40.	-0.022	103.16	-4.345E+00	
U-235	185.72	497.	39.	0.022	102.17	1.417E+00	
TH-229	193.51	530.	12.	0.007	342.61	5.493E+00	
U-235	205.33	504.	-5.	-0.003	584.14	-2.239E+00	P
Cf-251	227.00	480.	-17.	-0.009	230.62	-6.202E+00	
TH-227	235.97	1205.	31.	0.017	161.64	5.898E+00	
EU-152	244.69	1226.	22.	0.012	231.37	6.937E+00	
TH-227	256.24	425.	11.	0.006	363.01	3.872E+00	
Cd-113m	263.70	539.	-40.	-0.022	84.08	-1.724E+04	
Hg-203	279.20	584.	27.	0.015	130.20	8.887E-01	
PA-231	300.07	1754.	-38.	-0.021	155.21	-4.518E+01	
PA-233	300.18	1749.	-38.	-0.021	154.99	-1.793E+01	
PA-231	302.65	1788.	-38.	-0.021	156.31	-3.896E+01	
BA-133	302.85	1826.	-38.	-0.021	157.93	-6.126E+00	
Ba-140	304.85	1865.	-39.	-0.021	159.27	-2.637E+01	
PA-233	312.01	1818.	38.	0.021	159.09	3.166E+00	
CR-51	320.08	595.	-17.	-0.010	200.42	-5.332E+00	
La-140	328.76	323.	10.	0.006	326.70	1.591E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Cf-249	333.44	293.	33.	0.018	97.84	6.783E+00		
AC-228	338.32	826.	35.	0.019	119.00	9.195E+00		P
Cs-136	340.57	860.	36.	0.020	117.98	2.437E+00		
HF-181	345.83	347.	-8.	-0.004	454.23	-1.664E+00		
BA-133	356.00	566.	-8.	-0.005	397.14	-4.573E-01		
BA-133	383.84	1036.	-41.	-0.023	113.26	-1.613E+01		
Cf-249	387.95	1076.	-41.	-0.023	115.03	-2.212E+00		
SN-113	391.69	912.	6.	0.003	777.11	3.109E-01		P
SB-125	427.88	384.	10.	0.006	384.97	1.314E+00		
AG-108M	433.94	436.	-26.	-0.015	163.46	-1.139E+00		P
PM-146	453.88	456.	-44.	-0.024	96.43	-2.760E+00		
SB-125	463.37	589.	8.	0.004	439.67	3.110E+00		
BE-7	477.59	638.	-29.	-0.016	125.26	-1.169E+01		
HF-181	482.00	631.	19.	0.010	190.00	1.005E+00		
RU-103	497.05	228.	9.	0.005	330.17	4.364E-01		
Kr-85	513.98	388.	8.	0.005	329.73	8.960E+01		
Nd-147	531.00	200.	-21.	-0.012	133.64	-7.525E+00		
Ba-140	537.26	168.	-6.	-0.004	671.23	-1.230E+00		P
CS-134	563.24	140.	10.	0.005	237.42	5.772E+00		P
CS-134	569.32	204.	-31.	-0.017	66.99	-1.005E+01		
SB-125	600.50	528.	24.	0.013	136.88	6.939E+00		P
SB-124	602.73	552.	24.	0.013	138.81	1.275E+00		
CS-134	604.71	576.	24.	0.013	141.58	1.289E+00		
BI-214	609.31	606.	18.	0.010	191.81	2.075E+00		P
RU-103	610.30	625.	24.	0.014	146.77	2.213E+01		
AG-108M	614.28	649.	24.	0.014	149.16	1.427E+00		
PM-144	618.06	773.	-27.	-0.015	147.27	-1.437E+00		
SB-125	635.89	100.	41.	0.023	51.70	1.979E+01		
AG-110M	657.76	5486.	-22.	-0.012	483.04	-1.278E+00		
PM-144	696.54	100.	-8.	-0.004	268.25	-4.525E-01		
NB-94	702.63	100.	12.	0.007	167.67	7.416E-01		
SB-124	722.79	150.	-14.	-0.008	126.57	-7.806E+00		
ZR-95	724.20	161.	-6.	-0.004	286.40	-8.661E-01		
BI-212	727.17	142.	20.	0.011	85.72	1.634E+01		
PM-146	735.72	83.	21.	0.012	90.61	5.736E+00		P
PM-146	747.16	126.	-20.	-0.011	118.52	-3.585E+00		
ZR-95	756.73	87.	14.	0.008	135.18	1.649E+00		
AG-110M	763.94	95.	20.	0.011	74.09	5.537E+00		
NB-95	765.79	115.	14.	0.008	107.91	9.168E-01		
PA-234M	766.41	133.	-12.	-0.007	137.16	-2.620E+02		
EU-152	778.92	136.	-7.	-0.004	288.14	-3.293E+00		P
BI-212	785.42	140.	-4.	-0.002	629.48	-2.019E+01		
CS-134	795.87	235.	5.	0.003	435.89	3.820E-01		
CS-134	801.95	183.	22.	0.012	87.73	1.699E+01		
CO-58	810.78	309.	-29.	-0.016	86.93	-1.954E+00		
La-140	815.77	339.	-16.	-0.009	164.04	-4.599E+00		
Cs-136	818.50	330.	28.	0.016	93.77	1.873E+00		
MN-54	834.85	98.	24.	0.013	89.75	1.634E+00		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
NB-94	871.10	158.	14.	0.008	125.38	1.022E+00		P
EU-154	873.23	181.	3.	0.002	636.83	1.727E+00		
PA-234	880.53	372.	-32.	-0.018	86.50	-3.818E+01		
PA-234	883.24	404.	-32.	-0.018	89.89	-2.396E+01		
AG-110M	884.68	356.	9.	0.005	299.48	8.808E-01		
Sc-46	889.28	328.	27.	0.015	95.16	1.972E+00		
Y-88	898.04	135.	13.	0.007	196.84	9.774E-01		
AG-110M	937.49	121.	28.	0.015	86.57	6.036E+00		
PA-234	946.02	191.	-7.	-0.004	401.83	-4.134E+00		
AC-228	968.97	100.	26.	0.014	84.73	1.133E+01		
EU-154	996.33	264.	-19.	-0.011	121.08	-1.439E+01		
EU-154	1004.77	120.	-6.	-0.003	403.46	-2.647E+00		
Cs-136	1048.07	133.	-10.	-0.006	161.06	-1.063E+00		
BI-207	1063.66	135.	-5.	-0.003	462.15	-5.625E-01		P
Ga-68	1077.40	115.	12.	0.007	198.58	3.600E+01		
FE-59	1099.25	105.	18.	0.010	128.60	2.704E+00		P
EU-152	1112.07	239.	-17.	-0.009	132.10	-1.068E+01		
BI-214	1120.29	229.	-3.	-0.001	870.36	-1.528E+00		P
Ta-182	1121.30	270.	-29.	-0.016	81.31	-7.326E+00		
Ta-182	1189.05	25.	7.	0.004	161.52	3.955E+00		
Ta-182	1221.41	21.	12.	0.007	88.90	4.320E+00		
NA-22	1274.53	12.	9.	0.005	64.57	8.723E-01		
EU-154	1274.54	41.	-15.	-0.008	65.71	-4.132E+00		
AG-110M	1384.30	11.	-4.	-0.002	209.09	-1.570E+00		
K-40	1460.83	14.	-4.	-0.002	161.11	-3.758E+00		P
La-140	1596.21	11.	-2.	-0.001	251.55	-2.907E-01		P
SB-124	1690.98	6.	1.	0.001	427.57	3.436E-01		
BI-214	1764.49	8.	4.	0.002	121.21	3.095E+00		P
Y-88	1836.06	0.	7.	0.004	41.33	8.780E-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	-1.1686E+01	-1.1686E+01	1.253E+02%	4.88E+01
NA-22	#A	8.7230E-01	8.7230E-01	6.457E+01%	1.85E+00
K-40	#A	-3.7580E+00	-3.7580E+00	1.611E+02%	2.04E+01
Sc-46	#A	1.9720E+00	1.9720E+00	9.516E+01%	6.25E+00
CR-51	#A	-5.3316E+00	-5.3317E+00	2.004E+02%	3.58E+01
MN-54	#A	1.6344E+00	1.6345E+00	8.975E+01%	3.32E+00
FE-59	#A	2.7039E+00	2.7040E+00	1.286E+02%	7.66E+00
Co-56	#A	2.1908E+00	2.1909E+00	2.139E+01%	3.37E+00
CO-57	#A	-8.0151E-01	-8.0151E-01	9.025E+01%	2.40E+00
CO-58	#A	-1.9539E+00	-1.9539E+00	8.693E+01%	5.65E+00
CO-60		1.5559E+02	1.5559E+02	1.787E+00%	7.43E-01

ZN-65	#A	2.5431E+00	2.5431E+00	1.502E+02%	1.29E+01
NB-94	#A	8.8302E-01	8.8302E-01	1.047E+02%	2.96E+00
ZR-95	#A	1.6485E+00	1.6486E+00	1.352E+02%	5.30E+00
NB-95	#A	9.1680E-01	9.1681E-01	1.079E+02%	3.33E+00
RU-103	#A	4.3644E-01	4.3645E-01	3.302E+02%	3.54E+00
RH-106	A	1.0896E+01	1.0896E+01	2.052E+02%	6.88E+01
AG-108M	#A	1.3991E-01	1.3991E-01	1.106E+02%	4.35E+00
AG-110M	#A	3.0526E+00	3.0526E+00	7.409E+01%	8.90E+00
SN-113	#A	3.1087E-01	3.1087E-01	7.771E+02%	8.10E+00
SB-124	#A	9.7028E-01	9.7029E-01	1.388E+02%	5.91E+00
SB-125	#A	6.0546E+00	6.0546E+00	5.170E+01%	1.24E+01
I-131	A	2.3693E+00	2.3694E+00	6.848E+01%	3.42E+00
Gd-153	#A	2.1561E+00	2.1561E+00	1.116E+02%	7.99E+00
Ga-68	#A	3.5602E+01	3.5998E+01	1.986E+02%	1.58E+02
Tc-99m	#A	-3.5979E-01	-3.6054E-01	2.667E+02%	3.21E+00
BA-133	#A	-4.5730E-01	-4.5730E-01	3.971E+02%	6.11E+00
CS-134	#A	1.7700E+00	1.7700E+00	8.773E+01%	5.66E+00
CS-137		3.5008E+02	3.5008E+02	1.424E+00%	2.85E+00
CE-139	#A	-1.2698E-01	-1.2698E-01	8.176E+02%	3.48E+00
Ba-140	#A	-1.2295E+00	-1.2296E+00	6.712E+02%	1.22E+01
La-140	#A	3.9348E-02	3.9350E-02	2.062E+02%	2.27E+00
CE-141	#A	1.1110E+00	1.1111E+00	1.501E+02%	5.55E+00
CE-144	#A	5.7872E+00	5.7873E+00	1.169E+02%	2.25E+01
PM-144	#A	-4.5255E-01	-4.5255E-01	2.682E+02%	2.91E+00
EU-152	#A	9.4683E-01	9.4683E-01	2.213E+02%	8.10E+00
EU-154	#A	3.7693E-01	3.7693E-01	6.368E+02%	5.58E+00
EU-155	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.21E+01
HF-181	#A	1.6650E+00	1.6650E+00	1.129E+02%	6.39E+00
Ta-182	#A	-7.3260E+00	-7.3260E+00	8.131E+01%	1.98E+01
Hg-203	#A	8.8872E-01	8.8873E-01	1.302E+02%	3.86E+00
TL-208		3.5335E+00	3.5335E+00	2.547E+01%	2.10E+00
PM-146	#A	-5.7515E-01	-5.7515E-01	6.616E+01%	6.43E+00
Y-88	#A	9.2632E-01	9.2633E-01	4.133E+01%	9.81E-01
Cd-113m	#A	-1.7242E+04	-1.7242E+04	8.408E+01%	4.81E+04
Cd-109	#A	1.5968E+01	1.5968E+01	1.711E+02%	9.07E+01
Cf-251	#A	-4.3452E+00	-4.3452E+00	1.032E+02%	1.19E+01
Cf-249	#A	-5.0012E-01	-5.0012E-01	7.551E+01%	8.45E+00
Sn-126	#A	-1.0006E+01	-1.0006E+01	1.021E+02%	3.39E+01
PB-210		1.0085E+04	1.0085E+04	1.016E+00%	1.86E+02
PB-212		5.9462E+00	5.9462E+00	2.318E+01%	4.28E+00
PB-214	#	7.9453E+00	7.9453E+00	3.099E+01%	5.84E+00
BI-207	#A	-5.6254E-01	-5.6254E-01	4.621E+02%	6.36E+00
BI-212	#A	1.6340E+01	1.6340E+01	8.572E+01%	4.68E+01
U-235	#A	5.8437E+00	5.8437E+00	1.119E+02%	2.17E+01
BI-214	#A	2.3302E+00	2.3302E+00	1.135E+02%	1.33E+01
BI-210M	#A	1.6422E+00	1.6422E+00	1.052E+02%	6.31E+00
AC-228	#A	5.4030E+00	5.4030E+00	8.473E+01%	1.61E+01
TH-227	#A	5.1633E+00	5.1633E+00	1.616E+02%	3.59E+01
TH-229	#A	5.4929E+00	5.4929E+00	3.426E+02%	5.03E+01

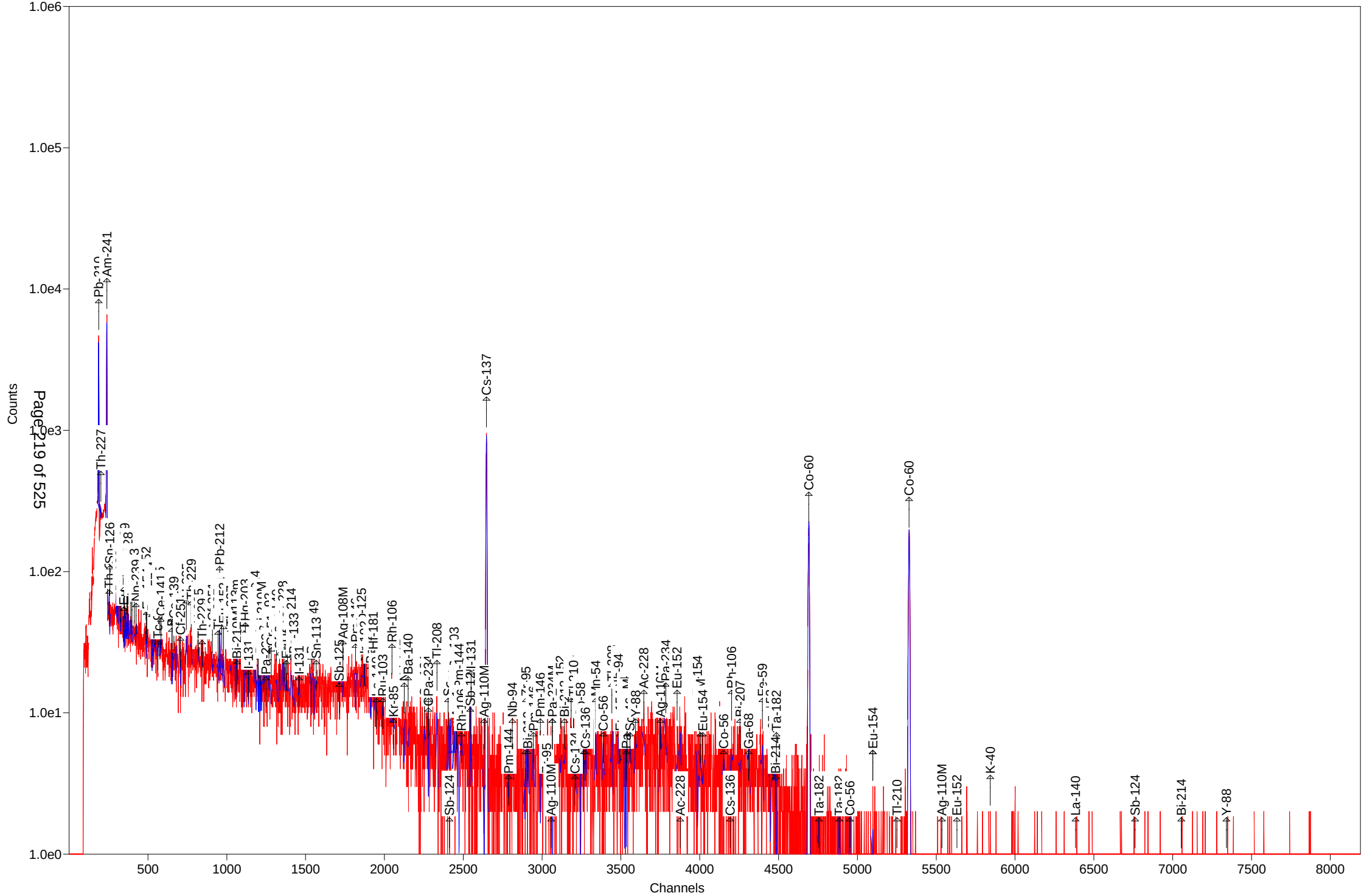
TH-234 #A	2.6818E+01	2.6818E+01	4.129E+01%		2.85E+01
PA-231 #A	-3.8956E+01	-3.8956E+01	1.563E+02%		2.02E+02
PA-233 #A	3.1661E+00	3.1661E+00	1.591E+02%		1.67E+01
PA-234 #A	-3.6331E+00	-3.6331E+00	1.274E+02%		1.54E+01
PA-234M#A	-3.9319E+00	-3.9319E+00	6.720E+03%		7.69E+02
AM-241	1.2609E+03	1.2609E+03	8.479E-01%		1.50E+01
Np-237 #A	-5.5681E+00	-5.5681E+00	1.532E+02%		2.83E+01
Ir-192 #A	1.7585E+00	1.7585E+00	9.298E+01%		3.95E+00
Cs-136 #A	2.0527E+00	2.0528E+00	7.535E+01%		5.85E+00
Np-239 #A	2.2196E+00	2.2201E+00	1.367E+02%		1.01E+01
Nd-147 #A	-7.5242E+00	-7.5246E+00	1.336E+02%		2.46E+01
TL-210 #A	6.6286E-01	6.6286E-01	2.168E+02%		4.86E+00
Kr-85 #A	8.9604E+01	8.9604E+01	3.297E+02%		9.97E+02

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

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

Total Activity (37.6 to 2000.8 keV) 1.190E+04 Bq/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 1.1895812E+04 Bq/Sample

404682_Gamma_LCS 160-404682~2-A. 5_Gamma_20184259.spc.



Test America St. Louis Spectrum ID: 2_Gamma_20180267

Sample Description: 404682_Gamma_490-164296-A-2-B DU
Detector: Detector # 2
Batch ID: 404682
Work Order Number: Gamma
Lot Number: 490-164296-A-2-B DU

Decay to Time: 12/29/2018 11:58 Live Time: 1800 sec
Acquisition Time: 12/29/2018 11:58:17 Real Time: 1805 sec
Analysis Time: 12/29/2018 12:28 Dead Time: 0.26 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 2_Soil_TunaCan.Clb
Efficiency Cal Desc: 2_Soil_TunaCan_101407
Efficiency Cal Date: 4/20/2018 13:56
Energy Cal Date: 4/20/2018 13:54
Library: Client_Long_Rev15.lib
Bkgd Correction File: 2_2018-12-22_1400.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	-7.118E-01	728.0	5.182E+00	5.182E+00	1.796E+01
NA-22	-1.490E+00	58.1	8.662E-01	8.694E-01	2.831E+00
K-40	1.144E+02	9.8	1.126E+01	1.266E+01	1.353E+01
Sc-46	9.186E-01	106.7	9.802E-01	9.813E-01	3.303E+00
CR-51	-4.142E+00	184.6	7.644E+00	7.646E+00	1.867E+01
MN-54	7.451E-01	89.9	6.699E-01	6.710E-01	1.615E+00
FE-59	-1.184E+00	122.3	1.448E+00	1.449E+00	4.278E+00
Co-56	3.387E+00	16.3	5.509E-01	5.773E-01	1.390E+00
CO-57	4.571E-01	107.1	4.894E-01	4.900E-01	1.466E+00
CO-58	6.591E-01	94.2	6.208E-01	6.217E-01	2.100E+00
CO-60	3.598E-02	554.2	1.994E-01	1.994E-01	2.156E+00
ZN-65	-1.520E+00	206.3	3.135E+00	3.136E+00	1.062E+01
NB-94	7.087E-01	95.2	6.751E-01	6.760E-01	1.621E+00
ZR-95	2.736E-01	285.4	7.808E-01	7.810E-01	2.028E+00
NB-95	-1.448E+00	79.2	1.146E+00	1.149E+00	3.811E+00
RU-103	2.758E-01	186.9	5.154E-01	5.156E-01	1.319E+00
RH-106	4.530E-01	160.5	7.270E-01	7.274E-01	1.880E+01
AG-108M	1.289E+00	38.6	4.972E-01	5.014E-01	1.163E+00
AG-110M	9.631E-01	44.3	4.267E-01	4.295E-01	5.101E+00
SN-113	3.513E-01	310.5	1.091E+00	1.091E+00	3.699E+00
SB-124	5.075E-01	50.6	2.567E-01	2.580E-01	6.890E+00
SB-125	-1.671E+00	153.4	2.562E+00	2.564E+00	5.967E+00
I-131	-8.247E-01	155.2	1.280E+00	1.281E+00	2.012E+00
Gd-153	-1.500E+00	148.1	2.221E+00	2.223E+00	7.389E+00
Ga-68	1.786E+00	1541.9	2.753E+01	2.753E+01	6.755E+01
Tc-99m	-3.922E-01	138.4	5.429E-01	5.434E-01	1.813E+00
BA-133	-8.472E-01	269.3	2.281E+00	2.282E+00	7.613E+00
CS-134	-1.093E-01	57.9	6.327E-02	6.351E-02	3.307E+00
CS-137	-9.260E-01	90.1	8.339E-01	8.352E-01	2.797E+00
CE-139	4.504E-01	112.2	5.055E-01	5.060E-01	1.689E+00
Ba-140	2.195E+00	99.5	2.183E+00	2.186E+00	5.508E+00
La-140	1.027E+00	57.8	5.937E-01	5.961E-01	1.553E+00
CE-141	9.679E-02	1001.4	9.692E-01	9.693E-01	3.268E+00

CE-144	0.000E+00	1.#INF	1.682E+00	1.682E+00	1.471E+01
PM-144	5.310E-01	96.6	5.129E-01	5.136E-01	1.288E+00
EU-152	2.316E+00	70.2	1.626E+00	1.631E+00	4.243E+00
EU-154	2.149E+00	102.8	2.209E+00	2.212E+00	2.949E+00
EU-155	1.718E+00	152.4	2.618E+00	2.620E+00	8.728E+00
HF-181	6.369E-01	95.4	6.077E-01	6.086E-01	2.047E+00
Ta-182	2.363E+00	184.6	4.361E+00	4.363E+00	1.478E+01
Hg-203	5.033E-01	106.6	5.363E-01	5.370E-01	1.379E+00
TL-208	4.049E+00	17.7	7.152E-01	7.442E-01	1.259E+00
PM-146	4.539E-01	199.1	9.038E-01	9.041E-01	2.199E+00
Y-88	-6.367E-02	107.4	6.840E-02	6.850E-02	2.308E+00
Cd-113m	-7.207E+03	107.2	7.728E+03	7.740E+03	2.588E+04
Cd-109	0.000E+00	1.#INF	3.287E+01	3.287E+01	1.090E+02
Cf-251	1.654E+00	148.5	2.456E+00	2.458E+00	6.600E+00
Cf-249	-6.458E-01	154.2	9.958E-01	9.963E-01	3.358E+00
Sn-126	-5.064E-01	1354.0	6.856E+00	6.856E+00	2.304E+01
PB-210	8.093E+01	18.9	1.527E+01	1.608E+01	4.536E+01
PB-212	8.197E+00	10.8	8.858E-01	9.836E-01	2.227E+00
PB-214	7.789E+01	2.9	2.286E+00	4.563E+00	2.899E+00
BI-207	-1.029E+00	103.3	1.064E+00	1.065E+00	2.766E+00
BI-212	7.181E-01	1195.8	8.587E+00	8.587E+00	3.014E+01
U-235	7.131E+00	38.1	2.714E+00	2.738E+00	1.374E+01
BI-214	7.667E+01	4.0	3.102E+00	4.986E+00	2.916E+00
BI-210M	9.181E-01	98.7	9.065E-01	9.077E-01	3.031E+00
AC-228	8.119E+00	25.8	2.097E+00	2.137E+00	8.234E+00
TH-227	3.469E+00	88.0	3.051E+00	3.056E+00	1.737E+01
TH-229	7.578E+00	118.1	8.953E+00	8.961E+00	2.405E+01
TH-234	9.520E+01	7.4	7.019E+00	8.784E+00	2.189E+01
PA-231	-1.795E+01	219.7	3.945E+01	3.946E+01	1.317E+02
PA-233	1.444E+00	218.0	3.146E+00	3.147E+00	1.050E+01
PA-234	-2.085E+00	124.9	2.605E+00	2.607E+00	8.687E+00
PA-234M	7.186E+00	81.3	5.840E+00	5.851E+00	4.279E+02
AM-241	-1.123E+00	96.7	1.087E+00	1.089E+00	5.067E+00
Np-237	2.729E+00	342.3	9.342E+00	9.344E+00	3.102E+01
Ir-192	-6.438E-01	92.0	5.920E-01	5.932E-01	1.977E+00
Cs-136	6.633E-01	95.7	6.348E-01	6.359E-01	2.148E+00
Np-239	1.611E+00	149.4	2.406E+00	2.408E+00	8.020E+00
Nd-147	4.438E+00	96.5	4.282E+00	4.290E+00	1.065E+01
TL-210	-3.633E-01	247.6	8.996E-01	8.999E-01	3.086E+00
Kr-85	1.402E+02	104.9	1.471E+02	1.473E+02	4.949E+02
Total	6.724E+02				

Analyst: Joey Sausto

Sample description
404682_Gamma_490-164296-A-2-B DU

Spectrum Filename: C:\User\SPC\Det2\2_Gamma_20180267.An1

Acquisition information

Start time:	12/29/2018 11:58:17 AM
Live time:	1800
Real time:	1805
Dead time:	0.26 %
Detector ID:	2

Detector system
Ge 2 SN/164

Calibration

Filename:	2_Soil_TunaCan.Clb

2_Soil_TunaCan_101407

Energy Calibration

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

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.60keV)
Stop channel:	8000 (2000.01keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	12/29/2018 11:58:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	2_2018-12-22_1400.PBC 12/22/2018 2:00:23 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 30 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1018

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.56	124.	19.99	0.77	1.827E-02	46.54	4.250	8.872E+01	PB210
50.24	21.	87.96	0.84	2.273E-02	50.14	8.000	PBC<MDA	TH227
63.20	290.	13.97	0.83	3.258E-02	63.29	3.810	1.298E+02	TH234
74.83	333.	9.40	0.86	3.746E-02				
77.11	538.	6.42	0.86	3.818E-02				
79.50	57.	43.80	0.86	3.887E-02				
81.16	55.	45.03	0.86	3.930E-02	80.99	34.060	2.302E+00	BA133
83.87	135.	20.01	0.86	3.993E-02				
87.25	172.	15.44	0.87	4.062E-02	86.49	13.100	1.808E+01	Np237
					86.54	30.700	7.712E+00	EU155
					86.94	9.040	2.614E+01	Sn126
					87.57	37.500	6.284E+00	Sn126
					88.04	3.790	6.205E+01	Cd109
90.00	42.	55.72	0.87	4.108E-02				
92.73	423.	7.28	0.87	4.147E-02	92.59	5.584	9.444E+01	TH234
					93.35	5.561	1.018E+02	AC228
105.31	28.	152.39	0.88	4.240E-02	105.31	21.200	PBC<MDA	EU155
106.13	28.	149.36	0.88	4.242E-02	106.13	22.700	PBC<MDA	Np239
121.78	27.	103.54	0.89	4.203E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	4.104E-01	CO57
122.06	27.	107.09	0.89	4.201E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	4.105E-01	CO57
123.10	6.	471.31	0.90	4.194E-02	123.10	40.790	PBC<MDA	EU154
136.47	6.	519.33	0.91	4.074E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	8.300E-01	CO57
143.70	83.	31.37	0.31	3.991E-02	143.79	10.960	1.054E+01	U235
162.66	24.	112.63	0.93	3.746E-02	162.66	6.220	PBC<MDA	Ba140

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
163.88	23.	115.27	0.93	3.736E-02	163.38	5.080	PBC<MDA	U235
165.85	24.	112.24	0.93	3.703E-02	165.85	79.900	PBC<MDA	CE139
176.60	18.	148.52	0.94	3.557E-02	176.60	17.000	PBC<MDA	Cf251
186.03	504.	7.38	1.05	3.430E-02	185.72	54.000	1.511E+01	U235
193.51	20.	118.15	0.95	3.333E-02	193.51	4.400	PBC<MDA	TH229
205.56	44.	38.06	1.24	3.183E-02	205.33	5.010	PBC<MDA	U235
227.00	44.	53.03	0.98	2.931E-02	227.00	6.300	PBC<MDA	Cf251
235.90	49.	30.95	0.99	2.836E-02	235.97	12.300	7.881E+00	TH227
238.62	181.	10.43	0.99	2.808E-02	238.63	43.300	8.288E+00	PB212
241.92	287.	7.84	0.99	2.775E-02	242.00	7.430	7.728E+01	PB214
265.83	21.	98.73	1.01	2.551E-02	265.83	50.000	PBC<MDA	BI210M
279.20	18.	106.57	1.02	2.439E-02	279.20	81.460	PBC<MDA	Hg203
295.20	616.	4.77	0.96	2.317E-02	295.09	19.300	7.646E+01	PB214
					296.00	79.000	1.873E+01	TL210
312.01	21.	217.95	1.05	2.201E-02	312.01	36.000	PBC<MDA	PA233
328.76	18.	104.60	1.06	2.096E-02	328.76	20.300	PBC<MDA	La140
338.48	58.	25.83	0.82	2.041E-02	338.32	12.010	1.324E+01	AC228
351.85	1047.	3.42	1.13	1.968E-02	351.93	37.600	7.862E+01	PB214
391.69	7.	310.47	1.11	1.780E-02	391.69	64.000	PBC<MDA	SN113
433.94	34.	38.57	1.14	1.620E-02	433.94	90.480	1.289E+00	AG108M
453.88	4.	394.76	1.16	1.554E-02	453.88	65.000	PBC<MDA	PM146
459.67	16.	33.20	0.35	1.536E-02				
468.06	6.	311.49	1.17	1.511E-02	468.06	51.750	PBC<MDA	Ir192
482.00	14.	95.42	1.18	1.472E-02	482.00	80.500	PBC<MDA	HF181
487.02	12.	104.00	1.18	1.458E-02	487.02	45.500	PBC<MDA	La140
497.05	6.	186.88	1.19	1.431E-02	497.05	90.900	PBC<MDA	RU103
511.86	31.	46.51	2.45	1.394E-02	511.86	20.000	PBC<MDA	RH106
513.98	15.	104.91	1.20	1.389E-02	513.98	0.430	PBC<MDA	Kr85
531.00	14.	96.50	1.21	1.349E-02	531.00	13.000	PBC<MDA	Nd147
537.26	8.	164.02	1.22	1.335E-02	537.26	24.390	PBC<MDA	Ba140
569.70	10.	174.87	1.24	1.267E-02	569.32	15.380	2.723E+00	CS134
					569.47	8.200	5.109E+00	PA234
					569.70	97.740	4.288E-01	BI207
583.53	74.	17.66	0.47	1.241E-02	583.02	84.500	3.897E+00	TL208
609.34	747.	4.05	1.47	1.194E-02	609.31	46.090	7.543E+01	BI214
					610.30	5.750	6.055E+02	RU103
618.06	11.	197.73	1.28	1.180E-02	618.06	99.100	PBC<MDA	PM144
657.76	9.	111.70	1.31	1.117E-02	657.76	94.640	PBC<MDA	AG110M
696.54	10.	96.59	1.34	1.063E-02	696.54	99.000	PBC<MDA	PM144
702.63	13.	95.25	1.34	1.055E-02	702.63	97.900	PBC<MDA	NB94
722.79	13.	87.52	1.35	1.030E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	7.912E-01	AG108M
					723.36	20.220	3.556E+00	EU154
735.72	4.	326.25	1.36	1.014E-02	735.72	22.500	PBC<MDA	PM146
747.16	3.	307.47	1.37	1.001E-02	747.16	34.000	PBC<MDA	PM146
756.73	3.	285.36	1.38	9.903E-03	756.73	54.460	PBC<MDA	ZR95
766.41	17.	99.09	1.39	9.796E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
778.92	11.	94.88	1.39	9.661E-03	778.92	12.940	PBC<MDA	EU152
785.42	13.	93.10	1.40	9.593E-03	785.42	1.280	PBC<MDA	BI212
801.95	15.	98.34	1.41	9.424E-03	801.95	8.690	PBC<MDA	CS134
810.78	11.	94.19	1.42	9.337E-03	810.78	99.460	PBC<MDA	CO58
818.50	11.	95.71	1.42	9.261E-03	818.50	100.000	PBC<MDA	Cs136
834.85	12.	89.92	1.43	9.107E-03	834.85	99.980	PBC<MDA	MN54
846.77	1.	892.71	1.44	8.997E-03	846.77	99.935	PBC<MDA	Co56
860.95	10.	89.88	1.45	8.874E-03	860.56	12.420	PBC<MDA	TL208
873.23	6.	145.30	1.46	8.765E-03	873.23	12.270	PBC<MDA	EU154
889.28	14.	106.71	1.47	8.630E-03	889.28	99.984	PBC<MDA	Sc46
898.04	8.	149.56	1.48	8.558E-03	898.04	93.700	PBC<MDA	Y88
911.26	16.	96.13	1.49	8.453E-03	911.07	29.000	PBC<MDA	AC228
968.93	30.	26.14	0.32	8.020E-03	968.97	17.460	1.190E+01	AC228
1004.77	15.	102.78	1.55	7.775E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	5.	192.68	1.57	7.562E-03	1037.84	14.130	PBC<MDA	Co56
1050.36	6.	179.93	1.58	7.484E-03	1050.36	1.560	PBC<MDA	RH106
1120.28	148.	9.02	1.02	7.078E-03	1120.29	15.100	7.686E+01	BI214
					1120.55	99.987	1.161E+01	Sc46
					1121.30	34.900	3.328E+01	Ta182
1173.24	2.	554.15	1.66	6.799E-03	1173.24	99.900	PBC<MDA	CO60
1238.28	66.	16.27	1.70	6.483E-03	1238.28	66.070	8.535E+00	Co56
1291.60	2.	431.57	1.73	6.244E-03	1291.60	43.200	PBC<MDA	FE59
1313.00	8.	112.15	1.75	6.152E-03	1313.00	21.000	PBC<MDA	TL210
1384.30	15.	44.30	1.79	5.864E-03	1384.30	24.290	5.721E+00	AG110M
1408.00	9.	90.20	1.80	5.773E-03	1408.00	21.005	PBC<MDA	EU152
1461.05	123.	9.84	1.58	5.579E-03	1460.83	10.670	1.144E+02	K40
1596.21	6.	91.14	1.91	5.131E-03	1596.21	95.400	PBC<MDA	La140
1690.98	7.	90.23	1.96	4.850E-03	1690.98	47.790	PBC<MDA	SB124
1764.71	103.	9.90	1.15	4.648E-03	1764.49	15.400	8.020E+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	
299.04	74.88	325.	332.	8.857E+03	9.45	0.856	-	sD
308.16	77.16	308.	529.	1.385E+04	6.40	0.858	-	D
317.74	79.55	302.	48.	1.223E+03	53.68	0.860	-	D
324.35	81.20	302.	43.	1.084E+03	59.74	0.861	-	sD
335.20	83.92	297.	119.	2.991E+03	22.36	0.863	-	sD
359.73	90.05	294.	19.	4.743E+02	126.48	0.868	-	sc
1838.15	459.67	6.	16.	1.052E+03	33.20	0.354	-	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	185.73	46.54	170.	113.	0.063	18.86	0.832D
TH-227	200.14	50.14	157.	21.	0.012	87.96	0.835D
AM-241	237.72	59.54	434.	-22.	-0.012	96.73	0.843s
TH-234	252.72	63.29	265.	238.	0.132	11.64	0.846D
BA-133	323.52	80.99	3924.	36.	0.020	249.85	0.861
Np-237	345.52	86.49	3960.	26.	0.014	342.30	0.866A
EU-155	345.73	86.54	4447.	-40.	-0.022	234.16	0.866s
Sn-126	347.32	86.94	4331.	-40.	-0.022	231.05	0.866
Sn-126	349.84	87.57	4194.	-40.	-0.022	227.23	0.866s
Cd-109	351.72	88.04	4154.	0.	0.000	226.03	0.867A
Nd-147	363.96	91.10	4114.	-41.	-0.023	224.30	0.869s
TH-234	369.92	92.59	360.	364.	0.202	9.05	0.870D
AC-228	372.96	93.35	3492.	35.	0.020	236.38	0.871s
Gd-153	389.56	97.50	1250.	-34.	-0.019	148.10	0.875
Np-239	397.56	99.50	1284.	-34.	-0.019	149.79	0.876s
Gd-153	412.36	103.20	1318.	-34.	-0.019	151.25	0.879
Np-239	414.35	103.70	1352.	-34.	-0.019	153.10	0.879
EU-155	420.81	105.31	883.	28.	0.015	152.39	0.881s
Np-239	424.07	106.13	855.	28.	0.016	149.36	0.882s
EU-152	486.67	121.78	365.	27.	0.015	103.54	0.894s
CO-57	487.79	122.06	392.	27.	0.015	107.09	0.895s
EU-154	491.95	123.10	357.	6.	0.003	471.31	0.895s
PA-234	524.72	131.29	592.	-28.	-0.015	124.93	0.902s
HF-181	531.64	133.02	620.	-19.	-0.010	190.55	0.904s
CE-144	533.70	133.54	639.	0.	0.000	1000.00	0.904s
HF-181	544.74	136.30	639.	0.	0.000	1000.00	0.906
CO-57	545.43	136.47	566.	6.	0.004	519.33	0.906
Tc-99m	561.58	140.51	571.	-25.	-0.014	138.43	0.910s
U-235	574.68	143.79	512.	28.	0.015	116.56	0.912s
Ba-140	650.17	162.66	340.	24.	0.013	112.63	0.928s
U-235	653.05	163.38	337.	23.	0.013	115.27	0.928
CE-139	662.94	165.85	350.	24.	0.013	112.24	0.930s
Cf-251	705.93	176.60	220.	18.	0.010	148.52	0.939s
U-235	743.64	186.03	203.	521.	0.290	7.09	1.045s
TH-229	773.56	193.51	170.	20.	0.011	118.15	0.953s
U-235	821.75	205.56	85.	44.	0.025	38.06	1.240s
TH-229	842.92	210.85	167.	-4.	-0.002	385.92	0.967
Cf-251	907.51	227.00	143.	44.	0.024	53.03	0.980s
TH-227	943.39	235.97	832.	21.	0.011	199.40	0.987s
PB-212	954.04	238.63	98.	179.	0.100	10.81	0.989D
PB-214	967.50	242.00	110.	286.	0.159	7.86	0.992D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	978.28	244.69	920.	-12.	-0.007	366.55	0.994s
Cd-113m	1054.30	263.70	220.	-20.	-0.011	107.24	1.009s
BI-210M	1062.83	265.83	206.	21.	0.012	98.73	1.011s
Hg-203	1116.30	279.20	100.	18.	0.010	106.57	1.021s
I-131	1136.69	284.30	129.	-15.	-0.008	137.10	1.025s
PB-214	1180.28	295.20	54.	616.	0.342	4.77	0.963
TL-210	1183.49	296.00	1146.	-21.	-0.012	229.37	1.034s
PB-212	1199.61	300.03	1125.	-21.	-0.012	139.45	1.038
PA-231	1199.77	300.07	1104.	-21.	-0.012	224.44	1.038
PA-233	1200.21	300.18	1083.	-21.	-0.012	222.31	1.038
PA-231	1210.09	302.65	1062.	-21.	-0.012	219.75	1.040s
BA-133	1210.90	302.85	1041.	-8.	-0.004	606.72	1.040s
Ba-140	1218.89	304.85	1033.	0.	0.000	1000.00	1.041s
BI-210M	1219.07	304.90	1033.	0.	0.000	1000.00	1.041s
Ir-192	1233.25	308.44	1033.	0.	0.000	1000.00	1.044s
PA-233	1247.54	312.01	997.	21.	0.011	217.95	1.047s
Ir-192	1265.45	316.49	192.	-22.	-0.012	91.96	1.050s
CR-51	1279.82	320.08	220.	-16.	-0.009	184.55	1.053s
La-140	1314.53	328.76	100.	18.	0.010	104.60	1.060s
Cf-249	1333.24	333.44	125.	-5.	-0.003	450.00	1.064s
AC-228	1353.40	338.48	43.	58.	0.032	25.83	0.822
Cs-136	1361.76	340.57	242.	-17.	-0.010	128.51	1.069s
EU-152	1376.62	344.29	207.	-10.	-0.005	214.97	1.072s
PB-214	1406.86	351.85	59.	1047.	0.582	3.42	1.129
BA-133	1423.48	356.00	1220.	-18.	-0.010	269.28	1.081s
I-131	1457.41	364.48	132.	-23.	-0.013	155.18	1.088s
BA-133	1534.84	383.84	200.	-20.	-0.011	180.01	1.103
Cf-249	1551.27	387.95	219.	-14.	-0.008	154.18	1.106s
SN-113	1566.23	391.69	246.	7.	0.004	310.47	1.109s
SB-125	1710.97	427.88	113.	-15.	-0.008	153.36	1.137s
AG-108M	1735.21	433.94	36.	34.	0.019	38.57	1.141s
PM-146	1814.98	453.88	64.	4.	0.002	394.76	1.157s
SB-125	1852.93	463.37	172.	-4.	-0.002	502.56	1.164s
Ir-192	1871.70	468.06	162.	6.	0.003	311.49	1.167s
BE-7	1909.84	477.60	105.	-2.	-0.001	728.01	1.175s
HF-181	1927.44	482.00	77.	14.	0.008	95.42	1.178s
La-140	1947.54	487.02	41.	12.	0.007	104.00	1.182s
RU-103	1987.67	497.05	37.	6.	0.004	186.88	1.189s
RH-106	2046.91	511.86	87.	31.	0.017	46.51	2.450s
Kr-85	2055.37	513.98	117.	15.	0.008	104.91	1.202s
Nd-147	2123.45	531.00	44.	14.	0.008	96.50	1.215s
Ba-140	2148.49	537.26	40.	8.	0.004	164.02	1.219s
CS-134	2276.73	569.32	100.	-22.	-0.012	68.88	1.243s
PA-234	2277.33	569.47	122.	-22.	-0.012	75.30	1.243s
BI-207	2278.25	569.70	135.	10.	0.005	174.87	1.244s
TL-208	2333.55	583.53	20.	74.	0.041	17.66	0.471s
SB-125	2401.44	600.50	973.	-15.	-0.008	290.42	1.266
SB-124	2410.37	602.73	958.	-15.	-0.009	85.01	1.268s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	2418.28	604.71	942.	-15.	-0.008	285.17	1.269s
BI-214	2436.79	609.34	32.	747.	0.415	4.05	1.471
RU-103	2440.64	610.30	927.	-15.	-0.009	281.93	1.274s
PM-144	2471.69	618.06	223.	11.	0.006	197.73	1.279s
RH-106	2487.11	621.92	62.	-8.	-0.004	265.79	1.282s
SB-125	2543.00	635.89	58.	-7.	-0.004	158.44	1.292s
I-131	2547.34	636.97	68.	-4.	-0.002	566.04	1.293s
AG-110M	2630.49	657.76	48.	9.	0.005	111.70	1.308s
CS-137	2646.08	661.66	93.	-16.	-0.009	90.05	1.311s
PM-144	2785.61	696.54	22.	10.	0.006	96.59	1.336s
NB-94	2809.96	702.63	35.	13.	0.007	95.25	1.340s
SB-124	2890.59	722.79	61.	13.	0.007	87.52	1.355s
EU-154	2892.88	723.36	75.	0.	0.000	1000.00	1.355s
ZR-95	2896.24	724.20	75.	0.	0.000	1000.00	1.356s
PM-146	2942.32	735.72	39.	4.	0.002	326.25	1.364s
PM-146	2988.08	747.16	27.	3.	0.002	307.47	1.372s
ZR-95	3026.36	756.73	13.	3.	0.001	285.36	1.379s
AG-110M	3055.21	763.94	187.	-28.	-0.015	72.50	1.384s
NB-95	3062.60	765.79	191.	-25.	-0.014	79.19	1.385s
PA-234M	3065.09	766.41	132.	17.	0.009	99.09	1.386s
EU-152	3115.12	778.92	22.	11.	0.006	94.88	1.395
BI-212	3141.12	785.42	30.	13.	0.007	93.10	1.399s
CS-134	3182.92	795.87	96.	-17.	-0.009	61.04	1.407s
TL-210	3197.84	799.60	112.	-6.	-0.003	247.63	1.409
CS-134	3207.25	801.95	97.	15.	0.008	98.34	1.411s
CO-58	3242.54	810.77	48.	11.	0.006	94.19	1.417s
La-140	3262.52	815.77	92.	-15.	-0.008	95.17	1.421s
Cs-136	3273.44	818.50	50.	11.	0.006	95.71	1.422s
MN-54	3338.84	834.85	26.	12.	0.007	89.92	1.434s
Co-56	3386.53	846.77	18.	1.	0.001	892.71	1.442s
TL-208	3441.70	860.56	17.	10.	0.006	89.88	1.452s
NB-94	3483.84	871.10	42.	-1.	-0.001	921.95	1.459s
EU-154	3492.37	873.23	35.	6.	0.003	145.30	1.460s
PA-234	3521.57	880.53	116.	-18.	-0.010	49.53	1.465s
PA-234	3532.41	883.24	133.	-8.	-0.004	110.36	1.467s
AG-110M	3538.19	884.68	140.	0.	0.000	1000.00	1.468s
Sc-46	3556.57	889.28	109.	14.	0.008	106.71	1.471s
Y-88	3591.61	898.04	33.	8.	0.005	149.56	1.477s
AC-228	3643.73	911.07	52.	16.	0.009	96.13	1.486
AG-110M	3749.43	937.49	98.	-24.	-0.013	89.98	1.504s
PA-234	3783.54	946.02	66.	-20.	-0.011	78.34	1.510s
EU-152	3855.90	964.11	77.	-13.	-0.007	99.68	1.522s
AC-228	3875.17	968.93	7.	30.	0.017	26.14	0.324s
EU-154	3984.78	996.33	102.	-17.	-0.009	87.45	1.544s
PA-234M	4003.46	1001.00	104.	-12.	-0.007	128.85	1.547s
EU-154	4018.57	1004.77	111.	15.	0.008	102.78	1.549s
Co-56	4150.84	1037.84	24.	5.	0.003	192.68	1.571s
Cs-136	4191.76	1048.07	48.	-9.	-0.005	113.86	1.578s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RH-106	4200.92	1050.36	52.	6.	0.003	179.93	1.579s
BI-207	4254.12	1063.66	28.	-10.	-0.006	103.35	1.588s
FE-59	4396.49	1099.25	38.	-9.	-0.005	122.32	1.611s
EU-152	4447.79	1112.07	191.	0.	0.000	1000.00	1.620s
ZN-65	4461.68	1115.55	201.	-10.	-0.005	206.29	1.622s
BI-214	4480.62	1120.28	7.	148.	0.082	9.02	1.023s
Sc-46	4481.70	1120.55	191.	0.	0.000	1000.00	1.625s
Ta-182	4484.70	1121.30	182.	10.	0.006	184.55	1.626
CO-60	4692.46	1173.24	25.	2.	0.001	554.15	1.659s
Ta-182	4755.72	1189.05	35.	-10.	-0.006	133.85	1.669
Ta-182	4885.17	1221.41	20.	0.	0.000	1000.00	1.689
Co-56	4952.65	1238.28	10.	66.	0.037	16.27	1.700s
NA-22	5097.66	1274.53	40.	-17.	-0.009	58.12	1.723s
EU-154	5097.70	1274.54	57.	-2.	-0.001	522.45	1.723s
FE-59	5165.93	1291.60	15.	2.	0.001	431.57	1.733s
TL-210	5251.56	1313.00	15.	8.	0.004	112.15	1.746s
CO-60	5329.57	1332.50	20.	-1.	-0.001	988.26	1.758s
AG-110M	5536.78	1384.30	5.	15.	0.008	44.30	1.789s
EU-152	5631.60	1408.00	11.	9.	0.005	90.20	1.804s
K-40	5843.81	1461.05	6.	123.	0.068	9.84	1.583
La-140	6384.53	1596.21	6.	6.	0.004	91.14	1.912s
SB-124	6763.68	1690.98	6.	7.	0.004	90.23	1.965s
BI-214	7058.63	1764.71	1.	103.	0.057	9.90	1.146s
Co-56	7085.20	1771.35	104.	0.	0.000	1000.00	2.008s
Y-88	7344.09	1836.06	11.	-5.	-0.003	154.24	2.042s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-7.1180E-01				5.31E+01	
			477.60	-7.118E-01	(	1.796E+01 7.28E+02 1.05E+01	G
NA-22	C	-1.4903E+00				9.50E+02	
			1274.53	-1.490E+00	?(	2.831E+00 5.81E+01 9.99E+01	G
K-40	N	1.1440E+02				4.66E+11	
			1460.83	1.144E+02	(P	1.353E+01 9.84E+00 1.07E+01	G
Sc-46	F	9.1855E-01				8.38E+01	
			889.28	9.186E-01	(P	3.303E+00 1.07E+02 1.00E+02	G
			1120.55	0.000E+00	-	5.269E+00 1.00E+03 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	-4.1416E+00					2.77E+01	
			320.08	-4.142E+00	?(P	1.867E+01	1.85E+02	9.94E+00 G
MN-54	C	7.4507E-01					3.12E+02	
			834.85	7.451E-01	(	1.615E+00	8.99E+01	1.00E+02 G
FE-59	F	-1.1836E+00					4.45E+01	
			1099.25	-1.184E+00	?(P	4.278E+00	1.22E+02	5.65E+01 G
			1291.60	4.119E-01	+	4.276E+00	4.32E+02	4.32E+01 G
Co-56	C	3.3865E+00					7.73E+01	
			846.77	5.981E-02	?(P	1.390E+00	8.93E+02	9.99E+01 G
			1238.28	8.535E+00	(P	2.282E+00	1.63E+01	6.61E+01 G
			1037.84	2.842E+00	&(P	1.316E+01	1.93E+02	1.41E+01 G
			1771.35	0.000E+00	-	3.894E+01	1.00E+03	1.55E+01 A
CO-57	C	4.5705E-01					2.72E+02	
			122.06	4.105E-01	(	1.466E+00	1.07E+02	8.56E+01 G
			136.47	8.300E-01	(	1.451E+01	5.19E+02	1.07E+01 G
CO-58	C	6.5910E-01					7.09E+01	
			810.78	6.591E-01	?(	2.100E+00	9.42E+01	9.95E+01 G
CO-60	F	3.5981E-02					1.93E+03	
			1332.50	-9.153E-02	?(	2.156E+00	9.88E+02	1.00E+02 G
			1173.24	1.636E-01	?(	2.128E+00	5.54E+02	9.99E+01 G
ZN-65	F	-1.5197E+00					2.44E+02	
			1115.55	-1.520E+00	?(	1.062E+01	2.06E+02	5.06E+01 G
NB-94	I	7.0874E-01					7.41E+06	
			702.63	7.087E-01	?(	1.621E+00	9.52E+01	9.79E+01 G
			871.10	-6.332E-02	-	2.084E+00	9.22E+02	9.99E+01 G
ZR-95	I	2.7363E-01					6.40E+01	
			756.73	2.736E-01	?(P	2.028E+00	2.85E+02	5.45E+01 G
			724.20	0.000E+00	-	5.270E+00	1.00E+03	4.42E+01 G
NB-95	I	-1.4476E+00					6.40E+01	
			765.79	-1.448E+00	?(	3.811E+00	7.92E+01	9.98E+01 G
RU-103	I	2.7578E-01					3.93E+01	
			497.05	2.758E-01	?(P	1.319E+00	1.87E+02	9.09E+01 G
			610.30	-1.243E+01	+	1.172E+02	2.82E+02	5.75E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RH-106	I	4.5300E-01				3.74E+02		
			621.92	-3.836E+00	?(P	1.880E+01	2.66E+02	9.93E+00 G
			1050.36	2.776E+01	?(	1.730E+02	1.80E+02	1.56E+00 G
			511.86	6.121E+00	?	9.186E+00	4.65E+01	2.00E+01 GA
AG-108M	C	1.2890E+00				1.53E+05		
			433.94	1.289E+00	(	1.163E+00	3.86E+01	9.05E+01 G
			722.94	2.036E-02	&	2.552E+00	3.57E+03	9.08E+01 G
			614.28	-4.476E-02	%	7.478E+00	4.98E+03	8.98E+01 G
AG-110M	F	9.6306E-01				2.50E+02		
			884.68	0.000E+00	&(	5.101E+00	1.00E+03	7.27E+01 G
			657.76	4.816E-01	?(	1.836E+00	1.12E+02	9.46E+01 G
			937.49	-4.697E+00	+	9.572E+00	9.00E+01	3.44E+01 G
			1384.30	5.721E+00	?(	5.255E+00	4.43E+01	2.43E+01 G
			763.94	-7.017E+00	+	1.686E+01	7.25E+01	2.23E+01 G
SN-113	F	3.5126E-01				1.15E+02		
			391.69	3.513E-01	?(P	3.699E+00	3.10E+02	6.40E+01 G
SB-124	F	5.0746E-01				6.02E+01		
			602.73	-7.177E-01	?(P	6.890E+00	8.50E+01	9.83E+01 G
			1690.98	1.638E+00	?(	3.309E+00	9.02E+01	4.78E+01 G
			722.79	6.648E+00	?(	1.956E+01	8.75E+01	1.08E+01 G
SB-125	I	-1.6709E+00				1.01E+03		
			427.88	-1.671E+00	&(P	5.967E+00	1.53E+02	2.96E+01 G
			600.50	-3.921E+00	+	3.808E+01	2.90E+02	1.79E+01 G
			635.89	-2.988E+00	+	1.631E+01	1.58E+02	1.13E+01 G
			463.37	-1.552E+00	+ P	2.223E+01	5.03E+02	1.05E+01 G
I-131	I	-8.2473E-01				8.02E+00		
			364.48	-8.247E-01	?(P	2.012E+00	1.55E+02	8.17E+01 G
			284.30	-5.491E+00	+ P	2.095E+01	1.37E+02	6.14E+00 G
			636.97	-2.549E+00	+ P	2.770E+01	5.66E+02	7.17E+00 G
Gd-153	F	-1.4997E+00				2.42E+02		
			97.50	-1.500E+00	&(	7.389E+00	1.48E+02	3.00E+01 G
			103.20	-2.057E+00	+	1.035E+01	1.51E+02	2.18E+01 G
Ga-68	C	1.7858E+00				4.71E-02		
			1077.40	1.786E+00	%(	6.755E+01	1.54E+03	3.30E+00 G
Tc-99m	I	-3.9220E-01				2.51E-01		
			140.51	-3.922E-01	?(	1.813E+00	1.38E+02	8.93E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BA-133	F	-8.4716E-01					3.85E+03	
			356.00	-8.472E-01	&(	7.613E+00	2.69E+02	6.20E+01 G
			302.85	-1.009E+00	+	2.050E+01	6.07E+02	1.83E+01 G
			383.84	-6.821E+00	+ P	2.348E+01	1.80E+02	8.94E+00 GA
			80.99	1.477E+00	?	1.225E+01	2.50E+02	3.41E+01 GA
CS-134	I	-1.0933E-01					7.54E+02	
			795.87	-1.135E+00	&(P	3.307E+00	6.10E+01	8.55E+01 G
			604.71	-7.236E-01	+	6.900E+00	2.85E+02	9.76E+01 G
			569.32	-6.158E+00	+	1.405E+01	6.89E+01	1.54E+01 G
			801.95	9.982E+00	?(	3.303E+01	9.83E+01	8.69E+00 G
			563.24	6.066E-01	% P	1.834E+01	1.17E+03	8.35E+00 G
CS-137	I	-9.2598E-01					1.10E+04	
			661.66	-9.260E-01	?(	2.797E+00	9.01E+01	8.52E+01 G
CE-139	F	4.5038E-01					1.38E+02	
			165.85	4.504E-01	*(	1.689E+00	1.12E+02	7.99E+01 G
Ba-140	I	2.1947E+00					1.28E+01	
			537.26	1.323E+00	?(P	5.508E+00	1.64E+02	2.44E+01 G
			162.66	5.613E+00	*(P	2.112E+01	1.13E+02	6.22E+00 G
			304.85	0.000E+00	-	8.780E+01	1.00E+03	4.29E+00 G
La-140	I	1.0273E+00					1.28E+01	
			1596.21	7.309E-01	?(P	1.553E+00	9.11E+01	9.54E+01 G
			487.02	1.041E+00	?(P	2.713E+00	1.04E+02	4.55E+01 G
			328.76	2.390E+00	&(P	6.433E+00	1.05E+02	2.03E+01 G
			815.77	-3.807E+00	&	1.218E+01	9.52E+01	2.33E+01 G
CE-141	I	9.6790E-02					3.25E+01	
			145.44	9.679E-02	&(	3.268E+00	1.00E+03	4.82E+01 G
PM-144	C	5.3096E-01					3.63E+02	
			696.54	5.482E-01	?(	1.288E+00	9.66E+01	9.90E+01 G
			618.06	5.138E-01	(P	3.436E+00	1.98E+02	9.91E+01 G
EU-152	F	2.3159E+00					4.94E+03	
			121.78	1.229E+00	&(	4.243E+00	1.04E+02	2.86E+01 G
			344.29	-9.985E-01	-	7.276E+00	2.15E+02	2.65E+01 G
			1112.07	0.000E+00	-	3.836E+01	1.00E+03	1.36E+01 G
			778.92	4.717E+00	?(P	1.089E+01	9.49E+01	1.29E+01 G
			964.11	-6.122E+00	&	2.059E+01	9.97E+01	1.46E+01 G
			244.69	-3.132E+00	+	3.843E+01	3.67E+02	7.58E+00 G
			1408.00	4.062E+00	?	8.214E+00	9.02E+01	2.10E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	2.1494E+00					3.14E+03	
			123.10	1.849E-01	*(	2.949E+00	4.71E+02	4.08E+01 G
			1274.54	-5.150E-01	+	9.463E+00	5.22E+02	3.52E+01 G
			723.36	0.000E+00	-	1.150E+01	1.00E+03	2.02E+01 G
			873.23	3.100E+00	?(	1.564E+01	1.45E+02	1.23E+01 G
			1004.77	5.951E+00	?(	2.058E+01	1.03E+02	1.80E+01 G
			996.33	-1.136E+01	+	3.326E+01	8.75E+01	1.06E+01 G
EU-155	I	1.7183E+00					1.81E+03	
			105.31	1.718E+00	?(P	8.728E+00	1.52E+02	2.12E+01 G
			86.54	-1.805E+00	+	1.402E+01	2.34E+02	3.07E+01 G
HF-181	F	6.3692E-01					4.24E+01	
			482.00	6.369E-01	&(	2.047E+00	9.54E+01	8.05E+01 G
			133.02	-5.814E-01	-	3.708E+00	1.91E+02	4.33E+01 G
			345.83	1.229E-01	%	1.311E+01	3.12E+03	1.51E+01 G
			136.30	0.000E+00	-	2.808E+01	1.00E+03	5.85E+00 G
Ta-182	F	2.3632E+00					1.14E+02	
			1121.30	2.363E+00	(	1.478E+01	1.85E+02	3.49E+01 G
			1221.41	0.000E+00	-	7.384E+00	1.00E+03	2.70E+01 G
			1189.05	-5.104E+00	+	1.545E+01	1.34E+02	1.62E+01 G
Hg-203	F	5.0325E-01					4.66E+01	
			279.20	5.033E-01	?(	1.379E+00	1.07E+02	8.15E+01 G
TL-208	N	4.0492E+00					6.98E+02	
			583.02	3.897E+00	(P	1.259E+00	1.77E+01	8.45E+01 G
			277.28	2.094E-01	% P	2.451E+01	3.42E+03	6.31E+00 G
			860.56	5.088E+00	?(	1.115E+01	8.99E+01	1.24E+01 G
PM-146	C	4.5390E-01					2.02E+03	
			453.88	2.200E-01	?(	2.199E+00	3.95E+02	6.50E+01 G
			747.16	5.642E-01	?(P	4.361E+00	3.07E+02	3.40E+01 G
			735.72	9.631E-01	?(P	7.747E+00	3.26E+02	2.25E+01 G
Y-88	F	-6.3674E-02					1.07E+02	
			1836.06	-6.692E-01	?(	2.308E+00	1.54E+02	9.92E+01 G
			898.04	5.774E-01	?(	2.033E+00	1.50E+02	9.37E+01 G
Cd-113m		-7.2069E+03					5.33E+03	
			263.70	-7.207E+03	&(	2.588E+04	1.07E+02	6.00E-03 K
Cf-251	T	1.6538E+00					3.28E+05	
			176.60	1.654E+00	&(	6.600E+00	1.49E+02	1.70E+01 G
			227.00	1.324E+01		1.758E+01	5.30E+01	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	-6.4584E-01					1.28E+05	
			387.95	-6.458E-01	?(	3.358E+00	1.54E+02	6.60E+01 G
			333.44	-8.080E-01	&	9.478E+00	4.50E+02	1.55E+01 G
Sn-126		-5.0638E-01					3.65E+07	
			87.57	-1.472E+00	}	1.109E+01	2.27E+02	3.75E+01 GA
			64.28	-5.064E-01	&(	2.304E+01	1.35E+03	9.70E+00 G
			86.94	-6.119E+00	}	4.689E+01	2.31E+02	9.04E+00 GA
PB-210	N	8.0927E+01					8.14E+03	
			46.54	8.093E+01	(P	4.536E+01	1.89E+01	4.25E+00 G
PB-212	N	8.1970E+00					6.98E+02	
			238.63	8.197E+00	(P	2.227E+00	1.08E+01	4.33E+01 G
			300.03	-1.563E+01	- P	1.180E+02	1.39E+02	3.28E+00 GA
PB-214	N	7.7889E+01					5.84E+05	
			351.93	7.862E+01	(P	2.899E+00	3.42E+00	3.76E+01 G
			295.09	7.646E+01	(P	4.599E+00	4.77E+00	1.93E+01 G
			242.00	7.710E+01		1.390E+01	7.86E+00	7.43E+00 GA
BI-207	C	-1.0291E+00					1.18E+04	
			1063.66	-1.029E+00	?(P	2.766E+00	1.03E+02	7.45E+01 G
			569.70	4.288E-01	+	2.550E+00	1.75E+02	9.77E+01 G
BI-212	N	7.1809E-01					6.98E+02	
			727.17	7.181E-01	%(	3.014E+01	1.20E+03	7.55E+00 G
			785.42	5.731E+01	&	1.284E+02	9.31E+01	1.28E+00 GA
U-235	N	7.1306E+00					2.57E+11	
			143.79	3.536E+00	?(	1.374E+01	1.17E+02	1.10E+01 G
			205.33	1.543E+01	(P	1.588E+01	3.81E+01	5.01E+00 G
			163.38	6.701E+00	?(P	2.582E+01	1.15E+02	5.08E+00 G
			185.72	1.562E+01		2.068E+00	7.09E+00	5.40E+01 GA
BI-214	N	7.6674E+01					5.84E+05	
			609.31	7.543E+01	(P	2.916E+00	4.05E+00	4.61E+01 G
			1120.29	7.686E+01	(P	7.878E+00	9.02E+00	1.51E+01 G
			1764.49	8.020E+01	(P	5.720E+00	9.90E+00	1.54E+01 G
BI-210M	T	9.1808E-01					1.10E+09	
			265.83	9.181E-01	(	3.031E+00	9.87E+01	5.00E+01 G
			304.90	0.000E+00	-	1.345E+01	1.00E+03	2.80E+01 G
AC-228	N	8.1189E+00					2.10E+03	
			911.07	3.720E+00	?(P	8.234E+00	9.61E+01	2.90E+01 G
			968.97	1.190E+01	(	5.966E+00	2.61E+01	1.75E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          338.32 1.324E+01  (P 7.506E+00 2.58E+01 1.20E+01 G
                           93.35 8.524E+00 ?   6.688E+01 2.36E+02 5.56E+00 XA

TH-227   N   3.4688E+00                                     7.95E+03
                          256.24 5.016E-01 %(  1.737E+01 1.33E+03 7.00E+00 G
                          235.97 3.278E+00 ?(  2.184E+01 1.99E+02 1.23E+01 G
                           50.14 6.359E+00  (  1.868E+01 8.80E+01 8.00E+00 G

TH-229   N   7.5775E+00                                     2.68E+06
                          193.51 7.578E+00 ?(  2.405E+01 1.18E+02 4.40E+00 G
                          210.85-2.613E+00 - P 3.756E+01 3.86E+02 2.99E+00 G

TH-234   N   9.5203E+01                                     1.63E+12
                           92.59 8.746E+01  (P 2.189E+01 9.05E+00 5.58E+00 G
                           63.29 1.065E+02  (P 3.511E+01 1.16E+01 3.81E+00 G

PA-231   N  -1.7952E+01                                     1.20E+07
                          302.65-1.795E+01  (  1.317E+02 2.20E+02 2.88E+00 G
                          300.07-2.081E+01 +   1.559E+02 2.24E+02 2.46E+00 G

PA-233   C   1.4436E+00                                     7.82E+08
                          312.01 1.444E+00 &(  1.050E+01 2.18E+02 3.60E+01 G
                          300.18-8.260E+00 +   6.128E+01 2.22E+02 6.20E+00 G

PA-234   N  -2.0851E+00                                     1.63E+12
                          131.29-2.085E+00 ?(  8.687E+00 1.25E+02 1.80E+01 G
                          946.02-1.023E+01 + P 2.053E+01 7.83E+01 1.34E+01 G
                          569.47-1.155E+01 +   2.892E+01 7.53E+01 8.20E+00 G
                          883.24-5.307E+00 & P 3.760E+01 1.10E+02 9.60E+00 G
                          880.53-1.876E+01 + P 5.634E+01 4.95E+01 6.00E+00 GA

PA-234M  N   7.1858E+00                                     1.63E+12
                         1001.00-1.048E+02 ?(P 4.279E+02 1.29E+02 8.37E-01 G
                          766.41 3.259E+02 ?(P 1.084E+03 9.91E+01 2.94E-01 G

AM-241   T  -1.1233E+00                                     1.58E+05
                           59.54-1.123E+00  (P 5.067E+00 9.67E+01 3.59E+01 G

Np-237   F   2.7293E+00                                     2.14E+06
                                                          Derived Ave Activity
                           86.49 2.729E+00 }(  3.102E+01 3.42E+02 1.31E+01 G

Ir-192   F  -6.4380E-01                                     7.40E+01
                          316.49-6.438E-01 &(  1.977E+00 9.20E+01 8.70E+01 G
                          468.06 4.144E-01 +   4.408E+00 3.11E+02 5.18E+01 G
                          308.44 0.000E+00 +   1.199E+01 1.00E+03 3.18E+01 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Cs-136   F   6.6331E-01                                      1.30E+01
                          818.50 6.633E-01 ?(  2.148E+00 9.57E+01 1.00E+02 G
                         1048.07-8.335E-01 +   3.241E+00 1.14E+02 8.00E+01 G
                          340.57-1.018E+00 +   4.395E+00 1.29E+02 4.69E+01 G

Np-239   T   1.6108E+00                                      2.36E+00
                          103.70-1.868E+00 &   9.515E+00 1.53E+02 2.40E+01 X
                          106.13 1.611E+00 ?(  8.020E+00 1.49E+02 2.27E+01 G
                           99.50-2.994E+00 +   1.492E+01 1.50E+02 1.50E+01 X

Nd-147       4.4376E+00                                      1.11E+01
                          531.00 4.438E+00 ?(  1.065E+01 9.65E+01 1.30E+01 G
                           91.10-1.930E+00 -   1.436E+01 2.24E+02 2.83E+01 G

TL-210   N  -3.6330E-01                                      5.84E+05
                          799.60-3.633E-01 ?(  3.086E+00 2.48E+02 9.90E+01 G
                          296.00-6.378E-01 +   4.881E+00 2.29E+02 7.90E+01 G
                         1313.00 3.440E+00 ?   8.926E+00 1.12E+02 2.10E+01 GA

Kr-85    I   1.4017E+02                                      3.92E+03
                          513.98 1.402E+02 ?(  4.949E+02 1.05E+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
R - Coincidence Corrected
H - Halflife limit exceeded
A - Not in Average
C - Coincidence Peak

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	59.54	434.	-22.	-0.012	96.73	-1.123E+00	P
BA-133	80.99	3924.	36.	0.020	249.85	1.477E+00	
EU-155	86.54	4447.	-40.	-0.022	234.16	-1.805E+00	
Sn-126	86.94	4331.	-40.	-0.022	231.05	-6.119E+00	
Sn-126	87.57	4194.	-40.	-0.022	227.23	-1.472E+00	
Nd-147	91.10	4114.	-41.	-0.023	224.30	-1.930E+00	
Gd-153	97.50	1250.	-34.	-0.019	148.10	-1.500E+00	
Np-239	99.50	1284.	-34.	-0.019	149.79	-2.994E+00	
Gd-153	103.20	1318.	-34.	-0.019	151.25	-2.057E+00	
Np-239	103.70	1352.	-34.	-0.019	153.10	-1.868E+00	
EU-155	105.31	883.	28.	0.015	152.39	1.718E+00	P
Np-239	106.13	855.	28.	0.016	149.36	1.611E+00	
EU-152	121.78	365.	27.	0.015	103.54	1.229E+00	
CO-57	122.06	392.	27.	0.015	107.09	4.105E-01	
EU-154	123.10	357.	6.	0.003	471.31	1.849E-01	
PA-234	131.29	592.	-28.	-0.015	124.93	-2.085E+00	
HF-181	133.02	620.	-19.	-0.010	190.55	-5.814E-01	
CO-57	136.47	566.	6.	0.004	519.33	8.300E-01	
Tc-99m	140.51	571.	-25.	-0.014	138.43	-3.922E-01	
Ba-140	162.66	340.	24.	0.013	112.63	5.613E+00	P
CE-139	165.85	350.	24.	0.013	112.24	4.504E-01	
Cf-251	176.60	220.	18.	0.010	148.52	1.654E+00	
TH-229	193.51	170.	20.	0.011	118.15	7.578E+00	
TH-229	210.85	167.	-4.	-0.002	385.92	-2.613E+00	P
Cf-251	227.00	143.	44.	0.024	53.03	1.324E+01	
EU-152	244.69	920.	-12.	-0.007	366.55	-3.132E+00	
Cd-113m	263.70	220.	-20.	-0.011	107.24	-7.207E+03	
BI-210M	265.83	206.	21.	0.012	98.73	9.181E-01	
Hg-203	279.20	100.	18.	0.010	106.57	5.033E-01	
I-131	284.30	129.	-15.	-0.008	137.10	-5.491E+00	P
TL-210	296.00	1146.	-21.	-0.012	229.37	-6.378E-01	
PA-231	300.07	1104.	-21.	-0.012	224.44	-2.081E+01	
PA-233	300.18	1083.	-21.	-0.012	222.31	-8.260E+00	
PA-231	302.65	1062.	-21.	-0.012	219.75	-1.795E+01	
BA-133	302.85	1041.	-8.	-0.004	606.72	-1.009E+00	
PA-233	312.01	997.	21.	0.011	217.95	1.444E+00	
Ir-192	316.49	192.	-22.	-0.012	91.96	-6.438E-01	
CR-51	320.08	220.	-16.	-0.009	184.55	-4.142E+00	P
La-140	328.76	100.	18.	0.010	104.60	2.390E+00	P
Cf-249	333.44	125.	-5.	-0.003	450.00	-8.080E-01	
Cs-136	340.57	242.	-17.	-0.010	128.51	-1.018E+00	
EU-152	344.29	207.	-10.	-0.005	214.97	-9.985E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BA-133	356.00	1220.	-18.	-0.010	269.28	-8.472E-01	
I-131	364.48	132.	-23.	-0.013	155.18	-8.247E-01	P
BA-133	383.84	200.	-20.	-0.011	180.01	-6.821E+00	P
Cf-249	387.95	219.	-14.	-0.008	154.18	-6.458E-01	
SN-113	391.69	246.	7.	0.004	310.47	3.513E-01	P
SB-125	427.88	113.	-15.	-0.008	153.36	-1.671E+00	P
PM-146	453.88	64.	4.	0.002	394.76	2.200E-01	
SB-125	463.37	172.	-4.	-0.002	502.56	-1.552E+00	P
Ir-192	468.06	162.	6.	0.003	311.49	4.144E-01	
BE-7	477.60	105.	-2.	-0.001	728.01	-7.118E-01	
HF-181	482.00	77.	14.	0.008	95.42	6.369E-01	
La-140	487.02	41.	12.	0.007	104.00	1.041E+00	P
RU-103	497.05	37.	6.	0.004	186.88	2.758E-01	P
RH-106	511.86	87.	31.	0.017	46.51	6.121E+00	
Kr-85	513.98	117.	15.	0.008	104.91	1.402E+02	
Nd-147	531.00	44.	14.	0.008	96.50	4.438E+00	
Ba-140	537.26	40.	8.	0.004	164.02	1.323E+00	P
CS-134	569.32	100.	-22.	-0.012	68.88	-6.158E+00	
PA-234	569.47	122.	-22.	-0.012	75.30	-1.155E+01	
BI-207	569.70	135.	10.	0.005	174.87	4.288E-01	
SB-125	600.50	973.	-15.	-0.008	290.42	-3.921E+00	
SB-124	602.73	958.	-15.	-0.009	85.01	-7.177E-01	P
CS-134	604.71	942.	-15.	-0.008	285.17	-7.236E-01	
RU-103	610.30	927.	-15.	-0.009	281.93	-1.243E+01	
PM-144	618.06	223.	11.	0.006	197.73	5.138E-01	P
RH-106	621.92	62.	-8.	-0.004	265.79	-3.836E+00	P
SB-125	635.89	58.	-7.	-0.004	158.44	-2.988E+00	
I-131	636.97	68.	-4.	-0.002	566.04	-2.549E+00	P
AG-110M	657.76	48.	9.	0.005	111.70	4.816E-01	
CS-137	661.66	93.	-16.	-0.009	90.05	-9.260E-01	
PM-144	696.54	22.	10.	0.006	96.59	5.482E-01	
NB-94	702.63	35.	13.	0.007	95.25	7.087E-01	
SB-124	722.79	61.	13.	0.007	87.52	6.648E+00	
PM-146	735.72	39.	4.	0.002	326.25	9.631E-01	P
PM-146	747.16	27.	3.	0.002	307.47	5.642E-01	P
ZR-95	756.73	13.	3.	0.001	285.36	2.736E-01	P
AG-110M	763.94	187.	-28.	-0.015	72.50	-7.017E+00	
NB-95	765.79	191.	-25.	-0.014	79.19	-1.448E+00	
PA-234M	766.41	132.	17.	0.009	99.09	3.259E+02	P
EU-152	778.92	22.	11.	0.006	94.88	4.717E+00	P
BI-212	785.42	30.	13.	0.007	93.10	5.731E+01	
CS-134	795.87	96.	-17.	-0.009	61.04	-1.135E+00	P
TL-210	799.60	112.	-6.	-0.003	247.63	-3.633E-01	
CS-134	801.95	97.	15.	0.008	98.34	9.982E+00	
CO-58	810.77	48.	11.	0.006	94.19	6.591E-01	
La-140	815.77	92.	-15.	-0.008	95.17	-3.807E+00	
Cs-136	818.50	50.	11.	0.006	95.71	6.633E-01	
MN-54	834.85	26.	12.	0.007	89.92	7.451E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
NB-94	871.10	42.	-1.	-0.001	921.95	-6.332E-02		
EU-154	873.23	35.	6.	0.003	145.30	3.100E+00		
PA-234	880.53	116.	-18.	-0.010	49.53	-1.876E+01		P
PA-234	883.24	133.	-8.	-0.004	110.36	-5.307E+00		P
Sc-46	889.28	109.	14.	0.008	106.71	9.186E-01		P
Y-88	898.04	33.	8.	0.005	149.56	5.774E-01		
AG-110M	937.49	98.	-24.	-0.013	89.98	-4.697E+00		
PA-234	946.02	66.	-20.	-0.011	78.34	-1.023E+01		P
EU-152	964.11	77.	-13.	-0.007	99.68	-6.122E+00		
EU-154	996.33	102.	-17.	-0.009	87.45	-1.136E+01		
PA-234M	1001.00	104.	-12.	-0.007	128.85	-1.048E+02		P
EU-154	1004.77	111.	15.	0.008	102.78	5.951E+00		
Cs-136	1048.07	48.	-9.	-0.005	113.86	-8.335E-01		
RH-106	1050.36	52.	6.	0.003	179.93	2.776E+01		
BI-207	1063.66	28.	-10.	-0.006	103.35	-1.029E+00		P
FE-59	1099.25	38.	-9.	-0.005	122.32	-1.184E+00		P
ZN-65	1115.55	201.	-10.	-0.005	206.29	-1.520E+00		
Ta-182	1121.30	182.	10.	0.006	184.55	2.363E+00		
CO-60	1173.24	25.	2.	0.001	554.15	1.636E-01		
Ta-182	1189.05	35.	-10.	-0.006	133.85	-5.104E+00		
NA-22	1274.53	40.	-17.	-0.009	58.12	-1.490E+00		
EU-154	1274.54	57.	-2.	-0.001	522.45	-5.150E-01		
FE-59	1291.60	15.	2.	0.001	431.57	4.119E-01		
TL-210	1313.00	15.	8.	0.004	112.15	3.440E+00		
CO-60	1332.50	20.	-1.	-0.001	988.26	-9.153E-02		
AG-110M	1384.30	5.	15.	0.008	44.30	5.721E+00		
EU-152	1408.00	11.	9.	0.005	90.20	4.062E+00		
La-140	1596.21	6.	6.	0.004	91.14	7.309E-01		P
SB-124	1690.98	6.	7.	0.004	90.23	1.638E+00		
Y-88	1836.06	11.	-5.	-0.003	154.24	-6.692E-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	-7.1180E-01	-7.1180E-01	7.280E+02%	1.80E+01
NA-22	#A	-1.4903E+00	-1.4903E+00	5.812E+01%	2.83E+00
K-40		1.1440E+02	1.1440E+02	9.842E+00%	1.35E+01
Sc-46	#A	9.1855E-01	9.1855E-01	1.067E+02%	3.30E+00
CR-51	#A	-4.1416E+00	-4.1416E+00	1.846E+02%	1.87E+01
MN-54	#A	7.4507E-01	7.4507E-01	8.992E+01%	1.62E+00
FE-59	#A	-1.1836E+00	-1.1836E+00	1.223E+02%	4.28E+00
Co-56	#C	3.3865E+00	3.3865E+00	1.627E+01%	1.39E+00
CO-57	#A	4.5705E-01	4.5705E-01	1.071E+02%	1.47E+00
CO-58	#A	6.5909E-01	6.5910E-01	9.419E+01%	2.10E+00

CO-60	#A	3.5981E-02	3.5981E-02	5.542E+02%	2.16E+00
ZN-65	#A	-1.5197E+00	-1.5197E+00	2.063E+02%	1.06E+01
NB-94	#A	7.0874E-01	7.0874E-01	9.525E+01%	1.62E+00
ZR-95	#A	2.7363E-01	2.7363E-01	2.854E+02%	2.03E+00
NB-95	#A	-1.4476E+00	-1.4476E+00	7.919E+01%	3.81E+00
RU-103	#A	2.7578E-01	2.7578E-01	1.869E+02%	1.32E+00
RH-106	#A	4.5300E-01	4.5300E-01	1.605E+02%	1.88E+01
AG-108M	#	1.2890E+00	1.2890E+00	3.857E+01%	1.16E+00
AG-110M	#A	9.6306E-01	9.6306E-01	4.430E+01%	5.10E+00
SN-113	#A	3.5126E-01	3.5126E-01	3.105E+02%	3.70E+00
SB-124	#A	5.0746E-01	5.0746E-01	5.058E+01%	6.89E+00
SB-125	#A	-1.6709E+00	-1.6709E+00	1.534E+02%	5.97E+00
I-131	#A	-8.2471E-01	-8.2473E-01	1.552E+02%	2.01E+00
Gd-153	#A	-1.4997E+00	-1.4997E+00	1.481E+02%	7.39E+00
Ga-68	A	1.7806E+00	1.7858E+00	1.542E+03%	6.76E+01
Tc-99m	#A	-3.9198E-01	-3.9220E-01	1.384E+02%	1.81E+00
BA-133	#A	-8.4716E-01	-8.4716E-01	2.693E+02%	7.61E+00
CS-134	#A	-1.0932E-01	-1.0933E-01	5.787E+01%	3.31E+00
CS-137	#A	-9.2598E-01	-9.2598E-01	9.005E+01%	2.80E+00
CE-139	#A	4.5038E-01	4.5038E-01	1.122E+02%	1.69E+00
Ba-140	#A	2.1946E+00	2.1947E+00	9.948E+01%	5.51E+00
La-140	#A	1.0273E+00	1.0273E+00	5.779E+01%	1.55E+00
CE-141	#A	9.6790E-02	9.6790E-02	1.001E+03%	3.27E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.47E+01
PM-144	#A	5.3096E-01	5.3096E-01	9.659E+01%	1.29E+00
EU-152	#A	2.3159E+00	2.3159E+00	7.022E+01%	4.24E+00
EU-154	#A	2.1494E+00	2.1494E+00	1.028E+02%	2.95E+00
EU-155	#A	1.7183E+00	1.7183E+00	1.524E+02%	8.73E+00
HF-181	#A	6.3692E-01	6.3692E-01	9.542E+01%	2.05E+00
Ta-182	#A	2.3632E+00	2.3632E+00	1.846E+02%	1.48E+01
Hg-203	#A	5.0325E-01	5.0325E-01	1.066E+02%	1.38E+00
TL-208		4.0492E+00	4.0492E+00	1.766E+01%	1.26E+00
PM-146	#A	4.5390E-01	4.5390E-01	1.991E+02%	2.20E+00
Y-88	#A	-6.3674E-02	-6.3674E-02	1.074E+02%	2.31E+00
Cd-113m	#A	-7.2069E+03	-7.2069E+03	1.072E+02%	2.59E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.09E+02
Cf-251	#A	1.6538E+00	1.6538E+00	1.485E+02%	6.60E+00
Cf-249	#A	-6.4584E-01	-6.4584E-01	1.542E+02%	3.36E+00
Sn-126	#A	-5.0638E-01	-5.0638E-01	1.354E+03%	2.30E+01
PB-210		8.0927E+01	8.0927E+01	1.886E+01%	4.54E+01
PB-212		8.1970E+00	8.1970E+00	1.081E+01%	2.23E+00
PB-214		7.7889E+01	7.7889E+01	2.935E+00%	2.90E+00
BI-207	#A	-1.0291E+00	-1.0291E+00	1.033E+02%	2.77E+00
BI-212	#A	7.1809E-01	7.1809E-01	1.196E+03%	3.01E+01
U-235	A	7.1306E+00	7.1306E+00	3.806E+01%	1.37E+01
BI-214		7.6674E+01	7.6674E+01	4.045E+00%	2.92E+00
BI-210M	#A	9.1808E-01	9.1808E-01	9.873E+01%	3.03E+00
AC-228	A	8.1189E+00	8.1189E+00	2.583E+01%	8.23E+00
TH-227	A	3.4688E+00	3.4688E+00	8.796E+01%	1.74E+01

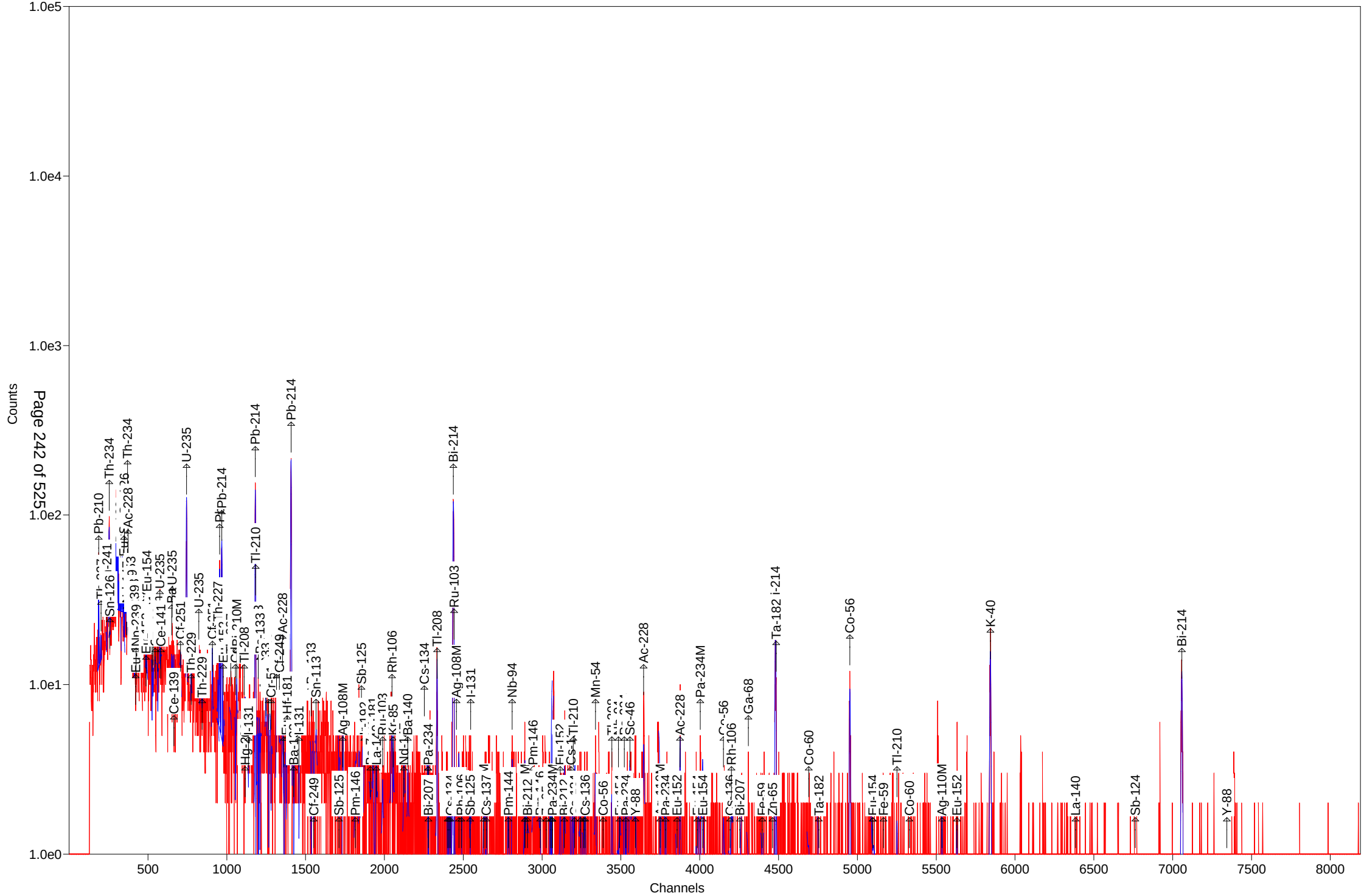
TH-229 #A	7.5775E+00	7.5775E+00	1.181E+02%		2.40E+01
TH-234	9.5203E+01	9.5203E+01	7.373E+00%		2.19E+01
PA-231 #A	-1.7952E+01	-1.7952E+01	2.197E+02%		1.32E+02
PA-233 #A	1.4436E+00	1.4436E+00	2.180E+02%		1.05E+01
PA-234 #A	-2.0851E+00	-2.0851E+00	1.249E+02%		8.69E+00
PA-234M#A	7.1858E+00	7.1858E+00	8.127E+01%		4.28E+02
AM-241 #A	-1.1233E+00	-1.1233E+00	9.673E+01%		5.07E+00
Np-237 #A	2.7293E+00	2.7293E+00	3.423E+02%		3.10E+01
Ir-192 #A	-6.4380E-01	-6.4380E-01	9.196E+01%		1.98E+00
Cs-136 #A	6.6330E-01	6.6331E-01	9.571E+01%		2.15E+00
Np-239 #A	1.6107E+00	1.6108E+00	1.494E+02%		8.02E+00
Nd-147 #A	4.4375E+00	4.4376E+00	9.650E+01%		1.07E+01
TL-210 #A	-3.6330E-01	-3.6330E-01	2.476E+02%		3.09E+00
Kr-85 #A	1.4017E+02	1.4017E+02	1.049E+02%		4.95E+02

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

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

Total Activity (37.6 to 2000.0 keV) 4.573E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.0 keV) 4.5733954E+02 Bq/Sample

404682_Gamma_490-164296-A-2-B DU. 2_Gamma_20180267.spc.



Test America St. Louis Spectrum ID: 9_Gamma_20185041

Sample Description: 404682_Gamma_490-164387-A-2-A
Detector: Detector # 9
Batch ID: 404682
Work Order Number: Gamma
Lot Number: 490-164387-A-2-A

Decay to Time: 12/29/2018 11:55 Live Time: 1800 sec
Acquisition Time: 12/29/2018 11:55:47 Real Time: 1803 sec
Analysis Time: 12/29/2018 12:26 Dead Time: 0.15 %
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	3.442E-01	948.7	3.265E+00	3.265E+00	1.134E+01
NA-22	-6.810E-02	367.4	2.502E-01	2.502E-01	9.397E-01
K-40	1.079E+02	7.3	7.904E+00	9.640E+00	8.509E+00
Sc-46	2.574E-01	89.5	2.304E-01	2.308E-01	1.169E+00
CR-51	-1.694E-01	1410.4	2.389E+00	2.389E+00	1.741E+01
MN-54	-5.397E-01	51.8	2.797E-01	2.811E-01	1.120E+00
FE-59	-8.834E-01	120.7	1.066E+00	1.067E+00	2.335E+00
Co-56	-1.589E-01	74.1	1.177E-01	1.180E-01	1.122E+00
CO-57	-1.319E-01	201.9	2.662E-01	2.663E-01	9.004E-01
CO-58	1.440E-01	229.1	3.300E-01	3.301E-01	1.159E+00
CO-60	-1.428E-01	372.3	5.318E-01	5.319E-01	1.181E+00
ZN-65	0.000E+00	1.#INF	9.073E-02	9.073E-02	3.548E+00
NB-94	-4.418E-01	86.7	3.832E-01	3.839E-01	1.288E+00
ZR-95	4.938E-01	95.0	4.689E-01	4.696E-01	1.092E+00
NB-95	-3.206E-01	106.1	3.401E-01	3.405E-01	1.159E+00
RU-103	-5.029E-01	63.1	3.175E-01	3.186E-01	1.067E+00
RH-106	4.916E+00	121.1	5.952E+00	5.957E+00	2.001E+01
AG-108M	-4.652E-01	103.4	4.811E-01	4.817E-01	1.006E+00
AG-110M	3.938E-01	37.8	1.489E-01	1.502E-01	1.595E+00
SN-113	0.000E+00	1.#INF	2.360E-01	2.360E-01	1.503E+00
SB-124	-5.260E-01	142.5	7.497E-01	7.502E-01	2.515E+00
SB-125	3.586E-01	88.0	3.154E-01	3.160E-01	2.736E+00
I-131	3.037E-01	96.2	2.923E-01	2.927E-01	7.842E-01
Gd-153	-9.708E-01	169.4	1.644E+00	1.645E+00	5.479E+00
Ga-68	1.030E+01	89.7	9.247E+00	9.265E+00	2.135E+01
Tc-99m	-3.122E-01	141.7	4.425E-01	4.429E-01	1.478E+00
BA-133	-4.552E-02	136.5	6.214E-02	6.218E-02	2.415E+00
CS-134	5.997E-01	56.5	3.389E-01	3.403E-01	1.266E+00
CS-137	5.129E-01	87.2	4.472E-01	4.480E-01	1.501E+00
CE-139	1.341E-01	220.2	2.953E-01	2.955E-01	1.001E+00
Ba-140	8.151E-01	185.0	1.508E+00	1.509E+00	2.865E+00
La-140	2.450E-01	164.2	4.023E-01	4.026E-01	9.183E-01
CE-141	1.270E-01	638.0	8.101E-01	8.101E-01	2.726E+00

CE-144	-2.379E+00	143.9	3.422E+00	3.424E+00	1.143E+01
PM-144	3.060E-01	83.3	2.548E-01	2.553E-01	8.604E-01
EU-152	-8.509E-01	90.2	7.679E-01	7.692E-01	2.562E+00
EU-154	5.272E-01	98.0	5.166E-01	5.174E-01	1.728E+00
EU-155	1.267E+00	190.0	2.408E+00	2.409E+00	8.025E+00
HF-181	1.777E-01	146.2	2.598E-01	2.600E-01	1.503E+00
Ta-182	8.355E-01	171.5	1.433E+00	1.433E+00	4.950E+00
Hg-203	2.976E-01	83.8	2.494E-01	2.500E-01	8.359E-01
TL-208	3.526E+00	12.2	4.305E-01	4.677E-01	6.522E-01
PM-146	2.683E-01	154.7	4.150E-01	4.153E-01	1.018E+00
Y-88	-4.173E-03	9244.0	3.857E-01	3.857E-01	5.109E-01
Cd-113m	2.123E+03	152.1	3.228E+03	3.231E+03	1.107E+04
Cd-109	-7.903E+00	163.3	1.290E+01	1.291E+01	4.301E+01
Cf-251	1.221E+00	95.1	1.160E+00	1.165E+00	2.989E+00
Cf-249	0.000E+00	1.#INF	7.720E-02	7.720E-02	1.447E+00
Sn-126	8.380E-01	455.6	3.818E+00	3.818E+00	1.292E+01
PB-210	2.317E+01	30.5	7.056E+00	7.186E+00	1.712E+01
PB-212	7.618E+00	7.6	5.818E-01	7.625E-01	1.005E+00
PB-214	8.856E+00	8.7	7.733E-01	8.999E-01	1.611E+00
BI-207	-1.512E-01	234.8	3.549E-01	3.550E-01	1.286E+00
BI-212	1.368E+01	23.2	3.180E+00	3.258E+00	6.026E+00
U-235	-1.177E+00	136.5	1.606E+00	1.607E+00	1.228E+01
BI-214	6.428E+00	12.0	7.686E-01	8.381E-01	1.275E+00
BI-210M	-6.303E-01	60.6	3.817E-01	3.835E-01	1.714E+00
AC-228	8.752E+00	12.0	1.048E+00	1.140E+00	9.956E-01
TH-227	-4.239E+00	99.4	4.211E+00	4.219E+00	1.036E+01
TH-229	-3.939E-01	72.9	2.871E-01	2.888E-01	1.558E+01
TH-234	1.089E+01	23.6	2.573E+00	2.643E+00	8.647E+00
PA-231	8.422E+00	146.4	1.233E+01	1.234E+01	5.554E+01
PA-233	5.309E-01	207.2	1.100E+00	1.100E+00	4.718E+00
PA-234	1.721E+00	76.1	1.310E+00	1.313E+00	5.821E+00
PA-234M	3.427E+01	82.2	2.818E+01	2.823E+01	1.575E+02
AM-241	-1.029E+00	115.3	1.186E+00	1.188E+00	3.963E+00
Np-237	0.000E+00	1.#INF	4.066E+00	4.066E+00	1.355E+01
Ir-192	1.938E-01	99.6	1.929E-01	1.933E-01	1.971E+00
Cs-136	4.809E-02	690.1	3.319E-01	3.319E-01	1.183E+00
Np-239	1.204E+00	174.7	2.103E+00	2.105E+00	7.012E+00
Nd-147	-2.073E+00	133.7	2.772E+00	2.774E+00	6.697E+00
TL-210	2.534E-01	123.9	3.138E-01	3.142E-01	1.172E+00
Kr-85	0.000E+00	1.#INF	2.369E+01	2.369E+01	3.449E+02
Total	2.386E+03				

Analyst: Joey Sausto

Sample description
404682_Gamma_490-164387-A-2-A

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20185041.An1

Acquisition information
Start time: 12/29/2018 11:55:47 AM
Live time: 1800
Real time: 1803
Dead time: 0.15 %
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	12/29/2018 11:55:00 AM
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. 27 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1561

***** 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
46.27	46.	30.46	1.06	2.577E-02	46.54	4.250	2.317E+01	PB210
63.21	24.	106.93	1.01	3.921E-02	63.29	3.810	PBC<MDA	TH234
64.96	15.	67.00	0.54	4.031E-02	64.28	9.700	2.155E+00	Sn126
74.65	127.	14.29	1.02	4.564E-02				
77.11	183.	10.98	1.03	4.675E-02				
86.74	35.	44.24	1.04	5.010E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.267E+00	EU155
					86.94	9.040	4.294E+00	Sn126
93.09	93.	20.32	0.68	5.166E-02	92.59	5.584	1.795E+01	TH234
					93.35	5.561	1.797E+01	AC228
105.92	26.	190.02	1.05	5.318E-02	105.31	21.200	PBC<MDA	EU155
					106.13	22.700	PBC<MDA	Np239
106.13	26.	174.68	1.05	5.323E-02	105.31	21.200	PBC<MDA	EU155
					106.13	22.700	1.204E+00	Np239
123.10	20.	97.99	1.07	5.296E-02	123.10	40.790	PBC<MDA	EU154
131.32	21.	143.07	1.08	5.216E-02	131.29	18.000	PBC<MDA	PA234
133.02	21.	146.21	1.08	5.195E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	1.986E+00	CE144
145.37	6.	638.00	1.09	5.012E-02	145.44	48.200	PBC<MDA	CE141
165.85	9.	220.19	1.11	4.736E-02	165.85	79.900	PBC<MDA	CE139
176.60	17.	95.05	1.12	4.549E-02	176.60	17.000	PBC<MDA	Cf251
185.72	45.	43.55	1.13	4.403E-02	185.72	54.000	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
205.33	8.	242.80	1.15	4.123E-02	205.33	5.010	PBC<MDA	U235
210.85	18.	104.72	1.15	4.052E-02	210.85	2.990	PBC<MDA	TH229
235.97	10.	286.40	1.18	3.760E-02	235.97	12.300	PBC<MDA	TH227
238.45	216.	8.61	0.95	3.734E-02	238.63	43.300	7.443E+00	PB212
241.83	53.	22.48	1.18	3.697E-02	242.00	7.430	1.064E+01	PB214
263.70	8.	152.07	1.20	3.489E-02	263.70	0.006	PBC<MDA	Cd113m
279.20	15.	83.82	1.22	3.356E-02	279.20	81.460	PBC<MDA	Hg203
284.30	13.	96.22	1.22	3.315E-02	284.30	6.140	PBC<MDA	I131
294.88	112.	13.44	0.91	3.234E-02	295.09	19.300	9.528E+00	PB214
					296.00	79.000	2.450E+00	TL210
296.00	13.	200.18	1.23	3.225E-02	296.00	79.000	PBC<MDA	TL210
300.02	29.	31.07	1.24	3.195E-02	300.03	3.280	1.552E+01	PB212
					300.07	2.460	2.069E+01	PA231
					300.18	6.200	8.212E+00	PA233
300.07	13.	203.40	1.24	3.195E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	9.105E+00	PA231
					300.18	6.200	3.614E+00	PA233
300.18	13.	207.18	1.24	3.194E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	9.105E+00	PA231
					300.18	6.200	3.614E+00	PA233
302.65	13.	210.51	1.24	3.176E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.232E+00	BA133
302.85	13.	214.12	1.24	3.175E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.232E+00	BA133
304.85	5.	602.88	1.24	3.160E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	2.911E-01	BI210M
338.30	59.	20.38	1.38	2.940E-02	338.32	12.010	9.335E+00	AC228
351.82	175.	11.04	1.32	2.861E-02	351.93	37.600	9.021E+00	PB214
383.84	10.	127.28	1.31	2.691E-02	383.84	8.940	PBC<MDA	BA133
453.88	7.	154.72	1.37	2.388E-02	453.88	65.000	PBC<MDA	PM146
463.37	13.	87.97	1.38	2.352E-02	463.37	10.470	PBC<MDA	SB125
468.06	11.	99.56	1.38	2.335E-02	468.06	51.750	PBC<MDA	Ir192
477.60	2.	948.68	1.39	2.301E-02	477.60	10.520	PBC<MDA	BE7
511.86	93.	14.86	2.67	2.188E-02	511.86	20.000	1.181E+01	RH106
537.26	6.	185.03	1.44	2.112E-02	537.26	24.390	PBC<MDA	Ba140
569.32	7.	80.51	1.47	2.024E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.421E+00	PA234
					569.70	97.740	2.032E-01	BI207
569.66	7.	87.85	1.47	2.024E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.421E+00	PA234
					569.70	97.740	2.032E-01	BI207
583.17	107.	12.21	1.66	1.989E-02	583.02	84.500	3.526E+00	TL208
609.29	103.	11.96	1.04	1.925E-02	609.31	46.090	6.428E+00	BI214
621.92	17.	121.07	1.51	1.896E-02	621.92	9.930	PBC<MDA	RH106
636.97	3.	383.38	1.53	1.862E-02	636.97	7.170	PBC<MDA	I131
661.66	14.	87.19	1.55	1.810E-02	661.66	85.210	PBC<MDA	CS137
696.54	9.	83.27	1.58	1.741E-02	696.54	99.000	PBC<MDA	PM144
726.85	31.	23.25	2.08	1.686E-02	727.17	7.550	1.368E+01	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
756.73	8.	94.95	1.62	1.635E-02	756.73	54.460	PBC<MDA	ZR95
766.41	12.	82.21	1.63	1.620E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.400E+02	PA234M
778.92	2.	431.57	1.64	1.600E-02	778.92	12.940	PBC<MDA	EU152
784.95	2.	537.77	1.65	1.590E-02	785.42	1.280	PBC<MDA	BI212
795.87	12.	79.35	1.66	1.574E-02	795.87	85.530	PBC<MDA	CS134
799.60	6.	145.95	1.66	1.568E-02	799.60	98.960	PBC<MDA	TL210
810.78	4.	229.13	1.67	1.551E-02	810.78	99.460	PBC<MDA	CO58
818.50	1.	690.11	1.67	1.540E-02	818.50	100.000	PBC<MDA	Cs136
871.10	16.	33.98	1.71	1.468E-02	871.10	99.890	5.935E-01	NB94
880.53	8.	90.22	1.72	1.456E-02	880.53	6.000	PBC<MDA	PA234
883.24	5.	154.92	1.72	1.453E-02	883.24	9.600	PBC<MDA	PA234
911.03	63.	12.60	1.48	1.418E-02	911.07	29.000	8.510E+00	AC228
946.02	1.	857.32	1.77	1.377E-02	946.02	13.400	PBC<MDA	PA234
968.96	11.	70.74	1.79	1.352E-02	968.97	17.460	PBC<MDA	AC228
1037.84	6.	96.74	1.84	1.281E-02	1037.84	14.130	PBC<MDA	Co56
1077.40	7.	89.75	1.87	1.244E-02	1077.40	3.300	PBC<MDA	Ga68
1120.33	9.	100.22	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	11.	89.52	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
1121.34	6.	171.49	1.90	1.205E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	8.355E-01	Ta182
1238.28	4.	237.10	1.98	1.114E-02	1238.28	66.070	PBC<MDA	Co56
1313.00	9.	33.33	2.03	1.063E-02	1313.00	21.000	2.241E+00	TL210
1384.30	7.	37.80	2.08	1.018E-02	1384.30	24.290	PBC<MDA	AG110M
1460.79	202.	7.33	1.98	9.749E-03	1460.83	10.670	1.079E+02	K40
1596.21	4.	164.23	2.22	9.069E-03	1596.21	95.400	PBC<MDA	La140
1763.85	24.	23.50	2.31	8.350E-03	1764.49	15.400	1.019E+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
259.15	64.96	80.	30.	7.351E+02	46.53	1.016	- sD
298.19	74.61	102.	127.	2.791E+03	14.29	1.025	- D
308.06	77.08	111.	183.	3.918E+03	10.98	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	184.74	46.27	44.	46.	0.025	30.46	1.062s
TH-227	200.20	50.14	261.	-20.	-0.011	114.76	1.001s
AM-241	237.77	59.54	381.	-24.	-0.014	115.28	1.010s
TH-234	252.77	63.29	309.	24.	0.013	106.93	1.014
Sn-126	256.74	64.28	350.	6.	0.003	455.55	1.015
BA-133	323.56	80.99	735.	-26.	-0.014	148.21	1.031s
Np-237	345.55	86.49	1139.	0.	0.000	176.56	1.036A
EU-155	345.76	86.54	1062.	35.	0.019	44.24	1.036D
Sn-126	347.35	86.94	1035.	-27.	-0.015	168.38	1.037
Sn-126	349.87	87.57	1008.	-27.	-0.015	166.07	1.037
Cd-109	351.75	88.04	975.	-27.	-0.015	163.25	1.038s
Nd-147	363.99	91.10	991.	-27.	-0.015	164.12	1.041s
TH-234	369.94	92.59	82.	64.	0.035	23.62	1.042D
AC-228	372.98	93.35	1041.	-27.	-0.015	167.86	1.043s
Gd-153	389.58	97.50	1069.	-27.	-0.015	169.37	1.047s
Np-239	397.58	99.50	1096.	-28.	-0.015	171.19	1.049s
Gd-153	412.37	103.20	1124.	-28.	-0.015	172.76	1.052s
EU-155	420.82	105.31	1181.	26.	0.014	190.02	1.054
Np-239	424.09	106.13	1033.	26.	0.015	174.68	1.055
EU-152	486.67	121.78	208.	-23.	-0.013	90.24	1.070s
CO-57	487.80	122.06	231.	-11.	-0.006	201.86	1.070s
EU-154	491.95	123.10	192.	20.	0.011	97.99	1.071s
PA-234	524.72	131.29	422.	21.	0.011	143.07	1.079s
HF-181	531.64	133.02	442.	21.	0.011	146.21	1.081s
CE-144	533.69	133.54	616.	-25.	-0.014	143.87	1.081s
HF-181	544.74	136.30	591.	-25.	-0.014	140.68	1.084s
CO-57	545.43	136.47	580.	-25.	-0.014	139.37	1.084s
Tc-99m	561.57	140.51	605.	-25.	-0.014	141.72	1.088s
U-235	574.67	143.79	656.	-27.	-0.015	136.52	1.091s
CE-141	581.29	145.44	618.	6.	0.003	638.00	1.092s
Ba-140	650.15	162.66	228.	-23.	-0.013	95.91	1.108s
CE-139	662.92	165.85	198.	9.	0.005	220.19	1.111s
Cf-251	705.90	176.60	70.	17.	0.009	95.05	1.122s
U-235	742.37	185.72	95.	45.	0.025	43.55	1.130s
TH-229	773.52	193.51	116.	-21.	-0.012	101.40	1.137s
U-235	820.80	205.33	96.	8.	0.004	242.80	1.148s
TH-229	842.87	210.85	88.	18.	0.010	104.72	1.153s
Cf-251	907.45	227.00	100.	-20.	-0.011	98.96	1.168s
TH-227	943.33	235.97	441.	10.	0.006	286.40	1.176s
PB-212	953.97	238.63	32.	222.	0.123	7.64	1.179D
PB-214	967.43	242.00	43.	53.	0.029	22.48	1.182D
EU-152	978.21	244.69	482.	-18.	-0.010	170.28	1.185
TH-227	1024.39	256.24	88.	-19.	-0.011	99.35	1.195s
Cd-113m	1054.23	263.70	70.	8.	0.004	152.07	1.202s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	1062.75	265.83	119.	-20.	-0.011	60.55	1.204s
TL-208	1108.55	277.28	80.	-6.	-0.003	214.73	1.215
Hg-203	1116.22	279.20	68.	15.	0.008	83.82	1.216s
I-131	1136.61	284.30	40.	13.	0.007	96.22	1.221s
PB-214	1179.77	295.09	35.	96.	0.053	13.53	1.231D
TL-210	1183.41	296.00	324.	13.	0.007	200.18	1.231s
PB-212	1199.52	300.03	27.	29.	0.016	31.07	1.235D
PA-231	1199.68	300.07	337.	13.	0.007	203.40	1.235
PA-233	1200.12	300.18	350.	13.	0.007	207.18	1.235
PA-231	1210.00	302.65	363.	13.	0.007	210.51	1.237s
BA-133	1210.81	302.85	375.	13.	0.007	214.12	1.238s
Ba-140	1218.80	304.85	388.	5.	0.003	602.88	1.240s
BI-210M	1218.99	304.90	393.	0.	0.000	1000.00	1.240s
Ir-192	1233.16	308.44	393.	0.	0.000	1000.00	1.243s
PA-233	1247.44	312.01	393.	0.	0.000	1000.00	1.246
Ir-192	1265.35	316.49	393.	0.	0.000	1000.00	1.250s
La-140	1314.43	328.76	257.	-17.	-0.009	78.80	1.261s
AC-228	1352.60	338.30	23.	59.	0.033	20.38	1.383
Cs-136	1361.66	340.57	192.	-18.	-0.010	113.33	1.272s
EU-152	1376.53	344.29	174.	-18.	-0.010	107.95	1.275s
HF-181	1382.70	345.83	149.	-9.	-0.005	190.16	1.276s
PB-214	1406.65	351.82	37.	175.	0.097	11.04	1.319
BA-133	1423.37	356.00	251.	-13.	-0.007	169.36	1.285s
BA-133	1534.73	383.84	76.	10.	0.006	127.28	1.310s
Cf-249	1551.17	387.95	86.	0.	0.000	1000.00	1.314s
SN-113	1566.12	391.69	86.	0.	0.000	1000.00	1.317s
SB-125	1710.86	427.88	52.	-7.	-0.004	213.65	1.349s
AG-108M	1735.10	433.94	65.	-19.	-0.010	103.40	1.354s
PM-146	1814.87	453.88	31.	7.	0.004	154.72	1.372
SB-125	1852.82	463.37	56.	13.	0.007	87.97	1.380s
Ir-192	1871.59	468.06	58.	11.	0.006	99.56	1.384s
BE-7	1909.73	477.60	100.	2.	0.001	948.68	1.392s
HF-181	1927.34	482.00	102.	0.	0.000	1000.00	1.396s
La-140	1947.43	487.02	96.	0.	0.000	1000.00	1.400s
RU-103	1987.56	497.05	61.	-18.	-0.010	63.14	1.409s
RH-106	2046.81	511.86	49.	93.	0.052	14.86	2.672s
Kr-85	2055.27	513.98	142.	0.	0.000	1000.00	1.424s
Nd-147	2123.35	531.00	43.	-10.	-0.006	133.71	1.438
Ba-140	2148.39	537.26	26.	6.	0.003	185.03	1.444s
CS-134	2252.30	563.24	28.	0.	0.000	1000.00	1.466s
CS-134	2276.64	569.32	13.	7.	0.004	80.51	1.471s
PA-234	2277.24	569.47	17.	7.	0.004	87.85	1.471s
BI-207	2278.16	569.70	29.	-2.	-0.001	394.00	1.471s
TL-208	2332.02	583.17	13.	107.	0.059	12.21	1.665
SB-125	2401.36	600.50	340.	-18.	-0.010	146.54	1.497s
SB-124	2410.29	602.73	322.	-18.	-0.010	142.53	1.499s
CS-134	2418.21	604.71	304.	-18.	-0.010	138.44	1.500
BI-214	2436.54	609.29	14.	103.	0.057	11.96	1.042s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RU-103	2440.56	610.30	286.	-18.	-0.010	133.96	1.505s
AG-108M	2456.49	614.28	268.	-18.	-0.010	129.51	1.508s
PM-144	2471.62	618.06	250.	-15.	-0.008	155.77	1.512s
RH-106	2487.04	621.92	195.	17.	0.009	121.07	1.515s
SB-125	2542.94	635.89	42.	-13.	-0.007	75.76	1.526
I-131	2547.28	636.97	56.	3.	0.002	383.38	1.527s
AG-110M	2630.43	657.76	69.	-19.	-0.011	56.28	1.544s
CS-137	2646.03	661.66	70.	14.	0.008	87.19	1.548s
PM-144	2785.58	696.54	26.	9.	0.005	83.27	1.576s
NB-94	2809.93	702.63	61.	-13.	-0.007	86.74	1.581s
SB-124	2890.57	722.79	70.	-12.	-0.006	107.38	1.598s
AG-108M	2891.17	722.94	59.	0.	0.000	1000.00	1.598s
EU-154	2892.86	723.36	59.	0.	0.000	1000.00	1.598s
ZR-95	2896.22	724.20	80.	-17.	-0.009	79.63	1.599s
BI-212	2906.83	726.85	6.	31.	0.017	23.25	2.083s
PM-146	2942.31	735.72	23.	-4.	-0.002	241.30	1.608s
ZR-95	3026.36	756.73	10.	8.	0.004	94.95	1.625s
AG-110M	3055.23	763.94	30.	0.	0.000	1000.00	1.631s
NB-95	3062.61	765.79	44.	-9.	-0.005	106.07	1.632s
PA-234M	3065.10	766.41	43.	12.	0.007	82.21	1.633s
EU-152	3115.14	778.92	15.	2.	0.001	431.57	1.643s
BI-212	3141.15	785.42	39.	2.	0.001	537.77	1.648s
CS-134	3182.96	795.87	36.	12.	0.006	79.35	1.656s
TL-210	3197.88	799.60	42.	6.	0.004	145.95	1.659
CS-134	3207.29	801.95	72.	-12.	-0.007	104.08	1.661s
CO-58	3242.59	810.78	40.	4.	0.002	229.13	1.668s
La-140	3262.58	815.77	37.	-2.	-0.001	376.07	1.672s
Cs-136	3273.50	818.50	42.	1.	0.001	690.11	1.674s
MN-54	3338.91	834.85	36.	-15.	-0.008	51.82	1.687s
Co-56	3386.61	846.77	35.	-12.	-0.007	112.17	1.696s
TL-208	3441.80	860.56	30.	-6.	-0.003	50.00	1.707s
NB-94	3483.94	871.10	6.	16.	0.009	33.98	1.715s
EU-154	3492.47	873.23	29.	-7.	-0.004	48.93	1.717s
PA-234	3521.68	880.53	25.	8.	0.005	90.22	1.722s
PA-234	3532.53	883.24	30.	5.	0.003	154.92	1.724s
AG-110M	3538.30	884.68	35.	0.	0.000	1000.00	1.725s
Y-88	3591.74	898.04	20.	-8.	-0.005	42.03	1.736s
AC-228	3643.71	911.03	0.	63.	0.035	12.60	1.479
AG-110M	3749.60	937.49	25.	-10.	-0.006	114.38	1.766s
PA-234	3783.72	946.02	15.	1.	0.001	857.32	1.772
EU-152	3856.11	964.11	60.	-1.	-0.001	311.99	1.786s
AC-228	3875.56	968.97	27.	11.	0.006	70.74	1.790s
EU-154	3985.03	996.33	32.	-5.	-0.003	166.13	1.810s
PA-234M	4003.71	1001.00	38.	-1.	0.000	659.24	1.814s
EU-154	4018.82	1004.77	38.	0.	0.000	1000.00	1.816s
Co-56	4151.13	1037.84	6.	6.	0.003	96.74	1.841s
Cs-136	4192.07	1048.07	21.	0.	0.000	1000.00	1.848s
BI-207	4254.46	1063.66	17.	-3.	-0.001	234.79	1.860s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ga-68	4309.44	1077.40	5.	7.	0.004	89.75	1.870s
FE-59	4396.88	1099.25	32.	-11.	-0.006	120.72	1.886s
EU-152	4448.20	1112.07	63.	-2.	-0.001	653.02	1.895s
ZN-65	4462.09	1115.55	61.	0.	0.000	1000.00	1.897s
BI-214	4481.06	1120.29	39.	9.	0.005	100.22	1.901s
Sc-46	4482.12	1120.55	47.	11.	0.006	89.52	1.901s
Ta-182	4485.12	1121.30	56.	6.	0.004	171.49	1.901s
Ta-182	4756.25	1189.05	34.	-10.	-0.006	140.36	1.949s
Ta-182	4885.75	1221.41	29.	-4.	-0.002	60.88	1.972s
Co-56	4953.27	1238.28	18.	4.	0.002	237.10	1.984s
NA-22	5098.35	1274.53	11.	-1.	-0.001	367.42	2.008s
EU-154	5098.39	1274.54	13.	0.	0.000	1000.00	2.008s
TL-210	5252.32	1313.00	0.	9.	0.005	33.33	2.034s
CO-60	5330.37	1332.50	18.	-3.	-0.001	372.32	2.047s
AG-110M	5537.69	1384.30	0.	7.	0.004	37.80	2.082s
EU-152	5632.56	1408.00	11.	-2.	-0.001	404.64	2.097s
K-40	5843.86	1460.79	8.	202.	0.112	7.33	1.985s
La-140	6385.95	1596.21	6.	4.	0.002	164.23	2.215s
SB-124	6765.35	1690.98	13.	-10.	-0.006	63.73	2.272s
BI-214	7059.65	1764.49	3.	24.	0.013	23.50	2.314s
Co-56	7087.11	1771.35	27.	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	3.4420E-01				5.31E+01	
			477.60	3.442E-01	&(	1.134E+01 9.49E+02 1.05E+01	G
NA-22	C	-6.8102E-02				9.50E+02	
			1274.53	-6.810E-02	?(	9.397E-01 3.67E+02 9.99E+01	G
K-40	N	1.0786E+02				4.66E+11	
			1460.83	1.079E+02	@(P	8.509E+00 7.33E+00 1.07E+01	G
Sc-46	F	2.5741E-01				8.38E+01	
			889.28	-1.282E-02	&(	1.169E+00 2.53E+03 1.00E+02	G
			1120.55	5.276E-01	?(	1.594E+00 8.95E+01 1.00E+02	G
CR-51	F	-1.6939E-01				2.77E+01	
			320.08	-1.694E-01	%(P	1.741E+01 1.41E+03 9.94E+00	G

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Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C -5.3974E-01					3.12E+02	
		834.85	-5.397E-01	?(P	1.120E+00	5.18E+01	1.00E+02 G
FE-59	F -8.8343E-01					4.45E+01	
		1099.25	-8.834E-01	?(	2.335E+00	1.21E+02	5.65E+01 G
		1291.60	-3.981E-02	%	2.197E+00	2.37E+03	4.32E+01 G
Co-56	C -1.5894E-01					7.73E+01	
		846.77	-4.446E-01	&(	1.122E+00	1.12E+02	9.99E+01 G
		1238.28	3.175E-01	+ P	1.689E+00	2.37E+02	6.61E+01 G
		1037.84	1.861E+00	?(P	4.238E+00	9.67E+01	1.41E+01 G
		1771.35	0.000E+00	+	1.161E+01	1.00E+03	1.55E+01 A
CO-57	C -1.3189E-01					2.72E+02	
		122.06	-1.319E-01	?(	9.004E-01	2.02E+02	8.56E+01 G
		136.47	-2.495E+00	+	1.161E+01	1.39E+02	1.07E+01 G
CO-58	C 1.4401E-01					7.09E+01	
		810.78	1.440E-01	&(	1.159E+00	2.29E+02	9.95E+01 G
CO-60	F -1.4285E-01					1.93E+03	
		1332.50	-1.428E-01	?(P	1.181E+00	3.72E+02	1.00E+02 G
		1173.24	-8.664E-03	% P	1.026E+00	5.16E+03	9.99E+01 G
NB-94	I -4.4180E-01					7.41E+06	
		702.63	-4.418E-01	?(	1.288E+00	8.67E+01	9.79E+01 G
		871.10	5.935E-01	+	5.469E-01	3.40E+01	9.99E+01 G
ZR-95	I 4.9384E-01					6.40E+01	
		756.73	4.938E-01	?(P	1.092E+00	9.50E+01	5.45E+01 G
		724.20	-1.241E+00	+	3.300E+00	7.96E+01	4.42E+01 G
NB-95	I -3.2063E-01					6.40E+01	
		765.79	-3.206E-01	?(	1.159E+00	1.06E+02	9.98E+01 G
RU-103	I -5.0289E-01					3.93E+01	
		497.05	-5.029E-01	(P	1.067E+00	6.31E+01	9.09E+01 G
		610.30	-9.112E+00	+	4.096E+01	1.34E+02	5.75E+00 GA
RH-106	I 4.9157E+00					3.74E+02	
		621.92	4.916E+00	?(	2.001E+01	1.21E+02	9.93E+00 G
		1050.36	1.403E+00	%	6.681E+01	1.29E+03	1.56E+00 G
		511.86	1.181E+01	?	4.485E+00	1.49E+01	2.00E+01 GA
AG-108M	C -4.6525E-01					1.53E+05	
		433.94	-4.652E-01	?(P	1.006E+00	1.03E+02	9.05E+01 G
		722.94	0.000E+00	+	1.391E+00	1.00E+03	9.08E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		614.28	-5.872E-01	+	2.552E+00	1.30E+02	8.98E+01 G
AG-110M F	3.9383E-01					2.50E+02	
		884.68	0.000E+00	?(	1.595E+00	1.00E+03	7.27E+01 G
		657.76	-6.203E-01	+ P	1.334E+00	5.63E+01	9.46E+01 G
		937.49	-1.166E+00	+	3.032E+00	1.14E+02	3.44E+01 G
		1384.30	1.572E+00	?(	1.655E+00	3.78E+01	2.43E+01 G
		763.94	0.000E+00	-	4.336E+00	1.00E+03	2.23E+01 G
SB-124 F	-5.2601E-01					6.02E+01	
		602.73	-5.260E-01	?(	2.515E+00	1.43E+02	9.83E+01 G
		1690.98	-1.332E+00	+ P	2.615E+00	6.37E+01	4.78E+01 G
		722.79	-3.490E+00	+	1.270E+01	1.07E+02	1.08E+01 G
SB-125 I	3.5858E-01					1.01E+03	
		427.88	-5.274E-01	?(	2.736E+00	2.14E+02	2.96E+01 G
		600.50	-2.882E+00	&	1.417E+01	1.47E+02	1.79E+01 G
		635.89	-3.425E+00	+	8.670E+00	7.58E+01	1.13E+01 G
		463.37	2.864E+00	&(	8.478E+00	8.80E+01	1.05E+01 G
I-131 I	3.0374E-01					8.02E+00	
		364.48	-2.437E-02	%(	7.842E-01	1.24E+03	8.17E+01 G
		284.30	3.663E+00	&(	8.784E+00	9.62E+01	6.14E+00 G
		636.97	1.166E+00	?(P	1.566E+01	3.83E+02	7.17E+00 G
Gd-153 F	-9.7082E-01					2.42E+02	
		97.50	-9.708E-01	?(	5.479E+00	1.69E+02	3.00E+01 G
		103.20	-1.327E+00	+	7.636E+00	1.73E+02	2.18E+01 G
Ga-68 C	1.0304E+01					4.71E-02	
		1077.40	1.030E+01	?(	2.135E+01	8.97E+01	3.30E+00 G
Tc-99m I	-3.1223E-01					2.51E-01	
		140.51	-3.122E-01	&(	1.478E+00	1.42E+02	8.93E+01 G
BA-133 F	-4.5522E-02					3.85E+03	
		356.00	-4.230E-01	?(	2.415E+00	1.69E+02	6.20E+01 G
		302.85	1.232E+00	?(	8.879E+00	2.14E+02	1.83E+01 G
		383.84	2.309E+00	&	1.001E+01	1.27E+02	8.94E+00 GA
		80.99	-8.810E-01	&	4.357E+00	1.48E+02	3.41E+01 GA
CS-134 I	5.9965E-01					7.54E+02	
		795.87	4.754E-01	?(	1.266E+00	7.93E+01	8.55E+01 G
		604.71	-5.313E-01	-	2.468E+00	1.38E+02	9.76E+01 G
		569.32	1.291E+00	?(	3.520E+00	8.05E+01	1.54E+01 G
		801.95	-4.903E+00	&	1.726E+01	1.04E+02	8.69E+00 G
		563.24	0.000E+00	-	8.926E+00	1.00E+03	8.35E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-137	I	5.1291E-01					1.10E+04	
			661.66	5.129E-01	&(	1.501E+00	8.72E+01	8.52E+01 G
CE-139	F	1.3410E-01					1.38E+02	
			165.85	1.341E-01	&(P	1.001E+00	2.20E+02	7.99E+01 G
Ba-140	I	8.1507E-01					1.28E+01	
			537.26	6.242E-01	&(P	2.865E+00	1.85E+02	2.44E+01 G
			162.66	-4.341E+00	&	1.390E+01	9.59E+01	6.22E+00 G
			304.85	1.900E+00	?(	3.874E+01	6.03E+02	4.29E+00 G
La-140	I	2.4499E-01					1.28E+01	
			1596.21	2.450E-01	?(P	9.183E-01	1.64E+02	9.54E+01 G
			487.02	0.000E+00	-	2.603E+00	1.00E+03	4.55E+01 G
			328.76	-1.523E+00	+ P	7.069E+00	7.88E+01	2.03E+01 G
			815.77	-3.606E-01	+	4.819E+00	3.76E+02	2.33E+01 G
CE-141	I	1.2697E-01					3.25E+01	
			145.44	1.270E-01	?(	2.726E+00	6.38E+02	4.82E+01 G
CE-144	I	-2.3787E+00					2.85E+02	
			133.54	-2.379E+00	?(	1.143E+01	1.44E+02	1.11E+01 G
PM-144	C	3.0596E-01					3.63E+02	
			696.54	3.060E-01	?(	8.604E-01	8.33E+01	9.90E+01 G
			618.06	-4.283E-01	&	2.247E+00	1.56E+02	9.91E+01 G
EU-152	F	-8.5095E-01					4.94E+03	
			121.78	-8.509E-01	?(	2.562E+00	9.02E+01	2.86E+01 G
			344.29	-1.280E+00	+	4.636E+00	1.08E+02	2.65E+01 G
			1112.07	-5.796E-01	&	1.330E+01	6.53E+02	1.36E+01 G
			778.92	5.367E-01	+	5.571E+00	4.32E+02	1.29E+01 G
			964.11	-3.209E-01	+ P	1.089E+01	3.12E+02	1.46E+01 G
			244.69	-3.678E+00	+	2.098E+01	1.70E+02	7.58E+00 G
			1408.00	-6.557E-01	+ P	4.873E+00	4.05E+02	2.10E+01 GA
EU-154	I	5.2724E-01					3.14E+03	
			123.10	5.272E-01	?(	1.728E+00	9.80E+01	4.08E+01 G
			1274.54	0.000E+00	-	2.799E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	6.251E+00	1.00E+03	2.02E+01 G
			873.23	-2.115E+00	& P	8.570E+00	4.89E+01	1.23E+01 G
			1004.77	0.000E+00	-	7.380E+00	1.00E+03	1.80E+01 G
			996.33	-1.981E+00	+	1.152E+01	1.66E+02	1.06E+01 G
EU-155	I	1.2672E+00					1.81E+03	
			105.31	1.267E+00	&(P	8.025E+00	1.90E+02	2.12E+01 G
			86.54	1.267E+00	}	5.584E+00	4.42E+01	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	1.7769E-01					4.24E+01	
			482.00	0.000E+00	?(	1.503E+00	1.00E+03	8.05E+01 G
			133.02	5.080E-01	?(	2.487E+00	1.46E+02	4.33E+01 G
			345.83	-1.174E+00	+	7.593E+00	1.90E+02	1.51E+01 G
			136.30	-4.552E+00	+	2.139E+01	1.41E+02	5.85E+00 G
Ta-182	F	8.3547E-01					1.14E+02	
			1121.30	8.355E-01	?(	4.950E+00	1.71E+02	3.49E+01 G
			1221.41	-7.232E-01	& P	5.077E+00	6.09E+01	2.70E+01 G
			1189.05	-2.981E+00	+	8.908E+00	1.40E+02	1.62E+01 G
Hg-203	F	2.9755E-01					4.66E+01	
			279.20	2.976E-01	?(	8.359E-01	8.38E+01	8.15E+01 G
TL-208	N	3.5262E+00					6.98E+02	
			583.02	3.526E+00	(P	6.522E-01	1.22E+01	8.45E+01 G
			277.28	-1.567E+00	-	1.159E+01	2.15E+02	6.31E+00 G
			860.56	-1.901E+00	- P	8.560E+00	5.00E+01	1.24E+01 G
PM-146	C	2.6825E-01					2.02E+03	
			453.88	2.683E-01	?(P	1.018E+00	1.55E+02	6.50E+01 G
			747.16	-4.717E-02	% P	2.303E+00	1.94E+03	3.40E+01 G
			735.72	-6.404E-01	+	3.727E+00	2.41E+02	2.25E+01 G
Y-88	F	-4.1727E-03					1.07E+02	
			1836.06	-4.173E-03	%(P	5.109E-01	9.24E+03	9.92E+01 G
			898.04	-3.426E-01	+ P	9.798E-01	4.20E+01	9.37E+01 G
Cd-113m		2.1229E+03					5.33E+03	
			263.70	2.123E+03	?(	1.107E+04	1.52E+02	6.00E-03 K
Cd-109	F	-7.9034E+00					4.53E+02	
			88.04	-7.903E+00	?(	4.301E+01	1.63E+02	3.79E+00 G
Cf-251	T	1.2207E+00					3.28E+05	
			176.60	1.221E+00	?(	2.989E+00	9.51E+01	1.70E+01 G
			227.00	-4.640E+00	+	1.127E+01	9.90E+01	6.30E+00 GA
Sn-126		8.3804E-01					3.65E+07	
			87.57	-8.004E-01	+	4.430E+00	1.66E+02	3.75E+01 GA
			64.28	8.380E-01	(	1.292E+01	4.56E+02	9.70E+00 G
			86.94	-3.329E+00	+	1.868E+01	1.68E+02	9.04E+00 GA
PB-210	N	2.3168E+01					8.14E+03	
			46.54	2.317E+01	@(	1.712E+01	3.05E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	7.6179E+00					6.98E+02	
			238.63	7.618E+00	(	1.005E+00	7.64E+00	4.33E+01 G
			300.03	1.552E+01	+	1.421E+01	3.11E+01	3.28E+00 GA
PB-214	N	8.8564E+00					5.84E+05	
			351.93	9.021E+00	(P	1.611E+00	1.10E+01	3.76E+01 G
			295.09	8.535E+00	(P	2.703E+00	1.35E+01	1.93E+01 G
			242.00	1.064E+01	P	6.758E+00	2.25E+01	7.43E+00 GA
BI-207	C	-1.5116E-01					1.18E+04	
			1063.66	-1.512E-01	?(P	1.286E+00	2.35E+02	7.45E+01 G
			569.70	-5.519E-02	+	7.808E-01	3.94E+02	9.77E+01 G
BI-212	N	1.3679E+01					6.98E+02	
			727.17	1.368E+01	(	6.026E+00	2.32E+01	7.55E+00 G
			785.42	4.551E+00	-	8.720E+01	5.38E+02	1.28E+00 GA
U-235	N	-1.1766E+00					2.57E+11	
			143.79	-2.697E+00	*(	1.228E+01	1.37E+02	1.10E+01 G
			205.33	2.149E+00	&(P	1.301E+01	2.43E+02	5.01E+00 G
			163.38	-2.610E-01	% P	1.500E+01	1.67E+03	5.08E+00 G
			185.72	1.044E+00		1.127E+00	4.35E+01	5.40E+01 GA
BI-214	N	6.4282E+00					5.84E+05	
			609.31	6.428E+00	(P	1.275E+00	1.20E+01	4.61E+01 G
			1120.29	2.834E+00	- P	9.649E+00	1.00E+02	1.51E+01 G
			1764.49	1.019E+01	+ P	4.888E+00	2.35E+01	1.54E+01 G
BI-210M	T	-6.3030E-01					1.10E+09	
			265.83	-6.303E-01	&(P	1.714E+00	6.06E+01	5.00E+01 G
			304.90	0.000E+00	+	5.971E+00	1.00E+03	2.80E+01 G
AC-228	N	8.7519E+00					2.10E+03	
			911.07	8.510E+00	(	9.956E-01	1.26E+01	2.90E+01 G
			968.97	2.691E+00	-	6.337E+00	7.07E+01	1.75E+01 G
			338.32	9.335E+00	(	3.917E+00	2.04E+01	1.20E+01 G
			93.35	-5.287E+00	-	2.958E+01	1.68E+02	5.56E+00 XA
TH-227	N	-4.2387E+00					7.95E+03	
			256.24	-4.239E+00	(	1.036E+01	9.94E+01	7.00E+00 G
			235.97	1.252E+00	+	1.208E+01	2.86E+02	1.23E+01 G
			50.14	-4.860E+00	+	1.868E+01	1.15E+02	8.00E+00 G
TH-229	N	-3.9390E-01					2.68E+06	
			193.51	-6.271E+00	?(	1.558E+01	1.01E+02	4.40E+00 G
			210.85	8.254E+00	?(	2.129E+01	1.05E+02	2.99E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	1.0894E+01					1.63E+12	
			92.59	1.231E+01	(	8.647E+00	2.36E+01	5.58E+00 G
			63.29	8.813E+00	&(	3.148E+01	1.07E+02	3.81E+00 G
PA-231	N	8.4218E+00					1.20E+07	
			302.65	7.838E+00	?(	5.554E+01	2.11E+02	2.88E+00 G
			300.07	9.105E+00	(	6.237E+01	2.03E+02	2.46E+00 G
PA-233	C	5.3093E-01					7.82E+08	
			312.01	0.000E+00	?(	4.718E+00	1.00E+03	3.60E+01 G
			300.18	3.614E+00	(	2.521E+01	2.07E+02	6.20E+00 G
PA-234	N	1.7208E+00					1.63E+12	
			131.29	1.215E+00	?(	5.821E+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	2.421E+00	?(	7.257E+00	8.78E+01	8.20E+00 G
			883.24	2.070E+00	?(	1.121E+01	1.55E+02	9.60E+00 G
			880.53	5.386E+00	&	1.653E+01	9.02E+01	6.00E+00 GA
PA-234M	N	3.4271E+01					1.63E+12	
			1001.00	-2.869E+00	?(P	1.575E+02	6.59E+02	8.37E-01 G
			766.41	1.400E+02	?(	3.868E+02	8.22E+01	2.94E-01 G
AM-241	T	-1.0291E+00					1.58E+05	
			59.54	-1.029E+00	&(	3.963E+00	1.15E+02	3.59E+01 G
Ir-192	F	1.9380E-01					7.40E+01	
			316.49	0.000E+00	?(	1.971E+00	1.00E+03	8.70E+01 G
			468.06	5.198E-01	?(	1.752E+00	9.96E+01	5.18E+01 G
			308.44	0.000E+00	-	5.308E+00	1.00E+03	3.18E+01 G
Cs-136	F	4.8093E-02					1.30E+01	
			818.50	4.809E-02	&(	1.183E+00	6.90E+02	1.00E+02 G
			1048.07	0.000E+00	-	1.315E+00	1.00E+03	8.00E+01 G
			340.57	-7.157E-01	+	2.723E+00	1.13E+02	4.69E+01 G
Np-239	T	1.2042E+00					2.36E+00	
			103.70	-3.641E-02	&	7.016E+00	5.75E+03	2.40E+01 X
			106.13	1.204E+00	(	7.012E+00	1.75E+02	2.27E+01 G
			99.50	-1.936E+00	&	1.104E+01	1.71E+02	1.50E+01 X
Nd-147		-2.0729E+00					1.11E+01	
			531.00	-2.073E+00	&(	6.697E+00	1.34E+02	1.30E+01 G
			91.10	-1.046E+00	+	5.723E+00	1.64E+02	2.83E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-210 N	2.5336E-01					5.84E+05	
		799.60	2.321E-01	?(	1.172E+00	1.46E+02	9.90E+01 G
		296.00	2.800E-01	?(	1.888E+00	2.00E+02	7.90E+01 G
		1313.00	2.241E+00	?	1.835E+00	3.33E+01	2.10E+01 GA

(- This peak used in the nuclide activity average.

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

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
TH-227	50.14	261.	-20.	-0.011	114.76	-4.860E+00
AM-241	59.54	381.	-24.	-0.014	115.28	-1.029E+00
BA-133	80.99	735.	-26.	-0.014	148.21	-8.810E-01
Cd-109	88.04	975.	-27.	-0.015	163.25	-7.903E+00
Nd-147	91.10	991.	-27.	-0.015	164.12	-1.046E+00
Gd-153	97.50	1069.	-27.	-0.015	169.37	-9.708E-01
Np-239	99.50	1096.	-28.	-0.015	171.19	-1.936E+00
Gd-153	103.20	1124.	-28.	-0.015	172.76	-1.327E+00
Np-239	106.13	1033.	26.	0.015	174.68	1.204E+00
EU-152	121.78	208.	-23.	-0.013	90.24	-8.509E-01

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CO-57	122.06	231.	-11.	-0.006	201.86	-1.319E-01		
EU-154	123.10	192.	20.	0.011	97.99	5.272E-01		
HF-181	133.02	442.	21.	0.011	146.21	5.080E-01		
CE-144	133.54	616.	-25.	-0.014	143.87	-2.379E+00		
HF-181	136.30	591.	-25.	-0.014	140.68	-4.552E+00		
CO-57	136.47	580.	-25.	-0.014	139.37	-2.495E+00		
Tc-99m	140.51	605.	-25.	-0.014	141.72	-3.122E-01		
U-235	143.79	656.	-27.	-0.015	136.52	-2.697E+00		
Ba-140	162.66	228.	-23.	-0.013	95.91	-4.341E+00		
CE-139	165.85	198.	9.	0.005	220.19	1.341E-01		P
Cf-251	176.60	70.	17.	0.009	95.05	1.221E+00		
U-235	185.72	95.	45.	0.025	43.55	1.044E+00		
TH-229	193.51	116.	-21.	-0.012	101.40	-6.271E+00		
U-235	205.33	96.	8.	0.004	242.80	2.149E+00		P
TH-229	210.85	88.	18.	0.010	104.72	8.254E+00		
Cf-251	227.00	100.	-20.	-0.011	98.96	-4.640E+00		
TH-227	235.97	441.	10.	0.006	286.40	1.252E+00		
EU-152	244.69	482.	-18.	-0.010	170.28	-3.678E+00		
TH-227	256.24	88.	-19.	-0.011	99.35	-4.239E+00		
Cd-113m	263.70	70.	8.	0.004	152.07	2.123E+03		
BI-210M	265.83	119.	-20.	-0.011	60.55	-6.303E-01		P
Hg-203	279.20	68.	15.	0.008	83.82	2.976E-01		
I-131	284.30	40.	13.	0.007	96.22	3.663E+00		
TL-210	296.00	324.	13.	0.007	200.18	2.800E-01		
PA-231	300.07	337.	13.	0.007	203.40	9.105E+00		
PA-233	300.18	350.	13.	0.007	207.18	3.614E+00		
PA-231	302.65	363.	13.	0.007	210.51	7.838E+00		
BA-133	302.85	375.	13.	0.007	214.12	1.232E+00		
Ba-140	304.85	388.	5.	0.003	602.88	1.900E+00		
La-140	328.76	257.	-17.	-0.009	78.80	-1.523E+00		P
Cs-136	340.57	192.	-18.	-0.010	113.33	-7.157E-01		
EU-152	344.29	174.	-18.	-0.010	107.95	-1.280E+00		
HF-181	345.83	149.	-9.	-0.005	190.16	-1.174E+00		
BA-133	356.00	251.	-13.	-0.007	169.36	-4.230E-01		
BA-133	383.84	76.	10.	0.006	127.28	2.309E+00		
SB-125	427.88	52.	-7.	-0.004	213.65	-5.274E-01		
AG-108M	433.94	65.	-19.	-0.010	103.40	-4.652E-01		P
PM-146	453.88	31.	7.	0.004	154.72	2.683E-01		P
SB-125	463.37	56.	13.	0.007	87.97	2.864E+00		
Ir-192	468.06	58.	11.	0.006	99.56	5.198E-01		
BE-7	477.60	100.	2.	0.001	948.68	3.442E-01		
RU-103	497.05	61.	-18.	-0.010	63.14	-5.029E-01		P
RH-106	511.86	49.	93.	0.052	14.86	1.181E+01		
Nd-147	531.00	43.	-10.	-0.006	133.71	-2.073E+00		
Ba-140	537.26	26.	6.	0.003	185.03	6.242E-01		P
CS-134	569.32	13.	7.	0.004	80.51	1.291E+00		
BI-207	569.70	29.	-2.	-0.001	394.00	-5.519E-02		
SB-125	600.50	340.	-18.	-0.010	146.54	-2.882E+00		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-124	602.73	322.	-18.	-0.010	142.53	-5.260E-01	
CS-134	604.71	304.	-18.	-0.010	138.44	-5.313E-01	
RU-103	610.30	286.	-18.	-0.010	133.96	-9.112E+00	
AG-108M	614.28	268.	-18.	-0.010	129.51	-5.872E-01	
PM-144	618.06	250.	-15.	-0.008	155.77	-4.283E-01	
RH-106	621.92	195.	17.	0.009	121.07	4.916E+00	
SB-125	635.89	42.	-13.	-0.007	75.76	-3.425E+00	
I-131	636.97	56.	3.	0.002	383.38	1.166E+00	P
AG-110M	657.76	69.	-19.	-0.011	56.28	-6.203E-01	P
CS-137	661.66	70.	14.	0.008	87.19	5.129E-01	
PM-144	696.54	26.	9.	0.005	83.27	3.060E-01	
NB-94	702.63	61.	-13.	-0.007	86.74	-4.418E-01	
SB-124	722.79	70.	-12.	-0.006	107.38	-3.490E+00	
ZR-95	724.20	80.	-17.	-0.009	79.63	-1.241E+00	
PM-146	735.72	23.	-4.	-0.002	241.30	-6.404E-01	
ZR-95	756.73	10.	8.	0.004	94.95	4.938E-01	P
NB-95	765.79	44.	-9.	-0.005	106.07	-3.206E-01	
PA-234M	766.41	43.	12.	0.007	82.21	1.400E+02	
EU-152	778.92	15.	2.	0.001	431.57	5.367E-01	
CS-134	795.87	36.	12.	0.006	79.35	4.754E-01	
TL-210	799.60	42.	6.	0.004	145.95	2.321E-01	
CS-134	801.95	72.	-12.	-0.007	104.08	-4.903E+00	
CO-58	810.78	40.	4.	0.002	229.13	1.440E-01	
La-140	815.77	37.	-2.	-0.001	376.07	-3.606E-01	
Cs-136	818.50	42.	1.	0.001	690.11	4.809E-02	
MN-54	834.85	36.	-15.	-0.008	51.82	-5.397E-01	P
Co-56	846.77	35.	-12.	-0.007	112.17	-4.446E-01	
NB-94	871.10	6.	16.	0.009	33.98	5.935E-01	
EU-154	873.23	29.	-7.	-0.004	48.93	-2.115E+00	P
Y-88	898.04	20.	-8.	-0.005	42.03	-3.426E-01	P
AG-110M	937.49	25.	-10.	-0.006	114.38	-1.166E+00	
EU-152	964.11	60.	-1.	-0.001	311.99	-3.209E-01	P
EU-154	996.33	32.	-5.	-0.003	166.13	-1.981E+00	
PA-234M	1001.00	38.	-1.	0.000	659.24	-2.869E+00	P
Co-56	1037.84	6.	6.	0.003	96.74	1.861E+00	P
BI-207	1063.66	17.	-3.	-0.001	234.79	-1.512E-01	P
Ga-68	1077.40	5.	7.	0.004	89.75	1.030E+01	
FE-59	1099.25	32.	-11.	-0.006	120.72	-8.834E-01	
EU-152	1112.07	63.	-2.	-0.001	653.02	-5.796E-01	
Sc-46	1120.55	47.	11.	0.006	89.52	5.276E-01	
Co-56	1238.28	18.	4.	0.002	237.10	3.175E-01	P
NA-22	1274.53	11.	-1.	-0.001	367.42	-6.810E-02	
TL-210	1313.00	0.	9.	0.005	33.33	2.241E+00	
CO-60	1332.50	18.	-3.	-0.001	372.32	-1.428E-01	P
AG-110M	1384.30	0.	7.	0.004	37.80	1.572E+00	
EU-152	1408.00	11.	-2.	-0.001	404.64	-6.557E-01	P
La-140	1596.21	6.	4.	0.002	164.23	2.450E-01	P
SB-124	1690.98	13.	-10.	-0.006	63.73	-1.332E+00	P

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	3.4420E-01	3.4420E-01	9.487E+02%	1.13E+01
NA-22	#A	-6.8102E-02	-6.8102E-02	3.674E+02%	9.40E-01
K-40	#	1.0786E+02	1.0786E+02	7.328E+00%	8.51E+00
Sc-46	#A	2.5741E-01	2.5741E-01	8.952E+01%	1.17E+00
CR-51	#A	-1.6939E-01	-1.6939E-01	1.410E+03%	1.74E+01
MN-54	#A	-5.3974E-01	-5.3974E-01	5.182E+01%	1.12E+00
FE-59	#A	-8.8342E-01	-8.8343E-01	1.207E+02%	2.33E+00
Co-56	#A	-1.5894E-01	-1.5894E-01	7.406E+01%	1.12E+00
CO-57	#A	-1.3189E-01	-1.3189E-01	2.019E+02%	9.00E-01
CO-58	#A	1.4401E-01	1.4401E-01	2.291E+02%	1.16E+00
CO-60	#A	-1.4285E-01	-1.4285E-01	3.723E+02%	1.18E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.55E+00
NB-94	#A	-4.4180E-01	-4.4180E-01	8.674E+01%	1.29E+00
ZR-95	#A	4.9384E-01	4.9384E-01	9.495E+01%	1.09E+00
NB-95	#A	-3.2062E-01	-3.2063E-01	1.061E+02%	1.16E+00
RU-103	#A	-5.0289E-01	-5.0289E-01	6.314E+01%	1.07E+00
RH-106	#A	4.9157E+00	4.9157E+00	1.211E+02%	2.00E+01
AG-108M	#A	-4.6525E-01	-4.6525E-01	1.034E+02%	1.01E+00
AG-110M	#A	3.9383E-01	3.9383E-01	3.780E+01%	1.60E+00
SN-113	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.50E+00
SB-124	#A	-5.2601E-01	-5.2601E-01	1.425E+02%	2.52E+00
SB-125	#A	3.5858E-01	3.5858E-01	8.797E+01%	2.74E+00
I-131	#A	3.0373E-01	3.0374E-01	9.622E+01%	7.84E-01
Gd-153	#A	-9.7082E-01	-9.7082E-01	1.694E+02%	5.48E+00
Ga-68	#A	1.0221E+01	1.0304E+01	8.975E+01%	2.13E+01
Tc-99m	#A	-3.1176E-01	-3.1223E-01	1.417E+02%	1.48E+00
BA-133	#A	-4.5522E-02	-4.5522E-02	1.365E+02%	2.42E+00
CS-134	#A	5.9965E-01	5.9965E-01	5.652E+01%	1.27E+00
CS-137	#A	5.1291E-01	5.1291E-01	8.719E+01%	1.50E+00
CE-139	#A	1.3410E-01	1.3410E-01	2.202E+02%	1.00E+00
Ba-140	#A	8.1505E-01	8.1507E-01	1.850E+02%	2.87E+00
La-140	#A	2.4498E-01	2.4499E-01	1.642E+02%	9.18E-01
CE-141	#A	1.2697E-01	1.2697E-01	6.380E+02%	2.73E+00
CE-144	#A	-2.3787E+00	-2.3787E+00	1.439E+02%	1.14E+01
PM-144	#A	3.0596E-01	3.0596E-01	8.327E+01%	8.60E-01
EU-152	#A	-8.5095E-01	-8.5095E-01	9.024E+01%	2.56E+00
EU-154	#A	5.2724E-01	5.2724E-01	9.799E+01%	1.73E+00
EU-155	#A	1.2672E+00	1.2672E+00	1.900E+02%	8.02E+00
HF-181	#A	1.7769E-01	1.7769E-01	1.462E+02%	1.50E+00
Ta-182	#A	8.3547E-01	8.3547E-01	1.715E+02%	4.95E+00
Hg-203	#A	2.9755E-01	2.9755E-01	8.382E+01%	8.36E-01

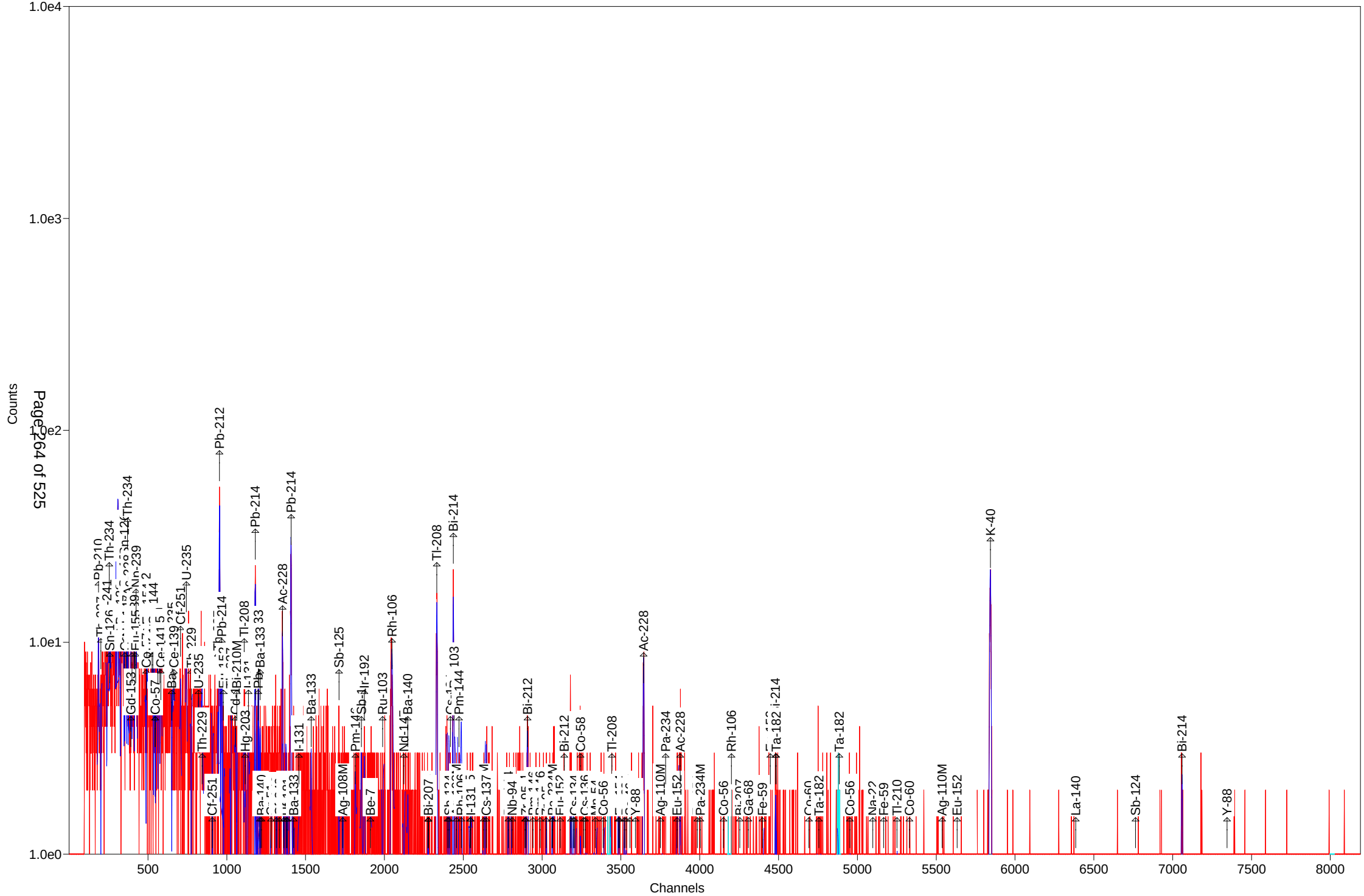
TL-208	3.5262E+00	3.5262E+00	1.221E+01%	6.52E-01
PM-146 #A	2.6825E-01	2.6825E-01	1.547E+02%	1.02E+00
Y-88 #A	-4.1727E-03	-4.1727E-03	9.244E+03%	5.11E-01
Cd-113m#A	2.1229E+03	2.1229E+03	1.521E+02%	1.11E+04
Cd-109 #A	-7.9034E+00	-7.9034E+00	1.633E+02%	4.30E+01
Cf-251 #A	1.2207E+00	1.2207E+00	9.505E+01%	2.99E+00
Cf-249 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.45E+00
Sn-126 A	8.3804E-01	8.3804E-01	4.555E+02%	1.29E+01
PB-210 #	2.3168E+01	2.3168E+01	3.046E+01%	1.71E+01
PB-212	7.6179E+00	7.6179E+00	7.638E+00%	1.01E+00
PB-214	8.8564E+00	8.8564E+00	8.732E+00%	1.61E+00
BI-207 #A	-1.5116E-01	-1.5116E-01	2.348E+02%	1.29E+00
BI-212	1.3679E+01	1.3679E+01	2.325E+01%	6.03E+00
U-235 #A	-1.1766E+00	-1.1766E+00	1.365E+02%	1.23E+01
BI-214	6.4282E+00	6.4282E+00	1.196E+01%	1.28E+00
BI-210M#A	-6.3030E-01	-6.3030E-01	6.055E+01%	1.71E+00
AC-228	8.7519E+00	8.7519E+00	1.198E+01%	9.96E-01
TH-227 #A	-4.2387E+00	-4.2387E+00	9.935E+01%	1.04E+01
TH-229 #A	-3.9390E-01	-3.9390E-01	7.288E+01%	1.56E+01
TH-234	1.0894E+01	1.0894E+01	2.362E+01%	8.65E+00
PA-231 #A	8.4218E+00	8.4218E+00	1.464E+02%	5.55E+01
PA-233 #A	5.3093E-01	5.3093E-01	2.072E+02%	4.72E+00
PA-234 A	1.7208E+00	1.7208E+00	7.615E+01%	5.82E+00
PA-234M#A	3.4271E+01	3.4271E+01	8.221E+01%	1.58E+02
AM-241 #A	-1.0291E+00	-1.0291E+00	1.153E+02%	3.96E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.35E+01
Ir-192 #A	1.9380E-01	1.9380E-01	9.956E+01%	1.97E+00
Cs-136 #A	4.8092E-02	4.8093E-02	6.901E+02%	1.18E+00
Np-239 #A	1.2040E+00	1.2042E+00	1.747E+02%	7.01E+00
Nd-147 #A	-2.0728E+00	-2.0729E+00	1.337E+02%	6.70E+00
TL-210 #A	2.5336E-01	2.5336E-01	1.239E+02%	1.17E+00
Kr-85 #A	0.0000E+00	0.0000E+00	1.000E+03%	3.45E+02

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

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

Total Activity (25.1 to 1999.3 keV) 1.908E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.3 keV) 1.9078041E+02 Bq/Sample

404682_Gamma_490-164387-A-2-A. 9_Gamma_20185041.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20182807

Sample Description: 404682_Gamma_490-164387-A-3-A
Detector: Detector #12
Batch ID: 404682
Work Order Number: Gamma
Lot Number: 490-164387-A-3-A

Decay to Time: 12/29/2018 11:56 Live Time: 1800 sec
Acquisition Time: 12/29/2018 11:56:38 Real Time: 1801 sec
Analysis Time: 12/29/2018 12:26 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	2.162E+00	184.5	3.990E+00	3.991E+00	1.373E+01
NA-22	-1.405E-01	300.0	4.215E-01	4.215E-01	1.540E+00
K-40	1.025E+02	12.0	1.225E+01	1.330E+01	1.870E+01
Sc-46	5.109E-01	83.8	4.281E-01	4.288E-01	1.534E+00
CR-51	-4.315E+00	176.0	7.595E+00	7.598E+00	2.547E+01
MN-54	8.055E-01	48.5	3.904E-01	3.926E-01	8.713E-01
FE-59	1.139E-01	26.7	3.045E-02	3.098E-02	3.232E+00
Co-56	1.098E+00	35.3	3.874E-01	3.914E-01	9.066E-01
CO-57	-1.111E-01	97.1	1.079E-01	1.080E-01	1.097E+00
CO-58	-6.866E-01	83.2	5.715E-01	5.726E-01	1.917E+00
CO-60	-2.422E-01	243.1	5.888E-01	5.890E-01	1.337E+00
ZN-65	-1.821E+00	83.3	1.517E+00	1.520E+00	5.085E+00
NB-94	2.163E-01	224.4	4.854E-01	4.855E-01	1.169E+00
ZR-95	6.672E-01	92.8	6.191E-01	6.201E-01	1.490E+00
NB-95	-1.289E-01	470.0	6.058E-01	6.058E-01	2.110E+00
RU-103	3.492E-01	92.9	3.245E-01	3.249E-01	8.258E-01
RH-106	-5.451E+00	178.2	9.716E+00	9.720E+00	3.276E+01
AG-108M	2.805E-01	125.0	3.507E-01	3.510E-01	8.956E-01
AG-110M	6.175E-01	35.4	2.183E-01	2.206E-01	2.654E+00
SN-113	3.813E-01	134.4	5.124E-01	5.127E-01	1.755E+00
SB-124	3.018E-01	44.7	1.350E-01	1.358E-01	3.011E+00
SB-125	1.651E+00	95.9	1.584E+00	1.586E+00	3.083E+00
I-131	2.361E-01	73.5	1.735E-01	1.739E-01	1.319E+00
Gd-153	-1.093E+00	148.9	1.628E+00	1.629E+00	5.444E+00
Ga-68	1.242E+01	101.7	1.263E+01	1.265E+01	2.953E+01
Tc-99m	1.150E-01	497.9	5.726E-01	5.726E-01	1.929E+00
BA-133	-5.127E-01	188.8	9.679E-01	9.682E-01	3.270E+00
CS-134	-3.030E-01	78.1	2.367E-01	2.372E-01	2.524E+00
CS-137	-3.569E-01	162.3	5.790E-01	5.793E-01	1.994E+00
CE-139	-3.903E-01	102.3	3.991E-01	3.997E-01	1.337E+00
Ba-140	-1.102E-01	147.4	1.625E-01	1.626E-01	3.728E+00
La-140	2.788E-01	89.1	2.483E-01	2.487E-01	1.243E+00
CE-141	9.644E-02	1057.8	1.020E+00	1.020E+00	3.443E+00

CE-144	-2.748E+00	164.3	4.515E+00	4.517E+00	1.511E+01
PM-144	1.063E-01	398.2	4.232E-01	4.233E-01	1.040E+00
EU-152	1.199E+00	97.7	1.172E+00	1.173E+00	3.120E+00
EU-154	1.139E+00	81.1	9.240E-01	9.259E-01	2.205E+00
EU-155	-1.315E+00	181.7	2.389E+00	2.390E+00	7.997E+00
HF-181	2.837E-01	187.1	5.309E-01	5.311E-01	1.883E+00
Ta-182	1.365E+00	88.2	1.204E+00	1.206E+00	5.025E+00
Hg-203	1.786E-01	206.6	3.690E-01	3.691E-01	1.269E+00
TL-208	4.375E+00	11.2	4.887E-01	5.369E-01	5.256E-01
PM-146	9.597E-01	32.8	3.152E-01	3.189E-01	1.468E+00
Y-88	-6.365E-02	995.0	6.333E-01	6.333E-01	1.407E+00
Cd-113m	2.296E+03	216.3	4.966E+03	4.968E+03	1.707E+04
Cd-109	0.000E+00	1.#INF	1.322E+01	1.322E+01	4.467E+01
Cf-251	-2.112E+00	107.1	2.260E+00	2.263E+00	5.782E+00
Cf-249	4.091E-01	117.8	4.820E-01	4.825E-01	1.645E+00
Sn-126	3.806E+00	110.1	4.192E+00	4.197E+00	1.404E+01
PB-210	1.791E+01	75.6	1.354E+01	1.359E+01	3.626E+01
PB-212	1.274E+01	7.1	8.993E-01	1.118E+00	1.632E+00
PB-214	1.107E+01	9.9	1.096E+00	1.231E+00	1.985E+00
BI-207	6.034E-01	107.8	6.502E-01	6.509E-01	1.475E+00
BI-212	2.588E+01	15.4	3.993E+00	4.207E+00	4.541E+00
U-235	1.110E+00	180.6	2.005E+00	2.005E+00	1.526E+01
BI-214	1.118E+01	10.5	1.176E+00	1.306E+00	1.481E+00
BI-210M	-2.771E-01	217.1	6.016E-01	6.017E-01	2.067E+00
AC-228	9.723E+00	15.1	1.465E+00	1.546E+00	1.903E+00
TH-227	-5.273E+00	99.9	5.268E+00	5.275E+00	1.356E+01
TH-229	-7.905E+00	105.5	8.341E+00	8.351E+00	2.138E+01
TH-234	1.147E+01	39.2	4.495E+00	4.540E+00	1.562E+01
PA-231	-1.368E+01	191.0	2.613E+01	2.614E+01	8.764E+01
PA-233	0.000E+00	1.#INF	5.731E-01	5.731E-01	6.758E+00
PA-234	-3.352E-01	566.8	1.900E+00	1.900E+00	6.463E+00
PA-234M	9.799E+01	66.8	6.544E+01	6.563E+01	1.947E+02
AM-241	1.140E-01	1307.6	1.490E+00	1.490E+00	5.052E+00
Np-237	0.000E+00	1.#INF	4.323E+00	4.324E+00	1.445E+01
Ir-192	2.829E-01	97.6	2.761E-01	2.765E-01	2.826E+00
Cs-136	-4.307E-01	127.9	5.509E-01	5.514E-01	1.886E+00
Np-239	1.231E+00	156.5	1.926E+00	1.927E+00	6.455E+00
Nd-147	-9.473E-01	341.7	3.237E+00	3.237E+00	8.064E+00
TL-210	-5.467E-01	127.1	6.949E-01	6.956E-01	2.360E+00
Kr-85	-1.397E+01	965.6	1.349E+02	1.349E+02	4.659E+02
Total	2.636E+03				

Analyst: Joey Sausto

Sample description
404682_Gamma_490-164387-A-3-A

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20182807.An1

Acquisition information

Start time:	12/29/2018 11:56:38 AM
Live time:	1800
Real time:	1801
Dead time:	0.07 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration

Filename:	12_Soil_TunaCan.Clb

12_TunaCan_108513

Energy Calibration

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

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	100 (25.08keV)
Stop channel:	8000 (1999.13keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	12/29/2018 11:56:00 AM
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. 26 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1070

***** 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
27.86	15.	43.22	0.39	3.932E-03				
46.78	25.	75.62	0.83	1.830E-02	46.54	4.250	PBC<MDA	PB210
63.34	26.	63.27	0.87	2.978E-02	63.29	3.810	PBC<MDA	TH234
64.33	20.	110.14	0.87	3.015E-02	64.28	9.700	PBC<MDA	Sn126
74.81	106.	17.25	0.88	3.332E-02				
77.10	162.	12.14	0.88	3.386E-02				
80.99	13.	180.62	0.89	3.466E-02	80.99	34.060	PBC<MDA	BA133
87.56	37.	44.88	0.89	3.575E-02	87.57	37.500	PBC<MDA	Sn126
90.02	52.	28.00	0.94	3.608E-02				
92.58	38.	46.30	0.90	3.637E-02	92.59	5.584	PBC<MDA	TH234
93.34	21.	155.80	0.90	3.645E-02	93.35	5.561	PBC<MDA	AC228
106.13	19.	156.50	0.91	3.729E-02	105.31	21.200	PBC<MDA	EU155
					106.13	22.700	1.231E+00	Np239
121.78	17.	104.73	0.93	3.725E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.963E-01	CO57
136.47	12.	273.05	0.94	3.651E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.702E+00	CO57
140.93	6.	497.92	0.95	3.623E-02	140.51	89.300	PBC<MDA	Tc99m
162.66	9.	208.12	0.97	3.435E-02	162.66	6.220	PBC<MDA	Ba140
185.72	3.	825.29	0.99	3.215E-02	185.72	54.000	PBC<MDA	U235
205.33	10.	180.62	1.01	3.030E-02	205.33	5.010	PBC<MDA	U235
238.53	256.	8.56	0.98	2.744E-02	238.63	43.300	1.195E+01	PB212
241.95	41.	29.37	1.05	2.716E-02	242.00	7.430	1.122E+01	PB214
263.70	6.	216.30	1.07	2.554E-02	263.70	0.006	PBC<MDA	Cd113m
277.55	15.	90.58	1.08	2.462E-02	277.28	6.310	PBC<MDA	TL208
279.20	6.	206.63	1.09	2.449E-02	279.20	81.460	PBC<MDA	Hg203
284.30	12.	107.37	1.09	2.416E-02	284.30	6.140	PBC<MDA	I131

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
294.82	99.	16.66	1.43	2.350E-02	295.09	19.300	1.212E+01	PB214
300.09	36.	28.87	0.91	2.321E-02	300.03	3.280	2.627E+01	PB212
					300.07	2.460	3.504E+01	PA231
					300.18	6.200	1.390E+01	PA233
338.15	84.	17.76	0.75	2.118E-02	338.32	12.010	1.834E+01	AC228
340.57	4.	523.42	1.15	2.108E-02	340.57	46.900	PBC<MDA	Cs136
345.83	10.	187.10	1.15	2.083E-02	345.83	15.070	PBC<MDA	HF181
351.66	146.	10.71	1.01	2.056E-02	351.93	37.600	1.053E+01	PB214
383.84	12.	108.59	1.19	1.923E-02	383.84	8.940	PBC<MDA	BA133
387.95	9.	117.82	1.19	1.907E-02	387.95	66.000	PBC<MDA	Cf249
391.69	8.	134.37	1.20	1.893E-02	391.69	64.000	PBC<MDA	SN113
427.88	12.	95.89	1.23	1.770E-02	427.88	29.600	PBC<MDA	SB125
433.94	8.	125.00	1.24	1.751E-02	433.94	90.480	PBC<MDA	AG108M
463.37	9.	131.94	1.27	1.666E-02	463.37	10.470	PBC<MDA	SB125
468.06	12.	97.59	1.27	1.653E-02	468.06	51.750	PBC<MDA	Ir192
477.60	7.	184.53	1.28	1.628E-02	477.60	10.520	PBC<MDA	BE7
487.02	9.	114.34	1.29	1.604E-02	487.02	45.500	PBC<MDA	La140
497.05	9.	92.92	1.30	1.580E-02	497.05	90.900	PBC<MDA	RU103
511.86	73.	18.43	2.56	1.546E-02	511.86	20.000	1.306E+01	RH106
569.70	4.	254.95	1.37	1.427E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.898E+00	PA234
					569.70	97.740	1.593E-01	BI207
583.19	93.	11.17	1.94	1.403E-02	583.02	84.500	4.342E+00	TL208
600.50	7.	309.46	1.40	1.373E-02	600.50	17.860	PBC<MDA	SB125
609.21	126.	10.51	1.26	1.359E-02	609.31	46.090	1.118E+01	BI214
					610.30	5.750	8.973E+01	RU103
636.97	7.	142.30	1.43	1.315E-02	636.97	7.170	PBC<MDA	I131
696.54	2.	398.21	1.49	1.232E-02	696.54	99.000	PBC<MDA	PM144
702.63	5.	224.40	1.49	1.224E-02	702.63	97.900	PBC<MDA	NB94
727.60	42.	15.43	0.94	1.194E-02	727.17	7.550	2.588E+01	BI212
747.16	19.	32.85	1.53	1.171E-02	747.16	34.000	2.698E+00	PM146
756.73	8.	92.79	1.54	1.160E-02	756.73	54.460	PBC<MDA	ZR95
766.41	13.	86.86	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.173E+02	PA234M
778.92	5.	164.92	1.56	1.136E-02	778.92	12.940	PBC<MDA	EU152
783.95	7.	119.52	1.57	1.129E-02	785.42	1.280	PBC<MDA	BI212
801.95	11.	134.77	1.58	1.113E-02	801.95	8.690	PBC<MDA	CS134
815.77	8.	126.79	1.60	1.099E-02	815.77	23.280	PBC<MDA	La140
834.59	16.	48.47	1.61	1.081E-02	834.85	99.980	PBC<MDA	MN54
846.77	5.	146.06	1.63	1.070E-02	846.77	99.935	PBC<MDA	Co56
860.39	10.	91.97	1.64	1.057E-02	860.56	12.420	PBC<MDA	TL208
873.23	6.	145.30	1.65	1.046E-02	873.23	12.270	PBC<MDA	EU154
889.28	8.	101.85	1.66	1.033E-02	889.28	99.984	PBC<MDA	Sc46
911.13	52.	15.07	1.15	1.015E-02	911.07	29.000	9.723E+00	AC228
968.83	12.	76.22	1.74	9.703E-03	968.97	17.460	PBC<MDA	AC228
996.33	9.	81.09	1.76	9.508E-03	996.33	10.600	PBC<MDA	EU154
1001.00	8.	101.47	1.76	9.476E-03	1001.00	0.837	PBC<MDA	PA234M
1037.84	5.	145.77	1.80	9.228E-03	1037.84	14.130	PBC<MDA	Co56

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1063.66	7.	107.76	1.82	9.063E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	6.	101.72	1.83	8.978E-03	1077.40	3.300	PBC<MDA	Ga68
1120.22	15.	92.72	1.87	8.722E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	9.268E-01	Sc46
1120.55	9.	133.05	1.87	8.721E-03	1120.29	15.100	3.849E+00	BI214
					1120.55	99.987	5.813E-01	Sc46
1121.88	9.	88.18	1.87	8.716E-03	1121.30	34.900	PBC<MDA	Ta182
1189.08	2.	634.67	1.93	8.342E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	20.	35.29	1.97	8.090E-03	1238.28	66.070	2.113E+00	Co56
1291.60	14.	26.73	2.02	7.834E-03	1291.60	43.200	2.298E+00	FE59
1384.30	8.	35.36	2.10	7.423E-03	1384.30	24.290	2.465E+00	AG110M
1408.00	7.	88.42	2.12	7.324E-03	1408.00	21.005	PBC<MDA	EU152
1460.92	140.	11.95	2.16	7.112E-03	1460.83	10.670	1.025E+02	K40
1690.98	5.	44.72	2.35	6.302E-03	1690.98	47.790	PBC<MDA	SB124
1764.38	27.	19.25	1.25	6.075E-03	1764.49	15.400	1.603E+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
111.12	27.86	13.	15.	3.858E+03	43.22	0.386	- s
298.80	74.82	113.	106.	3.177E+03	17.25	0.880	- sD
307.96	77.11	111.	162.	4.778E+03	12.14	0.882	- D
359.55	90.02	66.	54.	1.490E+03	25.40	0.896	- 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	186.75	46.78	103.	25.	0.014	75.62	0.829s
TH-227	200.18	50.14	268.	-18.	-0.010	130.37	0.855
TH-234	252.74	63.29	125.	26.	0.015	63.27	0.868D
Sn-126	256.71	64.28	233.	20.	0.011	110.14	0.869s
BA-133	323.50	80.99	170.	13.	0.007	180.62	0.887s
Np-237	345.49	86.49	647.	0.	0.000	162.38	0.892A
EU-155	345.70	86.54	584.	-22.	-0.012	154.40	0.892s
Sn-126	347.29	86.94	562.	-15.	-0.008	224.26	0.892D
Sn-126	349.81	87.57	499.	37.	0.021	44.88	0.893D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cd-109	351.68	88.04	522.	0.	0.000	1000.00	0.894A
TH-234	369.87	92.59	136.	38.	0.021	46.30	0.898D
AC-228	372.91	93.35	526.	21.	0.012	155.80	0.899
Gd-153	389.50	97.50	513.	-22.	-0.012	148.85	0.903
Np-239	397.50	99.50	491.	-22.	-0.012	145.45	0.905s
Gd-153	412.29	103.20	491.	-22.	-0.012	144.74	0.909s
Np-239	414.29	103.70	512.	-22.	-0.012	147.78	0.909s
EU-155	420.73	105.31	567.	-19.	-0.010	181.68	0.911s
Np-239	424.00	106.13	421.	19.	0.010	156.50	0.912s
EU-152	486.56	121.78	150.	17.	0.009	104.73	0.928s
CO-57	487.69	122.06	167.	-19.	-0.011	97.14	0.928s
EU-154	491.84	123.10	152.	-7.	-0.004	265.42	0.929s
PA-234	524.60	131.29	255.	-4.	-0.002	566.79	0.938
HF-181	531.51	133.02	522.	-20.	-0.011	162.10	0.939s
CE-144	533.57	133.54	537.	-20.	-0.011	164.30	0.940s
HF-181	544.61	136.30	557.	-20.	-0.011	166.80	0.943s
CO-57	545.30	136.47	526.	12.	0.007	273.05	0.943s
Tc-99m	561.44	140.51	520.	6.	0.004	497.92	0.947s
U-235	574.53	143.79	514.	0.	0.000	1000.00	0.950s
Ba-140	649.99	162.66	158.	9.	0.005	208.12	0.969s
U-235	652.87	163.38	148.	-14.	-0.008	124.38	0.970s
CE-139	662.76	165.85	182.	-19.	-0.011	102.26	0.973s
Cf-251	705.72	176.60	143.	-21.	-0.012	107.05	0.983
U-235	742.18	185.72	138.	3.	0.001	825.29	0.992s
TH-229	773.32	193.51	117.	-20.	-0.011	105.51	1.000
U-235	820.59	205.33	84.	10.	0.005	180.62	1.012s
TH-229	842.65	210.85	125.	-17.	-0.009	127.70	1.018s
Cf-251	907.22	227.00	88.	-6.	-0.003	295.33	1.034s
TH-227	943.09	235.97	539.	-17.	-0.009	194.75	1.043s
PB-212	953.73	238.63	48.	272.	0.151	7.06	1.045D
PB-214	967.18	242.00	51.	41.	0.023	29.37	1.049D
EU-152	977.96	244.69	524.	-13.	-0.007	241.94	1.051s
TH-227	1024.13	256.24	81.	-17.	-0.010	99.91	1.063
Cd-113m	1053.96	263.70	91.	6.	0.004	216.30	1.070s
BI-210M	1062.48	265.83	91.	-6.	-0.004	217.07	1.072s
TL-208	1108.27	277.28	80.	15.	0.008	90.58	1.084s
Hg-203	1115.93	279.20	85.	6.	0.004	206.63	1.086s
I-131	1136.32	284.30	44.	12.	0.007	107.37	1.091s
PB-214	1178.38	294.82	43.	99.	0.055	16.66	1.427s
TL-210	1183.11	296.00	528.	-16.	-0.009	201.52	1.102s
PB-212	1199.45	300.09	18.	36.	0.020	28.87	0.907
PA-231	1199.38	300.07	512.	-16.	-0.009	197.74	1.106
PA-233	1199.82	300.18	496.	-16.	-0.009	194.57	1.107
PA-231	1209.70	302.65	479.	-16.	-0.009	190.97	1.109s
BA-133	1210.50	302.85	463.	-16.	-0.009	187.70	1.109s
Ba-140	1218.49	304.85	447.	-16.	-0.009	184.13	1.111s
BI-210M	1218.68	304.90	430.	-6.	-0.004	462.93	1.111s
Ir-192	1232.85	308.44	424.	0.	0.000	1000.00	1.115s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-233	1247.13	312.01	424.	0.	0.000	1000.00	1.118s
Ir-192	1265.04	316.49	424.	0.	0.000	1000.00	1.123s
CR-51	1279.41	320.08	442.	-17.	-0.009	176.03	1.126
La-140	1314.10	328.76	119.	-11.	-0.006	143.45	1.135s
AC-228	1351.64	338.15	26.	84.	0.047	17.76	0.754s
Cs-136	1361.32	340.57	182.	4.	0.002	523.42	1.146s
EU-152	1376.18	344.29	192.	-10.	-0.006	195.36	1.150
HF-181	1382.35	345.83	176.	10.	0.006	187.10	1.151s
PB-214	1405.67	351.66	29.	146.	0.081	10.71	1.007
BA-133	1423.02	356.00	237.	-12.	-0.006	188.77	1.162s
I-131	1456.95	364.48	60.	-12.	-0.007	129.64	1.170
BA-133	1534.35	383.84	75.	12.	0.006	108.59	1.189s
Cf-249	1550.79	387.95	55.	9.	0.005	117.82	1.193s
SN-113	1565.74	391.69	58.	8.	0.005	134.37	1.196
SB-125	1710.45	427.88	32.	12.	0.007	95.89	1.232s
AG-108M	1734.69	433.94	24.	8.	0.004	125.00	1.238s
SB-125	1852.39	463.37	66.	9.	0.005	131.94	1.266s
Ir-192	1871.16	468.06	59.	12.	0.006	97.59	1.271s
BE-7	1909.29	477.60	72.	7.	0.004	184.53	1.280s
HF-181	1926.90	482.00	79.	0.	0.000	1000.00	1.284s
La-140	1946.98	487.02	48.	9.	0.005	114.34	1.289s
RU-103	1987.11	497.05	16.	9.	0.005	92.92	1.298s
RH-106	2046.35	511.86	53.	73.	0.040	18.43	2.563s
Kr-85	2054.81	513.98	129.	-2.	-0.001	965.61	1.315s
Nd-147	2122.88	531.00	30.	-3.	-0.002	341.69	1.331s
Ba-140	2147.92	537.26	22.	-5.	-0.003	208.80	1.337s
CS-134	2251.82	563.24	35.	-2.	-0.001	725.26	1.362s
CS-134	2276.15	569.32	43.	-7.	-0.004	132.21	1.367s
BI-207	2277.68	569.70	50.	4.	0.002	254.95	1.368s
TL-208	2331.62	583.19	3.	93.	0.051	11.17	1.936s
SB-125	2400.87	600.50	220.	7.	0.004	309.46	1.397s
SB-124	2409.79	602.73	227.	0.	0.000	1000.00	1.399s
CS-134	2417.71	604.71	227.	0.	0.000	1000.00	1.401s
BI-214	2435.70	609.21	9.	126.	0.070	10.51	1.263
RU-103	2440.06	610.30	227.	0.	0.000	1000.00	1.406s
AG-108M	2455.99	614.28	227.	0.	0.000	1000.00	1.410
PM-144	2471.12	618.06	227.	0.	0.000	1000.00	1.414s
RH-106	2486.54	621.92	264.	-13.	-0.007	178.24	1.417s
SB-125	2542.43	635.89	35.	-11.	-0.006	83.85	1.430s
I-131	2546.77	636.97	42.	7.	0.004	142.30	1.432s
AG-110M	2629.92	657.76	43.	-12.	-0.007	82.50	1.451s
CS-137	2645.51	661.66	61.	-7.	-0.004	162.25	1.455s
PM-144	2785.05	696.54	19.	2.	0.001	398.21	1.487
NB-94	2809.41	702.63	23.	5.	0.003	224.40	1.493s
SB-124	2890.04	722.79	77.	-11.	-0.006	121.76	1.512s
AG-108M	2890.65	722.94	66.	-6.	-0.003	191.22	1.512s
EU-154	2892.34	723.36	60.	0.	0.000	1000.00	1.512s
ZR-95	2895.69	724.20	60.	0.	0.000	1000.00	1.513s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	2909.31	727.60	0.	42.	0.023	15.43	0.942s
PM-146	2941.78	735.72	28.	-2.	-0.001	565.69	1.524s
PM-146	2987.55	747.16	5.	19.	0.011	32.85	1.535s
ZR-95	3025.83	756.73	9.	8.	0.004	92.79	1.543s
AG-110M	3054.69	763.94	56.	-19.	-0.010	61.23	1.550s
NB-95	3062.08	765.79	77.	-3.	-0.001	469.97	1.552s
PA-234M	3064.57	766.41	59.	13.	0.007	86.86	1.552s
EU-152	3114.61	778.92	14.	5.	0.003	164.92	1.564s
BI-212	3140.62	785.42	14.	7.	0.004	119.52	1.570s
CS-134	3182.43	795.87	76.	-16.	-0.009	79.02	1.579s
TL-210	3197.35	799.60	90.	-11.	-0.006	127.09	1.583s
CS-134	3206.76	801.95	98.	11.	0.006	134.77	1.585s
CO-58	3242.06	810.78	57.	-14.	-0.008	83.24	1.593s
La-140	3262.05	815.77	46.	8.	0.004	126.79	1.598s
Cs-136	3272.97	818.50	55.	-8.	-0.005	127.89	1.600s
MN-54	3338.38	834.85	9.	16.	0.009	48.47	1.615s
Co-56	3386.08	846.77	10.	5.	0.003	146.06	1.626s
TL-208	3441.27	860.56	15.	10.	0.005	91.97	1.638
NB-94	3483.41	871.10	30.	-9.	-0.005	92.30	1.648s
EU-154	3491.95	873.23	35.	6.	0.003	145.30	1.650s
PA-234	3521.16	880.53	42.	-9.	-0.005	107.15	1.657s
PA-234	3532.00	883.24	51.	0.	0.000	1000.00	1.659s
AG-110M	3537.78	884.68	51.	0.	0.000	1000.00	1.660s
Sc-46	3556.17	889.28	31.	8.	0.005	101.85	1.664s
Y-88	3591.22	898.04	35.	-11.	-0.006	122.02	1.672s
AC-228	3643.62	911.13	2.	52.	0.029	15.07	1.155s
AG-110M	3749.09	937.49	30.	-10.	-0.006	124.50	1.708s
PA-234	3783.21	946.02	15.	0.	0.000	1000.00	1.716s
EU-152	3855.60	964.11	64.	-4.	-0.002	312.15	1.732s
AC-228	3875.05	968.97	36.	12.	0.007	76.22	1.736s
EU-154	3984.54	996.33	20.	9.	0.005	81.09	1.761s
PA-234M	4003.22	1001.00	29.	8.	0.004	101.47	1.765s
EU-154	4018.33	1004.77	59.	-12.	-0.007	92.57	1.768s
Co-56	4150.66	1037.84	11.	5.	0.003	145.77	1.798s
Cs-136	4191.60	1048.07	19.	-1.	-0.001	624.50	1.807s
RH-106	4200.76	1050.36	42.	-15.	-0.009	64.70	1.809s
BI-207	4253.99	1063.66	11.	7.	0.004	107.76	1.820s
Ga-68	4308.98	1077.40	5.	6.	0.003	101.72	1.833s
FE-59	4396.44	1099.25	32.	-14.	-0.008	95.65	1.852s
EU-152	4447.76	1112.07	80.	-14.	-0.008	91.33	1.863s
ZN-65	4461.66	1115.55	66.	-15.	-0.008	83.30	1.866s
BI-214	4480.63	1120.29	84.	15.	0.008	92.72	1.870s
Sc-46	4481.68	1120.55	69.	9.	0.005	133.05	1.870s
Ta-182	4484.69	1121.30	28.	9.	0.005	88.18	1.871s
CO-60	4692.57	1173.24	27.	-6.	-0.003	211.36	1.916s
Ta-182	4755.86	1189.05	21.	2.	0.001	634.67	1.930s
Ta-182	4885.39	1221.41	28.	-3.	-0.002	378.48	1.957s
Co-56	4952.92	1238.28	6.	20.	0.011	35.29	1.972s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
NA-22	5098.03	1274.53	17.	-2.	-0.001	300.00	2.003s
EU-154	5098.08	1274.54	19.	0.	0.000	1000.00	2.003s
FE-59	5166.35	1291.60	0.	14.	0.008	26.73	2.017s
CO-60	5330.11	1332.50	11.	-3.	-0.002	243.10	2.052s
AG-110M	5537.48	1384.30	0.	8.	0.004	35.36	2.096s
EU-152	5632.39	1408.00	6.	7.	0.004	88.42	2.115s
K-40	5843.92	1460.83	24.	140.	0.078	11.95	2.159
La-140	6386.02	1596.21	6.	-3.	-0.002	205.48	2.269s
SB-124	6765.58	1690.98	0.	5.	0.003	44.72	2.345s
BI-214	7059.56	1764.38	0.	27.	0.015	19.25	1.248s
Co-56	7087.48	1771.35	38.	-8.	-0.005	108.91	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	2.1622E+00					5.31E+01	
			477.60	2.162E+00	?(	1.373E+01	1.85E+02	1.05E+01 G
NA-22	C	-1.4048E-01					9.50E+02	
			1274.53	-1.405E-01	?(	1.540E+00	3.00E+02	9.99E+01 G
K-40	N	1.0249E+02					4.66E+11	
			1460.83	1.025E+02	?(	1.870E+01	1.20E+01	1.07E+01 G
Sc-46	F	5.1093E-01					8.38E+01	
			889.28	4.405E-01	?(	1.534E+00	1.02E+02	1.00E+02 G
			1120.55	5.813E-01	?(	2.641E+00	1.33E+02	1.00E+02 G
CR-51	F	-4.3148E+00					2.77E+01	
			320.08	-4.315E+00	(	2.547E+01	1.76E+02	9.94E+00 G
MN-54	C	8.0546E-01					3.12E+02	
			834.85	8.055E-01	?(	8.713E-01	4.85E+01	1.00E+02 G
FE-59	F	1.1394E-01					4.45E+01	
			1099.25	-1.556E+00	?(	3.232E+00	9.57E+01	5.65E+01 G
			1291.60	2.298E+00	?(	1.210E+00	2.67E+01	4.32E+01 G
Co-56	C	1.0975E+00					7.73E+01	
			846.77	2.598E-01	?(	9.066E-01	1.46E+02	9.99E+01 G
			1238.28	2.113E+00	?(	1.435E+00	3.53E+01	6.61E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1037.84	2.272E+00	?(	7.639E+00	1.46E+02	1.41E+01 G
			1771.35	-4.970E+00	+	1.852E+01	1.09E+02	1.55E+01 A
CO-57	C	-1.1108E-01					2.72E+02	
			122.06	-3.373E-01	&(	1.097E+00	9.71E+01	8.56E+01 G
			136.47	1.702E+00	(	1.561E+01	2.73E+02	1.07E+01 G
CO-58	C	-6.8659E-01					7.09E+01	
			810.78	-6.866E-01	?(	1.917E+00	8.32E+01	9.95E+01 G
CO-60	F	-2.4221E-01					1.93E+03	
			1332.50	-2.422E-01	?(	1.337E+00	2.43E+02	1.00E+02 G
			1173.24	-3.740E-01	+	1.767E+00	2.11E+02	9.99E+01 G
ZN-65	F	-1.8212E+00					2.44E+02	
			1115.55	-1.821E+00	?(	5.085E+00	8.33E+01	5.06E+01 G
NB-94	I	2.1631E-01					7.41E+06	
			702.63	2.163E-01	&(	1.169E+00	2.24E+02	9.79E+01 G
			871.10	-4.776E-01	+	1.498E+00	9.23E+01	9.99E+01 G
ZR-95	I	6.6724E-01					6.40E+01	
			756.73	6.672E-01	?(	1.490E+00	9.28E+01	5.45E+01 G
			724.20	0.000E+00	-	4.077E+00	1.00E+03	4.42E+01 G
NB-95	I	-1.2890E-01					6.40E+01	
			765.79	-1.289E-01	?(	2.110E+00	4.70E+02	9.98E+01 G
RU-103	I	3.4917E-01					3.93E+01	
			497.05	3.492E-01	?(	8.258E-01	9.29E+01	9.09E+01 G
			610.30	0.000E+00	-	5.193E+01	1.00E+03	5.75E+00 GA
RH-106	I	-5.4513E+00					3.74E+02	
			621.92	-5.451E+00	?(	3.276E+01	1.78E+02	9.93E+00 G
			1050.36	-5.999E+01	+	1.281E+02	6.47E+01	1.56E+00 G
			511.86	1.306E+01	?	6.603E+00	1.84E+01	2.00E+01 GA
AG-108M	C	2.8054E-01					1.53E+05	
			433.94	2.805E-01	?(	8.956E-01	1.25E+02	9.05E+01 G
			722.94	-3.138E-01	+	2.071E+00	1.91E+02	9.08E+01 G
			614.28	0.000E+00	-	3.339E+00	1.00E+03	8.98E+01 G
AG-110M	F	6.1748E-01					2.50E+02	
			884.68	0.000E+00	?(	2.654E+00	1.00E+03	7.27E+01 G
			657.76	-5.484E-01	+	1.520E+00	8.25E+01	9.46E+01 G
			937.49	-1.627E+00	+	4.593E+00	1.24E+02	3.44E+01 G
			1384.30	2.465E+00	?(	2.271E+00	3.54E+01	2.43E+01 G
			763.94	-4.040E+00	+	8.132E+00	6.12E+01	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	3.8132E-01					1.15E+02	
			391.69	3.813E-01	?(	1.755E+00	1.34E+02	6.40E+01 G
SB-124	F	3.0178E-01					6.02E+01	
			602.73	0.000E+00	?(	3.011E+00	1.00E+03	9.83E+01 G
			1690.98	9.223E-01	?(	1.359E+00	4.47E+01	4.78E+01 G
			722.79	-4.505E+00	+	1.864E+01	1.22E+02	1.08E+01 G
SB-125	I	1.6515E+00					1.01E+03	
			427.88	1.284E+00	?(	3.083E+00	9.59E+01	2.96E+01 G
			600.50	1.548E+00	?(	1.628E+01	3.09E+02	1.79E+01 G
			635.89	-3.980E+00	+	1.125E+01	8.39E+01	1.13E+01 G
			463.37	2.867E+00	&(	1.292E+01	1.32E+02	1.05E+01 G
I-131	I	2.3615E-01					8.02E+00	
			364.48	-4.079E-01	?(	1.319E+00	1.30E+02	8.17E+01 G
			284.30	4.493E+00	&(	1.259E+01	1.07E+02	6.14E+00 G
			636.97	3.929E+00	?(	1.932E+01	1.42E+02	7.17E+00 G
Gd-153	F	-1.0935E+00					2.42E+02	
			97.50	-1.093E+00	&(	5.444E+00	1.49E+02	3.00E+01 G
			103.20	-1.500E+00	+	7.261E+00	1.45E+02	2.18E+01 G
Ga-68	C	1.2420E+01					4.71E-02	
			1077.40	1.242E+01	?(	2.953E+01	1.02E+02	3.30E+00 G
Tc-99m	I	1.1499E-01					2.51E-01	
			140.51	1.150E-01	?(	1.929E+00	4.98E+02	8.93E+01 G
BA-133	F	-5.1274E-01					3.85E+03	
			356.00	-5.127E-01	&(	3.270E+00	1.89E+02	6.20E+01 G
			302.85	-2.151E+00	+	1.355E+01	1.88E+02	1.83E+01 G
			383.84	3.776E+00	*	1.389E+01	1.09E+02	8.94E+00 GA
			80.99	6.118E-01	?	2.987E+00	1.81E+02	3.41E+01 GA
CS-134	I	-3.0299E-01					7.54E+02	
			795.87	-9.565E-01	&(	2.524E+00	7.90E+01	8.55E+01 G
			604.71	0.000E+00	+	3.038E+00	1.00E+03	9.76E+01 G
			569.32	-1.855E+00	+	8.445E+00	1.32E+02	1.54E+01 G
			801.95	6.129E+00	?(	2.806E+01	1.35E+02	8.69E+00 G
			563.24	-7.704E-01	+	1.393E+01	7.25E+02	8.35E+00 G
CS-137	I	-3.5686E-01					1.10E+04	
			661.66	-3.569E-01	?(	1.994E+00	1.62E+02	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	-3.9033E-01					1.38E+02	
			165.85	-3.903E-01	&(	1.337E+00	1.02E+02	7.99E+01 G
Ba-140	I	-1.1024E-01					1.28E+01	
			537.26	-7.130E-01	?(	3.728E+00	2.09E+02	2.44E+01 G
			162.66	2.253E+00	?(	1.595E+01	2.08E+02	6.22E+00 G
			304.85	-9.252E+00	+	5.716E+01	1.84E+02	4.29E+00 G
La-140	I	2.7884E-01					1.28E+01	
			1596.21	-2.641E-01	?(	1.243E+00	2.05E+02	9.54E+01 G
			487.02	6.819E-01	?(	2.663E+00	1.14E+02	4.55E+01 G
			328.76	-1.390E+00	+	6.768E+00	1.43E+02	2.03E+01 G
			815.77	1.716E+00	?(	7.469E+00	1.27E+02	2.33E+01 G
CE-141	I	9.6437E-02					3.25E+01	
			145.44	9.644E-02	&(	3.443E+00	1.06E+03	4.82E+01 G
CE-144	I	-2.7481E+00					2.85E+02	
			133.54	-2.748E+00	&(	1.511E+01	1.64E+02	1.11E+01 G
PM-144	C	1.0628E-01					3.63E+02	
			696.54	1.063E-01	?(	1.040E+00	3.98E+02	9.90E+01 G
			618.06	0.000E+00	&	3.041E+00	1.00E+03	9.91E+01 G
EU-152	F	1.1994E+00					4.94E+03	
			121.78	8.872E-01	?(	3.120E+00	1.05E+02	2.86E+01 G
			344.29	-1.020E+00	&	6.751E+00	1.95E+02	2.65E+01 G
			1112.07	-6.728E+00	+	2.065E+01	9.13E+01	1.36E+01 G
			778.92	1.889E+00	?(	7.612E+00	1.65E+02	1.29E+01 G
			964.11	-1.432E+00	+	1.558E+01	3.12E+02	1.46E+01 G
			244.69	-3.664E+00	+	2.976E+01	2.42E+02	7.58E+00 G
			1408.00	2.658E+00	?	5.101E+00	8.84E+01	2.10E+01 GA
EU-154	I	1.1394E+00					3.14E+03	
			123.10	-2.434E-01	*(	2.205E+00	2.65E+02	4.08E+01 G
			1274.54	0.000E+00	+	4.593E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	8.895E+00	1.00E+03	2.02E+01 G
			873.23	2.596E+00	?(	1.310E+01	1.45E+02	1.23E+01 G
			1004.77	-4.015E+00	+	1.254E+01	9.26E+01	1.80E+01 G
			996.33	4.774E+00	?(	1.308E+01	8.11E+01	1.06E+01 G
EU-155	I	-1.3147E+00					1.81E+03	
			105.31	-1.315E+00	?(	7.997E+00	1.82E+02	2.12E+01 G
			86.54	-1.136E+00	}	5.864E+00	1.54E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	2.8373E-01					4.24E+01	
			482.00	0.000E+00	*(	1.883E+00	1.00E+03	8.05E+01 G
			133.02	-7.029E-01	&	3.813E+00	1.62E+02	4.33E+01 G
			345.83	1.799E+00	?(	1.142E+01	1.87E+02	1.51E+01 G
			136.30	-5.250E+00	+	2.930E+01	1.67E+02	5.85E+00 G
Ta-182	F	1.3653E+00					1.14E+02	
			1121.30	1.681E+00	?(	5.025E+00	8.82E+01	3.49E+01 G
			1221.41	-8.390E-01	-	6.926E+00	3.78E+02	2.70E+01 G
			1189.05	6.851E-01	?(	9.962E+00	6.35E+02	1.62E+01 G
Hg-203	F	1.7857E-01					4.66E+01	
			279.20	1.786E-01	&(	1.269E+00	2.07E+02	8.15E+01 G
TL-208	N	4.3753E+00					6.98E+02	
			583.02	4.342E+00	(	5.256E-01	1.12E+01	8.45E+01 G
			277.28	5.217E+00	?(	1.588E+01	9.06E+01	6.31E+00 G
			860.56	4.175E+00	?(	8.781E+00	9.20E+01	1.24E+01 G
PM-146	C	9.5967E-01					2.02E+03	
			453.88	5.051E-02	%(	1.468E+00	1.11E+03	6.50E+01 G
			747.16	2.698E+00	?(	1.783E+00	3.28E+01	3.40E+01 G
			735.72	-4.170E-01	+	5.707E+00	5.66E+02	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	-6.361E-01	&	1.751E+00	1.22E+02	9.37E+01 G
Cd-113m		2.2959E+03					5.33E+03	
			263.70	2.296E+03	?(	1.707E+04	2.16E+02	6.00E-03 K
Cf-251	T	-2.1115E+00					3.28E+05	
			176.60	-2.112E+00	?(	5.782E+00	1.07E+02	1.70E+01 G
			227.00	-1.864E+00	&	1.442E+01	2.95E+02	6.30E+00 GA
Cf-249	T	4.0913E-01					1.28E+05	
			387.95	4.091E-01	?(	1.645E+00	1.18E+02	6.60E+01 G
			333.44	1.672E-01	%	9.805E+00	1.70E+03	1.55E+01 G
Sn-126		3.8061E+00					3.65E+07	
			87.57	1.537E+00	}	4.427E+00	4.49E+01	3.75E+01 GA
			64.28	3.806E+00	?(	1.404E+01	1.10E+02	9.70E+00 G
			86.94	-2.594E+00	-	1.951E+01	2.24E+02	9.04E+00 GA
PB-210	N	1.7911E+01					8.14E+03	
			46.54	1.791E+01	*(P	3.626E+01	7.56E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	1.2737E+01					6.98E+02	
			238.63	1.274E+01	(P	1.632E+00	7.06E+00	4.33E+01 G
			300.03	2.627E+01	+	1.641E+01	2.89E+01	3.28E+00 GA
PB-214	N	1.1068E+01					5.84E+05	
			351.93	1.053E+01	(P	1.985E+00	1.07E+01	3.76E+01 G
			295.09	1.212E+01	(P	4.078E+00	1.67E+01	1.93E+01 G
			242.00	1.122E+01		9.930E+00	2.94E+01	7.43E+00 GA
BI-207	C	6.0338E-01					1.18E+04	
			1063.66	6.034E-01	?(	1.475E+00	1.08E+02	7.45E+01 G
			569.70	1.593E-01	-	1.420E+00	2.55E+02	9.77E+01 G
BI-212	N	2.5880E+01					6.98E+02	
			727.17	2.588E+01	*(	4.541E+00	1.54E+01	7.55E+00 G
			785.42	2.690E+01	&	7.742E+01	1.20E+02	1.28E+00 GA
U-235	N	1.1099E+00					2.57E+11	
			143.79	0.000E+00	?(	1.526E+01	1.00E+03	1.10E+01 G
			205.33	3.538E+00	?(	1.665E+01	1.81E+02	5.01E+00 G
			163.38	-4.519E+00	+	1.896E+01	1.24E+02	5.08E+00 G
			185.72	8.351E-02	P	1.840E+00	8.25E+02	5.40E+01 GA
BI-214	N	1.1181E+01					5.84E+05	
			609.31	1.118E+01	(	1.481E+00	1.05E+01	4.61E+01 G
			1120.29	6.136E+00	-	1.912E+01	9.27E+01	1.51E+01 G
			1764.49	1.603E+01	+	4.376E+00	1.92E+01	1.54E+01 G
BI-210M	T	-2.7713E-01					1.10E+09	
			265.83	-2.771E-01	?(	2.067E+00	2.17E+02	5.00E+01 G
			304.90	-5.505E-01	+	8.600E+00	4.63E+02	2.80E+01 G
AC-228	N	9.7233E+00					2.10E+03	
			911.07	9.723E+00	(	1.903E+00	1.51E+01	2.90E+01 G
			968.97	3.960E+00	-	1.010E+01	7.62E+01	1.75E+01 G
			338.32	1.834E+01	+	5.781E+00	1.78E+01	1.20E+01 G
			93.35	5.762E+00	&	3.003E+01	1.56E+02	5.56E+00 XA
TH-227	N	-5.2726E+00					7.95E+03	
			256.24	-5.273E+00	?(	1.356E+01	9.99E+01	7.00E+00 G
			235.97	-2.777E+00	+	1.813E+01	1.95E+02	1.23E+01 G
			50.14	-5.720E+00	+	2.503E+01	1.30E+02	8.00E+00 G
TH-229	N	-7.9048E+00					2.68E+06	
			193.51	-7.905E+00	?(	2.138E+01	1.06E+02	4.40E+00 G
			210.85	-1.039E+01	+	3.414E+01	1.28E+02	2.99E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	1.1466E+01					1.63E+12	
			92.59	1.046E+01	(P	1.562E+01	4.63E+01	5.58E+00 G
			63.29	1.294E+01	(P	2.685E+01	6.33E+01	3.81E+00 G
PA-231	N	-1.3681E+01					1.20E+07	
			302.65	-1.368E+01	?(	8.764E+01	1.91E+02	2.88E+00 G
			300.07	-1.588E+01	+	1.053E+02	1.98E+02	2.46E+00 G
PA-234	N	-3.3521E-01					1.63E+12	
			131.29	-3.352E-01	?(	6.463E+00	5.67E+02	1.80E+01 G
			946.02	0.000E+00	+	8.716E+00	1.00E+03	1.34E+01 G
			569.47	-3.163E-01	%	1.728E+01	1.54E+03	8.20E+00 G
			883.24	0.000E+00	+	2.007E+01	1.00E+03	9.60E+00 G
			880.53	-8.013E+00	&	2.930E+01	1.07E+02	6.00E+00 GA
PA-234M	N	9.7992E+01					1.63E+12	
			1001.00	5.608E+01	?(	1.947E+02	1.01E+02	8.37E-01 G
			766.41	2.173E+02	?(	6.345E+02	8.69E+01	2.94E-01 G
AM-241	T	1.1396E-01					1.58E+05	
			59.54	1.140E-01	%(	5.052E+00	1.31E+03	3.59E+01 G
Ir-192	F	2.8290E-01					7.40E+01	
			316.49	0.000E+00	&(	2.826E+00	1.00E+03	8.70E+01 G
			468.06	7.587E-01	?(	2.504E+00	9.76E+01	5.18E+01 G
			308.44	0.000E+00	&	7.596E+00	1.00E+03	3.18E+01 G
Cs-136	F	-4.3073E-01					1.30E+01	
			818.50	-4.307E-01	?(	1.886E+00	1.28E+02	1.00E+02 G
			1048.07	-7.580E-02	+	1.745E+00	6.24E+02	8.00E+01 G
			340.57	2.061E-01	+	3.689E+00	5.23E+02	4.69E+01 G
Np-239	T	1.2307E+00					2.36E+00	
			103.70	-1.363E+00	+	6.734E+00	1.48E+02	2.40E+01 X
			106.13	1.231E+00	?(	6.455E+00	1.56E+02	2.27E+01 G
			99.50	-2.183E+00	&	1.062E+01	1.45E+02	1.50E+01 X
Nd-147		-9.4726E-01					1.11E+01	
			531.00	-9.473E-01	?(	8.064E+00	3.42E+02	1.30E+01 G
			91.10	1.624E-01	%	6.040E+00	1.10E+03	2.83E+01 G
TL-210	N	-5.4675E-01					5.84E+05	
			799.60	-5.467E-01	?(	2.360E+00	1.27E+02	9.90E+01 G
			296.00	-4.875E-01	+	3.294E+00	2.02E+02	7.90E+01 G
			1313.00	2.280E-01	%	6.293E+00	1.19E+03	2.10E+01 GA

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Kr-85    I  -1.3974E+01                                      3.92E+03
                            513.98-1.397E+01 ?(  4.659E+02 9.66E+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

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


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
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Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
TH-227	50.14	268.	-18.	-0.010	130.37	-5.720E+00
BA-133	80.99	170.	13.	0.007	180.62	6.118E-01
EU-155	86.54	584.	-22.	-0.012	154.40	-1.136E+00
Gd-153	97.50	513.	-22.	-0.012	148.85	-1.093E+00
Np-239	99.50	491.	-22.	-0.012	145.45	-2.183E+00
Gd-153	103.20	491.	-22.	-0.012	144.74	-1.500E+00
Np-239	103.70	512.	-22.	-0.012	147.78	-1.363E+00
EU-155	105.31	567.	-19.	-0.010	181.68	-1.315E+00
Np-239	106.13	421.	19.	0.010	156.50	1.231E+00
EU-152	121.78	150.	17.	0.009	104.73	8.872E-01
CO-57	122.06	167.	-19.	-0.011	97.14	-3.373E-01
EU-154	123.10	152.	-7.	-0.004	265.42	-2.434E-01

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	131.29	255.	-4.	-0.002	566.79	-3.352E-01	
HF-181	133.02	522.	-20.	-0.011	162.10	-7.029E-01	
CE-144	133.54	537.	-20.	-0.011	164.30	-2.748E+00	
HF-181	136.30	557.	-20.	-0.011	166.80	-5.250E+00	
CO-57	136.47	526.	12.	0.007	273.05	1.702E+00	
Ba-140	162.66	158.	9.	0.005	208.12	2.253E+00	
U-235	163.38	148.	-14.	-0.008	124.38	-4.519E+00	
CE-139	165.85	182.	-19.	-0.011	102.26	-3.903E-01	
Cf-251	176.60	143.	-21.	-0.012	107.05	-2.112E+00	
U-235	185.72	138.	3.	0.001	825.29	8.351E-02	P
TH-229	193.51	117.	-20.	-0.011	105.51	-7.905E+00	
U-235	205.33	84.	10.	0.005	180.62	3.538E+00	
TH-229	210.85	125.	-17.	-0.009	127.70	-1.039E+01	
Cf-251	227.00	88.	-6.	-0.003	295.33	-1.864E+00	
TH-227	235.97	539.	-17.	-0.009	194.75	-2.777E+00	
EU-152	244.69	524.	-13.	-0.007	241.94	-3.664E+00	
TH-227	256.24	81.	-17.	-0.010	99.91	-5.273E+00	
Cd-113m	263.70	91.	6.	0.004	216.30	2.296E+03	
BI-210M	265.83	91.	-6.	-0.004	217.07	-2.771E-01	
Hg-203	279.20	85.	6.	0.004	206.63	1.786E-01	
I-131	284.30	44.	12.	0.007	107.37	4.493E+00	
TL-210	296.00	528.	-16.	-0.009	201.52	-4.875E-01	
PA-231	300.07	512.	-16.	-0.009	197.74	-1.588E+01	
PA-233	300.18	496.	-16.	-0.009	194.57	-6.302E+00	
PA-231	302.65	479.	-16.	-0.009	190.97	-1.368E+01	
BA-133	302.85	463.	-16.	-0.009	187.70	-2.151E+00	
Ba-140	304.85	447.	-16.	-0.009	184.13	-9.252E+00	
BI-210M	304.90	430.	-6.	-0.004	462.93	-5.505E-01	
CR-51	320.08	442.	-17.	-0.009	176.03	-4.315E+00	
La-140	328.76	119.	-11.	-0.006	143.45	-1.390E+00	
Cs-136	340.57	182.	4.	0.002	523.42	2.061E-01	
EU-152	344.29	192.	-10.	-0.006	195.36	-1.020E+00	
HF-181	345.83	176.	10.	0.006	187.10	1.799E+00	
BA-133	356.00	237.	-12.	-0.006	188.77	-5.127E-01	
I-131	364.48	60.	-12.	-0.007	129.64	-4.079E-01	
BA-133	383.84	75.	12.	0.006	108.59	3.776E+00	
Cf-249	387.95	55.	9.	0.005	117.82	4.091E-01	
SN-113	391.69	58.	8.	0.005	134.37	3.813E-01	
SB-125	427.88	32.	12.	0.007	95.89	1.284E+00	
AG-108M	433.94	24.	8.	0.004	125.00	2.805E-01	
SB-125	463.37	66.	9.	0.005	131.94	2.867E+00	
Ir-192	468.06	59.	12.	0.006	97.59	7.587E-01	
BE-7	477.60	72.	7.	0.004	184.53	2.162E+00	
La-140	487.02	48.	9.	0.005	114.34	6.819E-01	
RU-103	497.05	16.	9.	0.005	92.92	3.492E-01	
RH-106	511.86	53.	73.	0.040	18.43	1.306E+01	
Kr-85	513.98	129.	-2.	-0.001	965.61	-1.397E+01	
Nd-147	531.00	30.	-3.	-0.002	341.69	-9.473E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ba-140	537.26	22.	-5.	-0.003	208.80	-7.130E-01	
CS-134	563.24	35.	-2.	-0.001	725.26	-7.704E-01	
CS-134	569.32	43.	-7.	-0.004	132.21	-1.855E+00	
BI-207	569.70	50.	4.	0.002	254.95	1.593E-01	
SB-125	600.50	220.	7.	0.004	309.46	1.548E+00	
RH-106	621.92	264.	-13.	-0.007	178.24	-5.451E+00	
SB-125	635.89	35.	-11.	-0.006	83.85	-3.980E+00	
I-131	636.97	42.	7.	0.004	142.30	3.929E+00	
AG-110M	657.76	43.	-12.	-0.007	82.50	-5.484E-01	
CS-137	661.66	61.	-7.	-0.004	162.25	-3.569E-01	
PM-144	696.54	19.	2.	0.001	398.21	1.063E-01	
NB-94	702.63	23.	5.	0.003	224.40	2.163E-01	
SB-124	722.79	77.	-11.	-0.006	121.76	-4.505E+00	
AG-108M	722.94	66.	-6.	-0.003	191.22	-3.138E-01	
PM-146	735.72	28.	-2.	-0.001	565.69	-4.170E-01	
PM-146	747.16	5.	19.	0.011	32.85	2.698E+00	
ZR-95	756.73	9.	8.	0.004	92.79	6.672E-01	
AG-110M	763.94	56.	-19.	-0.010	61.23	-4.040E+00	
NB-95	765.79	77.	-3.	-0.001	469.97	-1.289E-01	
PA-234M	766.41	59.	13.	0.007	86.86	2.173E+02	
EU-152	778.92	14.	5.	0.003	164.92	1.889E+00	
CS-134	795.87	76.	-16.	-0.009	79.02	-9.565E-01	
TL-210	799.60	90.	-11.	-0.006	127.09	-5.467E-01	
CS-134	801.95	98.	11.	0.006	134.77	6.129E+00	
CO-58	810.78	57.	-14.	-0.008	83.24	-6.866E-01	
La-140	815.77	46.	8.	0.004	126.79	1.716E+00	
Cs-136	818.50	55.	-8.	-0.005	127.89	-4.307E-01	
NB-94	871.10	30.	-9.	-0.005	92.30	-4.776E-01	
EU-154	873.23	35.	6.	0.003	145.30	2.596E+00	
PA-234	880.53	42.	-9.	-0.005	107.15	-8.013E+00	
Sc-46	889.28	31.	8.	0.005	101.85	4.405E-01	
Y-88	898.04	35.	-11.	-0.006	122.02	-6.361E-01	
AG-110M	937.49	30.	-10.	-0.006	124.50	-1.627E+00	
EU-152	964.11	64.	-4.	-0.002	312.15	-1.432E+00	
EU-154	996.33	20.	9.	0.005	81.09	4.774E+00	
PA-234M	1001.00	29.	8.	0.004	101.47	5.608E+01	
EU-154	1004.77	59.	-12.	-0.007	92.57	-4.015E+00	
Cs-136	1048.07	19.	-1.	-0.001	624.50	-7.580E-02	
RH-106	1050.36	42.	-15.	-0.009	64.70	-5.999E+01	
BI-207	1063.66	11.	7.	0.004	107.76	6.034E-01	
Ga-68	1077.40	5.	6.	0.003	101.72	1.242E+01	
FE-59	1099.25	32.	-14.	-0.008	95.65	-1.556E+00	
EU-152	1112.07	80.	-14.	-0.008	91.33	-6.728E+00	
ZN-65	1115.55	66.	-15.	-0.008	83.30	-1.821E+00	
Sc-46	1120.55	69.	9.	0.005	133.05	5.813E-01	
CO-60	1173.24	27.	-6.	-0.003	211.36	-3.740E-01	
NA-22	1274.53	17.	-2.	-0.001	300.00	-1.405E-01	
FE-59	1291.60	0.	14.	0.008	26.73	2.298E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	1332.50	11.	-3.	-0.002	243.10	-2.422E-01	
AG-110M	1384.30	0.	8.	0.004	35.36	2.465E+00	
EU-152	1408.00	6.	7.	0.004	88.42	2.658E+00	
La-140	1596.21	6.	-3.	-0.002	205.48	-2.641E-01	
SB-124	1690.98	0.	5.	0.003	44.72	9.223E-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 *****

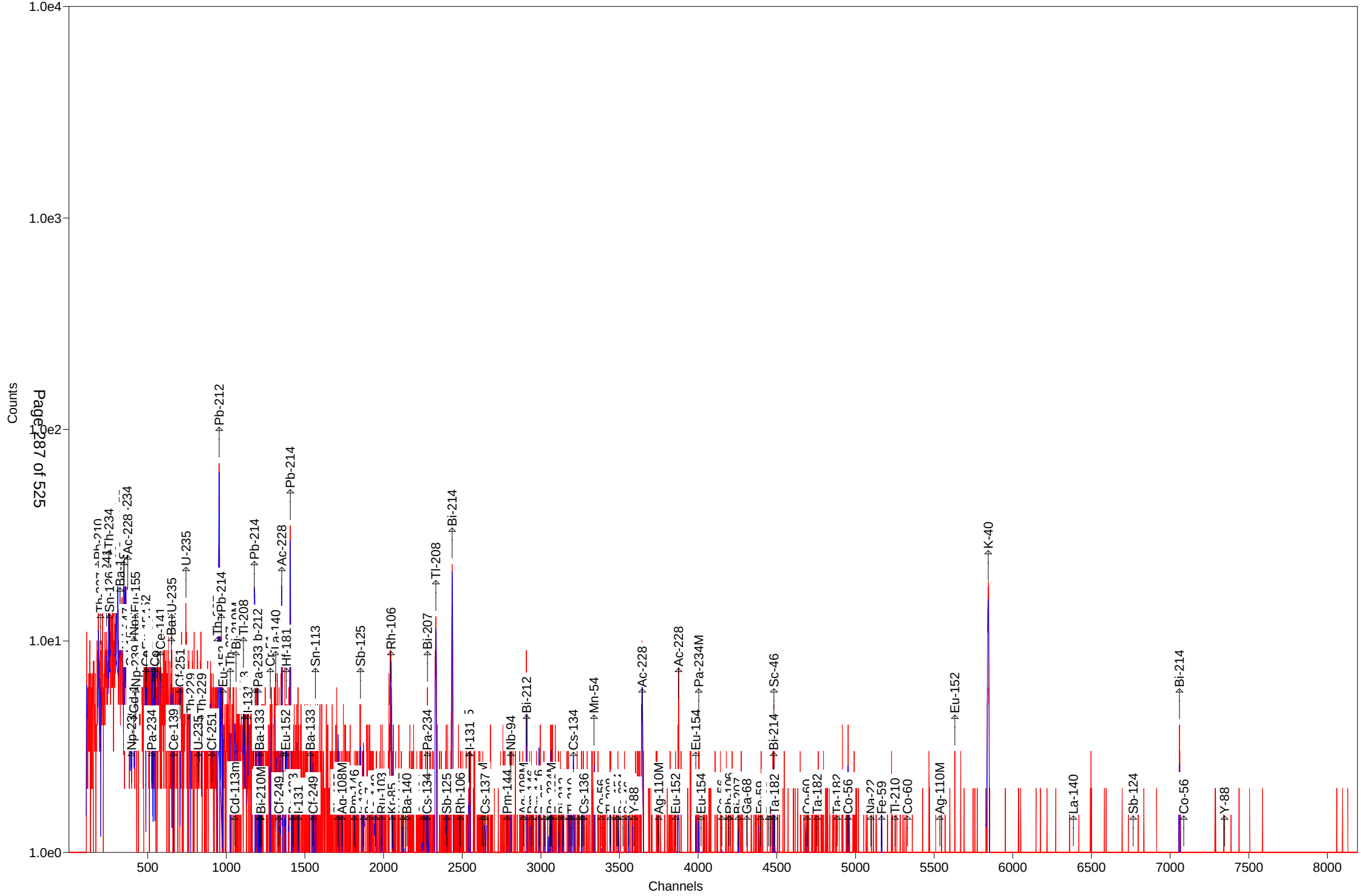
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	2.1622E+00	2.1622E+00	1.845E+02%	1.37E+01
NA-22	#A	-1.4048E-01	-1.4048E-01	3.000E+02%	1.54E+00
K-40	#	1.0249E+02	1.0249E+02	1.195E+01%	1.87E+01
Sc-46	#A	5.1093E-01	5.1093E-01	8.378E+01%	1.53E+00
CR-51	#A	-4.3147E+00	-4.3148E+00	1.760E+02%	2.55E+01
MN-54	#A	8.0546E-01	8.0546E-01	4.847E+01%	8.71E-01
FE-59	#A	1.1394E-01	1.1394E-01	2.673E+01%	3.23E+00
Co-56	#C	1.0975E+00	1.0975E+00	3.529E+01%	9.07E-01
CO-57	#A	-1.1108E-01	-1.1108E-01	9.714E+01%	1.10E+00
CO-58	#A	-6.8659E-01	-6.8659E-01	8.324E+01%	1.92E+00
CO-60	#A	-2.4221E-01	-2.4221E-01	2.431E+02%	1.34E+00
ZN-65	#A	-1.8212E+00	-1.8212E+00	8.330E+01%	5.08E+00
NB-94	#A	2.1631E-01	2.1631E-01	2.244E+02%	1.17E+00
ZR-95	#A	6.6724E-01	6.6724E-01	9.279E+01%	1.49E+00
NB-95	#A	-1.2890E-01	-1.2890E-01	4.700E+02%	2.11E+00
RU-103	#A	3.4917E-01	3.4917E-01	9.292E+01%	8.26E-01
RH-106	#A	-5.4513E+00	-5.4513E+00	1.782E+02%	3.28E+01
AG-108M	#A	2.8054E-01	2.8054E-01	1.250E+02%	8.96E-01
AG-110M	#A	6.1748E-01	6.1748E-01	3.536E+01%	2.65E+00
SN-113	#A	3.8132E-01	3.8132E-01	1.344E+02%	1.76E+00
SB-124	#A	3.0178E-01	3.0178E-01	4.472E+01%	3.01E+00
SB-125	#A	1.6515E+00	1.6515E+00	9.589E+01%	3.08E+00
I-131	#A	2.3614E-01	2.3615E-01	7.347E+01%	1.32E+00
Gd-153	#A	-1.0935E+00	-1.0935E+00	1.489E+02%	5.44E+00
Ga-68	#A	1.2340E+01	1.2420E+01	1.017E+02%	2.95E+01
Tc-99m	#A	1.1485E-01	1.1499E-01	4.979E+02%	1.93E+00
BA-133	#A	-5.1274E-01	-5.1274E-01	1.888E+02%	3.27E+00
CS-134	#A	-3.0299E-01	-3.0299E-01	7.812E+01%	2.52E+00
CS-137	#A	-3.5686E-01	-3.5686E-01	1.623E+02%	1.99E+00
CE-139	#A	-3.9033E-01	-3.9033E-01	1.023E+02%	1.34E+00
Ba-140	#A	-1.1024E-01	-1.1024E-01	1.474E+02%	3.73E+00
La-140	#A	2.7884E-01	2.7884E-01	8.905E+01%	1.24E+00
CE-141	#A	9.6436E-02	9.6437E-02	1.058E+03%	3.44E+00
CE-144	#A	-2.7481E+00	-2.7481E+00	1.643E+02%	1.51E+01

PM-144 #A	1.0628E-01	1.0628E-01	3.982E+02%		1.04E+00
EU-152 #A	1.1994E+00	1.1994E+00	9.768E+01%		3.12E+00
EU-154 #A	1.1394E+00	1.1394E+00	8.109E+01%		2.20E+00
EU-155 #A	-1.3147E+00	-1.3147E+00	1.817E+02%		8.00E+00
HF-181 #A	2.8373E-01	2.8373E-01	1.871E+02%		1.88E+00
Ta-182 #A	1.3652E+00	1.3653E+00	8.818E+01%		5.03E+00
Hg-203 #A	1.7857E-01	1.7857E-01	2.066E+02%		1.27E+00
TL-208	4.3753E+00	4.3753E+00	1.117E+01%		5.26E-01
PM-146 #A	9.5967E-01	9.5967E-01	3.285E+01%		1.47E+00
Y-88 #A	-6.3646E-02	-6.3646E-02	9.950E+02%		1.41E+00
Cd-113m#A	2.2959E+03	2.2959E+03	2.163E+02%		1.71E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		4.47E+01
Cf-251 #A	-2.1115E+00	-2.1115E+00	1.071E+02%		5.78E+00
Cf-249 #A	4.0913E-01	4.0913E-01	1.178E+02%		1.65E+00
Sn-126 #A	3.8061E+00	3.8061E+00	1.101E+02%		1.40E+01
PB-210 #A	1.7911E+01	1.7911E+01	7.562E+01%		3.63E+01
PB-212	1.2737E+01	1.2737E+01	7.061E+00%		1.63E+00
PB-214	1.1068E+01	1.1068E+01	9.903E+00%		1.98E+00
BI-207 #A	6.0338E-01	6.0338E-01	1.078E+02%		1.48E+00
BI-212 #	2.5880E+01	2.5880E+01	1.543E+01%		4.54E+00
U-235 #A	1.1099E+00	1.1099E+00	1.806E+02%		1.53E+01
BI-214	1.1181E+01	1.1181E+01	1.051E+01%		1.48E+00
BI-210M#A	-2.7713E-01	-2.7713E-01	2.171E+02%		2.07E+00
AC-228	9.7233E+00	9.7233E+00	1.507E+01%		1.90E+00
TH-227 #A	-5.2726E+00	-5.2726E+00	9.991E+01%		1.36E+01
TH-229 #A	-7.9048E+00	-7.9048E+00	1.055E+02%		2.14E+01
TH-234 A	1.1466E+01	1.1466E+01	3.920E+01%		1.56E+01
PA-231 #A	-1.3681E+01	-1.3681E+01	1.910E+02%		8.76E+01
PA-233 #A	0.0000E+00	0.0000E+00	1.000E+03%		6.76E+00
PA-234 #A	-3.3521E-01	-3.3521E-01	5.668E+02%		6.46E+00
PA-234M#A	9.7992E+01	9.7992E+01	6.679E+01%		1.95E+02
AM-241 #A	1.1396E-01	1.1396E-01	1.308E+03%		5.05E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.44E+01
Ir-192 #A	2.8290E-01	2.8290E-01	9.759E+01%		2.83E+00
Cs-136 #A	-4.3072E-01	-4.3073E-01	1.279E+02%		1.89E+00
Np-239 #A	1.2305E+00	1.2307E+00	1.565E+02%		6.45E+00
Nd-147 #A	-9.4723E-01	-9.4726E-01	3.417E+02%		8.06E+00
TL-210 #A	-5.4675E-01	-5.4675E-01	1.271E+02%		2.36E+00
Kr-85 #A	-1.3974E+01	-1.3974E+01	9.656E+02%		4.66E+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)     2.076E+02  Bq/Sample
Total Decayed Activity (   25.1 to  1999.1 keV) 2.0763797E+02  Bq/Sample
```

404682_Gamma_490-164387-A-3-A. 12_Gamma_20182807.spc.



Test America St. Louis Spectrum ID: 19_Gamma_20182702

Sample Description: 404682_Gamma_490-164387-B-4-A
Detector: Detector #19
Batch ID: 404682
Work Order Number: Gamma
Lot Number: 490-164387-B-4-A

Decay to Time: 12/29/2018 11:56 Live Time: 1800 sec
Acquisition Time: 12/29/2018 11:56:18 Real Time: 1801 sec
Analysis Time: 12/29/2018 12:26 Dead Time: 0.06 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 19_Soil_TunaCan.Clb
Efficiency Cal Desc: 19_TunaCan_108513
Efficiency Cal Date: 4/16/2018 12:11
Energy Cal Date: 4/16/2018 11:22
Library: Client_Long_Rev15.lib
Bkgd Correction File: 19_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	2.972E+00	108.3	3.218E+00	3.223E+00	1.104E+01
NA-22	4.428E-01	96.8	4.287E-01	4.295E-01	1.489E+00
K-40	1.152E+02	9.2	1.054E+01	1.244E+01	1.318E+01
Sc-46	-6.229E-01	95.4	5.940E-01	5.951E-01	2.016E+00
CR-51	-3.485E-01	1842.0	6.419E+00	6.419E+00	2.407E+01
MN-54	6.745E-01	51.1	3.448E-01	3.470E-01	7.818E-01
FE-59	1.573E+00	28.9	4.541E-01	4.629E-01	9.661E-01
Co-56	9.152E-01	28.4	2.600E-01	2.653E-01	1.230E+00
CO-57	0.000E+00	1.#INF	2.561E-01	2.561E-01	1.258E+00
CO-58	0.000E+00	1.#INF	1.188E-01	1.188E-01	1.677E+00
CO-60	-1.303E+00	86.2	1.124E+00	1.126E+00	2.365E+00
ZN-65	0.000E+00	1.#INF	4.681E-01	4.681E-01	5.180E+00
NB-94	2.714E-01	164.9	4.476E-01	4.479E-01	1.094E+00
ZR-95	4.029E-01	138.7	5.588E-01	5.593E-01	2.077E+00
NB-95	0.000E+00	1.#INF	5.676E-02	5.676E-02	2.011E+00
RU-103	4.500E-02	742.7	3.342E-01	3.342E-01	8.780E-01
RH-106	-1.244E+00	719.7	8.951E+00	8.951E+00	3.070E+01
AG-108M	2.196E-01	107.8	2.368E-01	2.371E-01	1.039E+00
AG-110M	9.372E-02	206.8	1.938E-01	1.939E-01	2.372E+00
SN-113	6.837E-01	121.3	8.290E-01	8.300E-01	2.802E+00
SB-124	8.671E-01	35.4	3.066E-01	3.106E-01	2.427E+00
SB-125	2.561E-01	137.3	3.515E-01	3.518E-01	3.780E+00
I-131	-2.750E-01	133.7	3.676E-01	3.679E-01	1.319E+00
Gd-153	-1.216E+00	186.1	2.264E+00	2.266E+00	7.560E+00
Ga-68	0.000E+00	1.#INF	2.575E+00	2.575E+00	4.493E+01
Tc-99m	-1.207E-01	535.6	6.462E-01	6.463E-01	2.176E+00
BA-133	-1.516E-01	128.9	1.953E-01	1.955E-01	3.552E+00
CS-134	1.703E+00	26.2	4.467E-01	4.575E-01	1.137E+00
CS-137	6.050E-01	83.8	5.072E-01	5.084E-01	1.711E+00
CE-139	-4.122E-01	103.0	4.247E-01	4.254E-01	1.424E+00
Ba-140	7.373E-01	101.6	7.492E-01	7.504E-01	5.367E+00
La-140	-2.469E-01	120.5	2.975E-01	2.978E-01	1.976E+00
CE-141	4.902E-01	245.3	1.203E+00	1.203E+00	4.035E+00

CE-144	-3.218E+00	151.1	4.863E+00	4.867E+00	1.627E+01
PM-144	3.042E-01	154.8	4.710E-01	4.713E-01	1.365E+00
EU-152	1.469E+00	53.6	7.868E-01	7.915E-01	3.576E+00
EU-154	3.157E+00	20.0	6.313E-01	6.577E-01	2.289E+00
EU-155	7.469E-01	133.7	9.986E-01	9.997E-01	9.798E+00
HF-181	6.717E-01	95.9	6.443E-01	6.454E-01	1.341E+00
Ta-182	1.109E+00	90.5	1.004E+00	1.006E+00	7.554E+00
Hg-203	1.327E-01	295.7	3.925E-01	3.926E-01	1.362E+00
TL-208	3.812E+00	16.8	6.405E-01	6.772E-01	1.078E+00
PM-146	5.198E-01	102.8	5.345E-01	5.353E-01	1.381E+00
Y-88	1.741E-01	104.7	1.822E-01	1.825E-01	8.367E-01
Cd-113m	-7.251E+03	90.4	6.553E+03	6.569E+03	2.195E+04
Cd-109	0.000E+00	1.#INF	1.292E+01	1.292E+01	4.377E+01
Cf-251	-2.359E+00	100.4	2.370E+00	2.374E+00	6.063E+00
Cf-249	-8.479E-01	111.7	9.475E-01	9.487E-01	3.184E+00
Sn-126	-2.746E+00	197.5	5.423E+00	5.425E+00	1.825E+01
PB-210	3.427E+01	41.5	1.421E+01	1.440E+01	3.667E+01
PB-212	9.972E+00	9.0	8.928E-01	1.068E+00	1.832E+00
PB-214	9.399E+00	12.3	1.160E+00	1.280E+00	2.134E+00
BI-207	2.992E-01	94.7	2.834E-01	2.839E-01	1.692E+00
BI-212	3.123E+00	184.6	5.767E+00	5.770E+00	2.028E+01
U-235	6.855E-01	577.2	3.957E+00	3.957E+00	1.767E+01
BI-214	7.361E+00	15.2	1.120E+00	1.198E+00	2.164E+00
BI-210M	6.202E-01	98.9	6.135E-01	6.146E-01	2.072E+00
AC-228	1.132E+01	21.8	2.467E+00	2.552E+00	4.609E+00
TH-227	1.479E+00	199.7	2.954E+00	2.955E+00	1.263E+01
TH-229	4.678E+00	102.5	4.793E+00	4.801E+00	2.149E+01
TH-234	1.703E+01	27.7	4.709E+00	4.825E+00	1.377E+01
PA-231	1.177E+01	142.7	1.679E+01	1.681E+01	7.618E+01
PA-233	7.417E-01	202.0	1.498E+00	1.499E+00	6.499E+00
PA-234	7.478E-01	87.7	6.562E-01	6.576E-01	1.013E+01
PA-234M	-2.000E+01	248.5	4.970E+01	4.971E+01	2.237E+02
AM-241	-9.499E-01	165.0	1.567E+00	1.568E+00	5.264E+00
Np-237	-3.334E+00	62.5	2.085E+00	2.095E+00	1.733E+01
Ir-192	3.094E-01	104.3	3.228E-01	3.234E-01	2.719E+00
Cs-136	2.173E-01	135.3	2.940E-01	2.943E-01	1.008E+00
Np-239	1.129E+00	73.2	8.265E-01	8.298E-01	2.751E+00
Nd-147	-2.979E+00	120.4	3.586E+00	3.591E+00	8.763E+00
TL-210	1.734E-01	198.8	3.447E-01	3.449E-01	1.766E+00
Kr-85	0.000E+00	1.#INF	4.977E+01	4.977E+01	4.433E+02
Total	2.555E+02				

Analyst: Joey Sausto

Sample description
404682_Gamma_490-164387-B-4-A

Spectrum Filename: C:\User\SPC\Det19\19_Gamma_20182702.An1

Acquisition information
Start time: 12/29/2018 11:56:18 AM
Live time: 1800
Real time: 1801
Dead time: 0.06 %
Detector ID: 19

Detector system
Ge19 SN/11146715

Calibration
Filename: 19_Soil_TunaCan.Clb
19_TunaCan_108513

Energy Calibration
Created: 4/16/2018 11:22:57 AM
Zero offset: 0.177 keV
Gain: 0.250 keV/channel
Quadratic: -3.735E-08 keV/channel^2

Efficiency Calibration
Created: 4/16/2018 12:11:21 PM
Type: Polynomial
Uncertainty: 0.841 %
Coefficients: -0.371612 -4.869309 0.466742
-0.049787 0.002234 -0.000039

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 (37.71keV)
Stop channel: 8000 (1999.42keV)
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	12/29/2018 11:56:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	19_2018-12-22_1357.PBC 12/22/2018 1:57:47 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 27 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1559

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.44	45.	41.46	0.53	1.702E-02	46.54	4.250	PBC<MDA	PB210
63.48	28.	57.10	0.95	2.764E-02	63.29	3.810	PBC<MDA	TH234
77.17	114.	22.73	0.65	3.147E-02				
86.54	21.	133.70	0.97	3.301E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.169E+00	EU155
					86.94	9.040	3.964E+00	Sn126
86.89	19.	148.56	0.97	3.306E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.067E+00	EU155
					86.94	9.040	3.619E+00	Sn126
87.52	18.	79.59	0.97	3.314E-02	87.57	37.500	PBC<MDA	Sn126
91.10	4.	815.28	0.97	3.352E-02	91.10	28.300	PBC<MDA	Nd147
92.82	63.	27.66	1.31	3.366E-02	92.59	5.584	1.872E+01	TH234
					93.35	5.561	1.876E+01	AC228
106.13	16.	73.22	0.99	3.430E-02	106.13	22.700	PBC<MDA	Np239
123.10	18.	95.75	1.00	3.395E-02	123.10	40.790	PBC<MDA	EU154
144.13	4.	793.29	1.02	3.254E-02	143.79	10.960	PBC<MDA	U235
145.78	14.	245.34	1.02	3.240E-02	145.44	48.200	PBC<MDA	CE141
162.66	17.	101.62	1.04	3.083E-02	162.66	6.220	PBC<MDA	Ba140
					163.38	5.080	PBC<MDA	U235
163.04	2.	838.59	1.04	3.076E-02	162.66	6.220	PBC<MDA	Ba140
					163.38	5.080	PBC<MDA	U235
185.94	47.	29.21	0.88	2.864E-02	185.72	54.000	1.671E+00	U235
210.85	15.	102.47	1.08	2.637E-02	210.85	2.990	PBC<MDA	TH229
235.97	14.	199.67	1.10	2.434E-02	235.97	12.300	PBC<MDA	TH227
238.46	173.	12.31	0.87	2.415E-02	238.63	43.300	9.203E+00	PB212
241.91	45.	27.10	1.11	2.388E-02	242.00	7.430	1.393E+01	PB214
265.83	12.	98.92	1.13	2.224E-02	265.83	50.000	PBC<MDA	BI210M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
279.20	4.	295.73	1.14	2.141E-02	279.20	81.460	PBC<MDA	Hg203
284.30	3.	436.74	1.15	2.111E-02	284.30	6.140	PBC<MDA	I131
295.22	61.	21.31	1.10	2.050E-02	295.09	19.300	8.565E+00	PB214
296.00	11.	198.77	1.16	2.045E-02	296.00	79.000	PBC<MDA	TL210
299.81	11.	196.22	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	11.	197.57	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.272E+01	PA231
					300.18	6.200	5.049E+00	PA233
300.18	11.	201.96	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.272E+01	PA231
					300.18	6.200	5.049E+00	PA233
302.65	11.	205.88	1.16	2.010E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.723E+00	BA133
302.85	11.	210.05	1.16	2.009E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.723E+00	BA133
338.32	14.	140.55	1.19	1.839E-02	338.32	12.010	PBC<MDA	AC228
340.57	13.	135.29	1.19	1.830E-02	340.57	46.900	PBC<MDA	Cs136
344.29	13.	140.44	1.20	1.814E-02	344.29	26.500	PBC<MDA	EU152
345.83	12.	148.95	1.20	1.808E-02	345.83	15.070	PBC<MDA	HF181
351.60	125.	11.63	0.97	1.784E-02	351.93	37.600	9.828E+00	PB214
391.69	13.	121.26	1.24	1.637E-02	391.69	64.000	PBC<MDA	SN113
433.94	2.	484.77	1.27	1.510E-02	433.94	90.480	PBC<MDA	AG108M
453.88	9.	102.84	1.29	1.458E-02	453.88	65.000	PBC<MDA	PM146
468.06	11.	104.31	1.30	1.423E-02	468.06	51.750	PBC<MDA	Ir192
477.60	8.	108.27	1.31	1.401E-02	477.60	10.520	PBC<MDA	BE7
482.00	6.	120.88	1.31	1.391E-02	482.00	80.500	PBC<MDA	HF181
487.02	6.	135.64	1.32	1.380E-02	487.02	45.500	PBC<MDA	La140
497.05	1.	742.74	1.33	1.358E-02	497.05	90.900	PBC<MDA	RU103
511.86	43.	26.00	2.59	1.328E-02	511.86	20.000	8.995E+00	RH106
569.47	8.	113.76	1.39	1.224E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.705E+00	PA234
					569.70	97.740	3.949E-01	BI207
569.70	8.	94.72	1.39	1.224E-02	569.32	15.380	2.410E+00	CS134
					569.47	8.200	4.521E+00	PA234
					569.70	97.740	3.794E-01	BI207
583.01	70.	16.80	0.96	1.202E-02	583.02	84.500	3.812E+00	TL208
600.50	5.	291.29	1.41	1.176E-02	600.50	17.860	PBC<MDA	SB125
602.73	5.	297.84	1.41	1.172E-02	602.73	98.260	PBC<MDA	SB124
604.71	5.	304.26	1.41	1.170E-02	604.71	97.620	PBC<MDA	CS134
609.12	73.	15.21	1.75	1.163E-02	609.31	46.090	7.546E+00	BI214
610.30	5.	309.91	1.42	1.162E-02	610.30	5.750	PBC<MDA	RU103
614.28	5.	315.68	1.42	1.156E-02	614.28	89.850	PBC<MDA	AG108M
618.06	5.	321.35	1.42	1.151E-02	618.06	99.100	PBC<MDA	PM144
635.89	4.	193.49	1.44	1.126E-02	635.89	11.310	PBC<MDA	SB125
657.76	3.	206.82	1.46	1.098E-02	657.76	94.640	PBC<MDA	AG110M
661.66	10.	83.83	1.46	1.093E-02	661.66	85.210	PBC<MDA	CS137

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
696.54	7.	154.79	1.49	1.052E-02	696.54	99.000	PBC<MDA	PM144
702.63	5.	164.92	1.49	1.045E-02	702.63	97.900	PBC<MDA	NB94
722.79	5.	86.39	1.51	1.024E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.196E-01	AG108M
					723.36	20.220	1.436E+00	EU154
722.94	5.	107.83	1.51	1.024E-02	722.79	10.810	2.631E+00	SB124
					722.94	90.840	3.131E-01	AG108M
					723.36	20.220	1.407E+00	EU154
723.36	5.	124.24	1.51	1.023E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.132E-01	AG108M
					723.36	20.220	1.408E+00	EU154
724.20	5.	138.69	1.51	1.022E-02	724.20	44.150	PBC<MDA	ZR95
727.17	4.	184.64	1.51	1.019E-02	727.17	7.550	PBC<MDA	BI212
747.16	3.	220.77	1.53	9.989E-03	747.16	34.000	PBC<MDA	PM146
756.73	2.	403.11	1.53	9.896E-03	756.73	54.460	PBC<MDA	ZR95
766.41	-1.	722.83	1.54	9.803E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	8.	92.37	1.55	9.687E-03	778.92	12.940	PBC<MDA	EU152
795.87	25.	26.23	1.56	9.534E-03	795.87	85.530	1.703E+00	CS134
834.85	11.	51.12	1.59	9.204E-03	834.85	99.980	PBC<MDA	MN54
846.77	7.	119.52	1.60	9.108E-03	846.77	99.935	PBC<MDA	Co56
871.10	1.	624.50	1.62	8.920E-03	871.10	99.890	PBC<MDA	NB94
873.23	6.	78.53	1.62	8.903E-03	873.23	12.270	PBC<MDA	EU154
880.53	7.	105.36	1.63	8.849E-03	880.53	6.000	PBC<MDA	PA234
898.04	5.	104.66	1.64	8.721E-03	898.04	93.700	PBC<MDA	Y88
911.07	51.	21.79	1.65	8.629E-03	911.07	29.000	1.132E+01	AC228
946.02	4.	180.85	1.68	8.392E-03	946.02	13.400	PBC<MDA	PA234
964.11	10.	89.28	1.69	8.274E-03	964.11	14.605	PBC<MDA	EU152
968.97	8.	94.01	1.69	8.244E-03	968.97	17.460	PBC<MDA	AC228
996.33	25.	20.00	1.71	8.075E-03	996.33	10.600	1.623E+01	EU154
1001.00	-2.	248.45	1.72	8.047E-03	1001.00	0.837	PBC<MDA	PA234M
1063.66	2.	354.73	1.76	7.689E-03	1063.66	74.500	PBC<MDA	BI207
1099.25	12.	28.87	1.79	7.501E-03	1099.25	56.500	1.573E+00	FE59
1120.32	6.	117.39	1.80	7.394E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	9.	96.13	1.80	7.393E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	6.669E-01	Sc46
					1121.30	34.900	1.912E+00	Ta182
1189.09	6.	90.52	1.85	7.065E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	13.	28.40	1.89	6.848E-03	1238.28	66.070	1.653E+00	Co56
1274.53	5.	96.82	1.91	6.696E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.258E+00	EU154
1291.60	3.	177.81	1.92	6.626E-03	1291.60	43.200	PBC<MDA	FE59
1408.00	7.	38.30	2.00	6.187E-03	1408.00	21.005	PBC<MDA	EU152
1460.47	133.	9.15	0.89	6.005E-03	1460.83	10.670	1.152E+02	K40
1690.98	8.	35.36	2.18	5.307E-03	1690.98	47.790	1.752E+00	SB124
1764.36	10.	39.75	2.22	5.112E-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
307.74	77.17	152.	114.	3.623E+03	22.73	0.649	- 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	184.89	46.44	94.	45.	0.025	41.46	0.527s
TH-227	199.70	50.14	314.	-20.	-0.011	130.09	0.938s
AM-241	237.25	59.54	342.	-16.	-0.009	164.96	0.946s
TH-234	252.25	63.29	108.	28.	0.015	57.10	0.950D
Sn-126	256.21	64.28	344.	-13.	-0.007	197.49	0.951s
BA-133	323.00	80.99	523.	-29.	-0.016	54.01	0.966s
Np-237	344.99	86.49	805.	-26.	-0.014	62.54	0.971
EU-155	345.20	86.54	396.	21.	0.012	133.70	0.971s
Sn-126	346.79	86.94	409.	19.	0.011	148.56	0.971
Sn-126	349.31	87.57	403.	18.	0.010	79.59	0.972D
Cd-109	351.19	88.04	428.	0.	0.000	1000.00	0.972A
Nd-147	363.42	91.10	424.	4.	0.002	815.28	0.975s
TH-234	370.30	92.82	89.	63.	0.035	27.66	1.312s
AC-228	372.41	93.35	876.	-22.	-0.012	189.25	0.977
Gd-153	389.00	97.50	853.	-22.	-0.012	186.13	0.981
Np-239	396.99	99.50	826.	-22.	-0.012	182.83	0.982s
Gd-153	411.78	103.20	804.	-22.	-0.012	179.76	0.986s
Np-239	413.78	103.70	778.	-22.	-0.012	176.79	0.986
Np-239	423.49	106.13	59.	16.	0.009	73.22	0.988D
EU-152	486.05	121.78	165.	-19.	-0.011	98.32	1.002s
CO-57	487.18	122.06	184.	0.	0.000	1000.00	1.003s
EU-154	491.33	123.10	136.	18.	0.010	95.75	1.004s
PA-234	524.09	131.29	529.	-21.	-0.012	153.77	1.011
HF-181	531.00	133.02	508.	-21.	-0.012	150.46	1.013
CE-144	533.06	133.54	513.	-21.	-0.012	151.14	1.013
HF-181	544.09	136.30	534.	-21.	-0.012	153.83	1.015s
CO-57	544.79	136.47	517.	-21.	-0.012	155.57	1.016s
Tc-99m	560.92	140.51	544.	-6.	-0.003	535.60	1.019s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	574.02	143.79	565.	4.	0.002	793.29	1.022s
CE-141	580.63	145.44	564.	14.	0.008	245.34	1.024s
Ba-140	649.47	162.66	133.	17.	0.009	101.62	1.039s
U-235	652.34	163.38	150.	2.	0.001	838.59	1.040s
CE-139	662.23	165.85	165.	-18.	-0.010	103.04	1.042s
Cf-251	705.19	176.60	125.	-21.	-0.012	100.44	1.051s
U-235	742.51	185.94	46.	47.	0.026	29.21	0.877
U-235	820.06	205.33	81.	-2.	-0.001	813.63	1.077
TH-229	842.11	210.85	63.	15.	0.008	102.47	1.082s
Cf-251	906.68	227.00	73.	-4.	-0.002	372.82	1.096
TH-227	942.54	235.97	374.	14.	0.008	199.67	1.104s
PB-212	953.18	238.63	46.	188.	0.104	8.95	1.106D
PB-214	966.63	242.00	50.	45.	0.025	27.10	1.109D
Cd-113m	1053.40	263.70	117.	-18.	-0.010	90.37	1.128s
BI-210M	1061.92	265.83	69.	12.	0.007	98.92	1.130s
TL-208	1107.70	277.28	88.	-2.	-0.001	268.68	1.140s
Hg-203	1115.37	279.20	74.	4.	0.002	295.73	1.141s
I-131	1135.76	284.30	44.	3.	0.002	436.74	1.146s
PB-214	1179.41	295.22	27.	61.	0.034	21.31	1.097
TL-210	1182.54	296.00	249.	11.	0.006	198.77	1.156s
PB-212	1198.65	300.03	237.	11.	0.006	196.22	1.159s
PA-231	1198.81	300.07	248.	11.	0.006	197.57	1.159s
PA-233	1199.25	300.18	259.	11.	0.006	201.96	1.159s
PA-231	1209.13	302.65	271.	11.	0.006	205.88	1.162s
BA-133	1209.93	302.85	282.	11.	0.006	210.05	1.162s
BI-210M	1218.11	304.90	294.	0.	0.000	1000.00	1.164s
Ir-192	1232.27	308.44	294.	0.	0.000	1000.00	1.167s
PA-233	1246.56	312.01	294.	0.	0.000	1000.00	1.170s
Ir-192	1264.46	316.49	294.	0.	0.000	1000.00	1.173s
La-140	1313.52	328.76	76.	-9.	-0.005	256.71	1.184s
Cf-249	1332.23	333.44	99.	-3.	-0.002	447.52	1.188s
AC-228	1351.74	338.32	180.	14.	0.008	140.55	1.192
Cs-136	1360.74	340.57	151.	13.	0.007	135.29	1.194
EU-152	1375.60	344.29	164.	13.	0.007	140.44	1.197s
HF-181	1381.77	345.83	167.	12.	0.007	148.95	1.199s
PB-214	1404.84	351.60	24.	119.	0.066	12.44	0.971s
BA-133	1422.43	356.00	209.	-14.	-0.008	149.35	1.207s
I-131	1456.35	364.48	44.	-10.	-0.006	133.67	1.215s
BA-133	1533.76	383.84	150.	-17.	-0.009	107.43	1.231
Cf-249	1550.19	387.95	164.	-17.	-0.009	111.74	1.235s
SN-113	1565.14	391.69	116.	13.	0.007	121.26	1.238s
SB-125	1709.84	427.88	36.	-7.	-0.004	217.55	1.268
AG-108M	1734.08	433.94	24.	2.	0.001	484.77	1.273s
PM-146	1813.83	453.88	20.	9.	0.005	102.84	1.290s
SB-125	1851.76	463.37	77.	-2.	-0.001	746.99	1.298s
Ir-192	1870.53	468.06	60.	11.	0.006	104.31	1.302
BE-7	1908.66	477.60	32.	8.	0.004	108.27	1.310s
HF-181	1926.26	482.00	27.	6.	0.004	120.88	1.313s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	1946.35	487.02	35.	6.	0.004	135.64	1.317s
RU-103	1986.48	497.05	13.	1.	0.001	742.74	1.326s
RH-106	2045.71	511.86	41.	43.	0.024	26.00	2.588s
Kr-85	2054.17	513.98	84.	0.	0.000	1000.00	1.340s
Nd-147	2122.23	531.00	26.	-9.	-0.005	120.36	1.354s
Ba-140	2147.27	537.26	35.	-2.	-0.001	725.26	1.359s
CS-134	2251.16	563.24	40.	-10.	-0.005	161.78	1.380s
CS-134	2275.49	569.32	39.	-11.	-0.006	85.76	1.385s
PA-234	2276.09	569.47	42.	8.	0.005	113.76	1.385s
BI-207	2277.02	569.70	26.	8.	0.005	94.72	1.385s
TL-208	2330.23	583.01	13.	70.	0.039	16.80	0.958s
SB-125	2400.20	600.50	100.	5.	0.003	291.29	1.410s
SB-124	2409.12	602.73	104.	5.	0.003	297.84	1.412s
CS-134	2417.03	604.71	109.	5.	0.003	304.26	1.414s
BI-214	2434.68	609.12	15.	73.	0.040	15.21	1.750s
RU-103	2439.39	610.30	114.	5.	0.003	309.91	1.418s
AG-108M	2455.31	614.28	119.	5.	0.003	315.68	1.421s
PM-144	2470.44	618.06	124.	5.	0.003	321.35	1.424s
RH-106	2485.86	621.92	167.	-3.	-0.001	719.70	1.427s
SB-125	2541.74	635.89	23.	4.	0.002	193.49	1.439s
I-131	2546.08	636.97	29.	-1.	-0.001	956.99	1.440s
AG-110M	2629.23	657.76	19.	3.	0.002	206.82	1.456s
CS-137	2644.82	661.66	31.	10.	0.006	83.83	1.459s
PM-144	2784.35	696.54	24.	7.	0.004	154.79	1.487s
NB-94	2808.70	702.63	14.	5.	0.003	164.92	1.492
SB-124	2889.33	722.79	8.	5.	0.003	86.39	1.507s
AG-108M	2889.93	722.94	13.	5.	0.003	107.83	1.507s
EU-154	2891.62	723.36	19.	5.	0.003	124.24	1.508s
ZR-95	2894.98	724.20	24.	5.	0.003	138.69	1.508s
BI-212	2906.86	727.17	30.	4.	0.002	184.64	1.511s
PM-146	2941.07	735.72	19.	-7.	-0.004	115.43	1.518s
PM-146	2986.83	747.16	10.	3.	0.002	220.77	1.526s
ZR-95	3025.11	756.73	14.	2.	0.001	403.11	1.534s
AG-110M	3053.97	763.94	43.	-6.	-0.003	155.96	1.539s
NB-95	3061.35	765.79	49.	0.	0.000	1000.00	1.541s
PA-234M	3063.85	766.41	54.	-1.	-0.001	722.83	1.541s
EU-152	3113.88	778.92	9.	8.	0.004	92.37	1.551s
BI-212	3139.88	785.42	33.	-14.	-0.008	71.52	1.556s
CS-134	3181.69	795.87	9.	25.	0.014	26.23	1.564
TL-210	3196.61	799.60	34.	0.	0.000	1000.00	1.567s
CS-134	3206.02	801.95	42.	-8.	-0.004	124.60	1.569s
CO-58	3241.32	810.78	30.	0.	0.000	1000.00	1.575s
Cs-136	3272.22	818.50	9.	-1.	-0.001	493.71	1.581s
MN-54	3337.63	834.85	5.	11.	0.006	51.12	1.594s
Co-56	3385.32	846.77	14.	7.	0.004	119.52	1.603s
TL-208	3440.51	860.56	23.	-1.	-0.001	91.89	1.614s
NB-94	3482.65	871.10	19.	1.	0.001	624.50	1.621s
EU-154	3491.19	873.23	7.	6.	0.003	78.53	1.623s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	3520.39	880.53	21.	7.	0.004	105.36	1.628s
PA-234	3531.23	883.24	28.	0.	0.000	1000.00	1.630s
AG-110M	3537.01	884.68	28.	0.	0.000	1000.00	1.632s
Sc-46	3555.40	889.28	39.	-10.	-0.005	95.36	1.635s
Y-88	3590.45	898.04	5.	5.	0.003	104.66	1.642s
AC-228	3642.58	911.07	15.	51.	0.028	21.79	1.651
AG-110M	3748.30	937.49	15.	-3.	-0.002	289.64	1.671s
PA-234	3782.42	946.02	10.	4.	0.002	180.85	1.677s
EU-152	3854.81	964.11	15.	10.	0.006	89.28	1.691s
AC-228	3874.26	968.97	27.	8.	0.005	94.01	1.694
EU-154	3983.73	996.33	0.	25.	0.014	20.00	1.714
PA-234M	4002.41	1001.00	27.	-2.	-0.001	248.45	1.718s
EU-154	4017.53	1004.77	36.	-6.	-0.003	146.94	1.721s
Co-56	4149.84	1037.84	30.	-14.	-0.008	90.07	1.745
Cs-136	4190.78	1048.07	20.	-6.	-0.003	113.04	1.752s
RH-106	4199.94	1050.36	38.	-8.	-0.005	108.78	1.754s
BI-207	4253.17	1063.66	10.	2.	0.001	354.73	1.763s
Ga-68	4308.15	1077.40	10.	0.	0.000	1000.00	1.773s
FE-59	4395.60	1099.25	0.	12.	0.007	28.87	1.789s
EU-152	4446.92	1112.07	52.	-4.	-0.002	257.07	1.798s
ZN-65	4460.81	1115.55	48.	0.	0.000	1000.00	1.800s
BI-214	4479.78	1120.29	25.	6.	0.004	117.39	1.803
Sc-46	4480.84	1120.55	32.	9.	0.005	96.13	1.804
CO-60	4691.70	1173.24	16.	-2.	-0.001	460.07	1.841s
Ta-182	4754.99	1189.05	5.	6.	0.004	90.52	1.852s
Ta-182	4884.51	1221.41	43.	-18.	-0.010	83.82	1.874s
Co-56	4952.04	1238.28	1.	13.	0.007	28.40	1.886s
NA-22	5097.14	1274.53	11.	5.	0.003	96.82	1.910s
EU-154	5097.18	1274.54	16.	0.	0.000	1000.00	1.910s
FE-59	5165.45	1291.60	6.	3.	0.002	177.81	1.922s
TL-210	5251.13	1313.00	0.	0.	0.000	1000.00	1.936s
CO-60	5329.19	1332.50	28.	-15.	-0.008	86.23	1.949s
AG-110M	5536.55	1384.30	17.	-9.	-0.005	112.49	1.984s
EU-152	5631.44	1408.00	0.	7.	0.004	38.30	1.999s
K-40	5841.50	1460.47	7.	133.	0.074	9.15	0.895s
La-140	6385.01	1596.21	12.	-6.	-0.003	199.14	2.119s
SB-124	6764.54	1690.98	0.	8.	0.004	35.36	2.176s
BI-214	7058.94	1764.49	2.	10.	0.005	39.75	2.219s
Co-56	7086.41	1771.35	12.	0.	0.000	1000.00	2.223s
Y-88	7345.60	1836.06	0.	0.	0.000	1000.00	2.261s

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	2.9723E+00					5.31E+01	
			477.60	2.972E+00	?(	1.104E+01	1.08E+02 1.05E+01	G
NA-22	C	4.4280E-01					9.50E+02	
			1274.53	4.428E-01	?(	1.489E+00	9.68E+01 9.99E+01	G
K-40	N	1.1517E+02					4.66E+11	
			1460.83	1.152E+02	(P	1.318E+01	9.15E+00 1.07E+01	G
Sc-46	F	-6.2289E-01					8.38E+01	
			889.28	-6.229E-01	?(	2.016E+00	9.54E+01 1.00E+02	G
			1120.55	6.669E-01	+	2.183E+00	9.61E+01 1.00E+02	G
CR-51	F	-3.4847E-01					2.77E+01	
			320.08	-3.485E-01	%(P	2.407E+01	1.84E+03 9.94E+00	G
MN-54	C	6.7454E-01					3.12E+02	
			834.85	6.745E-01	?(P	7.818E-01	5.11E+01 1.00E+02	G
FE-59	F	1.5731E+00					4.45E+01	
			1099.25	1.573E+00	?(	9.661E-01	2.89E+01 5.65E+01	G
			1291.60	6.154E-01	- P	2.710E+00	1.78E+02 4.32E+01	G
Co-56	C	9.1524E-01					7.73E+01	
			846.77	4.273E-01	?(	1.230E+00	1.20E+02 9.99E+01	G
			1238.28	1.653E+00	&(P	9.050E-01	2.84E+01 6.61E+01	G
			1037.84	-7.028E+00	+	1.417E+01	9.01E+01 1.41E+01	G
			1771.35	0.000E+00	-	1.328E+01	1.00E+03 1.55E+01	A
CO-60	F	-1.3034E+00					1.93E+03	
			1332.50	-1.303E+00	?(	2.365E+00	8.62E+01 1.00E+02	G
			1173.24	-1.558E-01	+	1.663E+00	4.60E+02 9.99E+01	G
NB-94	I	2.7140E-01					7.41E+06	
			702.63	2.714E-01	&(	1.094E+00	1.65E+02 9.79E+01	G
			871.10	6.235E-02	-	1.436E+00	6.24E+02 9.99E+01	G
ZR-95	I	4.0289E-01					6.40E+01	
			756.73	2.062E-01	?(	2.077E+00	4.03E+02 5.45E+01	G
			724.20	6.456E-01	?(	3.134E+00	1.39E+02 4.42E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RU-103	I	4.4997E-02					3.93E+01	
			497.05	4.500E-02	?(	8.780E-01	7.43E+02	9.09E+01 G
			610.30	4.100E+00	?	4.368E+01	3.10E+02	5.75E+00 GA
RH-106	I	-1.2437E+00					3.74E+02	
			621.92	-1.244E+00	?(	3.070E+01	7.20E+02	9.93E+00 G
			1050.36	-3.900E+01	+	1.451E+02	1.09E+02	1.56E+00 G
			511.86	8.995E+00	?	6.809E+00	2.60E+01	2.00E+01 GA
AG-108M	C	2.1961E-01					1.53E+05	
			433.94	8.133E-02	?(	1.039E+00	4.85E+02	9.05E+01 G
			722.94	3.131E-01	?(	1.179E+00	1.08E+02	9.08E+01 G
			614.28	2.643E-01	&(	2.866E+00	3.16E+02	8.98E+01 G
AG-110M	F	9.3725E-02					2.50E+02	
			884.68	0.000E+00	?(	2.372E+00	1.00E+03	7.27E+01 G
			657.76	1.657E-01	&(	1.231E+00	2.07E+02	9.46E+01 G
			937.49	-5.742E-01	+	3.973E+00	2.90E+02	3.44E+01 G
			1384.30	-3.282E+00	+	7.995E+00	1.12E+02	2.43E+01 G
			763.94	-1.565E+00	+	8.457E+00	1.56E+02	2.23E+01 G
SN-113	F	6.8368E-01					1.15E+02	
			391.69	6.837E-01	?(P	2.802E+00	1.21E+02	6.40E+01 G
SB-124	F	8.6715E-01					6.02E+01	
			602.73	2.367E-01	?(	2.427E+00	2.98E+02	9.83E+01 G
			1690.98	1.752E+00	?(	1.614E+00	3.54E+01	4.78E+01 G
			722.79	2.685E+00	?(	7.977E+00	8.64E+01	1.08E+01 G
SB-125	I	2.5607E-01					1.01E+03	
			427.88	-8.852E-01	?(P	3.780E+00	2.18E+02	2.96E+01 G
			600.50	1.297E+00	&(	1.301E+01	2.91E+02	1.79E+01 G
			635.89	1.599E+00	?(	1.100E+01	1.93E+02	1.13E+01 G
			463.37	-6.166E-01	+	1.610E+01	7.47E+02	1.05E+01 G
I-131	I	-2.7498E-01					8.02E+00	
			364.48	-3.923E-01	?(	1.319E+00	1.34E+02	8.17E+01 G
			284.30	1.286E+00	?(	1.441E+01	4.37E+02	6.14E+00 G
			636.97	-8.012E-01	+ P	1.920E+01	9.57E+02	7.17E+00 G
Gd-153	F	-1.2164E+00					2.42E+02	
			97.50	-1.216E+00	(	7.560E+00	1.86E+02	3.00E+01 G
			103.20	-1.671E+00	+	1.003E+01	1.80E+02	2.18E+01 G
Tc-99m	I	-1.2065E-01					2.51E-01	
			140.51	-1.207E-01	?(	2.176E+00	5.36E+02	8.93E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BA-133	F	-1.5157E-01					3.85E+03	
			356.00	-7.054E-01	?(	3.552E+00	1.49E+02	6.20E+01 G
			302.85	1.723E+00	(	1.222E+01	2.10E+02	1.83E+01 G
			383.84	-6.190E+00	&	2.234E+01	1.07E+02	8.94E+00 GA
			80.99	-1.485E+00	+ P	5.538E+00	5.40E+01	3.41E+01 GA
CS-134	I	1.7032E+00					7.54E+02	
			795.87	1.703E+00	?(	1.137E+00	2.62E+01	8.55E+01 G
			604.71	2.391E-01	-	2.503E+00	3.04E+02	9.76E+01 G
			569.32	-3.246E+00	-	9.387E+00	8.58E+01	1.54E+01 G
			801.95	-5.202E+00	-	2.227E+01	1.25E+02	8.69E+00 G
			563.24	-5.239E+00	- P	1.729E+01	1.62E+02	8.35E+00 G
CS-137	I	6.0505E-01					1.10E+04	
			661.66	6.050E-01	?(	1.711E+00	8.38E+01	8.52E+01 G
CE-139	F	-4.1219E-01					1.38E+02	
			165.85	-4.122E-01	&(	1.424E+00	1.03E+02	7.99E+01 G
Ba-140	I	7.3727E-01					1.28E+01	
			537.26	-2.967E-01	?(	5.367E+00	7.25E+02	2.44E+01 G
			162.66	4.792E+00	?(	1.635E+01	1.02E+02	6.22E+00 G
			304.85	3.972E-01	%	5.349E+01	3.95E+03	4.29E+00 G
La-140	I	-2.4690E-01					1.28E+01	
			1596.21	-6.380E-01	?(P	1.976E+00	1.99E+02	9.54E+01 G
			487.02	5.730E-01	?(	2.691E+00	1.36E+02	4.55E+01 G
			328.76	-1.253E+00	+ P	6.287E+00	2.57E+02	2.03E+01 G
			815.77	-7.756E-02	% P	7.230E+00	3.42E+03	2.33E+01 G
CE-141	I	4.9021E-01					3.25E+01	
			145.44	4.902E-01	&(	4.035E+00	2.45E+02	4.82E+01 G
CE-144	I	-3.2178E+00					2.85E+02	
			133.54	-3.218E+00	?(	1.627E+01	1.51E+02	1.11E+01 G
PM-144	C	3.0425E-01					3.63E+02	
			696.54	3.673E-01	?(P	1.365E+00	1.55E+02	9.90E+01 G
			618.06	2.412E-01	?(	2.661E+00	3.21E+02	9.91E+01 G
EU-152	F	1.4692E+00					4.94E+03	
			121.78	-1.086E+00	*(	3.576E+00	9.83E+01	2.86E+01 G
			344.29	1.521E+00	?(	7.214E+00	1.40E+02	2.65E+01 G
			1112.07	-2.215E+00	+	1.989E+01	2.57E+02	1.36E+01 G
			778.92	3.380E+00	?(	7.511E+00	9.24E+01	1.29E+01 G
			964.11	4.682E+00	?(	9.543E+00	8.93E+01	1.46E+01 G
			244.69	-5.572E-01	%	3.045E+01	1.61E+03	7.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1408.00	2.979E+00	? P	3.151E+00	3.83E+01	2.10E+01 GA
EU-154	I	3.1566E+00					3.14E+03	
			123.10	7.132E-01	(	2.289E+00	9.57E+01	4.08E+01 G
			1274.54	0.000E+00	-	5.034E+00	1.00E+03	3.52E+01 G
			723.36	1.408E+00	?(	6.123E+00	1.24E+02	2.02E+01 G
			873.23	2.870E+00	?(	7.648E+00	7.85E+01	1.23E+01 G
			1004.77	-2.301E+00	+	1.174E+01	1.47E+02	1.80E+01 G
			996.33	1.623E+01	?(	4.784E+00	2.00E+01	1.06E+01 G
EU-155	I	7.4694E-01					1.81E+03	
			105.31	1.355E-01	&(P	9.798E+00	2.15E+03	2.12E+01 G
			86.54	1.169E+00	?(	5.231E+00	1.34E+02	3.07E+01 G
HF-181	F	6.7172E-01					4.24E+01	
			482.00	3.203E-01	?(	1.341E+00	1.21E+02	8.05E+01 G
			133.02	-8.229E-01	+	4.142E+00	1.50E+02	4.33E+01 G
			345.83	2.549E+00	(	1.284E+01	1.49E+02	1.51E+01 G
			136.30	-6.152E+00	+	3.165E+01	1.54E+02	5.85E+00 G
Ta-182	F	1.1090E+00					1.14E+02	
			1121.30	1.725E-01	%(	7.554E+00	1.23E+03	3.49E+01 G
			1221.41	-5.483E+00	+	9.856E+00	8.38E+01	2.70E+01 G
			1189.05	3.126E+00	?(	6.539E+00	9.05E+01	1.62E+01 G
Hg-203	F	1.3272E-01					4.66E+01	
			279.20	1.327E-01	&(	1.362E+00	2.96E+02	8.15E+01 G
TL-208	N	3.8115E+00					6.98E+02	
			583.02	3.812E+00	@(P	1.078E+00	1.68E+01	8.45E+01 G
			277.28	-6.835E-01	& P	1.895E+01	2.69E+02	6.31E+00 G
			860.56	-7.223E-01	- P	1.256E+01	9.19E+01	1.24E+01 G
PM-146	C	5.1975E-01					2.02E+03	
			453.88	5.277E-01	?(	1.381E+00	1.03E+02	6.50E+01 G
			747.16	5.045E-01	?(P	2.844E+00	2.21E+02	3.40E+01 G
			735.72	-1.702E+00	+ P	5.621E+00	1.15E+02	2.25E+01 G
Y-88	F	1.7406E-01					1.07E+02	
			1836.06	0.000E+00	?(	8.367E-01	1.00E+03	9.92E+01 G
			898.04	3.583E-01	?(P	9.230E-01	1.05E+02	9.37E+01 G
Cd-113m		-7.2513E+03					5.33E+03	
			263.70	-7.251E+03	?(	2.195E+04	9.04E+01	6.00E-03 K
Cf-251	T	-2.3593E+00					3.28E+05	
			176.60	-2.359E+00	?(	6.063E+00	1.00E+02	1.70E+01 G
			227.00	-1.527E+00	+	1.501E+01	3.73E+02	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	-8.4792E-01					1.28E+05	
			387.95	-8.479E-01	?(	3.184E+00	1.12E+02	6.60E+01 G
			333.44	-6.096E-01	&	9.439E+00	4.48E+02	1.55E+01 G
Sn-126		-2.7458E+00					3.65E+07	
			87.57	7.948E-01	}	4.304E+00	7.96E+01	3.75E+01 GA
			64.28	-2.746E+00	?(	1.825E+01	1.97E+02	9.70E+00 G
			86.94	3.619E+00	?	1.801E+01	1.49E+02	9.04E+00 GA
PB-210	N	3.4268E+01					8.14E+03	
			46.54	3.427E+01	@(P	3.667E+01	4.15E+01	4.25E+00 G
PB-212	N	9.9719E+00					6.98E+02	
			238.63	9.972E+00	(P	1.832E+00	8.95E+00	4.33E+01 G
			300.03	9.390E+00	? P	6.226E+01	1.96E+02	3.28E+00 GA
PB-214	N	9.3995E+00					5.84E+05	
			351.93	9.828E+00	@(P	2.134E+00	1.24E+01	3.76E+01 G
			295.09	8.565E+00	(	3.780E+00	2.13E+01	1.93E+01 G
			242.00	1.393E+01	+	1.121E+01	2.71E+01	7.43E+00 GA
BI-207	C	2.9919E-01					1.18E+04	
			1063.66	1.940E-01	?(	1.692E+00	3.55E+02	7.45E+01 G
			569.70	3.794E-01	?(	1.226E+00	9.47E+01	9.77E+01 G
BI-212	N	3.1233E+00					6.98E+02	
			727.17	3.123E+00	?(P	2.028E+01	1.85E+02	7.55E+00 G
			785.42	-6.529E+01	+ P	1.326E+02	7.15E+01	1.28E+00 GA
U-235	N	6.8552E-01					2.57E+11	
			143.79	6.616E-01	?(P	1.767E+01	7.93E+02	1.10E+01 G
			205.33	-9.168E-01	+ P	1.846E+01	8.14E+02	5.01E+00 G
			163.38	7.372E-01	?(P	2.125E+01	8.39E+02	5.08E+00 G
			185.72	1.671E+00	P	1.239E+00	2.92E+01	5.40E+01 GA
BI-214	N	7.3613E+00					5.84E+05	
			609.31	7.546E+00	(P	2.164E+00	1.52E+01	4.61E+01 G
			1120.29	3.220E+00	- P	1.305E+01	1.17E+02	1.51E+01 G
			1764.49	6.809E+00	?(P	6.953E+00	3.97E+01	1.54E+01 G
BI-210M	T	6.2019E-01					1.10E+09	
			265.83	6.202E-01	&(	2.072E+00	9.89E+01	5.00E+01 G
			304.90	0.000E+00	-	8.204E+00	1.00E+03	2.80E+01 G
AC-228	N	1.1323E+01					2.10E+03	
			911.07	1.132E+01	(	4.609E+00	2.18E+01	2.90E+01 G
			968.97	3.216E+00	-	1.031E+01	9.40E+01	1.75E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			338.32	3.456E+00	-	1.639E+01	1.41E+02	1.20E+01 G
			93.35	-6.592E+00	-	4.165E+01	1.89E+02	5.56E+00 XA
TH-227	N	1.4794E+00					7.95E+03	
			256.24	-4.312E-01	%(P	1.263E+01	1.36E+03	7.00E+00 G
			235.97	2.567E+00	?(	1.724E+01	2.00E+02	1.23E+01 G
			50.14	-6.625E+00	&	2.888E+01	1.30E+02	8.00E+00 G
TH-229	N	4.6776E+00					2.68E+06	
			193.51	7.001E-01	&(P	2.149E+01	1.16E+03	4.40E+00 G
			210.85	1.053E+01	?(P	2.795E+01	1.02E+02	2.99E+00 G
TH-234	N	1.7025E+01					1.63E+12	
			92.59	1.872E+01	(P	1.377E+01	2.77E+01	5.58E+00 G
			63.29	1.454E+01	(P	2.695E+01	5.71E+01	3.81E+00 G
PA-231	N	1.1771E+01					1.20E+07	
			302.65	1.096E+01	&(	7.618E+01	2.06E+02	2.88E+00 G
			300.07	1.272E+01	?(	8.490E+01	1.98E+02	2.46E+00 G
PA-233	C	7.4174E-01					7.82E+08	
			312.01	0.000E+00	?(	6.499E+00	1.00E+03	3.60E+01 G
			300.18	5.049E+00	?(	3.443E+01	2.02E+02	6.20E+00 G
PA-234	N	7.4780E-01					1.63E+12	
			131.29	-1.970E+00	?(	1.013E+01	1.54E+02	1.80E+01 G
			946.02	1.976E+00	&(	8.619E+00	1.81E+02	1.34E+01 G
			569.47	4.705E+00	?(	1.832E+01	1.14E+02	8.20E+00 G
			883.24	0.000E+00	&	1.794E+01	1.00E+03	9.60E+00 G
			880.53	6.976E+00	?	2.536E+01	1.05E+02	6.00E+00 GA
PA-234M	N	-2.0003E+01					1.63E+12	
			1001.00	-2.000E+01	?(P	2.237E+02	2.48E+02	8.37E-01 G
			766.41	-2.755E+01	+ P	7.109E+02	7.23E+02	2.94E-01 G
AM-241	T	-9.4988E-01					1.58E+05	
			59.54	-9.499E-01	(	5.264E+00	1.65E+02	3.59E+01 G
Np-237	F	-3.3342E+00					2.14E+06	
			86.49	-3.334E+00	(P	1.733E+01	6.25E+01	1.31E+01 G
Ir-192	F	3.0941E-01					7.40E+01	
			316.49	0.000E+00	?(	2.719E+00	1.00E+03	8.70E+01 G
			468.06	8.298E-01	?(	2.935E+00	1.04E+02	5.18E+01 G
			308.44	0.000E+00	-	7.302E+00	1.00E+03	3.18E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Cs-136   F   2.1728E-01                                      1.30E+01
                          818.50-7.932E-02 ?(  1.008E+00 4.94E+02 1.00E+02 G
                         1048.07-5.359E-01 +   2.104E+00 1.13E+02 8.00E+01 G
                          340.57 8.497E-01  (  3.884E+00 1.35E+02 4.69E+01 G

Np-239   T   1.1289E+00                                      2.36E+00
                          103.70-1.518E+00 &   8.965E+00 1.77E+02 2.40E+01 X
                          106.13 1.129E+00  (  2.751E+00 7.32E+01 2.27E+01 G
                           99.50-2.430E+00 +   1.484E+01 1.83E+02 1.50E+01 X

Nd-147      -2.9794E+00                                      1.11E+01
                          531.00-2.979E+00 ?(  8.763E+00 1.20E+02 1.30E+01 G
                           91.10 2.097E-01 +   5.781E+00 8.15E+02 2.83E+01 G

TL-210   N   1.7344E-01                                      5.84E+05
                          799.60 0.000E+00 ?(  1.766E+00 1.00E+03 9.90E+01 G
                          296.00 3.907E-01 ?(  2.623E+00 1.99E+02 7.90E+01 G
                         1313.00 0.000E+00 -   2.981E+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:                      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	314.	-20.	-0.011	130.09	-6.625E+00	
AM-241	59.54	342.	-16.	-0.009	164.96	-9.499E-01	
BA-133	80.99	523.	-29.	-0.016	54.01	-1.485E+00	P
Np-237	86.49	805.	-26.	-0.014	62.54	-3.334E+00	P
EU-155	86.54	396.	21.	0.012	133.70	1.169E+00	
Nd-147	91.10	424.	4.	0.002	815.28	2.097E-01	
Gd-153	97.50	853.	-22.	-0.012	186.13	-1.216E+00	
Gd-153	103.20	804.	-22.	-0.012	179.76	-1.671E+00	
EU-152	121.78	165.	-19.	-0.011	98.32	-1.086E+00	
PA-234	131.29	529.	-21.	-0.012	153.77	-1.970E+00	
HF-181	133.02	508.	-21.	-0.012	150.46	-8.229E-01	
CE-144	133.54	513.	-21.	-0.012	151.14	-3.218E+00	
HF-181	136.30	534.	-21.	-0.012	153.83	-6.152E+00	
CO-57	136.47	517.	-21.	-0.012	155.57	-3.279E+00	
Tc-99m	140.51	544.	-6.	-0.003	535.60	-1.207E-01	
Ba-140	162.66	133.	17.	0.009	101.62	4.792E+00	
CE-139	165.85	165.	-18.	-0.010	103.04	-4.122E-01	
Cf-251	176.60	125.	-21.	-0.012	100.44	-2.359E+00	
TH-229	210.85	63.	15.	0.008	102.47	1.053E+01	P
Cf-251	227.00	73.	-4.	-0.002	372.82	-1.527E+00	
TH-227	235.97	374.	14.	0.008	199.67	2.567E+00	
Cd-113m	263.70	117.	-18.	-0.010	90.37	-7.251E+03	
BI-210M	265.83	69.	12.	0.007	98.92	6.202E-01	
Hg-203	279.20	74.	4.	0.002	295.73	1.327E-01	
I-131	284.30	44.	3.	0.002	436.74	1.286E+00	
TL-210	296.00	249.	11.	0.006	198.77	3.907E-01	
PA-231	300.07	248.	11.	0.006	197.57	1.272E+01	
PA-233	300.18	259.	11.	0.006	201.96	5.049E+00	
PA-231	302.65	271.	11.	0.006	205.88	1.096E+01	
BA-133	302.85	282.	11.	0.006	210.05	1.723E+00	
La-140	328.76	76.	-9.	-0.005	256.71	-1.253E+00	P
Cf-249	333.44	99.	-3.	-0.002	447.52	-6.096E-01	
Cs-136	340.57	151.	13.	0.007	135.29	8.497E-01	
EU-152	344.29	164.	13.	0.007	140.44	1.521E+00	
HF-181	345.83	167.	12.	0.007	148.95	2.549E+00	
BA-133	356.00	209.	-14.	-0.008	149.35	-7.054E-01	
I-131	364.48	44.	-10.	-0.006	133.67	-3.923E-01	
BA-133	383.84	150.	-17.	-0.009	107.43	-6.190E+00	
Cf-249	387.95	164.	-17.	-0.009	111.74	-8.479E-01	
SN-113	391.69	116.	13.	0.007	121.26	6.837E-01	P
SB-125	427.88	36.	-7.	-0.004	217.55	-8.852E-01	P
AG-108M	433.94	24.	2.	0.001	484.77	8.133E-02	
PM-146	453.88	20.	9.	0.005	102.84	5.277E-01	
SB-125	463.37	77.	-2.	-0.001	746.99	-6.166E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Ir-192	468.06	60.	11.	0.006	104.31	8.298E-01		
BE-7	477.60	32.	8.	0.004	108.27	2.972E+00		
HF-181	482.00	27.	6.	0.004	120.88	3.203E-01		
La-140	487.02	35.	6.	0.004	135.64	5.730E-01		
RU-103	497.05	13.	1.	0.001	742.74	4.500E-02		
RH-106	511.86	41.	43.	0.024	26.00	8.995E+00		
Nd-147	531.00	26.	-9.	-0.005	120.36	-2.979E+00		
Ba-140	537.26	35.	-2.	-0.001	725.26	-2.967E-01		
PA-234	569.47	42.	8.	0.005	113.76	4.705E+00		
BI-207	569.70	26.	8.	0.005	94.72	3.794E-01		
SB-125	600.50	100.	5.	0.003	291.29	1.297E+00		
SB-124	602.73	104.	5.	0.003	297.84	2.367E-01		
RU-103	610.30	114.	5.	0.003	309.91	4.100E+00		
AG-108M	614.28	119.	5.	0.003	315.68	2.643E-01		
PM-144	618.06	124.	5.	0.003	321.35	2.412E-01		
RH-106	621.92	167.	-3.	-0.001	719.70	-1.244E+00		
SB-125	635.89	23.	4.	0.002	193.49	1.599E+00		
I-131	636.97	29.	-1.	-0.001	956.99	-8.012E-01		P
AG-110M	657.76	19.	3.	0.002	206.82	1.657E-01		
CS-137	661.66	31.	10.	0.006	83.83	6.050E-01		
PM-144	696.54	24.	7.	0.004	154.79	3.673E-01		P
NB-94	702.63	14.	5.	0.003	164.92	2.714E-01		
SB-124	722.79	8.	5.	0.003	86.39	2.685E+00		
AG-108M	722.94	13.	5.	0.003	107.83	3.131E-01		
ZR-95	724.20	24.	5.	0.003	138.69	6.456E-01		
BI-212	727.17	30.	4.	0.002	184.64	3.123E+00		P
PM-146	735.72	19.	-7.	-0.004	115.43	-1.702E+00		P
PM-146	747.16	10.	3.	0.002	220.77	5.045E-01		P
ZR-95	756.73	14.	2.	0.001	403.11	2.062E-01		
AG-110M	763.94	43.	-6.	-0.003	155.96	-1.565E+00		
PA-234M	766.41	54.	-1.	-0.001	722.83	-2.755E+01		P
EU-152	778.92	9.	8.	0.004	92.37	3.380E+00		
BI-212	785.42	33.	-14.	-0.008	71.52	-6.529E+01		P
Cs-136	818.50	9.	-1.	-0.001	493.71	-7.932E-02		
MN-54	834.85	5.	11.	0.006	51.12	6.745E-01		P
Co-56	846.77	14.	7.	0.004	119.52	4.273E-01		
NB-94	871.10	19.	1.	0.001	624.50	6.235E-02		
PA-234	880.53	21.	7.	0.004	105.36	6.976E+00		
Sc-46	889.28	39.	-10.	-0.005	95.36	-6.229E-01		
Y-88	898.04	5.	5.	0.003	104.66	3.583E-01		P
AG-110M	937.49	15.	-3.	-0.002	289.64	-5.742E-01		
PA-234	946.02	10.	4.	0.002	180.85	1.976E+00		
EU-152	964.11	15.	10.	0.006	89.28	4.682E+00		
PA-234M	1001.00	27.	-2.	-0.001	248.45	-2.000E+01		P
Co-56	1037.84	30.	-14.	-0.008	90.07	-7.028E+00		
Cs-136	1048.07	20.	-6.	-0.003	113.04	-5.359E-01		
RH-106	1050.36	38.	-8.	-0.005	108.78	-3.900E+01		
BI-207	1063.66	10.	2.	0.001	354.73	1.940E-01		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-152	1112.07	52.	-4.	-0.002	257.07	-2.215E+00		
Sc-46	1120.55	32.	9.	0.005	96.13	6.669E-01		
CO-60	1173.24	16.	-2.	-0.001	460.07	-1.558E-01		
Co-56	1238.28	1.	13.	0.007	28.40	1.653E+00		P
NA-22	1274.53	11.	5.	0.003	96.82	4.428E-01		
CO-60	1332.50	28.	-15.	-0.008	86.23	-1.303E+00		
AG-110M	1384.30	17.	-9.	-0.005	112.49	-3.282E+00		
EU-152	1408.00	0.	7.	0.004	38.30	2.979E+00		P
La-140	1596.21	12.	-6.	-0.003	199.14	-6.380E-01		P
SB-124	1690.98	0.	8.	0.004	35.36	1.752E+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	2.9723E+00	2.9723E+00	1.083E+02%	1.10E+01
NA-22	#A	4.4280E-01	4.4280E-01	9.682E+01%	1.49E+00
K-40		1.1517E+02	1.1517E+02	9.151E+00%	1.32E+01
Sc-46	#A	-6.2289E-01	-6.2289E-01	9.536E+01%	2.02E+00
CR-51	#A	-3.4846E-01	-3.4847E-01	1.842E+03%	2.41E+01
MN-54	#A	6.7454E-01	6.7454E-01	5.112E+01%	7.82E-01
FE-59	#	1.5731E+00	1.5731E+00	2.887E+01%	9.66E-01
Co-56	#A	9.1523E-01	9.1524E-01	2.840E+01%	1.23E+00
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.26E+00
CO-58	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.68E+00
CO-60	#A	-1.3034E+00	-1.3034E+00	8.623E+01%	2.36E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.18E+00
NB-94	#A	2.7140E-01	2.7140E-01	1.649E+02%	1.09E+00
ZR-95	#A	4.0289E-01	4.0289E-01	1.387E+02%	2.08E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.01E+00
RU-103	#A	4.4997E-02	4.4997E-02	7.427E+02%	8.78E-01
RH-106	#A	-1.2437E+00	-1.2437E+00	7.197E+02%	3.07E+01
AG-108M	#A	2.1961E-01	2.1961E-01	1.078E+02%	1.04E+00
AG-110M	#A	9.3725E-02	9.3725E-02	2.068E+02%	2.37E+00
SN-113	#A	6.8368E-01	6.8368E-01	1.213E+02%	2.80E+00
SB-124	#A	8.6715E-01	8.6715E-01	3.536E+01%	2.43E+00
SB-125	#A	2.5607E-01	2.5607E-01	1.373E+02%	3.78E+00
I-131	#A	-2.7498E-01	-2.7498E-01	1.337E+02%	1.32E+00
Gd-153	#A	-1.2164E+00	-1.2164E+00	1.861E+02%	7.56E+00
Ga-68	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.49E+01
Tc-99m	#A	-1.2059E-01	-1.2065E-01	5.356E+02%	2.18E+00
BA-133	#A	-1.5157E-01	-1.5157E-01	1.289E+02%	3.55E+00
CS-134	#	1.7032E+00	1.7032E+00	2.623E+01%	1.14E+00
CS-137	#A	6.0505E-01	6.0505E-01	8.383E+01%	1.71E+00
CE-139	#A	-4.1219E-01	-4.1219E-01	1.030E+02%	1.42E+00

Ba-140 #A	7.3727E-01	7.3727E-01	1.016E+02%		5.37E+00
La-140 #A	-2.4690E-01	-2.4690E-01	1.205E+02%		1.98E+00
CE-141 A	4.9021E-01	4.9021E-01	2.453E+02%		4.04E+00
CE-144 #A	-3.2178E+00	-3.2178E+00	1.511E+02%		1.63E+01
PM-144 #A	3.0425E-01	3.0425E-01	1.548E+02%		1.36E+00
EU-152 #A	1.4692E+00	1.4692E+00	5.356E+01%		3.58E+00
EU-154 #C	3.1566E+00	3.1566E+00	2.000E+01%		2.29E+00
EU-155 #A	7.4694E-01	7.4694E-01	1.337E+02%		9.80E+00
HF-181 #A	6.7172E-01	6.7172E-01	9.592E+01%		1.34E+00
Ta-182 #A	1.1090E+00	1.1090E+00	9.052E+01%		7.55E+00
Hg-203 #A	1.3272E-01	1.3272E-01	2.957E+02%		1.36E+00
TL-208 #	3.8115E+00	3.8115E+00	1.680E+01%		1.08E+00
PM-146 #A	5.1975E-01	5.1975E-01	1.028E+02%		1.38E+00
Y-88 #A	1.7406E-01	1.7406E-01	1.047E+02%		8.37E-01
Cd-113m#A	-7.2513E+03	-7.2513E+03	9.037E+01%		2.19E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		4.38E+01
Cf-251 #A	-2.3593E+00	-2.3593E+00	1.004E+02%		6.06E+00
Cf-249 #A	-8.4792E-01	-8.4792E-01	1.117E+02%		3.18E+00
Sn-126 #A	-2.7458E+00	-2.7458E+00	1.975E+02%		1.83E+01
PB-210 #A	3.4268E+01	3.4268E+01	4.146E+01%		3.67E+01
PB-212	9.9719E+00	9.9719E+00	8.953E+00%		1.83E+00
PB-214	9.3995E+00	9.3995E+00	1.234E+01%		2.13E+00
BI-207 #A	2.9919E-01	2.9919E-01	9.472E+01%		1.69E+00
BI-212 #A	3.1233E+00	3.1233E+00	1.846E+02%		2.03E+01
U-235 A	6.8552E-01	6.8552E-01	5.772E+02%		1.77E+01
BI-214	7.3613E+00	7.3613E+00	1.521E+01%		2.16E+00
BI-210M#A	6.2019E-01	6.2019E-01	9.892E+01%		2.07E+00
AC-228	1.1323E+01	1.1323E+01	2.179E+01%		4.61E+00
TH-227 #A	1.4794E+00	1.4794E+00	1.997E+02%		1.26E+01
TH-229 #A	4.6776E+00	4.6776E+00	1.025E+02%		2.15E+01
TH-234	1.7025E+01	1.7025E+01	2.766E+01%		1.38E+01
PA-231 #A	1.1771E+01	1.1771E+01	1.427E+02%		7.62E+01
PA-233 #A	7.4174E-01	7.4174E-01	2.020E+02%		6.50E+00
PA-234 #A	7.4780E-01	7.4780E-01	8.775E+01%		1.01E+01
PA-234M#A	-2.0003E+01	-2.0003E+01	2.485E+02%		2.24E+02
AM-241 #A	-9.4988E-01	-9.4988E-01	1.650E+02%		5.26E+00
Np-237 #A	-3.3342E+00	-3.3342E+00	6.254E+01%		1.73E+01
Ir-192 #A	3.0941E-01	3.0941E-01	1.043E+02%		2.72E+00
Cs-136 #A	2.1728E-01	2.1728E-01	1.353E+02%		1.01E+00
Np-239 A	1.1288E+00	1.1289E+00	7.322E+01%		2.75E+00
Nd-147 #A	-2.9793E+00	-2.9794E+00	1.204E+02%		8.76E+00
TL-210 #A	1.7344E-01	1.7344E-01	1.988E+02%		1.77E+00
Kr-85 #A	0.0000E+00	0.0000E+00	1.000E+03%		4.43E+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 (   37.7 to  1999.4 keV)     2.083E+02  Bq/Sample
Total Decayed Activity (   37.7 to  1999.4 keV) 2.0833151E+02  Bq/Sample
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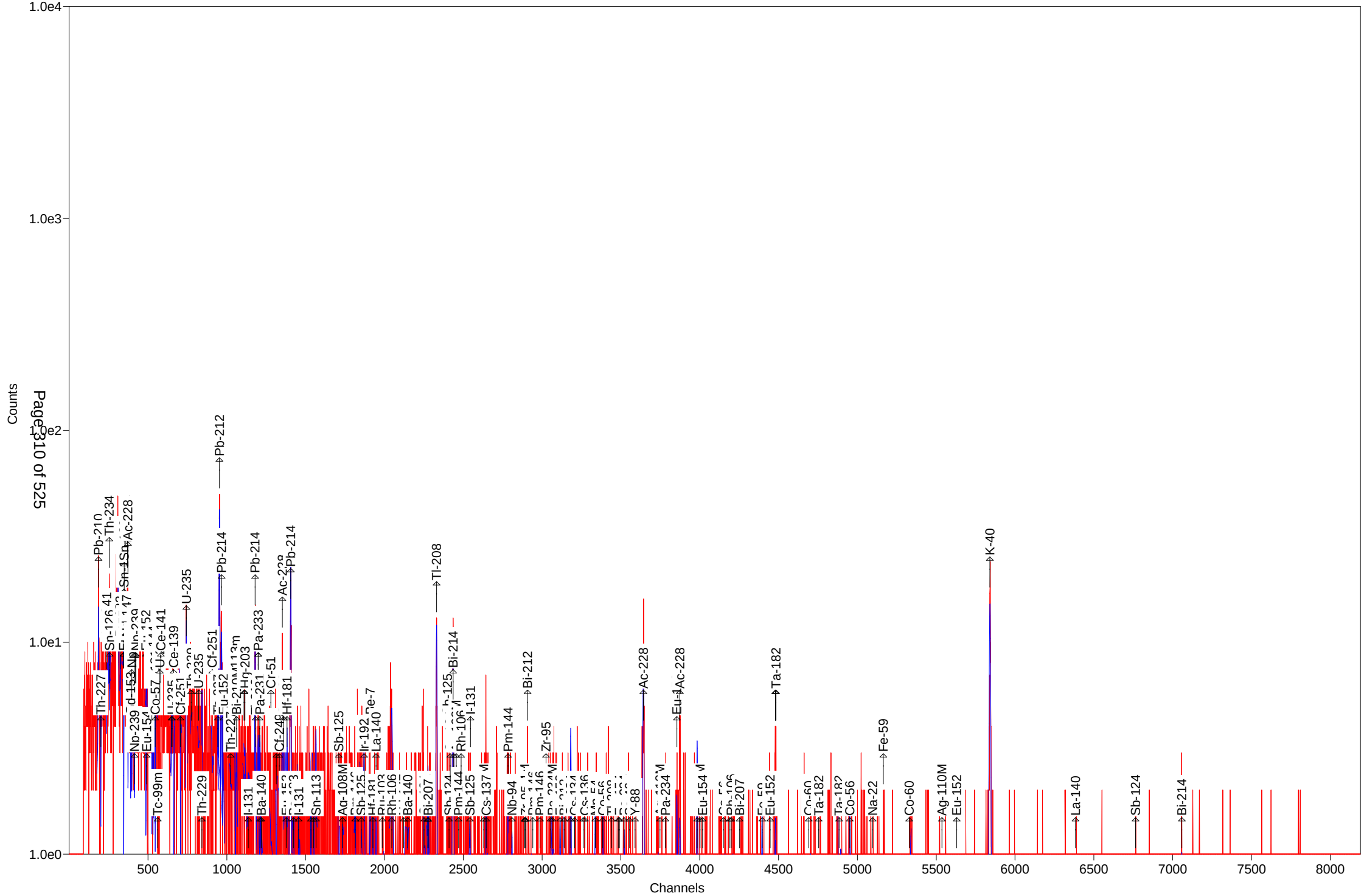
404682_Gamma_490-164387-B-4-A. 19_Gamma_20182702.spc.



Test America St. Louis Spectrum ID: 2_Gamma_20180268

Sample Description: 404682_Gamma_490-164387-B-5-A
Detector: Detector # 2
Batch ID: 404682
Work Order Number: Gamma
Lot Number: 490-164387-B-5-A

Decay to Time: 12/29/2018 12:50 Live Time: 1800 sec
Acquisition Time: 12/29/2018 12:50:52 Real Time: 1804 sec
Analysis Time: 12/29/2018 13:21 Dead Time: 0.22 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 2_Soil_TunaCan.Clb
Efficiency Cal Desc: 2_Soil_TunaCan_101407
Efficiency Cal Date: 4/20/2018 13:56
Energy Cal Date: 4/20/2018 13:54
Library: Client_Long_Rev15.lib
Bkgd Correction File: 2_2018-12-22_1400.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	2.135E+00	159.9	3.414E+00	3.415E+00	1.184E+01
NA-22	-7.918E-01	77.8	6.158E-01	6.171E-01	2.072E+00
K-40	8.890E+01	10.6	9.385E+00	1.040E+01	9.718E+00
Sc-46	-4.790E-01	81.7	3.913E-01	3.921E-01	1.987E+00
CR-51	5.340E-01	559.7	2.989E+00	2.989E+00	1.047E+01
MN-54	3.051E-01	153.8	4.694E-01	4.696E-01	1.191E+00
FE-59	4.724E-01	108.0	5.103E-01	5.108E-01	2.350E+00
Co-56	7.178E-01	29.7	2.130E-01	2.161E-01	1.233E+00
CO-57	-2.226E-01	133.4	2.970E-01	2.972E-01	1.001E+00
CO-58	4.169E-01	97.0	4.041E-01	4.047E-01	1.388E+00
CO-60	-7.322E-01	112.2	8.212E-01	8.220E-01	1.900E+00
ZN-65	-1.196E+00	128.7	1.539E+00	1.540E+00	5.289E+00
NB-94	1.075E-01	374.7	4.030E-01	4.030E-01	1.049E+00
ZR-95	1.286E-01	147.2	1.893E-01	1.894E-01	2.028E+00
NB-95	5.017E-01	94.2	4.723E-01	4.730E-01	1.607E+00
RU-103	-2.367E-01	164.0	3.882E-01	3.884E-01	1.179E+00
RH-106	1.050E+00	333.6	3.503E+00	3.503E+00	1.258E+01
AG-108M	-1.120E-02	98.0	1.097E-02	1.099E-02	1.220E+00
AG-110M	4.501E-01	133.1	5.992E-01	5.996E-01	2.101E+00
SN-113	-3.059E-01	196.6	6.015E-01	6.017E-01	2.855E+00
SB-124	-2.199E-01	67.5	1.484E-01	1.488E-01	3.031E+00
SB-125	-1.189E-01	67.9	8.072E-02	8.095E-02	3.707E+00
I-131	-1.556E-01	89.5	1.393E-01	1.396E-01	1.159E+00
Gd-153	3.658E-01	137.1	5.017E-01	5.022E-01	3.911E+00
Ga-68	3.593E+00	354.4	1.273E+01	1.274E+01	3.443E+01
Tc-99m	7.959E-03	3875.6	3.084E-01	3.084E-01	1.059E+00
BA-133	2.454E-01	317.5	7.789E-01	7.790E-01	2.667E+00
CS-134	8.557E-01	35.7	3.052E-01	3.083E-01	1.824E+00
CS-137	4.630E-01	105.1	4.868E-01	4.874E-01	1.668E+00
CE-139	-1.331E-01	244.7	3.257E-01	3.258E-01	1.112E+00
Ba-140	1.628E+00	77.4	1.260E+00	1.263E+00	3.246E+00
La-140	1.418E-01	262.7	3.726E-01	3.726E-01	1.553E+00
CE-141	-2.564E-01	191.4	4.909E-01	4.911E-01	1.344E+00

CE-144	-1.401E+00	196.2	2.749E+00	2.750E+00	9.285E+00
PM-144	3.409E-01	82.3	2.807E-01	2.813E-01	1.288E+00
EU-152	1.035E+00	100.8	1.044E+00	1.045E+00	2.852E+00
EU-154	3.618E-01	108.7	3.933E-01	3.938E-01	2.130E+00
EU-155	-5.974E-03	17529.0	1.047E+00	1.047E+00	4.883E+00
HF-181	8.894E-02	69.7	6.203E-02	6.219E-02	1.923E+00
Ta-182	1.733E+00	93.5	1.621E+00	1.623E+00	6.990E+00
Hg-203	-3.578E-01	118.3	4.232E-01	4.236E-01	1.431E+00
TL-208	4.691E+00	12.0	5.624E-01	6.109E-01	7.181E-01
PM-146	3.259E-01	165.0	5.376E-01	5.379E-01	1.404E+00
Y-88	-1.129E+00	112.5	1.270E+00	1.272E+00	2.751E+00
Cd-113m	2.883E+03	122.5	3.531E+03	3.535E+03	1.212E+04
Cd-109	-7.778E+00	146.6	1.140E+01	1.141E+01	3.814E+01
Cf-251	4.288E-01	329.8	1.414E+00	1.414E+00	3.916E+00
Cf-249	-6.496E-01	122.5	7.959E-01	7.966E-01	2.686E+00
Sn-126	-3.042E+00	131.2	3.991E+00	3.994E+00	1.340E+01
PB-210	2.151E+01	48.1	1.033E+01	1.042E+01	2.960E+01
PB-212	1.271E+01	6.9	8.803E-01	1.102E+00	1.566E+00
PB-214	7.149E+00	13.2	9.435E-01	1.011E+00	1.686E+00
BI-207	5.343E-01	97.6	5.215E-01	5.222E-01	1.310E+00
BI-212	3.390E+00	159.8	5.419E+00	5.422E+00	1.905E+01
U-235	1.126E+00	136.2	1.533E+00	1.534E+00	6.520E+00
BI-214	7.343E+00	13.9	1.022E+00	1.088E+00	1.704E+00
BI-210M	-5.926E-01	99.9	5.918E-01	5.926E-01	1.995E+00
AC-228	1.377E+01	10.2	1.399E+00	1.563E+00	1.670E+00
TH-227	-5.032E+00	105.6	5.316E+00	5.322E+00	1.370E+01
TH-229	-6.315E-01	875.2	5.527E+00	5.527E+00	1.544E+01
TH-234	1.070E+01	38.8	4.153E+00	4.195E+00	1.339E+01
PA-231	-1.377E+01	165.1	2.273E+01	2.274E+01	7.635E+01
PA-233	0.000E+00	1.#INF	2.975E-01	2.975E-01	5.461E+00
PA-234	1.694E-01	89.4	1.514E-01	1.517E-01	6.009E+00
PA-234M	-5.250E+00	1311.7	6.887E+01	6.887E+01	2.530E+02
AM-241	2.136E-01	521.4	1.114E+00	1.114E+00	3.043E+00
Np-237	-2.401E+00	150.0	3.602E+00	3.605E+00	1.204E+01
Ir-192	4.281E-01	75.4	3.228E-01	3.238E-01	9.348E-01
Cs-136	-4.199E-01	123.7	5.195E-01	5.201E-01	1.793E+00
Np-239	8.655E-01	149.2	1.292E+00	1.293E+00	4.348E+00
Nd-147	-1.584E+00	226.0	3.580E+00	3.581E+00	9.211E+00
TL-210	-6.433E-10	66605267824.7	4.285E-01	4.285E-01	1.573E+00
Kr-85	0.000E+00	1.#INF	4.364E+01	4.364E+01	4.319E+02
Total	3.075E+03				

Analyst: Joey Sausto

Sample description
404682_Gamma_490-164387-B-5-A

Spectrum Filename: C:\User\SPC\Det2\2_Gamma_20180268.An1

Acquisition information

Start time:	12/29/2018 12:50:52 PM
Live time:	1800
Real time:	1804
Dead time:	0.22 %
Detector ID:	2

Detector system
Ge 2 SN/164

Calibration

Filename:	2_Soil_TunaCan.Clb

2_Soil_TunaCan_101407

Energy Calibration

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

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.60keV)
Stop channel:	8000 (2000.01keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	12/29/2018 12:50:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	2_2018-12-22_1400.PBC 12/22/2018 2:00:23 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0864

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.58	30.	48.06	1.17	1.829E-02	46.54	4.250	PBC<MDA	PB210
50.14	14.	142.68	0.84	2.273E-02	50.14	8.000	PBC<MDA	TH227
59.54	4.	521.42	0.84	3.048E-02	59.54	35.900	PBC<MDA	AM241
63.44	54.	37.44	0.92	3.270E-02	63.29	3.810	2.410E+01	TH234
75.00	94.	19.52	0.86	3.750E-02				
77.18	193.	10.02	0.86	3.819E-02				
87.46	23.	135.07	0.87	4.066E-02	87.57	37.500	PBC<MDA	Sn126
92.68	25.	66.53	0.87	4.144E-02	92.59	5.584	PBC<MDA	TH234
93.44	9.	238.70	0.87	4.154E-02	93.35	5.561	PBC<MDA	AC228
99.50	16.	134.18	0.88	4.213E-02	99.50	15.000	PBC<MDA	Np239
103.20	16.	137.13	0.88	4.233E-02	103.20	21.800	PBC<MDA	Gd153
103.70	5.	448.18	0.88	4.235E-02	103.70	24.000	PBC<MDA	Np239
106.13	15.	149.22	0.88	4.242E-02	106.13	22.700	PBC<MDA	Np239
136.30	18.	130.85	0.91	4.076E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.276E+00	CO57
162.66	14.	115.35	0.93	3.746E-02	162.66	6.220	PBC<MDA	Ba140
176.60	5.	329.81	0.94	3.557E-02	176.60	17.000	PBC<MDA	Cf251
185.72	43.	41.14	0.95	3.435E-02	185.72	54.000	PBC<MDA	U235
205.33	11.	136.20	0.96	3.183E-02	205.33	5.010	PBC<MDA	U235
235.97	13.	232.51	0.99	2.836E-02	235.97	12.300	PBC<MDA	TH227
238.57	282.	7.86	0.97	2.809E-02	238.63	43.300	1.287E+01	PB212
241.96	13.	225.82	0.99	2.774E-02	242.00	7.430	PBC<MDA	PB214
244.69	12.	245.36	0.99	2.747E-02	244.69	7.580	PBC<MDA	EU152
263.70	8.	122.47	1.01	2.570E-02	263.70	0.006	PBC<MDA	Cd113m
277.41	41.	27.08	0.36	2.455E-02	277.28	6.310	1.456E+01	TL208
295.50	61.	23.85	1.04	2.318E-02	295.09	19.300	7.606E+00	PB214
					296.00	79.000	PBC<MDA	TL210

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
300.17	22.	47.78	2.86	2.283E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	2.174E+01	PA231
					300.18	6.200	PBC<MDA	PA233
316.49	9.	104.25	1.05	2.172E-02	316.49	87.040	PBC<MDA	Ir192
320.08	2.	559.74	1.05	2.149E-02	320.08	9.940	PBC<MDA	CR51
328.76	2.	660.08	1.06	2.096E-02	328.76	20.300	PBC<MDA	La140
338.37	51.	22.33	1.26	2.041E-02	338.32	12.010	1.158E+01	AC228
345.83	11.	130.00	1.07	2.000E-02	345.83	15.070	PBC<MDA	HF181
352.00	92.	13.20	1.44	1.967E-02	351.93	37.600	6.914E+00	PB214
356.00	5.	317.46	1.08	1.946E-02	356.00	62.050	PBC<MDA	BA133
453.88	6.	164.99	1.16	1.554E-02	453.88	65.000	PBC<MDA	PM146
463.37	10.	93.67	1.16	1.525E-02	463.37	10.470	PBC<MDA	SB125
468.06	10.	108.97	1.17	1.511E-02	468.06	51.750	PBC<MDA	Ir192
477.60	6.	159.86	1.17	1.484E-02	477.60	10.520	PBC<MDA	BE7
487.02	3.	262.66	1.18	1.458E-02	487.02	45.500	PBC<MDA	La140
511.86	75.	13.48	2.45	1.394E-02	511.86	20.000	1.488E+01	RH106
537.26	7.	103.28	1.22	1.335E-02	537.26	24.390	PBC<MDA	Ba140
563.24	16.	35.67	1.24	1.280E-02	563.24	8.350	8.404E+00	CS134
583.16	89.	11.99	1.33	1.241E-02	583.02	84.500	4.691E+00	TL208
609.34	73.	13.92	0.62	1.194E-02	609.31	46.090	7.343E+00	BI214
					610.30	5.750	5.894E+01	RU103
618.06	6.	94.69	1.28	1.180E-02	618.06	99.100	PBC<MDA	PM144
621.92	2.	333.64	1.28	1.173E-02	621.92	9.930	PBC<MDA	RH106
635.89	3.	241.09	1.29	1.151E-02	635.89	11.310	PBC<MDA	SB125
636.97	4.	145.85	1.29	1.149E-02	636.97	7.170	PBC<MDA	I131
661.66	8.	105.15	1.31	1.112E-02	661.66	85.210	PBC<MDA	CS137
696.54	7.	134.72	1.34	1.063E-02	696.54	99.000	PBC<MDA	PM144
702.63	2.	374.72	1.34	1.055E-02	702.63	97.900	PBC<MDA	NB94
722.79	5.	92.57	1.35	1.030E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.855E-01	AG108M
					723.36	20.220	1.283E+00	EU154
722.94	5.	114.96	1.35	1.030E-02	722.79	10.810	2.350E+00	SB124
					722.94	90.840	2.797E-01	AG108M
					723.36	20.220	1.257E+00	EU154
723.36	5.	132.11	1.36	1.029E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.798E-01	AG108M
					723.36	20.220	1.258E+00	EU154
724.20	5.	147.24	1.36	1.028E-02	724.20	44.150	PBC<MDA	ZR95
727.17	5.	159.83	1.36	1.025E-02	727.17	7.550	PBC<MDA	BI212
735.72	1.	742.44	1.36	1.014E-02	735.72	22.500	PBC<MDA	PM146
765.79	9.	94.15	1.39	9.803E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	1.	964.31	1.39	9.661E-03	778.92	12.940	PBC<MDA	EU152
801.95	3.	188.41	1.41	9.424E-03	801.95	8.690	PBC<MDA	CS134
810.78	7.	96.95	1.42	9.337E-03	810.78	99.460	PBC<MDA	CO58
834.85	5.	153.84	1.43	9.107E-03	834.85	99.980	PBC<MDA	MN54
860.90	28.	18.90	1.25	8.874E-03	860.56	12.420	1.411E+01	TL208
880.53	4.	118.35	1.47	8.703E-03	880.53	6.000	PBC<MDA	PA234

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
883.24	5.	127.15	1.47	8.680E-03	883.24	9.600	PBC<MDA	PA234
884.68	5.	133.11	1.47	8.668E-03	884.68	72.680	PBC<MDA	AG110M
911.10	61.	12.94	1.67	8.453E-03	911.07	29.000	1.389E+01	AC228
964.11	7.	142.76	1.52	8.055E-03	964.11	14.605	PBC<MDA	EU152
969.08	38.	16.22	0.81	8.020E-03	968.97	17.460	1.508E+01	AC228
1004.77	3.	250.62	1.55	7.775E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	5.	98.23	1.57	7.562E-03	1037.84	14.130	PBC<MDA	Co56
1063.66	5.	97.61	1.59	7.403E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	1.	354.44	1.60	7.322E-03	1077.40	3.300	PBC<MDA	Ga68
1120.55	4.	274.43	1.63	7.077E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	2.905E-01	Sc46
					1121.30	34.900	8.327E-01	Ta182
1120.84	11.	106.79	1.63	7.078E-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.	93.50	1.63	7.073E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	7.686E-01	Sc46
					1121.30	34.900	2.203E+00	Ta182
1173.24	7.	37.80	1.66	6.799E-03	1173.24	99.900	PBC<MDA	CO60
1189.05	4.	180.85	1.67	6.719E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	3.	238.82	1.69	6.562E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	12.	29.68	1.70	6.483E-03	1238.28	66.070	1.531E+00	Co56
1291.60	5.	108.01	1.73	6.244E-03	1291.60	43.200	PBC<MDA	FE59
1313.00	7.	37.80	1.75	6.152E-03	1313.00	21.000	PBC<MDA	TL210
1408.00	8.	35.36	1.80	5.773E-03	1408.00	21.005	3.665E+00	EU152
1461.06	95.	10.56	1.83	5.580E-03	1460.83	10.670	8.890E+01	K40
1764.72	6.	43.83	2.00	4.648E-03	1764.49	15.400	PBC<MDA	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.55	75.00	121.	94.	2.508E+03	19.52	0.856	-	D
308.27	77.18	90.	193.	5.052E+03	10.02	0.858	-	D

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

This section based on library: Client_Long_Rev15.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.89	46.58	69.	30.	0.017	48.06	1.168s
TH-227	200.14	50.14	182.	14.	0.008	142.68	0.835s
AM-241	237.72	59.54	151.	4.	0.002	521.42	0.843
TH-234	252.72	63.29	101.	39.	0.022	39.93	0.846D
Sn-126	256.69	64.28	258.	-18.	-0.010	131.17	0.847
BA-133	323.52	80.99	200.	-23.	-0.013	110.52	0.861s
Np-237	345.52	86.49	579.	-23.	-0.013	149.99	0.866s
EU-155	345.73	86.54	556.	-23.	-0.013	147.05	0.866s
Sn-126	347.32	86.94	533.	-23.	-0.013	144.02	0.866
Sn-126	349.84	87.57	468.	23.	0.013	135.07	0.866s
Cd-109	351.72	88.04	492.	-22.	-0.012	146.62	0.867s
TH-234	369.92	92.59	130.	25.	0.014	66.53	0.871D
AC-228	372.96	93.35	209.	9.	0.005	238.70	0.871
Np-239	397.56	99.50	234.	16.	0.009	134.18	0.876s
Gd-153	412.36	103.20	246.	16.	0.009	137.13	0.879s
Np-239	414.35	103.70	263.	5.	0.003	448.18	0.879
Np-239	424.07	106.13	243.	15.	0.008	149.22	0.882
EU-152	486.67	121.78	160.	-18.	-0.010	104.46	0.894
CO-57	487.79	122.06	178.	-14.	-0.008	133.40	0.895
EU-154	491.95	123.10	182.	-12.	-0.007	161.59	0.895s
PA-234	524.72	131.29	278.	-19.	-0.011	125.59	0.902s
HF-181	531.64	133.02	297.	-19.	-0.011	129.50	0.904s
CE-144	533.70	133.54	248.	-11.	-0.006	196.16	0.904s
HF-181	544.74	136.30	263.	18.	0.010	130.85	0.906s
CE-141	581.30	145.44	88.	-9.	-0.005	191.42	0.914
Ba-140	650.17	162.66	118.	14.	0.008	115.35	0.928s
U-235	653.05	163.38	170.	-19.	-0.011	83.48	0.928s
CE-139	662.94	165.85	147.	-7.	-0.004	244.67	0.930s
Cf-251	705.93	176.60	73.	5.	0.003	329.81	0.939s
U-235	742.41	185.72	87.	43.	0.024	41.14	0.946s
TH-229	773.56	193.51	67.	-2.	-0.001	875.22	0.953
U-235	820.85	205.33	67.	11.	0.006	136.20	0.962s
TH-229	842.92	210.85	124.	-18.	-0.010	83.10	0.967s
Cf-251	907.51	227.00	73.	-3.	-0.002	483.74	0.980s
TH-227	943.39	235.97	470.	13.	0.007	232.51	0.987s
PB-212	954.04	238.63	46.	278.	0.154	6.93	0.989D
PB-214	967.50	242.00	448.	13.	0.007	225.82	0.991s
EU-152	978.28	244.69	425.	12.	0.007	245.36	0.994s
TH-227	1024.46	256.24	84.	-17.	-0.009	105.64	1.003s
Cd-113m	1054.30	263.70	44.	8.	0.004	122.47	1.009s
BI-210M	1062.83	265.83	86.	-14.	-0.008	99.86	1.011s
TL-208	1109.15	277.41	19.	41.	0.023	27.08	0.357s
Hg-203	1116.30	279.20	108.	-13.	-0.007	118.28	1.021s
I-131	1136.69	284.30	52.	-13.	-0.007	87.80	1.025s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	1181.48	295.50	38.	61.	0.034	23.85	1.043s
TL-210	1183.49	296.00	396.	-16.	-0.009	176.83	1.034s
PB-212	1200.17	300.17	24.	22.	0.012	47.78	2.865s
PA-231	1199.77	300.07	380.	-16.	-0.009	172.72	1.038s
PA-233	1200.21	300.18	364.	-16.	-0.009	169.10	1.038s
PA-231	1210.09	302.65	348.	-16.	-0.009	165.08	1.040s
BA-133	1210.90	302.85	274.	-15.	-0.008	159.15	1.040s
Ba-140	1218.89	304.85	259.	-15.	-0.008	154.65	1.041s
Ir-192	1233.25	308.44	260.	0.	0.000	1000.00	1.044s
PA-233	1247.54	312.01	260.	0.	0.000	1000.00	1.047s
Ir-192	1265.45	316.49	39.	9.	0.005	104.25	1.050
CR-51	1279.82	320.08	65.	2.	0.001	559.74	1.053s
La-140	1314.53	328.76	41.	2.	0.001	660.08	1.060s
Cf-249	1333.24	333.44	59.	-14.	-0.008	108.28	1.064s
AC-228	1352.96	338.37	24.	51.	0.028	22.33	1.259s
Cs-136	1361.76	340.57	180.	-14.	-0.008	139.02	1.069s
EU-152	1376.62	344.29	147.	-14.	-0.008	125.99	1.072s
HF-181	1382.80	345.83	100.	11.	0.006	130.00	1.073
PB-214	1407.49	352.00	18.	92.	0.051	13.20	1.439s
BA-133	1423.48	356.00	141.	5.	0.003	317.46	1.081s
I-131	1457.41	364.48	41.	-12.	-0.007	103.92	1.088s
BA-133	1534.84	383.84	124.	-14.	-0.008	86.23	1.103
Cf-249	1551.27	387.95	137.	-14.	-0.008	122.52	1.106s
SN-113	1566.23	391.69	144.	-6.	-0.003	196.62	1.109s
SB-125	1710.97	427.88	41.	-13.	-0.007	98.33	1.137
AG-108M	1735.21	433.94	40.	-8.	-0.004	158.77	1.141s
PM-146	1814.98	453.88	24.	6.	0.003	164.99	1.157s
SB-125	1852.93	463.37	42.	10.	0.006	93.67	1.164s
Ir-192	1871.70	468.06	54.	10.	0.006	108.97	1.167s
BE-7	1909.84	477.60	43.	6.	0.003	159.86	1.175
HF-181	1927.44	482.00	68.	-12.	-0.007	98.79	1.178s
La-140	1947.54	487.02	21.	3.	0.002	262.66	1.182s
RU-103	1987.67	497.05	29.	-6.	-0.003	164.03	1.189s
RH-106	2046.91	511.86	13.	75.	0.041	13.48	2.450s
Kr-85	2055.37	513.98	88.	0.	0.000	1000.00	1.202
Nd-147	2123.45	531.00	32.	-5.	-0.003	225.98	1.215s
Ba-140	2148.49	537.26	12.	7.	0.004	103.28	1.219s
CS-134	2252.39	563.24	5.	16.	0.009	35.67	1.239s
CS-134	2276.73	569.32	28.	-5.	-0.003	156.21	1.243s
PA-234	2277.33	569.47	33.	0.	0.000	1000.00	1.243s
TL-208	2332.09	583.16	5.	89.	0.049	11.99	1.325s
SB-125	2401.44	600.50	187.	-11.	-0.006	182.08	1.266s
SB-124	2410.37	602.73	177.	-11.	-0.006	98.21	1.268s
CS-134	2418.28	604.71	166.	-11.	-0.006	171.17	1.269s
BI-214	2436.80	609.34	9.	73.	0.040	13.92	0.615s
RU-103	2440.64	610.30	155.	-2.	-0.001	907.98	1.274s
PM-144	2471.69	618.06	14.	6.	0.003	94.69	1.279
RH-106	2487.11	621.92	26.	2.	0.001	333.64	1.282s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	2543.00	635.89	19.	3.	0.001	241.09	1.292s
I-131	2547.34	636.97	17.	4.	0.002	145.85	1.293s
AG-110M	2630.49	657.76	28.	-10.	-0.005	84.54	1.308s
CS-137	2646.08	661.66	30.	8.	0.004	105.15	1.311s
PM-144	2785.61	696.54	22.	7.	0.004	134.72	1.336s
NB-94	2809.96	702.63	13.	2.	0.001	374.72	1.340s
SB-124	2890.59	722.79	8.	5.	0.003	92.57	1.355s
AG-108M	2891.19	722.94	12.	5.	0.003	114.96	1.355s
EU-154	2892.88	723.36	17.	5.	0.003	132.11	1.355s
ZR-95	2896.24	724.20	22.	5.	0.003	147.24	1.356s
BI-212	2908.12	727.17	26.	5.	0.003	159.83	1.358s
PM-146	2942.32	735.72	22.	1.	0.001	742.44	1.364s
PM-146	2988.08	747.16	22.	-8.	-0.005	117.48	1.372s
ZR-95	3026.36	756.73	13.	-2.	-0.001	424.74	1.379s
AG-110M	3055.21	763.94	22.	-8.	-0.004	96.61	1.384s
NB-95	3062.60	765.79	30.	9.	0.005	94.15	1.385s
EU-152	3115.12	778.92	13.	1.	0.000	964.31	1.395s
CS-134	3207.25	801.95	9.	3.	0.002	188.41	1.411s
CO-58	3242.54	810.77	19.	7.	0.004	96.95	1.417s
La-140	3262.52	815.77	24.	-1.	-0.001	722.70	1.421s
Cs-136	3273.44	818.50	34.	-7.	-0.004	123.72	1.422s
MN-54	3338.84	834.85	13.	5.	0.003	153.84	1.434s
Co-56	3386.53	846.77	14.	-2.	-0.001	448.04	1.442s
TL-208	3443.04	860.90	0.	28.	0.016	18.90	1.250
NB-94	3483.84	871.10	30.	-9.	-0.005	92.30	1.459s
EU-154	3492.37	873.23	43.	-4.	-0.002	237.17	1.460s
PA-234	3521.57	880.53	11.	4.	0.002	118.35	1.465s
PA-234	3532.41	883.24	16.	5.	0.003	127.15	1.467s
AG-110M	3538.19	884.68	21.	5.	0.003	133.11	1.468s
Sc-46	3556.57	889.28	37.	-7.	-0.004	81.70	1.471s
Y-88	3591.61	898.04	14.	-1.	-0.001	800.00	1.477s
AC-228	3643.85	911.10	1.	61.	0.034	12.94	1.667
AG-110M	3749.43	937.49	14.	-4.	-0.002	204.63	1.504s
PA-234	3783.54	946.02	19.	-10.	-0.006	78.36	1.510s
EU-152	3855.90	964.11	53.	7.	0.004	142.76	1.522s
AC-228	3875.79	969.08	0.	38.	0.021	16.22	0.812s
EU-154	3984.78	996.33	30.	-2.	-0.001	318.75	1.544s
EU-154	4018.57	1004.77	9.	3.	0.001	250.62	1.549s
Co-56	4150.84	1037.84	5.	5.	0.003	98.23	1.571
Cs-136	4191.76	1048.07	19.	-9.	-0.005	78.26	1.578s
RH-106	4200.92	1050.36	33.	-3.	-0.002	278.22	1.579s
BI-207	4254.12	1063.66	5.	5.	0.003	97.61	1.588s
Ga-68	4309.08	1077.40	5.	1.	0.001	354.44	1.597s
EU-152	4447.79	1112.07	58.	-11.	-0.006	99.90	1.620s
ZN-65	4461.68	1115.55	46.	-8.	-0.004	128.74	1.622s
BI-214	4480.64	1120.29	61.	11.	0.006	106.79	1.625s
Sc-46	4481.70	1120.55	50.	4.	0.002	274.43	1.625s
Ta-182	4484.70	1121.30	37.	10.	0.005	93.50	1.626s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	4692.46	1173.24	0.	7.	0.004	37.80	1.659s
Ta-182	4755.72	1189.05	10.	4.	0.002	180.85	1.669s
Ta-182	4885.17	1221.41	10.	3.	0.002	238.82	1.689s
Co-56	4952.65	1238.28	0.	12.	0.007	29.68	1.700s
NA-22	5097.66	1274.53	20.	-9.	-0.005	77.78	1.723s
EU-154	5097.70	1274.54	29.	0.	0.000	1000.00	1.723s
FE-59	5165.93	1291.60	5.	5.	0.003	108.01	1.733s
TL-210	5251.56	1313.00	0.	7.	0.004	37.80	1.746s
CO-60	5329.57	1332.50	15.	-8.	-0.004	112.15	1.758s
AG-110M	5536.78	1384.30	21.	-11.	-0.006	97.28	1.789s
EU-152	5631.60	1408.00	0.	8.	0.004	35.36	1.804s
K-40	5842.95	1460.83	3.	95.	0.053	10.56	1.834s
SB-124	6763.68	1690.98	0.	0.	0.000	1000.00	1.965s
BI-214	7057.76	1764.49	1.	6.	0.004	43.83	2.005s
Co-56	7085.20	1771.35	7.	0.	0.000	1000.00	2.008s
Y-88	7344.09	1836.06	17.	-9.	-0.005	112.49	2.042s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	2.1354E+00				5.31E+01	
			477.60	2.135E+00	(	1.184E+01 1.60E+02 1.05E+01	G
NA-22	C	-7.9181E-01				9.50E+02	
			1274.53	-7.918E-01	?(	2.072E+00 7.78E+01 9.99E+01	G
K-40	N	8.8895E+01				4.66E+11	
			1460.83	8.890E+01	?(P	9.718E+00 1.06E+01 1.07E+01	G
Sc-46	F	-4.7895E-01				8.38E+01	
			889.28	-4.790E-01	?(P	1.987E+00 8.17E+01 1.00E+02	G
			1120.55	2.905E-01	+	2.792E+00 2.74E+02 1.00E+02	G
CR-51	F	5.3398E-01				2.77E+01	
			320.08	5.340E-01	?(P	1.047E+01 5.60E+02 9.94E+00	G
MN-54	C	3.0509E-01				3.12E+02	
			834.85	3.051E-01	?(	1.191E+00 1.54E+02 1.00E+02	G
FE-59	F	4.7242E-01				4.45E+01	
			1099.25	4.620E-02	%(P	2.350E+00 1.94E+03 5.65E+01	G
			1291.60	1.030E+00	?(	2.704E+00 1.08E+02 4.32E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C 7.1783E-01					7.73E+01	
		846.77	-1.050E-01	?(P	1.233E+00	4.48E+02	9.99E+01 G
		1238.28	1.531E+00	?(P	9.559E-01	2.97E+01	6.61E+01 G
		1037.84	2.736E+00	?(P	6.755E+00	9.82E+01	1.41E+01 G
		1771.35	0.000E+00	-	1.166E+01	1.00E+03	1.55E+01 A
CO-57	C -2.2264E-01					2.72E+02	
		122.06	-2.226E-01	&(	1.001E+00	1.33E+02	8.56E+01 G
		136.47	1.929E-01	&	9.663E+00	1.47E+03	1.07E+01 G
CO-58	C 4.1685E-01					7.09E+01	
		810.78	4.169E-01	?(	1.388E+00	9.70E+01	9.95E+01 G
CO-60	F -7.3224E-01					1.93E+03	
		1332.50	-7.322E-01	?(	1.900E+00	1.12E+02	1.00E+02 G
		1173.24	5.726E-01	+	6.028E-01	3.78E+01	9.99E+01 G
ZN-65	F -1.1957E+00					2.44E+02	
		1115.55	-1.196E+00	?(	5.289E+00	1.29E+02	5.06E+01 G
NB-94	I 1.0754E-01					7.41E+06	
		702.63	1.075E-01	&(	1.049E+00	3.75E+02	9.79E+01 G
		871.10	-5.699E-01	+	1.788E+00	9.23E+01	9.99E+01 G
ZR-95	I 1.2858E-01					6.40E+01	
		756.73	-2.348E-01	?(P	2.028E+00	4.25E+02	5.45E+01 G
		724.20	5.768E-01	?(	2.990E+00	1.47E+02	4.42E+01 G
NB-95	I 5.0167E-01					6.40E+01	
		765.79	5.017E-01	?(	1.607E+00	9.42E+01	9.98E+01 G
RU-103	I -2.3667E-01					3.93E+01	
		497.05	-2.367E-01	?(P	1.179E+00	1.64E+02	9.09E+01 G
		610.30	-1.576E+00	+	4.919E+01	9.08E+02	5.75E+00 GA
RH-106	I 1.0498E+00					3.74E+02	
		621.92	1.050E+00	(P	1.258E+01	3.34E+02	9.93E+00 G
		1050.36	-1.428E+01	+	1.409E+02	2.78E+02	1.56E+00 G
		511.86	1.488E+01	?	3.931E+00	1.35E+01	2.00E+01 GA
AG-108M	C -1.1197E-02					1.53E+05	
		433.94	-3.033E-01	?(	1.220E+00	1.59E+02	9.05E+01 G
		722.94	2.797E-01	?(	1.132E+00	1.15E+02	9.08E+01 G
		614.28	-1.989E-07	%	3.147E+00	4.59E+08	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	4.5015E-01					2.50E+02	
			884.68	4.501E-01	?(	2.101E+00	1.33E+02	7.27E+01 G
			657.76	-4.991E-01	+	1.426E+00	8.45E+01	9.46E+01 G
			937.49	-7.840E-01	+	3.948E+00	2.05E+02	3.44E+01 G
			1384.30	-4.420E+00	+	9.452E+00	9.73E+01	2.43E+01 G
			763.94	-1.904E+00	+	6.299E+00	9.66E+01	2.23E+01 G
SN-113	F	-3.0593E-01					1.15E+02	
			391.69	-3.059E-01	?(P	2.855E+00	1.97E+02	6.40E+01 G
SB-124	F	-2.1993E-01					6.02E+01	
			602.73	-5.080E-01	(P	3.031E+00	9.82E+01	9.83E+01 G
			1690.98	0.000E+00	+	1.767E+00	1.00E+03	4.78E+01 G
			722.79	2.399E+00	?(	7.720E+00	9.26E+01	1.08E+01 G
SB-125	I	-1.1888E-01					1.01E+03	
			427.88	-1.442E+00	(P	3.707E+00	9.83E+01	2.96E+01 G
			600.50	-2.773E+00	+	1.710E+01	1.82E+02	1.79E+01 G
			635.89	1.138E+00	+	9.904E+00	2.41E+02	1.13E+01 G
			463.37	3.622E+00	(P	1.149E+01	9.37E+01	1.05E+01 G
I-131	I	-1.5561E-01					8.02E+00	
			364.48	-4.191E-01	?(P	1.159E+00	1.04E+02	8.17E+01 G
			284.30	-4.737E+00	+ P	1.364E+01	8.78E+01	6.14E+00 G
			636.97	2.847E+00	?(P	1.470E+01	1.46E+02	7.17E+00 G
Gd-153	F	3.6583E-01					2.42E+02	
			97.50	-8.824E-02	%(	3.911E+00	1.31E+03	3.00E+01 G
			103.20	9.907E-01	?(	4.567E+00	1.37E+02	2.18E+01 G
Ga-68	C	3.5926E+00					4.71E-02	
			1077.40	3.593E+00	?(	3.443E+01	3.54E+02	3.30E+00 G
Tc-99m	I	7.9587E-03					2.51E-01	
			140.51	7.959E-03	&(	1.059E+00	3.88E+03	8.93E+01 G
BA-133	F	2.4537E-01					3.85E+03	
			356.00	2.454E-01	&(	2.667E+00	3.17E+02	6.20E+01 G
			302.85	-1.996E+00	+	1.069E+01	1.59E+02	1.83E+01 G
			383.84	-4.859E+00	+ P	1.869E+01	8.62E+01	8.94E+00 GA
			80.99	-9.636E-01	+	2.852E+00	1.11E+02	3.41E+01 GA
CS-134	I	8.5574E-01					7.54E+02	
			795.87	-2.397E-02	%(P	1.824E+00	2.14E+03	8.55E+01 G
			604.71	-5.117E-01	+	2.968E+00	1.71E+02	9.76E+01 G
			569.32	-1.425E+00	+	7.798E+00	1.56E+02	1.54E+01 G
			801.95	2.261E+00	(	1.114E+01	1.88E+02	8.69E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	8.404E+00	?(P	6.734E+00	3.57E+01	8.35E+00 G
CS-137	I	4.6299E-01					1.10E+04	
			661.66	4.630E-01	?(	1.668E+00	1.05E+02	8.52E+01 G
CE-139	F	-1.3314E-01					1.38E+02	
			165.85	-1.331E-01	&(	1.112E+00	2.45E+02	7.99E+01 G
Ba-140	I	1.6276E+00					1.28E+01	
			537.26	1.211E+00	?(P	3.246E+00	1.03E+02	2.44E+01 G
			162.66	3.262E+00	&(P	1.269E+01	1.15E+02	6.22E+00 G
			304.85	-8.594E+00	+	4.474E+01	1.55E+02	4.29E+00 G
La-140	I	1.4184E-01					1.28E+01	
			1596.21	5.185E-02	%(P	1.553E+00	1.17E+03	9.54E+01 G
			487.02	2.876E-01	?(P	1.997E+00	2.63E+02	4.55E+01 G
			328.76	2.380E-01	*(P	4.258E+00	6.60E+02	2.03E+01 G
			815.77	-2.486E-01	+	6.558E+00	7.23E+02	2.33E+01 G
CE-141	I	-2.5644E-01					3.25E+01	
			145.44	-2.564E-01	?(	1.344E+00	1.91E+02	4.82E+01 G
CE-144	I	-1.4012E+00					2.85E+02	
			133.54	-1.401E+00	(	9.285E+00	1.96E+02	1.11E+01 G
PM-144	C	3.4095E-01					3.63E+02	
			696.54	3.870E-01	?(	1.288E+00	1.35E+02	9.90E+01 G
			618.06	2.949E-01	&(P	9.600E-01	9.47E+01	9.91E+01 G
EU-152	F	1.0355E+00					4.94E+03	
			121.78	-8.135E-01	?(	2.852E+00	1.04E+02	2.86E+01 G
			344.29	-1.456E+00	+	6.190E+00	1.26E+02	2.65E+01 G
			1112.07	-6.438E+00	+	2.178E+01	9.99E+01	1.36E+01 G
			778.92	3.432E-01	+ P	8.736E+00	9.64E+02	1.29E+01 G
			964.11	3.534E+00	?(	1.735E+01	1.43E+02	1.46E+01 G
			244.69	3.192E+00	?(	2.635E+01	2.45E+02	7.58E+00 G
			1408.00	3.665E+00	?	3.376E+00	3.54E+01	2.10E+01 GA
EU-154	I	3.6181E-01					3.14E+03	
			123.10	-3.897E-01	?(	2.130E+00	1.62E+02	4.08E+01 G
			1274.54	0.000E+00	+	6.947E+00	1.00E+03	3.52E+01 G
			723.36	1.258E+00	?(	5.855E+00	1.32E+02	2.02E+01 G
			873.23	-2.066E+00	+	1.719E+01	2.37E+02	1.23E+01 G
			1004.77	1.058E+00	?(	6.723E+00	2.51E+02	1.80E+01 G
			996.33	-1.673E+00	+	1.904E+01	3.19E+02	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	-5.9737E-03					1.81E+03	
			105.31	-5.974E-03	%(P	4.883E+00	1.75E+04	2.12E+01 G
			86.54	-1.024E+00	+	5.035E+00	1.47E+02	3.07E+01 G
HF-181	F	8.8938E-02					4.24E+01	
			482.00	-5.761E-01	?(	1.923E+00	9.88E+01	8.05E+01 G
			133.02	-5.966E-01	+	2.590E+00	1.29E+02	4.33E+01 G
			345.83	2.064E+00	?(	9.105E+00	1.30E+02	1.51E+01 G
			136.30	4.153E+00	&(	1.824E+01	1.31E+02	5.85E+00 G
Ta-182	F	1.7333E+00					1.14E+02	
			1121.30	2.203E+00	?(	6.990E+00	9.35E+01	3.49E+01 G
			1221.41	9.407E-01	?(	5.470E+00	2.39E+02	2.70E+01 G
			1189.05	2.042E+00	*(	8.904E+00	1.81E+02	1.62E+01 G
Hg-203	F	-3.5780E-01					4.66E+01	
			279.20	-3.578E-01	?(	1.431E+00	1.18E+02	8.15E+01 G
TL-208	N	4.6909E+00					6.98E+02	
			583.02	4.691E+00	*(P	7.181E-01	1.20E+01	8.45E+01 G
			277.28	1.456E+01	+ P	8.337E+00	2.71E+01	6.31E+00 G
			860.56	1.411E+01	+	3.715E+00	1.89E+01	1.24E+01 G
PM-146	C	3.2585E-01					2.02E+03	
			453.88	3.299E-01	?(	1.404E+00	1.65E+02	6.50E+01 G
			747.16	-1.340E+00	+ P	4.027E+00	1.17E+02	3.40E+01 G
			735.72	3.140E-01	?(P	5.944E+00	7.42E+02	2.25E+01 G
Y-88	F	-1.1292E+00					1.07E+02	
			1836.06	-1.129E+00	?(	2.751E+00	1.12E+02	9.92E+01 G
			898.04	-6.928E-02	+	1.396E+00	8.00E+02	9.37E+01 G
Cd-113m		2.8827E+03					5.33E+03	
			263.70	2.883E+03	?(	1.212E+04	1.22E+02	6.00E-03 K
Cd-109	F	-7.7775E+00					4.53E+02	
			88.04	-7.778E+00	?(	3.814E+01	1.47E+02	3.79E+00 G
Cf-251	T	4.2877E-01					3.28E+05	
			176.60	4.288E-01	(	3.916E+00	3.30E+02	1.70E+01 G
			227.00	-1.003E+00	+	1.282E+01	4.84E+02	6.30E+00 GA
Cf-249	T	-6.4963E-01					1.28E+05	
			387.95	-6.496E-01	?(	2.686E+00	1.23E+02	6.60E+01 G
			333.44	-2.366E+00	+	6.649E+00	1.08E+02	1.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sn-126		-3.0423E+00					3.65E+07	
			87.57	8.356E-01	+	3.773E+00	1.35E+02	3.75E+01 GA
			64.28	-3.042E+00	?(	1.340E+01	1.31E+02	9.70E+00 G
			86.94	-3.474E+00	+	1.672E+01	1.44E+02	9.04E+00 GA
PB-210	N	2.1505E+01					8.14E+03	
			46.54	2.151E+01	*(P	2.960E+01	4.81E+01	4.25E+00 G
PB-212	N	1.2706E+01					6.98E+02	
			238.63	1.271E+01	(P	1.566E+00	6.93E+00	4.33E+01 G
			300.03	1.630E+01	+ P	1.896E+01	4.78E+01	3.28E+00 GA
PB-214	N	7.1487E+00					5.84E+05	
			351.93	6.914E+00	*(P	1.686E+00	1.32E+01	3.76E+01 G
			295.09	7.606E+00	@(P	3.892E+00	2.38E+01	1.93E+01 G
			242.00	3.598E+00	&	2.731E+01	2.26E+02	7.43E+00 GA
BI-207	C	5.3429E-01					1.18E+04	
			1063.66	5.343E-01	?(P	1.310E+00	9.76E+01	7.45E+01 G
			569.70	-7.477E-03	%	1.344E+00	4.97E+03	9.77E+01 G
BI-212	N	3.3903E+00					6.98E+02	
			727.17	3.390E+00	(	1.905E+01	1.60E+02	7.55E+00 G
			785.42	-3.016E+00	&	1.104E+02	1.43E+03	1.28E+00 GA
U-235	N	1.1257E+00					2.57E+11	
			143.79	-1.059E-01	%(	6.520E+00	1.77E+03	1.10E+01 G
			205.33	3.820E+00	(P	1.423E+01	1.36E+02	5.01E+00 G
			163.38	-5.563E+00	+ P	1.858E+01	8.35E+01	5.08E+00 G
			185.72	1.298E+00		1.381E+00	4.11E+01	5.40E+01 GA
BI-214	N	7.3428E+00					5.84E+05	
			609.31	7.343E+00	(P	1.704E+00	1.39E+01	4.61E+01 G
			1120.29	5.631E+00	- P	2.040E+01	1.07E+02	1.51E+01 G
			1764.49	4.920E+00	- P	5.720E+00	4.38E+01	1.54E+01 G
BI-210M	T	-5.9262E-01					1.10E+09	
			265.83	-5.926E-01	?(	1.995E+00	9.99E+01	5.00E+01 G
			304.90	-1.090E-04	%	6.873E+00	1.85E+06	2.80E+01 G
AC-228	N	1.3768E+01					2.10E+03	
			911.07	1.389E+01	(P	1.670E+00	1.29E+01	2.90E+01 G
			968.97	1.508E+01	(	2.924E+00	1.62E+01	1.75E+01 G
			338.32	1.158E+01	@(P	5.779E+00	2.23E+01	1.20E+01 G
			93.35	2.083E+00	-	1.687E+01	2.39E+02	5.56E+00 XA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	N	-5.0320E+00					7.95E+03	
			256.24	-5.032E+00	?(	1.370E+01	1.06E+02	7.00E+00 G
			235.97	2.116E+00	&	1.653E+01	2.33E+02	1.23E+01 G
			50.14	4.160E+00	+	2.003E+01	1.43E+02	8.00E+00 G
TH-229	N	-6.3146E-01					2.68E+06	
			193.51	-6.315E-01	?(	1.544E+01	8.75E+02	4.40E+00 G
			210.85	-1.076E+01	+ P	3.256E+01	8.31E+01	2.99E+00 G
TH-234	N	1.0704E+01					1.63E+12	
			92.59	6.106E+00	(P	1.339E+01	6.65E+01	5.58E+00 G
			63.29	1.744E+01	(P	2.212E+01	3.99E+01	3.81E+00 G
PA-231	N	-1.3768E+01					1.20E+07	
			302.65	-1.377E+01	&(	7.635E+01	1.65E+02	2.88E+00 G
			300.07	-1.596E+01	+	9.257E+01	1.73E+02	2.46E+00 G
PA-234	N	1.6945E-01					1.63E+12	
			131.29	-1.427E+00	?(	6.009E+00	1.26E+02	1.80E+01 G
			946.02	-5.174E+00	+ P	1.172E+01	7.84E+01	1.34E+01 G
			569.47	0.000E+00	+	1.576E+01	1.00E+03	8.20E+00 G
			883.24	3.163E+00	?(P	1.415E+01	1.27E+02	9.60E+00 G
			880.53	4.635E+00	& P	1.938E+01	1.18E+02	6.00E+00 GA
PA-234M	N	-5.2502E+00					1.63E+12	
			1001.00	-5.250E+00	&(P	2.530E+02	1.31E+03	8.37E-01 G
			766.41	-1.565E+01	% P	5.090E+02	1.20E+03	2.94E-01 G
AM-241	T	2.1356E-01					1.58E+05	
			59.54	2.136E-01	?(P	3.043E+00	5.21E+02	3.59E+01 G
Np-237	F	-2.4015E+00					2.14E+06	
			86.49	-2.401E+00	&(	1.204E+01	1.50E+02	1.31E+01 G
Ir-192	F	4.2815E-01					7.40E+01	
			316.49	2.628E-01	?(	9.348E-01	1.04E+02	8.70E+01 G
			468.06	7.062E-01	?(	2.618E+00	1.09E+02	5.18E+01 G
			308.44	0.000E+00	-	6.127E+00	1.00E+03	3.18E+01 G
Cs-136	F	-4.1992E-01					1.30E+01	
			818.50	-4.199E-01	?(	1.793E+00	1.24E+02	1.00E+02 G
			1048.07	-8.027E-01	+	2.116E+00	7.83E+01	8.00E+01 G
			340.57	-8.123E-01	+	3.810E+00	1.39E+02	4.69E+01 G
Np-239	T	8.6555E-01					2.36E+00	
			103.70	2.810E-01		4.278E+00	4.48E+02	2.40E+01 X
			106.13	8.655E-01	&(	4.348E+00	1.49E+02	2.27E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                           99.50 1.442E+00 &   6.506E+00 1.34E+02 1.50E+01 X

Nd-147      -1.5843E+00                                     1.11E+01
                          531.00-1.584E+00 ?(  9.211E+00 2.26E+02 1.30E+01 G
                           91.10 4.540E-08 %   4.938E+00 3.21E+09 2.83E+01 G

TL-210   N  -6.4333E-10                                     5.84E+05
                          799.60-6.433E-10 %(  1.573E+00 6.66E+10 9.90E+01 G
                          296.00-4.892E-01 +   2.904E+00 1.77E+02 7.90E+01 G
                         1313.00 3.010E+00 ?   3.169E+00 3.78E+01 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

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

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
 TH-227      50.14       182.        14.     0.008   142.68   4.160E+00
 AM-241      59.54       151.         4.     0.002   521.42   2.136E-01  P
 BA-133      80.99       200.       -23.    -0.013   110.52  -9.636E-01
 Np-237      86.49       579.       -23.    -0.013   149.99  -2.401E+00
 EU-155      86.54       556.       -23.    -0.013   147.05  -1.024E+00
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Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cd-109	88.04	492.	-22.	-0.012	146.62	-7.778E+00	
Np-239	99.50	234.	16.	0.009	134.18	1.442E+00	
Gd-153	103.20	246.	16.	0.009	137.13	9.907E-01	
Np-239	103.70	263.	5.	0.003	448.18	2.810E-01	
Np-239	106.13	243.	15.	0.008	149.22	8.655E-01	
EU-152	121.78	160.	-18.	-0.010	104.46	-8.135E-01	
CO-57	122.06	178.	-14.	-0.008	133.40	-2.226E-01	
EU-154	123.10	182.	-12.	-0.007	161.59	-3.897E-01	
PA-234	131.29	278.	-19.	-0.011	125.59	-1.427E+00	
HF-181	133.02	297.	-19.	-0.011	129.50	-5.966E-01	
CE-144	133.54	248.	-11.	-0.006	196.16	-1.401E+00	
HF-181	136.30	263.	18.	0.010	130.85	4.153E+00	
CE-141	145.44	88.	-9.	-0.005	191.42	-2.564E-01	
Ba-140	162.66	118.	14.	0.008	115.35	3.262E+00	P
U-235	163.38	170.	-19.	-0.011	83.48	-5.563E+00	P
CE-139	165.85	147.	-7.	-0.004	244.67	-1.331E-01	
Cf-251	176.60	73.	5.	0.003	329.81	4.288E-01	
U-235	185.72	87.	43.	0.024	41.14	1.298E+00	
TH-229	193.51	67.	-2.	-0.001	875.22	-6.315E-01	
U-235	205.33	67.	11.	0.006	136.20	3.820E+00	P
TH-229	210.85	124.	-18.	-0.010	83.10	-1.076E+01	P
Cf-251	227.00	73.	-3.	-0.002	483.74	-1.003E+00	
TH-227	235.97	470.	13.	0.007	232.51	2.116E+00	
EU-152	244.69	425.	12.	0.007	245.36	3.192E+00	
TH-227	256.24	84.	-17.	-0.009	105.64	-5.032E+00	
Cd-113m	263.70	44.	8.	0.004	122.47	2.883E+03	
BI-210M	265.83	86.	-14.	-0.008	99.86	-5.926E-01	
Hg-203	279.20	108.	-13.	-0.007	118.28	-3.578E-01	
I-131	284.30	52.	-13.	-0.007	87.80	-4.737E+00	P
TL-210	296.00	396.	-16.	-0.009	176.83	-4.892E-01	
PA-231	300.07	380.	-16.	-0.009	172.72	-1.596E+01	
PA-233	300.18	364.	-16.	-0.009	169.10	-6.335E+00	
PA-231	302.65	348.	-16.	-0.009	165.08	-1.377E+01	
BA-133	302.85	274.	-15.	-0.008	159.15	-1.996E+00	
Ba-140	304.85	259.	-15.	-0.008	154.65	-8.594E+00	
Ir-192	316.49	39.	9.	0.005	104.25	2.628E-01	
CR-51	320.08	65.	2.	0.001	559.74	5.340E-01	P
La-140	328.76	41.	2.	0.001	660.08	2.380E-01	P
Cf-249	333.44	59.	-14.	-0.008	108.28	-2.366E+00	
Cs-136	340.57	180.	-14.	-0.008	139.02	-8.123E-01	
EU-152	344.29	147.	-14.	-0.008	125.99	-1.456E+00	
HF-181	345.83	100.	11.	0.006	130.00	2.064E+00	
BA-133	356.00	141.	5.	0.003	317.46	2.454E-01	
I-131	364.48	41.	-12.	-0.007	103.92	-4.191E-01	P
BA-133	383.84	124.	-14.	-0.008	86.23	-4.859E+00	P
Cf-249	387.95	137.	-14.	-0.008	122.52	-6.496E-01	
SN-113	391.69	144.	-6.	-0.003	196.62	-3.059E-01	P
SB-125	427.88	41.	-13.	-0.007	98.33	-1.442E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
AG-108M	433.94	40.	-8.	-0.004	158.77	-3.033E-01		
PM-146	453.88	24.	6.	0.003	164.99	3.299E-01		
SB-125	463.37	42.	10.	0.006	93.67	3.622E+00		P
Ir-192	468.06	54.	10.	0.006	108.97	7.062E-01		
BE-7	477.60	43.	6.	0.003	159.86	2.135E+00		
HF-181	482.00	68.	-12.	-0.007	98.79	-5.761E-01		
La-140	487.02	21.	3.	0.002	262.66	2.876E-01		P
RU-103	497.05	29.	-6.	-0.003	164.03	-2.367E-01		P
RH-106	511.86	13.	75.	0.041	13.48	1.488E+01		
Nd-147	531.00	32.	-5.	-0.003	225.98	-1.584E+00		
Ba-140	537.26	12.	7.	0.004	103.28	1.211E+00		P
CS-134	563.24	5.	16.	0.009	35.67	8.404E+00		P
CS-134	569.32	28.	-5.	-0.003	156.21	-1.425E+00		
SB-125	600.50	187.	-11.	-0.006	182.08	-2.773E+00		
SB-124	602.73	177.	-11.	-0.006	98.21	-5.080E-01		P
CS-134	604.71	166.	-11.	-0.006	171.17	-5.117E-01		
RU-103	610.30	155.	-2.	-0.001	907.98	-1.576E+00		
PM-144	618.06	14.	6.	0.003	94.69	2.949E-01		P
RH-106	621.92	26.	2.	0.001	333.64	1.050E+00		P
SB-125	635.89	19.	3.	0.001	241.09	1.138E+00		
I-131	636.97	17.	4.	0.002	145.85	2.847E+00		P
AG-110M	657.76	28.	-10.	-0.005	84.54	-4.991E-01		
CS-137	661.66	30.	8.	0.004	105.15	4.630E-01		
PM-144	696.54	22.	7.	0.004	134.72	3.870E-01		
NB-94	702.63	13.	2.	0.001	374.72	1.075E-01		
SB-124	722.79	8.	5.	0.003	92.57	2.399E+00		
AG-108M	722.94	12.	5.	0.003	114.96	2.797E-01		
EU-154	723.36	17.	5.	0.003	132.11	1.258E+00		
ZR-95	724.20	22.	5.	0.003	147.24	5.768E-01		
BI-212	727.17	26.	5.	0.003	159.83	3.390E+00		
PM-146	735.72	22.	1.	0.001	742.44	3.140E-01		P
PM-146	747.16	22.	-8.	-0.005	117.48	-1.340E+00		P
ZR-95	756.73	13.	-2.	-0.001	424.74	-2.348E-01		P
AG-110M	763.94	22.	-8.	-0.004	96.61	-1.904E+00		
NB-95	765.79	30.	9.	0.005	94.15	5.017E-01		
EU-152	778.92	13.	1.	0.000	964.31	3.432E-01		P
CS-134	801.95	9.	3.	0.002	188.41	2.261E+00		
CO-58	810.77	19.	7.	0.004	96.95	4.169E-01		
La-140	815.77	24.	-1.	-0.001	722.70	-2.486E-01		
Cs-136	818.50	34.	-7.	-0.004	123.72	-4.199E-01		
MN-54	834.85	13.	5.	0.003	153.84	3.051E-01		
Co-56	846.77	14.	-2.	-0.001	448.04	-1.050E-01		P
NB-94	871.10	30.	-9.	-0.005	92.30	-5.699E-01		
EU-154	873.23	43.	-4.	-0.002	237.17	-2.066E+00		
PA-234	880.53	11.	4.	0.002	118.35	4.635E+00		P
PA-234	883.24	16.	5.	0.003	127.15	3.163E+00		P
AG-110M	884.68	21.	5.	0.003	133.11	4.501E-01		
Sc-46	889.28	37.	-7.	-0.004	81.70	-4.790E-01		P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Y-88	898.04	14.	-1.	-0.001	800.00	-6.928E-02		
AG-110M	937.49	14.	-4.	-0.002	204.63	-7.840E-01		
PA-234	946.02	19.	-10.	-0.006	78.36	-5.174E+00		P
EU-152	964.11	53.	7.	0.004	142.76	3.534E+00		
EU-154	996.33	30.	-2.	-0.001	318.75	-1.673E+00		
EU-154	1004.77	9.	3.	0.001	250.62	1.058E+00		
Co-56	1037.84	5.	5.	0.003	98.23	2.736E+00		P
Cs-136	1048.07	19.	-9.	-0.005	78.26	-8.027E-01		
RH-106	1050.36	33.	-3.	-0.002	278.22	-1.428E+01		
BI-207	1063.66	5.	5.	0.003	97.61	5.343E-01		P
Ga-68	1077.40	5.	1.	0.001	354.44	3.593E+00		
EU-152	1112.07	58.	-11.	-0.006	99.90	-6.438E+00		
ZN-65	1115.55	46.	-8.	-0.004	128.74	-1.196E+00		
Sc-46	1120.55	50.	4.	0.002	274.43	2.905E-01		
Ta-182	1121.30	37.	10.	0.005	93.50	2.203E+00		
CO-60	1173.24	0.	7.	0.004	37.80	5.726E-01		
Ta-182	1189.05	10.	4.	0.002	180.85	2.042E+00		
Ta-182	1221.41	10.	3.	0.002	238.82	9.407E-01		
Co-56	1238.28	0.	12.	0.007	29.68	1.531E+00		P
NA-22	1274.53	20.	-9.	-0.005	77.78	-7.918E-01		
FE-59	1291.60	5.	5.	0.003	108.01	1.030E+00		
TL-210	1313.00	0.	7.	0.004	37.80	3.010E+00		
CO-60	1332.50	15.	-8.	-0.004	112.15	-7.322E-01		
AG-110M	1384.30	21.	-11.	-0.006	97.28	-4.420E+00		
EU-152	1408.00	0.	8.	0.004	35.36	3.665E+00		
Y-88	1836.06	17.	-9.	-0.005	112.49	-1.129E+00		

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	2.1354E+00	2.1354E+00	1.599E+02%	1.18E+01
NA-22	#A	-7.9181E-01	-7.9181E-01	7.778E+01%	2.07E+00
K-40	#	8.8895E+01	8.8895E+01	1.056E+01%	9.72E+00
Sc-46	#A	-4.7895E-01	-4.7895E-01	8.170E+01%	1.99E+00
CR-51	#A	5.3397E-01	5.3398E-01	5.597E+02%	1.05E+01
MN-54	#A	3.0509E-01	3.0509E-01	1.538E+02%	1.19E+00
FE-59	#A	4.7241E-01	4.7242E-01	1.080E+02%	2.35E+00
Co-56	#A	7.1783E-01	7.1783E-01	2.968E+01%	1.23E+00
CO-57	#A	-2.2264E-01	-2.2264E-01	1.334E+02%	1.00E+00
CO-58	#A	4.1685E-01	4.1685E-01	9.695E+01%	1.39E+00
CO-60	#A	-7.3224E-01	-7.3224E-01	1.122E+02%	1.90E+00
ZN-65	#A	-1.1957E+00	-1.1957E+00	1.287E+02%	5.29E+00
NB-94	#A	1.0754E-01	1.0754E-01	3.747E+02%	1.05E+00
ZR-95	#A	1.2858E-01	1.2858E-01	1.472E+02%	2.03E+00

NB-95	#A	5.0167E-01	5.0167E-01	9.415E+01%	1.61E+00
RU-103	#A	-2.3667E-01	-2.3667E-01	1.640E+02%	1.18E+00
RH-106	#A	1.0498E+00	1.0498E+00	3.336E+02%	1.26E+01
AG-108M	#A	-1.1197E-02	-1.1197E-02	9.801E+01%	1.22E+00
AG-110M	#A	4.5014E-01	4.5015E-01	1.331E+02%	2.10E+00
SN-113	#A	-3.0593E-01	-3.0593E-01	1.966E+02%	2.86E+00
SB-124	#A	-2.1993E-01	-2.1993E-01	6.748E+01%	3.03E+00
SB-125	#A	-1.1888E-01	-1.1888E-01	6.790E+01%	3.71E+00
I-131	#A	-1.5560E-01	-1.5561E-01	8.954E+01%	1.16E+00
Gd-153	#A	3.6583E-01	3.6583E-01	1.371E+02%	3.91E+00
Ga-68	#A	3.5609E+00	3.5926E+00	3.544E+02%	3.44E+01
Tc-99m	#A	7.9455E-03	7.9587E-03	3.876E+03%	1.06E+00
BA-133	#A	2.4537E-01	2.4537E-01	3.175E+02%	2.67E+00
CS-134	#A	8.5574E-01	8.5574E-01	3.567E+01%	1.82E+00
CS-137	#A	4.6299E-01	4.6299E-01	1.051E+02%	1.67E+00
CE-139	#A	-1.3314E-01	-1.3314E-01	2.447E+02%	1.11E+00
Ba-140	#A	1.6275E+00	1.6276E+00	7.741E+01%	3.25E+00
La-140	#A	1.4183E-01	1.4184E-01	2.627E+02%	1.55E+00
CE-141	#A	-2.5644E-01	-2.5644E-01	1.914E+02%	1.34E+00
CE-144	#A	-1.4012E+00	-1.4012E+00	1.962E+02%	9.28E+00
PM-144	#A	3.4095E-01	3.4095E-01	8.234E+01%	1.29E+00
EU-152	#A	1.0355E+00	1.0355E+00	1.008E+02%	2.85E+00
EU-154	#A	3.6181E-01	3.6181E-01	1.087E+02%	2.13E+00
EU-155	#A	-5.9737E-03	-5.9737E-03	1.753E+04%	4.88E+00
HF-181	#A	8.8937E-02	8.8938E-02	6.975E+01%	1.92E+00
Ta-182	#A	1.7333E+00	1.7333E+00	9.350E+01%	6.99E+00
Hg-203	#A	-3.5780E-01	-3.5780E-01	1.183E+02%	1.43E+00
TL-208		4.6909E+00	4.6909E+00	1.199E+01%	7.18E-01
PM-146	#A	3.2585E-01	3.2585E-01	1.650E+02%	1.40E+00
Y-88	#A	-1.1292E+00	-1.1292E+00	1.125E+02%	2.75E+00
Cd-113m	#A	2.8827E+03	2.8827E+03	1.225E+02%	1.21E+04
Cd-109	#A	-7.7775E+00	-7.7775E+00	1.466E+02%	3.81E+01
Cf-251	#A	4.2877E-01	4.2877E-01	3.298E+02%	3.92E+00
Cf-249	#A	-6.4963E-01	-6.4963E-01	1.225E+02%	2.69E+00
Sn-126	#A	-3.0423E+00	-3.0423E+00	1.312E+02%	1.34E+01
PB-210	#A	2.1505E+01	2.1505E+01	4.806E+01%	2.96E+01
PB-212		1.2706E+01	1.2706E+01	6.928E+00%	1.57E+00
PB-214	#	7.1487E+00	7.1487E+00	1.320E+01%	1.69E+00
BI-207	#A	5.3429E-01	5.3429E-01	9.761E+01%	1.31E+00
BI-212	#A	3.3903E+00	3.3903E+00	1.598E+02%	1.90E+01
U-235	#A	1.1257E+00	1.1257E+00	1.362E+02%	6.52E+00
BI-214		7.3428E+00	7.3428E+00	1.392E+01%	1.70E+00
BI-210M	#A	-5.9262E-01	-5.9262E-01	9.986E+01%	1.99E+00
AC-228		1.3768E+01	1.3768E+01	1.016E+01%	1.67E+00
TH-227	#A	-5.0320E+00	-5.0320E+00	1.056E+02%	1.37E+01
TH-229	#A	-6.3146E-01	-6.3146E-01	8.752E+02%	1.54E+01
TH-234	A	1.0704E+01	1.0704E+01	3.880E+01%	1.34E+01
PA-231	#A	-1.3768E+01	-1.3768E+01	1.651E+02%	7.63E+01
PA-233	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.46E+00

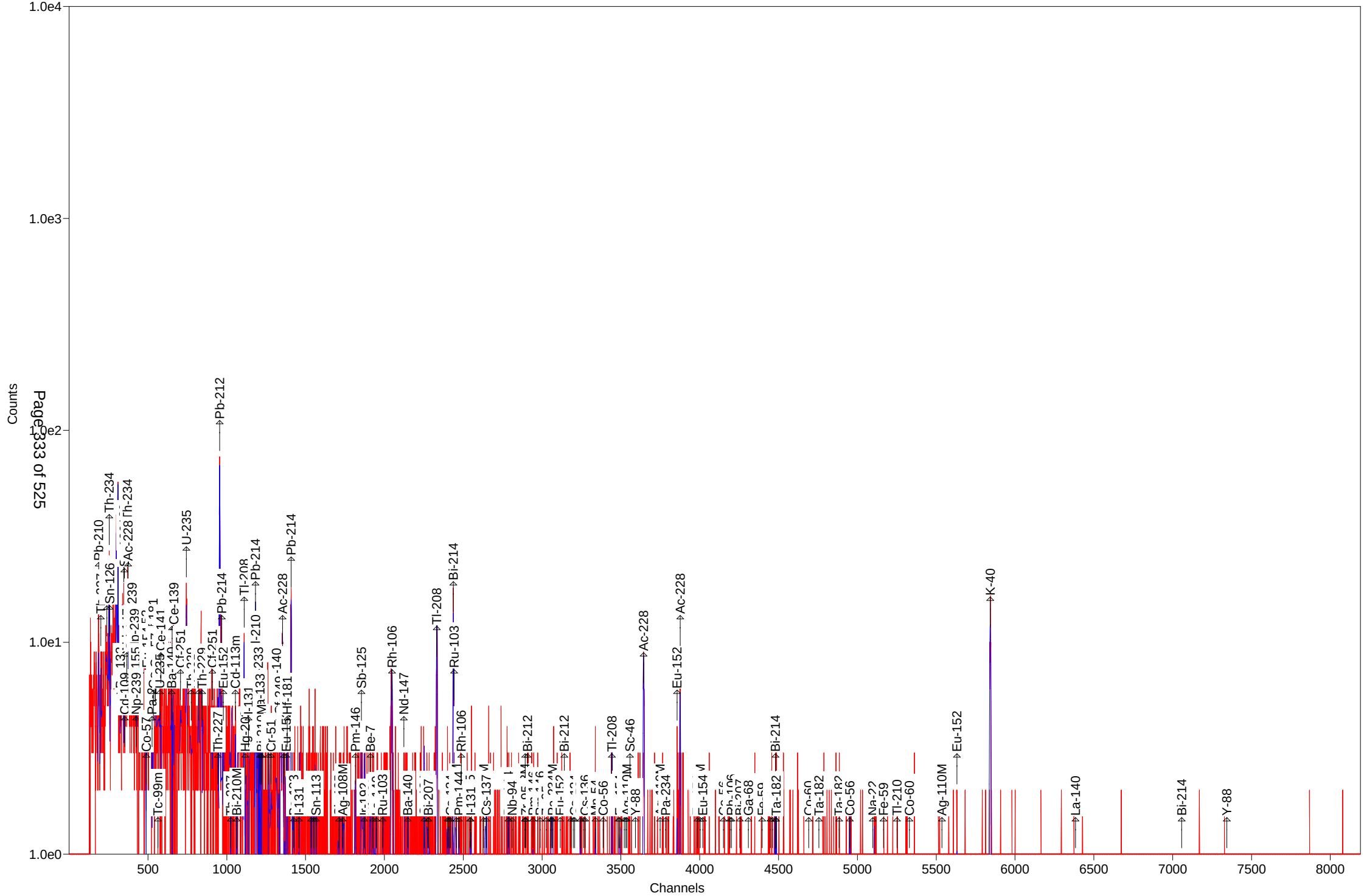
PA-234 #A	1.6945E-01	1.6945E-01	8.936E+01%		6.01E+00
PA-234M#A	-5.2502E+00	-5.2502E+00	1.312E+03%		2.53E+02
AM-241 #A	2.1356E-01	2.1356E-01	5.214E+02%		3.04E+00
Np-237 #A	-2.4015E+00	-2.4015E+00	1.500E+02%		1.20E+01
Ir-192 #A	4.2814E-01	4.2815E-01	7.540E+01%		9.35E-01
Cs-136 #A	-4.1990E-01	-4.1992E-01	1.237E+02%		1.79E+00
Np-239 #A	8.6539E-01	8.6555E-01	1.492E+02%		4.35E+00
Nd-147 #A	-1.5842E+00	-1.5843E+00	2.260E+02%		9.21E+00
TL-210 #A	-6.4333E-10	-6.4333E-10	6.661E+10%		1.57E+00
Kr-85 #A	0.0000E+00	0.0000E+00	1.000E+03%		4.32E+02

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

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

Total Activity (37.6 to 2000.0 keV) 1.561E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.0 keV) 1.5605670E+02 Bq/Sample

404682_Gamma_490-164387-B-5-A. 2_Gamma_20180268.spc.



Daily Checks

Test America
St. Louis
Quality Control Check

Spectrum: 2_20181229001_QCAsLeft
Description: Quality control Check (QC Source 'B') Post Stabilization
Acquired: 12/29/2018 3:49:32 AM
Detector: Detector # 2
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.61	59.79	60.04	PASS
FWHM	0.75	0.00	0.00	0.83	1.85	1.95	PASS
ActivityDiff	670.10	-5.00	-4.00	-0.92	4.00	5.00	PASS
QA-662							
FWHM	1.28	0.00	0.00	1.33	2.98	3.08	PASS
ActivityDiff	628.20	-5.00	-4.00	-0.75	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	1332.60	1333.01	1333.26	PASS
FWHM	1.73	0.00	0.00	1.77	3.93	4.03	PASS
ActivityDiff	1225.40	-5.00	-4.00	-0.87	4.00	5.00	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

Test America
St. Louis
Background Check

Spectrum: 2_20181229002_BG
Description: Background Contamination Check
Acquired: 12/29/2018 4:23:55 AM
Detector: Detector # 2
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.69	1.21	1.37	1.53	2.00	2.16	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

Test America
St. Louis
Quality Control Check

Spectrum: 5_20181229001_QCAsLeft
Description: Quality control Check (QC Source 'A') Post Stabilization
Acquired: 12/29/2018 3:50:53 AM
Detector: Detector # 5
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.59	59.79	60.04	PASS
FWHM	0.74	0.00	0.00	0.74	1.84	1.94	PASS
ActivityDiff	636.60	-5.00	-4.00	-0.19	4.00	5.00	PASS
QA-662							
FWHM	1.36	0.00	0.00	1.33	3.06	3.16	PASS
ActivityDiff	596.80	-5.00	-4.00	-1.94	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5328.30	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.13	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	2.01	4.10	4.20	PASS
ActivityDiff	1164.20	-5.00	-4.00	-0.58	4.00	5.00	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

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Sample description
Quality control Check (QC Source 'A') Post Stabilization

Spectrum Filename: C:\User\SPC\Det5\5_20181229001_QCAsLeft.An1

Acquisition information

Start time:	12/29/2018 3:50:53 AM
Live time:	1000
Real time:	1009
Dead time:	0.87 %
Detector ID:	5

Detector system
Ge 5 SN/157

Calibration

Filename:	5_QC.Clb

Ge5_QC

Energy Calibration

Created:	2/28/2012 7:35:48 PM
Zero offset:	0.158 keV
Gain:	0.250 keV/channel
Quadratic:	3.911E-08 keV/channel^2

Efficiency Calibration

Created:	1/6/2011 8:03:22 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files

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

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.62keV)
Stop channel:	8000 (2000.81keV)
Peak rejection level:	10.000%
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:	1.0000000E+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       4/1/2009 12:00:00 PM
       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.    5 cutoff: 5.00E+01 %
       Energy Calibration
            Normalized diff:       0.1239

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    GPS
_____________________________________________________________________________
   59.59    46592.   0.51   0.74  7.427E-02    59.54 100.000  6.378E+02 QA60
   87.99      497.   8.32   0.88  1.124E-01    88.03 100.000  9.145E+02 QA88
  661.51    13901.   0.90   1.33  2.861E-02   661.66 100.000  6.084E+02 QA662
 1172.90     5013.   1.56   1.75  1.552E-02  1173.23 100.000  1.164E+03 QA1173
 1332.13     4492.   1.51   2.01  1.382E-02  1332.51 100.000  1.171E+03 QA1332
No unknown peaks passed sensitivity test.

-------------------------------------------------------------
This section based on library: DET_QC.lib


************** I D E N T I F I E D   P E A K   S U M M A R Y **************
Nuclide  Peak    Centroid  Background  Net Area   Intensity   Uncert  FWHM
         Channel Energy    Counts      Counts     Cts/Sec  1 Sigma %  keV
_____________________________________________________________________________
QA-60     237.95    59.59      2472.     46592.    46.592     0.51   0.736
QA-88     351.63    87.99       364.       497.     0.497     8.32   0.883
QA-662   2646.75   661.51       305.     13901.    13.901     0.90   1.330
QA-1173  4691.85  1172.90       143.      5013.     5.013     1.56   1.754
QA-1332  5328.38  1332.13        18.      4492.     4.492     1.51   2.012

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

(Page 3 of 5)

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

- Nuclide - Name	Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS	Code	MDA Value GPS			COMMENTS
QA-60		6.3778E+02					1.58E+05		
			59.54	6.378E+02	(	3.209E+00	5.10E-01	1.00E+02	G
QA-88		9.1449E+02					4.63E+02		
			88.03	9.145E+02	(	1.686E+02	8.32E+00	1.00E+02	G
QA-662		6.0836E+02					1.10E+04		
			661.66	6.084E+02	(	3.680E+00	9.02E-01	1.00E+02	G
QA-1173		1.1638E+03					1.92E+03		
			1173.23	1.164E+03	(	1.357E+01	1.56E+00	1.00E+02	G
QA-1332		1.1709E+03					1.92E+03		
			1332.51	1.171E+03	(	5.930E+00	1.51E+00	1.00E+02	G

(- This peak used in the nuclide activity average.

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

Nuclide Codes:	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 GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60	6.2790E+02	6.3778E+02	5.101E-01%	3.21E+00
QA-88	4.4201E+00	9.1449E+02	8.321E+00%	1.69E+02
QA-122		>12 Halflives		
QA-166		>12 Halflives		
QA-279		>12 Halflives		
QA-392		>12 Halflives		
QA-514		>12 Halflives		
QA-662	4.8598E+02	6.0836E+02	9.023E-01%	3.68E+00
QA-898		>12 Halflives		
QA-1173	3.2310E+02	1.1638E+03	1.556E+00%	1.36E+01
QA-1332	3.2507E+02	1.1709E+03	1.514E+00%	5.93E+00
QA-1836		>12 Halflives		

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

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

Total Activity (37.6 to 2000.8 keV) 1.766E+03 GPS
Total Decayed Activity (37.6 to 2000.8 keV) 4.4954102E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 5_20181229002_BG
Description: Background Contamination Check
Acquired: 12/29/2018 4:27:47 AM
Detector: Detector # 5
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.45	1.30	1.35	1.40	1.55	1.60	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

Test America
St. Louis
Quality Control Check

Spectrum: 7_20181229001_QCAsLeft
Description: Quality control Check (QC Source 'C') Post Stabilization
Acquired: 12/29/2018 3:56:00 AM
Detector: Detector # 7
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.59	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	1.17	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	2.01	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.70	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	0.20	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.10	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.36	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.19	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	0.18	4.00	5.00	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

Test America
St. Louis
Background Check

Spectrum: 7_20181229002_BG
Description: Background Contamination Check
Acquired: 12/29/2018 4:28:35 AM
Detector: Detector # 7
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.27	1.40	1.45	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

Test America
St. Louis
Quality Control Check

Spectrum: 9_20181229001_QCAsLeft
Description: Quality control Check (QC Source 'E') Post Stabilization
Acquired: 12/29/2018 3:54:04 AM
Detector: Detector # 9
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.57	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	0.59	4.00	5.00	PASS
QA-662							
FWHM	1.62	0.00	0.00	1.52	3.32	3.42	PASS
ActivityDiff	607.56	-5.00	-4.00	-0.18	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.10	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.43	1333.01	1333.26	PASS
FWHM	2.12	0.00	0.00	1.81	4.32	4.42	PASS
ActivityDiff	1191.31	-5.00	-4.00	-1.40	4.00	5.00	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

Test America
St. Louis
Background Check

Spectrum: 9_20181229002_BG
Description: Background Contamination Check
Acquired: 12/29/2018 4:59:12 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	1.75	2.14	2.26	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

Test America
St. Louis
Quality Control Check

Spectrum: 12_20181229001_QCAsLeft
Description: Quality control Check (QC Source 'H') Post Stabilization
Acquired: 12/29/2018 4:45:13 AM
Detector: Detector #12
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.56	59.79	60.04	PASS
FWHM	0.90	0.00	0.00	0.85	2.00	2.10	PASS
ActivityDiff	691.00	-5.00	-4.00	-0.15	4.00	5.00	PASS
QA-662							
FWHM	1.48	0.00	0.00	1.43	3.18	3.28	PASS
ActivityDiff	659.00	-5.00	-4.00	-1.28	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.10	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.51	1333.01	1333.26	PASS
FWHM	2.00	0.00	0.00	1.99	4.20	4.30	PASS
ActivityDiff	1274.00	-5.00	-4.00	0.35	4.00	5.00	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

Test America
St. Louis
Background Check

Spectrum: 12_20181229002_BG
Description: Background Contamination Check
Acquired: 12/29/2018 5:02:55 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	1.98	2.07	2.10	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

Test America
St. Louis
Background Check

Spectrum: 14_20181229001_BG
Description: Background Contamination Check
Acquired: 12/29/2018 3:32:41 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	1.70	1.90	1.94	Low OOT

Analyst: Aaron Schroder Reviewer: Aaron Schroder

Test America
St. Louis
Quality Control Check

Spectrum: 14_20181229002_QCAsLeft
Description: Quality control Check (QC Source 'E') Post Stabilization
Acquired: 12/29/2018 5:20:00 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	59.61	59.79	60.04	PASS
FWHM	0.76	0.00	0.00	0.87	1.86	1.96	PASS
ActivityDiff	671.90	-5.00	-4.00	2.07	4.00	5.00	PASS
QA-662							
FWHM	1.35	0.00	0.00	1.42	3.05	3.15	PASS
ActivityDiff	628.85	-5.00	-4.00	0.96	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.40	1333.01	1333.26	PASS
FWHM	1.91	0.00	0.00	1.96	4.11	4.21	PASS
ActivityDiff	1224.59	-5.00	-4.00	0.99	4.00	5.00	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

Test America
St. Louis
Background Check

Spectrum: 19_20181229001_BG
Description: Background Contamination Check
Acquired: 12/29/2018 3:31:38 AM
Detector: Detector #19
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	2.25	2.07	2.13	2.15	2.37	2.42	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

ERROR: undefinedfilename
OFFENDING COMMAND: C:\Users\STLCOU~1\AppData\Local\Temp\PDFCreator\Spool\DC08DE1EAB8D42BAB

STACK:

Test America
St. Louis
Quality Control Check

Spectrum: 19_20181229002_QCAsLeft
Description: Quality control Check (QC Source 'F') Post Stabilization
Acquired: 12/29/2018 4:45:54 AM
Detector: Detector #19
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	59.70	59.79	60.04	PASS
FWHM	0.89	0.00	0.00	0.90	1.99	2.09	PASS
ActivityDiff	663.00	-5.00	-4.00	-0.76	4.00	5.00	PASS
QA-662							
FWHM	1.47	0.00	0.00	1.53	3.17	3.27	PASS
ActivityDiff	633.00	-5.00	-4.00	-0.04	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5327.90	5332.00	5333.00	Low OOT
Energy	1332.51	1331.76	1332.01	1332.20	1333.01	1333.26	PASS
FWHM	1.92	0.00	0.00	1.94	4.12	4.22	PASS
ActivityDiff	1222.00	-5.00	-4.00	0.75	4.00	5.00	PASS

Analyst: Aaron Schroder Reviewer: Aaron Schroder

Initial Calibrations

Gamma Verification per Geometry

Detector: Ge2
Geometry: Tuna Can
Reference date: 1/1/2018
Calibration Standard: 108513
Standard volume g / vial: 1550
Standard volume transferred in g / geometry: 342.2
lab ID# of cal standard: #1402359 / Tuna Can_2018_00001

Isotope	Certified Activity - Bq	Geometry Activity - Bq	Count Results	%recovery
Pb-210	72410	15986	15990	100.0
Am-241	5770	1274	1263	99.1
Cd-109	79700	17596	18110	102.9
Co-57	1809	399	391.7	98.1
Ce-139	2723	601	595.1	99.0
Hg-203	5868	1296	1294	99.9
Sn-113	4658	1028	1059	103.0
Cs-137	2283	504	516	102.4
Y-88	7810	1724	1689	98.0
Co-60	3574	789	775.8	98.3
Co-60	3574	789	774.6	98.2
Y-88	7810	1724	1760	102.1

Reviewed By: Jody Watson

Date: 4/23/2018

Calibration Data from file: 2_Soil_TunaCan.Clb
Energy Calibration Date: 4/20/2018 Time: 1:56:12 PM
Efficiency Calibration Date: 4/20/2018 Time: 1:56:20 PM

Calibration Description:
2_Soil_TunaCan_101407

Energy Calibration Fit
Energy = 0.1005 +0.250028*Channel -4.97473e-009*Channel**2
FWHM (ch) = 3.1737 +0.000840*Channel -2.16998e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.87	46.54	46.57	-0.07%	0.82	0.83	-1.01%
237.88	59.54	59.58	-0.06%	0.84	0.84	-0.85%
351.71	88.03	88.04	-0.01%	0.86	0.87	-0.27%
487.70	122.06	122.04	0.02%	0.90	0.89	0.18%
662.91	165.85	165.84	0.00%	0.92	0.93	-0.73%
1116.03	279.17	279.13	0.01%	1.03	1.02	0.73%
1566.05	391.69	391.64	0.01%	1.14	1.11	2.44%
2646.01	661.66	661.64	0.00%	1.32	1.31	0.83%
3591.70	898.02	898.06	-0.00%	1.46	1.48	-0.87%
4692.54	1173.24	1173.26	-0.00%	1.62	1.66	-2.21%
5329.62	1332.50	1332.51	-0.00%	1.78	1.76	1.20%
7343.84	1836.01	1835.99	0.00%	2.05	2.04	0.18%

Efficiency Calibration Fit
Polynomial Uncertainty = 1.0026 %
Coefficients:
-0.414971 -4.933446 0.551852 -0.058768 0.002630 -0.000046

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.8282E-002	1.8238E-002	0.24%
59.54	3.0217E-002	3.0485E-002	-0.89%
88.03	4.2084E-002	4.0747E-002	3.18%
122.06	4.1203E-002	4.2009E-002	-1.96%
165.85	3.6656E-002	3.7027E-002	-1.01%
279.17	2.4402E-002	2.4396E-002	0.03%
391.69	1.8337E-002	1.7804E-002	2.91%
661.66	1.1379E-002	1.1116E-002	2.32%
898.02	8.3829E-003	8.5580E-003	-2.09%
1173.24	6.6850E-003	6.7987E-003	-1.70%
1332.50	5.9600E-003	6.0709E-003	-1.86%
1836.01	4.5575E-003	4.4637E-003	2.06%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.50	4.25	8.11E+003	15986.00	679.41	4.20%	1/1/2018 11:00:00 AM
Am-241	59.50	35.70	1.58E+005	1273.90	454.78	3.60%	1/1/2018 11:00:00 AM
Cd-109	88.00	3.61	4.61E+002	17596.00	635.22	4.10%	1/1/2018 11:00:00 AM
Co-57	122.10	85.60	2.72E+002	399.38	341.87	3.40%	1/1/2018 11:00:00 AM
Ce-139	165.90	79.90	1.38E+002	601.20	480.36	3.60%	1/1/2018 11:00:00 AM
Hg-203	279.20	81.50	4.66E+001	1295.50	1055.83	3.50%	1/1/2018 11:00:00 AM
Sn-113	391.70	64.00	1.15E+002	1028.40	658.18	3.90%	1/1/2018 11:00:00 AM
Cs-137	661.70	85.21	1.10E+004	504.03	429.48	4.10%	1/1/2018 11:00:00 AM
Y-88	898.00	93.70	1.07E+002	1724.30	1615.67	3.70%	1/1/2018 11:00:00 AM
Co-60	1173.20	99.90	1.93E+003	789.05	788.26	3.90%	1/1/2018 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	789.05	788.89	3.90%	1/1/2018 11:00:00 AM
Y-88	1836.10	99.20	1.07E+002	1724.30	1710.51	3.70%	1/1/2018 11:00:00 AM

Test America St. Louis Spectrum ID: 2_TunaCan_20180010

Sample Description: 2_TunaCan_108513
Detector: Detector # 2
Batch ID: 2
Work Order Number: TunaCan
Lot Number: 108513

Decay to Time: 1/1/2018 11:00 Live Time: 3600 sec
Acquisition Time: 3/22/2018 02:01:23 Real Time: 3667 sec
Analysis Time: 4/20/2018 14:00 Dead Time: 1.83 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 2_Soil_TunaCan.Clb
Efficiency Cal Desc: 2_Soil_TunaCan_101407
Efficiency Cal Date: 4/20/2018 13:56
Energy Cal Date: 4/20/2018 13:54
Library: DET_EnergyStandardMix & Pb.lib
Bkgd Correction File: 2_2016-11-06_0311.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
Pb-210	1.599E+04	0.6	9.424E+01	1.031E+03	1.847E+02
AM-241	1.263E+03	0.7	8.421E+00	8.043E+01	1.521E+01
CD-109	1.811E+04	0.4	6.867E+01	1.126E+03	9.736E+01
CO-57	3.917E+02	0.7	2.807E+00	2.268E+01	4.688E+00
Ce-139	5.951E+02	0.6	3.823E+00	3.380E+01	5.755E+00
Hg-203	1.294E+03	0.7	9.594E+00	7.484E+01	1.351E+01
SN-113	1.059E+03	0.8	8.237E+00	6.299E+01	1.076E+01
CS-137	5.160E+02	1.1	5.874E+00	2.719E+01	8.322E+00
Y-898	1.689E+03	0.7	1.238E+01	8.671E+01	1.372E+01
Co-1173	7.758E+02	0.9	6.916E+00	3.922E+01	6.976E+00
Co-1332	7.746E+02	0.9	7.163E+00	3.924E+01	6.756E+00
Y-1836	1.760E+03	0.8	1.416E+01	1.013E+02	6.868E+00
Total	4.422E+04				

Analyst: Jody Watson

Sample description
2_TunaCan_108513

Spectrum Filename: C:\User\SPC\Det2\2_TunaCan_20180010.An1

Acquisition information

Start time:	3/22/2018 2:01:23 AM
Live time:	3600
Real time:	3667
Dead time:	1.83 %
Detector ID:	2

Detector system
Ge 2 SN/164

Calibration

Filename:	2_Soil_TunaCan.Clb

2_Soil_TunaCan_101407

Energy Calibration

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

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.60keV)
Stop channel:	8000 (2000.00keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2018 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	2_2016-11-06_0311.PBC 11/6/2016 3:11:26 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0221

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.62	44323.	0.59	0.83	1.828E-02	46.54	4.250	1.599E+04	Pb210
49.67	262.	56.28	0.83	2.215E-02				
59.61	48072.	0.57	0.84	3.051E-02	59.54	35.700	1.227E+03	AM241
63.26	133.	84.38	0.53	3.261E-02				
70.84	1917.	8.83	0.85	3.602E-02				
72.92	3381.	4.90	0.85	3.679E-02				
75.06	852.	17.67	0.86	3.752E-02				
82.55	1666.	9.67	0.86	3.962E-02				
85.00	2541.	6.47	0.86	4.016E-02				
88.05	85104.	0.38	0.87	4.075E-02	88.03	3.610	1.811E+04	CD109
122.04	41386.	0.72	0.90	4.201E-02	122.06	85.600	3.917E+02	CO57
136.42	4993.	4.03	0.90	4.074E-02				
165.84	42444.	0.64	0.92	3.703E-02	165.85	79.900	5.951E+02	Ce139
175.24	41.	157.44	0.40	3.575E-02				
189.89	220.	43.10	0.51	3.380E-02				
199.36	307.	35.91	1.86	3.258E-02				
238.58	364.	27.37	0.79	2.809E-02				
255.12	1412.	6.21	1.00	2.647E-02				
258.87	199.	40.65	1.00	2.613E-02				
279.13	28359.	0.74	1.03	2.440E-02	279.17	81.500	1.294E+03	Hg203
346.64	83.	80.15	0.65	1.995E-02				
352.00	190.	41.23	0.51	1.967E-02				
369.76	208.	45.15	0.55	1.878E-02				
391.64	26895.	0.78	1.14	1.781E-02	391.69	64.000	1.059E+03	SN113
420.53	48.	93.88	0.68	1.667E-02				
440.85	113.	61.42	0.36	1.596E-02				
467.57	126.	59.92	0.62	1.513E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
583.16	154.	48.59	1.10	1.241E-02				
661.64	17506.	1.14	1.32	1.112E-02	661.66	85.210	5.160E+02	CS137
726.17	98.	51.60	0.63	1.026E-02				
814.23	735.	12.15	1.56	9.303E-03				
873.82	243.	36.39	0.36	8.760E-03				
898.06	29049.	0.73	1.46	8.558E-03	898.02	93.700	1.689E+03	Y898
917.04	94.	58.43	0.29	8.407E-03				
984.82	77.	44.29	0.93	7.910E-03				
992.71	94.	38.13	0.67	7.856E-03				
1006.17	95.	57.14	0.31	7.766E-03				
1173.26	18434.	0.89	1.62	6.799E-03	1173.24	99.900	7.758E+02	Co1173
1258.73	90.	45.19	2.14	6.389E-03				
1277.77	145.	29.63	4.05	6.304E-03				
1332.51	16448.	0.92	1.78	6.071E-03	1332.50	99.982	7.746E+02	Co1332
1835.99	16720.	0.80	2.05	4.464E-03	1836.01	99.200	1.760E+03	Y1836

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

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
198.38	49.62	10765.	274.	1.235E+04	53.97	0.835	-	sD
252.61	63.26	5722.	133.	4.070E+03	84.38	0.528	-	sc
282.95	70.83	13365.	1917.	5.324E+04	8.83	0.852	-	D
291.24	72.90	12037.	3381.	9.190E+04	4.90	0.854	-	D
299.82	75.05	10895.	852.	2.271E+04	17.67	0.856	-	sD
329.80	82.54	12146.	1669.	4.212E+04	9.66	0.862	-	D
339.61	84.99	12245.	2543.	6.331E+04	6.47	0.864	-	sD
545.24	136.42	9285.	4993.	1.225E+05	4.03	0.900	-	
700.50	175.24	2063.	41.	1.147E+03	157.44	0.404	-	c
759.10	189.89	3278.	220.	6.500E+03	43.10	0.505	-	s
796.95	199.36	3948.	307.	9.423E+03	35.91	1.860	-	s
953.85	238.58	3380.	364.	1.297E+04	27.37	0.791	-	
1019.98	255.13	3131.	1412.	5.333E+04	6.21	1.002	-	D
1035.00	258.89	3179.	199.	7.624E+03	40.65	1.005	-	sD
1386.03	346.64	1642.	83.	4.177E+03	80.15	0.652	-	sc
1407.47	352.00	1977.	190.	9.646E+03	41.23	0.513	-	s
1478.53	369.76	2341.	208.	1.106E+04	45.15	0.550	-	s
1681.59	420.53	934.	48.	2.909E+03	93.88	0.681	-	sc
1762.86	440.85	1568.	113.	7.079E+03	61.42	0.359	-	s
1869.74	467.57	1774.	126.	8.363E+03	59.92	0.617	-	s
2332.08	583.16	1562.	154.	1.242E+04	48.59	1.101	-	s
2904.14	726.17	871.	98.	9.569E+03	51.60	0.628	-	s
3256.36	814.23	1551.	735.	7.901E+04	12.15	1.562	-	
3494.72	873.82	1572.	243.	2.778E+04	36.39	0.357	-	s
3667.60	917.04	923.	94.	1.118E+04	58.43	0.286	-	s
3938.76	984.82	461.	77.	9.693E+03	44.29	0.926	-	s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
3970.32	992.71	482.	94.	1.203E+04	38.13	0.668	- s
4024.16	1006.17	849.	95.	1.219E+04	57.14	0.314	- s
5034.48	1258.73	377.	90.	1.411E+04	45.19	2.139	- s
5110.62	1277.77	378.	145.	2.300E+04	29.63	4.054	- s

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

This section based on library: DET_EnergyStandardMix & Pb.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.74	46.54	11937.	44323.	12.312	0.59	0.832D
AM-241	237.88	59.58	16183.	49453.	13.737	0.67	0.836
CD-109	351.68	88.03	9528.	85104.	23.640	0.38	0.867D
CO-57	487.70	122.04	11175.	41386.	11.496	0.72	0.896
Ce-139	662.91	165.84	7657.	42444.	11.790	0.64	0.924
Hg-203	1116.03	279.13	3961.	28359.	7.877	0.74	1.029
SN-113	1566.05	391.64	3372.	26895.	7.471	0.78	1.137
CS-137	2646.01	661.64	3601.	17506.	4.863	1.14	1.322
Y-898	3591.70	898.06	2508.	29049.	8.069	0.73	1.465
Co-1173	4692.54	1173.26	1224.	18434.	5.120	0.89	1.623
Co-1332	5329.62	1332.51	912.	16448.	4.569	0.92	1.779
Y-1836	7343.84	1835.99	180.	16720.	4.644	0.80	2.046

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.5992E+04				8.15E+03	
			46.54	1.599E+04	(P	1.847E+02 5.89E-01 4.25E+00 G	
AM-241		1.2627E+03				1.58E+05	
			59.54	1.263E+03	(P	1.521E+01 6.67E-01 3.57E+01 G	
CD-109		1.8108E+04				4.63E+02	
			88.03	1.811E+04	(	9.736E+01 3.79E-01 3.61E+00 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	3.9167E+02					2.72E+02	
		122.06	3.917E+02	(	4.688E+00	7.17E-01	8.56E+01 G
Ce-139	5.9510E+02					1.38E+02	
		165.85	5.951E+02	(	5.755E+00	6.42E-01	7.99E+01 G
Hg-203	1.2940E+03					4.66E+01	
		279.17	1.294E+03	(P	1.351E+01	7.41E-01	8.15E+01 G
SN-113	1.0591E+03					1.15E+02	
		391.69	1.059E+03	(P	1.076E+01	7.78E-01	6.40E+01 G
CS-137	5.1597E+02					1.10E+04	
		661.66	5.160E+02	(	8.322E+00	1.14E+00	8.52E+01 G
Y-898	1.6888E+03					1.07E+02	
		898.02	1.689E+03	(	1.372E+01	7.33E-01	9.37E+01 G
Co-1173	7.7584E+02					1.93E+03	
		1173.24	7.758E+02	(P	6.976E+00	8.91E-01	9.99E+01 G
Co-1332	7.7461E+02					1.93E+03	
		1332.50	7.746E+02	(P	6.756E+00	9.25E-01	1.00E+02 G
Y-1836	1.7603E+03					1.07E+02	
		1836.01	1.760E+03	(	6.868E+00	8.05E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

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

Nuclide Codes:
T - Thermal Neutron Activation

Peak Codes:
G - Gamma Ray

F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
Pb-210	1.5884E+04	1.5992E+04	5.893E-01%	1.85E+02
AM-241	1.2622E+03	1.2627E+03	6.670E-01%	1.52E+01
CD-109	1.6071E+04	1.8108E+04	3.792E-01%	9.74E+01
CO-57	3.1969E+02	3.9167E+02	7.166E-01%	4.69E+00
Ce-139	3.9851E+02	5.9510E+02	6.424E-01%	5.76E+00
Hg-203	3.9619E+02	1.2940E+03	7.414E-01%	1.35E+01
SN-113	6.5565E+02	1.0591E+03	7.778E-01%	1.08E+01
CS-137	5.1338E+02	5.1597E+02	1.138E+00%	8.32E+00
Y-898	1.0063E+03	1.6888E+03	7.331E-01%	1.37E+01
Co-1173	7.5391E+02	7.7584E+02	8.914E-01%	6.98E+00
Co-1332	7.5272E+02	7.7461E+02	9.248E-01%	6.76E+00
Y-1836	1.0489E+03	1.7603E+03	8.046E-01%	6.87E+00

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

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

Total Activity (37.6 to 2000.0 keV) 3.906E+04 Bq/Sample
Total Decayed Activity (37.6 to 2000.0 keV) 4.4218129E+04 Bq/Sample

Gamma Verification per Geometry

Detector: Ge5

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard Rad12-0007

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14353	96.2
Am-241	2037	418	0.3590	1163	1230.2	105.7
Cd-109	2881	591	0.0361	16363	16101	98.4
Co-57	1511	310	0.8560	362	347.72	96.1
Ce-139	2139	439	0.7990	549	538.4	98.1
Hg-203	4651	954	0.8146	1171	1208.4	103.2
Sn-113	3015	618	0.6400	966	972.07	100.6
Cs-137	1938	397	0.8510	467	462.35	99.0
Y-88	7264	1489	0.9370	1589	1559.3	98.1
Co-60	3580	734	0.9997	734	722.51	98.4
Co-60	3581	734	0.9999	734	739.67	100.7
Y-88	7690	1577	0.9920	1589	1613.8	101.5

Reviewed By: Jody Watson

Date: 3/27/2012

Calibration Data from file: 5_Soil_TunaCan.Clb
Energy Calibration Date: 3/27/2012 Time: 5:20:02 PM
Efficiency Calibration Date: 3/27/2012 Time: 5:20:37 PM

Calibration Description:
5_Soil_TunaCan_90099_032612

Energy Calibration Fit
Energy = 0.1351 +0.249831*Channel +2.72022e-008*Channel**2
FWHM (ch) = 2.8138 +0.001050*Channel -2.57606e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
186.01	46.54	46.61	-0.15%	0.74	0.75	-1.17%
237.86	59.54	59.56	-0.04%	0.74	0.77	-4.07%
351.46	88.03	87.95	0.10%	0.80	0.79	1.28%
487.52	122.06	121.94	0.10%	0.85	0.83	2.66%
663.26	165.85	165.85	0.00%	0.88	0.87	0.98%
1116.90	279.17	279.20	-0.01%	0.97	0.99	-2.35%
1567.36	391.69	391.78	-0.02%	1.12	1.10	1.78%
2647.45	661.66	661.74	-0.01%	1.38	1.35	1.91%
3592.51	898.02	898.01	0.00%	1.55	1.56	-1.11%
4692.96	1173.24	1173.18	0.00%	1.77	1.79	-1.18%
5329.72	1332.50	1332.44	0.00%	1.93	1.92	0.31%
7342.77	1836.01	1836.05	-0.00%	2.29	2.29	0.24%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.8682 %
Ln(Eff) = 0.6466 -0.783045*Ln(Eng) -0.0041175*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.4296 %
Ln(Eff) = -24.6225 +9.075211*Ln(Eng) -0.966442*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.7205E-002	1.7882E-002	-3.93%
59.54	2.6619E-002	2.5335E-002	4.82%
88.03	3.4045E-002	3.4617E-002	-1.68%
122.06	3.4394E-002	3.5819E-002	-4.15%
165.85	========== Knee ==========		
165.85	3.0704E-002	3.1331E-002	-2.04%
279.17	2.1030E-002	2.0365E-002	3.17%
391.69	1.5475E-002	1.5370E-002	0.68%
661.66	9.8486E-003	9.9244E-003	-0.77%
898.02	7.5404E-003	7.6837E-003	-1.90%
1173.24	6.0360E-003	6.1381E-003	-1.69%
1332.50	5.5560E-003	5.5144E-003	0.75%
1836.01	4.2722E-003	4.2078E-003	1.51%

Calibration Certificate Table

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

```
     ORTEC g v - i (1087) Env32  G53W4.25  3/27/2012 5:22:03 PM
TestAmerica                      Spectrum name: 5_TunaCan_20120810.An1

Sample description
     5_TunaCan_90099_032612


Spectrum Filename: C:\User\SPC\Det5\5_TunaCan_20120810.An1

Acquisition information
       Start time:                 3/26/2012 3:05:42 PM
       Live time:               3600
       Real time:               3652
       Dead time:                  1.44 %
       Detector ID:                   5

Detector system
     Ge 5 SN/157


Calibration
       Filename:                   5_Soil_TunaCan.Clb
     5_Soil_TunaCan_90099_032612


       Energy Calibration
            Created:               3/27/2012 5:20:02 PM
            Zero offset:           0.135 keV
            Gain:                  0.250 keV/channel
            Quadratic:             2.720E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/27/2012 5:20:37 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.87 %
            Log(Eff):              6.466115E-01 + (-7.830454E-01*Log(E) ) +
                                   ( -4.117504E-03*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.43 %
            Log(Eff):             -2.462251E+01 + ( 9.075211E+00*Log(E) ) +
                                   ( -9.664422E-01*Log(E)^2 )

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

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.61keV )
       Stop channel:            8000 (  2000.53keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

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

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

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0527

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.61	38986.	0.74	0.74	1.793E-02	46.54	4.250	1.435E+04	Pb210
59.56	40041.	0.74	0.74	2.535E-02	59.54	35.700	1.230E+03	AM241
70.85	1493.	9.22	0.78	3.019E-02				
72.87	2354.	5.96	0.78	3.089E-02				
87.95	63754.	0.53	0.80	3.460E-02	88.03	3.610	1.610E+04	CD109
121.94	30888.	0.76	0.85	3.583E-02	122.06	85.600	3.477E+02	CO57
136.41	3768.	3.80	0.89	3.457E-02				
165.85	31597.	0.74	0.88	3.066E-02	165.85	79.900	5.384E+02	Ce139
279.20	20358.	0.87	0.97	2.036E-02	279.17	81.500	1.208E+03	Hg203
391.78	20611.	0.93	1.12	1.537E-02	391.69	64.000	9.721E+02	SN113
661.74	14000.	1.10	1.38	9.923E-03	661.66	85.210	4.623E+02	CS137
898.01	23228.	0.82	1.55	7.684E-03	898.02	93.700	1.559E+03	Y898
1173.18	15468.	0.93	1.77	6.138E-03	1173.24	99.900	7.225E+02	Co1173
1332.44	14238.	0.98	1.93	5.515E-03	1332.50	99.982	7.397E+02	Co1332
1836.04	13938.	0.87	2.30	4.208E-03	1836.01	99.200	1.614E+03	Y1836

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
291.16	72.88	8722.	2253.	7.295E+04	7.09	0.801	-
545.44	136.41	5274.	3768.	1.090E+05	3.80	0.888	-

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

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

This section based on library: DET_EnergyStandardMix & Pb.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.01	46.61	12895.	38986.	10.829	0.74	0.743
AM-241	237.86	59.56	13293.	40041.	11.122	0.74	0.735
CD-109	351.46	87.95	12894.	63754.	17.710	0.53	0.805
CO-57	487.52	121.94	6935.	30888.	8.580	0.76	0.852
Ce-139	663.26	165.85	5616.	31597.	8.777	0.74	0.883
Hg-203	1116.90	279.20	2848.	20358.	5.655	0.87	0.966
SN-113	1567.36	391.78	3046.	20611.	5.725	0.93	1.119
CS-137	2647.45	661.74	1982.	14000.	3.889	1.10	1.380
Y-898	3592.51	898.01	1944.	23228.	6.452	0.82	1.547
Co-1173	4692.96	1173.18	847.	15468.	4.297	0.93	1.774
Co-1332	5329.75	1332.44	693.	14238.	3.955	0.98	1.927
Y-1836	7342.72	1836.04	102.	13938.	3.872	0.87	2.295

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

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

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq			COMMENTS
Pb-210	N	1.4353E+04						8.15E+03	
			46.54	1.435E+04	(	1.958E+02	7.44E-01	4.25E+00	G
AM-241		1.2302E+03						1.58E+05	
			59.54	1.230E+03	(	1.659E+01	7.44E-01	3.57E+01	G
CD-109		1.6101E+04						4.63E+02	
			88.03	1.610E+04	(	1.343E+02	5.28E-01	3.61E+00	G
CO-57		3.4772E+02						2.72E+02	
			122.06	3.477E+02	(	4.399E+00	7.60E-01	8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3840E+02					1.38E+02	
		165.85	5.384E+02	(	5.997E+00	7.36E-01	7.99E+01 G
Hg-203	1.2084E+03					4.66E+01	
		279.17	1.208E+03	(	1.492E+01	8.69E-01	8.15E+01 G
SN-113	9.7207E+02					1.15E+02	
		391.69	9.721E+02	(	1.226E+01	9.31E-01	6.40E+01 G
CS-137	4.6235E+02					1.10E+04	
		661.66	4.623E+02	(	6.941E+00	1.10E+00	8.52E+01 G
Y-898	1.5593E+03					1.07E+02	
		898.02	1.559E+03	(	1.397E+01	8.19E-01	9.37E+01 G
Co-1173	7.2251E+02					1.93E+03	
		1173.24	7.225E+02	(	6.463E+00	9.30E-01	9.99E+01 G
Co-1332	7.3967E+02					1.93E+03	
		1332.50	7.397E+02	(	6.515E+00	9.82E-01	1.00E+02 G
Y-1836	1.6138E+03					1.07E+02	
		1836.01	1.614E+03	(	5.776E+00	8.71E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

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

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

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

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4250E+04	1.4353E+04	7.439E-01%	1.96E+02
AM-241	1.2297E+03	1.2302E+03	7.442E-01%	1.66E+01
CD-109	1.4172E+04	1.6101E+04	5.277E-01%	1.34E+02
CO-57	2.7983E+02	3.4772E+02	7.604E-01%	4.40E+00
Ce-139	3.5061E+02	5.3840E+02	7.359E-01%	6.00E+00
Hg-203	3.4071E+02	1.2084E+03	8.687E-01%	1.49E+01
SN-113	5.8200E+02	9.7207E+02	9.315E-01%	1.23E+01
CS-137	4.5987E+02	4.6235E+02	1.097E+00%	6.94E+00
Y-898	8.9620E+02	1.5593E+03	8.189E-01%	1.40E+01
Co-1173	7.0069E+02	7.2251E+02	9.300E-01%	6.46E+00
Co-1332	7.1733E+02	7.3967E+02	9.821E-01%	6.52E+00
Y-1836	9.2756E+02	1.6138E+03	8.711E-01%	5.78E+00

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

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

Total Activity (37.6 to 2000.5 keV) 3.491E+04 Bq
Total Decayed Activity (37.6 to 2000.5 keV) 3.9848164E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector: Ge7

Geometry: 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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     ORTEC g v - i (1087) Env32  G53W4.25  3/28/2012 9:26:09 AM    Page  1
TestAmerica                     Spectrum name: 7_1Lmarn_20120463.An1

Sample description
     7_1Lmarn_90062_032612


Spectrum Filename: C:\User\Cal\Spectra\Det7\7_1Lmarn_20120463.An1

Acquisition information
       Start time:                 3/26/2012 6:37:24 AM
       Live time:               3600
       Real time:               4044
       Dead time:                 10.97 %
       Detector ID:                    7

Detector system
     Ge 7 SN/154


Calibration
       Filename:                   7_Liquid_Marinelli 1L.Clb
     7_1Lmarn_90062_032612


       Energy Calibration
            Created:               3/28/2012 9:18:12 AM
            Zero offset:           0.187 keV
            Gain:                  0.250 keV/channel
            Quadratic:             7.031E-09 keV/channel^2

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

Library Files
       Main analysis library:      DET_EnergyStandardMix & Mn, Zn.L
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.68keV )
       Stop channel:            8000 (  2000.10keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (1087) Env32  G53W4.25  3/28/2012 9:26:09 AM    Page  2
TestAmerica                     Spectrum name: 7_1Lmarn_20120463.An1
                                      Page 1
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```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

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

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


total peaks alloc.   13 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0281
```

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
37.93	20996.	2.35	0.98	2.809E-02				
49.58	10390.	5.72	1.78	3.540E-02				
59.57	258725.	0.32	0.88	3.955E-02	59.54	35.700	5.093E+03	AM241
70.77	8653.	4.55	0.93	4.237E-02				
72.95	14085.	2.76	0.93	4.274E-02				
82.51	7182.	5.10	0.94	4.379E-02				
84.92	9567.	3.85	0.94	4.393E-02				
88.04	365268.	0.19	0.94	4.405E-02	88.03	3.610	7.246E+04	CD109
122.00	165308.	0.41	0.98	4.215E-02	122.06	85.600	1.580E+03	CO57
136.39	20328.	2.30	0.95	4.037E-02				
165.77	162197.	0.40	1.02	3.618E-02	165.85	79.900	2.383E+03	Ce139
255.17	5383.	4.05	1.10	2.619E-02				
279.26	107214.	0.47	1.14	2.441E-02	279.17	81.500	5.282E+03	Hg203
391.75	109651.	0.43	1.24	1.863E-02	391.69	64.000	4.258E+03	SN113
511.09	7966.	4.06	2.42	1.496E-02				
661.65	74553.	0.54	1.51	1.202E-02	661.66	85.210	2.033E+03	CS137
813.91	2256.	8.87	1.49	1.004E-02				
834.90	92175.	0.36	1.63	9.815E-03	834.85	99.980	3.149E+03	Mn54
898.04	120447.	0.39	1.68	9.204E-03	898.02	93.700	6.734E+03	Y898
1115.53	70435.	0.55	1.85	7.578E-03	1115.55	50.600	6.491E+03	Zn65
1173.22	79095.	0.48	1.89	7.239E-03	1173.24	99.900	3.132E+03	Co1173
1324.75	2192.	6.90	2.97	6.477E-03				
1332.47	70838.	0.46	2.03	6.443E-03	1332.50	99.982	3.150E+03	Co1332
1836.01	69898.	0.41	2.46	4.773E-03	1836.01	99.200	7.118E+03	Y1836

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

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
151.03	37.93	57996.	20996.	7.475E+05	2.35	0.976	- s
197.64	49.58	98022.	10390.	2.935E+05	5.72	1.780	- s
282.39	70.75	73097.	8653.	2.042E+05	4.55	0.926	- D

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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	Code	MDA Value Bq	COMMENTS
AM-241		5.0933E+03				1.58E+05	
			59.54	5.093E+03	(	3.021E+01 3.21E-01 3.57E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 9:26:09 AM Page 4
TestAmerica Spectrum name: 7_1Lmarn_20120463.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments

```
CD-109        6.9699E+04                                        4.63E+02
                             88.03 6.970E+04  (  2.842E+02 2.48E-01 3.61E+00 G

CO-57         1.5804E+03                                        2.72E+02
                            122.06 1.580E+03  (  1.120E+01 4.05E-01 8.56E+01 G

Ce-139        2.3835E+03                                        1.38E+02
                            165.85 2.383E+03  (  1.577E+01 4.02E-01 7.99E+01 G

Hg-203        5.2816E+03                                        4.66E+01
                            279.17 5.282E+03  (  3.983E+01 4.73E-01 8.15E+01 G

SN-113        4.2577E+03                                        1.15E+02
                            391.69 4.258E+03  (  2.691E+01 4.34E-01 6.40E+01 G

CS-137        2.0333E+03                                        1.10E+04
                            661.66 2.033E+03  (  1.645E+01 5.37E-01 8.52E+01 G

Mn-54         3.1502E+03                                        3.12E+02
                            834.85 3.150E+03  (  1.615E+01 3.64E-01 1.00E+02 G

Y-898         6.7342E+03                                        1.07E+02
                            898.02 6.734E+03  (  3.247E+01 3.90E-01 9.37E+01 G

Zn-65     F   6.4905E+03                                        2.44E+02
                           1115.55 6.491E+03  (  4.310E+01 5.47E-01 5.06E+01 G

Co-1173       3.1322E+03                                        1.93E+03
                           1173.24 3.132E+03  (  1.584E+01 4.77E-01 9.99E+01 G

Co-1332       3.1495E+03                                        1.93E+03
                           1332.50 3.150E+03  (  1.419E+01 4.58E-01 1.00E+02 G

Y-1836        7.1179E+03                                        1.07E+02
                           1836.01 7.118E+03  (  1.619E+01 4.08E-01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
```



```
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
                                       Page 4
```

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

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
AM-241	5.0914E+03	5.0933E+03	3.213E-01%	3.02E+01
CD-109	6.1380E+04	6.9699E+04	2.480E-01%	2.84E+02
CO-57	1.2730E+03	1.5804E+03	4.051E-01%	1.12E+01
Ce-139	1.5549E+03	2.3835E+03	4.024E-01%	1.58E+01
Hg-203	1.4969E+03	5.2816E+03	4.726E-01%	3.98E+01
SN-113	2.5546E+03	4.2577E+03	4.342E-01%	2.69E+01
CS-137	2.0225E+03	2.0333E+03	5.371E-01%	1.64E+01
Mn-54	2.6097E+03	3.1502E+03	3.638E-01%	1.62E+01
Y-898	3.8795E+03	6.7342E+03	3.898E-01%	3.25E+01
Zn-65	5.1023E+03	6.4905E+03	5.470E-01%	4.31E+01
Co-1173	3.0380E+03	3.1322E+03	4.766E-01%	1.58E+01
Co-1332	3.0548E+03	3.1495E+03	4.583E-01%	1.42E+01
Y-1836	4.1005E+03	7.1179E+03	4.075E-01%	1.62E+01

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

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 Centroid Channel	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
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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:       0.0292
```

***** 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
```

I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty Counting 1 Sigma	MDA
AM-241	5.0982E+03	5.0997E+03	2.948E-01%	2.79E+01
CD-109	6.3647E+04	7.0211E+04	2.150E-01%	2.46E+02
CO-57	1.3465E+03	1.5913E+03	3.536E-01%	9.90E+00
Ce-139	1.7132E+03	2.3827E+03	3.352E-01%	1.31E+01
Hg-203	2.0000E+03	5.2957E+03	3.181E-01%	2.48E+01
SN-113	2.8588E+03	4.2415E+03	3.329E-01%	1.94E+01
CS-137	2.0240E+03	2.0323E+03	5.102E-01%	1.56E+01
Mn-54	2.7764E+03	3.2108E+03	3.741E-01%	1.50E+01
Y-898	4.3268E+03	6.6244E+03	3.304E-01%	2.64E+01
Zn-65	5.3988E+03	6.5015E+03	4.445E-01%	3.39E+01
Co-1173	3.0570E+03	3.1300E+03	3.728E-01%	1.16E+01
Co-1332	3.0881E+03	3.1618E+03	3.985E-01%	1.19E+01
Y-1836	4.6406E+03	7.1049E+03	3.322E-01%	1.29E+01

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

ORTEC g v - i (1087) Env32 G53W4.25 3/14/2012 5:01:08 PM Page 6
TestAmerica, Inc. Spectrum name: 14_Marn1L_20120214.An1

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

Total Activity (37.7 to 1999.4 keV) 1.020E+05 Bq
Total Decayed Activity (37.7 to 1999.4 keV) 1.2058714E+05 Bq

Gamma Verification per Geometry

Detector: **Ge19**
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	1262	99.1
Cd-109	79700	17596	18110	102.9
Co-57	1809	399	392.1	98.2
Ce-139	2723	601	592.2	98.5
Hg-203	5868	1296	1308	101.0
Sn-113	4658	1028	1045	101.6
Cs-137	2283	504	518.1	102.8
Y-88	7810	1724	1691	98.1
Co-60	3574	789	778.3	98.6
Co-60	3574	789	770.3	97.6
Y-88	7810	1724	1762	102.2

Reviewed By: Jody Watson

Date: 4/17/2018

Calibration Data from file: 19_Soil_TunaCan.Clb
Energy Calibration Date: 4/16/2018 Time: 12:11:10 PM
Efficiency Calibration Date: 4/16/2018 Time: 12:11:21 PM

Calibration Description:
19_TunaCan_108513

Energy Calibration Fit
Energy = 0.1766 +0.250204*Channel -3.73478e-008*Channel**2
FWHM (ch) = 3.5649 +0.000922*Channel -2.36904e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.55	46.54	46.60	-0.13%	0.89	0.93	-4.67%
237.43	59.54	59.58	-0.07%	0.92	0.95	-2.49%
351.31	88.03	88.07	-0.05%	0.99	0.97	1.45%
487.25	122.06	122.08	-0.02%	1.02	1.00	1.42%
662.37	165.85	165.89	-0.02%	1.07	1.04	2.92%
1114.62	279.17	279.01	0.06%	1.17	1.14	2.29%
1564.53	391.69	391.54	0.04%	1.23	1.24	-0.87%
2644.90	661.66	661.68	-0.00%	1.46	1.46	0.15%
3590.43	898.02	898.04	-0.00%	1.63	1.64	-0.77%
4691.85	1173.24	1173.27	-0.00%	1.84	1.84	-0.05%
5329.60	1332.50	1332.60	-0.01%	1.94	1.95	-0.29%
7345.15	1836.01	1835.95	0.00%	2.27	2.26	0.25%

Efficiency Calibration Fit
Polynomial Uncertainty = 0.8405 %
Coefficients:
-0.371612 -4.869309 0.466742 -0.049787 0.002234 -0.000039

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.7090E-002	1.7048E-002	0.25%
59.54	2.5898E-002	2.6134E-002	-0.91%
88.03	3.4294E-002	3.3195E-002	3.21%
122.06	3.3380E-002	3.3999E-002	-1.85%
165.85	3.0076E-002	3.0529E-002	-1.51%
279.17	2.1644E-002	2.1412E-002	1.07%
391.69	1.6644E-002	1.6371E-002	1.64%
661.66	1.1237E-002	1.0933E-002	2.71%
898.02	8.5558E-003	8.7213E-003	-1.93%
1173.24	7.0410E-003	7.1383E-003	-1.38%
1332.50	6.3120E-003	6.4652E-003	-2.43%
1836.01	5.0415E-003	4.9331E-003	2.15%

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: 19_TunaCan_20180020

Sample Description: 19_TunaCan_108513
Detector: Detector #19
Batch ID: 19
Work Order Number: TunaCan
Lot Number: 108513

Decay to Time: 1/1/2018 11:00 Live Time: 3600 sec
Acquisition Time: 3/14/2018 15:23:10 Real Time: 3652 sec
Analysis Time: 4/16/2018 13:51 Dead Time: 1.43 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 19_Soil_TunaCan.Clb
Efficiency Cal Desc: 19_TunaCan_108513
Efficiency Cal Date: 4/16/2018 12:11
Energy Cal Date: 4/16/2018 11:22
Library: DET_EnergyStandardMix & Pb.lib
Bkgd Correction File: 19_2017-05-03_0244.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	9.827E+01	1.032E+03	1.956E+02
AM-241	1.262E+03	0.8	9.764E+00	8.057E+01	1.778E+01
CD-109	1.811E+04	0.4	7.707E+01	1.127E+03	1.177E+02
CO-57	3.921E+02	0.9	3.334E+00	2.277E+01	5.681E+00
Ce-139	5.922E+02	0.7	4.306E+00	3.370E+01	6.700E+00
Hg-203	1.308E+03	0.8	1.088E+01	7.580E+01	1.542E+01
SN-113	1.045E+03	0.8	8.323E+00	6.221E+01	1.083E+01
CS-137	5.181E+02	1.1	5.945E+00	2.731E+01	8.219E+00
Y-898	1.691E+03	0.7	1.196E+01	8.678E+01	1.289E+01
Co-1173	7.783E+02	0.9	6.815E+00	3.933E+01	6.923E+00
Co-1332	7.703E+02	1.0	7.560E+00	3.911E+01	7.892E+00
Y-1836	1.762E+03	0.8	1.428E+01	1.014E+02	1.026E+01
Total	4.424E+04				

Analyst: Jody Watson

TestAmerica Inc Spectrum name: 19_TunaCan_20180020.An1

Sample description
19_TunaCan_108513

Spectrum Filename: C:\User\SPC\Det19\19_TunaCan_20180020.An1

Acquisition information

Start time:	3/14/2018 3:23:10 PM
Live time:	3600
Real time:	3652
Dead time:	1.43 %
Detector ID:	19

Detector system
Ge19 SN/11146715

Calibration
Filename: 19_Soil_TunaCan.Clb
19_TunaCan_108513

Energy Calibration

Created:	4/16/2018 11:22:57 AM
Zero offset:	0.177 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/16/2018 12:11:21 PM
Type:	Polynomial
Uncertainty:	0.841 %
Coefficients:	-0.371612 -4.869309 0.466742
	-0.049787 0.002234 -0.000039

Library Files

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

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.71keV)
Stop channel:	8000 (1999.42keV)
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	19_2017-05-03_0244.PBC 5/3/2017 2:44:56 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0474

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.64	41485.	0.61	0.93	1.711E-02	46.54	4.250	1.600E+04	Pb210
49.66	185.	79.61	0.94	2.004E-02				
59.58	42387.	0.77	0.92	2.615E-02	59.54	35.700	1.262E+03	AM241
70.77	1497.	10.76	0.96	2.996E-02				
72.98	2850.	5.71	0.96	3.053E-02				
77.04	130.	105.86	0.96	3.144E-02				
82.61	1804.	9.10	0.97	3.245E-02				
84.89	1999.	8.21	0.97	3.279E-02				
88.09	70129.	0.43	0.97	3.320E-02	88.03	3.610	1.811E+04	CD109
109.95	270.	55.08	0.90	3.432E-02				
122.08	34171.	0.85	1.02	3.400E-02	122.06	85.600	3.921E+02	CO57
136.52	4531.	4.35	1.04	3.311E-02				
156.45	191.	70.26	0.48	3.141E-02				
165.89	36156.	0.73	1.07	3.053E-02	165.85	79.900	5.922E+02	Ce139
255.00	1262.	10.74	1.03	2.296E-02				
279.01	28100.	0.83	1.17	2.142E-02	279.17	81.500	1.308E+03	Hg203
374.53	40.	110.13	0.47	1.696E-02				
391.54	25531.	0.80	1.23	1.638E-02	391.69	64.000	1.045E+03	SN113
438.33	68.	61.86	0.55	1.498E-02				
450.42	51.	90.94	0.45	1.466E-02				
579.11	37.	118.27	1.39	1.208E-02				
583.45	143.	40.12	1.40	1.201E-02				
590.49	120.	62.06	0.55	1.191E-02				
602.94	89.	61.09	0.46	1.172E-02				
608.99	230.	39.38	0.89	1.163E-02				
634.72	58.	97.26	0.36	1.128E-02				
661.68	17295.	1.15	1.46	1.093E-02	661.66	85.210	5.181E+02	CS137

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
680.83	293.	36.47	0.98	1.070E-02				
701.88	76.	74.94	0.28	1.046E-02				
813.88	662.	13.53	1.81	9.378E-03				
898.02	31118.	0.71	1.63	8.721E-03	898.02	93.700	1.691E+03	Y898
919.02	96.	39.05	0.43	8.573E-03				
973.55	110.	43.13	1.47	8.215E-03				
1173.23	19468.	0.88	1.84	7.138E-03	1173.24	99.900	7.783E+02	Co1173
1311.47	54.	70.42	0.52	6.547E-03				
1332.58	17466.	0.98	1.95	6.465E-03	1332.50	99.982	7.703E+02	Co1332
1426.68	175.	38.25	0.53	6.121E-03				
1515.29	59.	39.89	1.20	5.826E-03				
1553.02	72.	48.79	0.62	5.708E-03				
1619.47	59.	52.31	0.50	5.509E-03				
1835.90	19413.	0.81	2.27	4.933E-03	1836.01	99.200	1.762E+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
197.98	49.61	10751.	205.	1.023E+04	71.88	0.937	- c
282.14	70.75	12228.	1497.	4.997E+04	10.76	0.956	- D
290.98	72.96	11800.	2850.	9.335E+04	5.71	0.958	- D
307.22	77.02	9412.	130.	4.137E+03	105.86	0.962	- c
329.65	82.59	12567.	1809.	5.576E+04	9.07	0.967	- sD
338.75	84.87	12449.	2015.	6.145E+04	8.14	0.969	- sD
438.78	109.95	7282.	270.	7.868E+03	55.08	0.905	- s
544.98	136.52	8574.	4531.	1.368E+05	4.35	1.039	- s
624.64	156.45	5607.	191.	6.070E+03	70.26	0.482	- s
1018.60	255.00	4278.	1262.	5.496E+04	10.74	1.030	-
1496.54	374.53	900.	40.	2.387E+03	110.13	0.471	- c
1751.63	438.33	774.	68.	4.506E+03	61.86	0.545	- s
1800.00	450.42	900.	51.	3.478E+03	90.94	0.447	- sc
2314.63	579.33	954.	37.	3.086E+03	118.27	1.393	- sc
2331.99	583.67	1569.	143.	1.188E+04	40.12	1.396	- sD
2360.15	590.49	1480.	120.	1.008E+04	62.06	0.550	- s
2409.97	602.94	1012.	89.	7.593E+03	61.09	0.464	- s
2434.16	608.99	1840.	230.	1.977E+04	39.38	0.887	- s
2537.07	634.72	1084.	58.	5.099E+03	97.26	0.355	- sc
2721.49	680.83	2304.	293.	2.739E+04	36.47	0.976	- s
2805.71	701.88	1056.	76.	7.264E+03	74.94	0.285	- s
3253.74	813.88	1425.	662.	7.059E+04	13.53	1.808	- s
3674.40	919.02	530.	96.	1.126E+04	39.05	0.432	- s
3892.57	973.55	682.	110.	1.345E+04	43.13	1.468	- s
5245.01	1311.47	348.	54.	8.248E+03	70.42	0.522	- s
5706.21	1426.68	646.	175.	2.859E+04	38.25	0.525	- s
6061.00	1515.29	198.	59.	1.013E+04	39.89	1.199	- s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
6212.08	1553.02	345.	72.	1.256E+04	48.79	0.621	- s
6478.17	1619.47	284.	59.	1.074E+04	52.31	0.497	- 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	185.31	46.54	11710.	41485.	11.524	0.61	0.935D
AM-241	237.43	59.58	16272.	42387.	11.774	0.77	0.923
CD-109	351.15	88.03	9451.	70129.	19.480	0.43	0.972D
CO-57	487.25	122.08	11165.	34171.	9.492	0.85	1.017
Ce-139	662.37	165.89	7603.	36156.	10.043	0.73	1.073
Hg-203	1114.62	279.01	4975.	28100.	7.806	0.83	1.168
SN-113	1564.53	391.54	3156.	25531.	7.092	0.80	1.227
CS-137	2644.90	661.68	3399.	17295.	4.804	1.15	1.461
Y-898	3590.36	898.02	2532.	31118.	8.644	0.71	1.632
Co-1173	4691.69	1173.23	1338.	19468.	5.408	0.88	1.845
Co-1332	5329.52	1332.58	1430.	17466.	4.852	0.98	1.948
Y-1836	7344.98	1835.90	561.	19413.	5.392	0.81	2.273

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	1.6003E+04				8.15E+03	
			46.54	1.600E+04	(	1.956E+02 6.14E-01 4.25E+00 G	
AM-241		1.2624E+03				1.58E+05	
			59.54	1.262E+03	(	1.778E+01 7.73E-01 3.57E+01 G	
CD-109		1.8113E+04				4.63E+02	
			88.03	1.811E+04	(	1.177E+02 4.25E-01 3.61E+00 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	3.9206E+02						2.72E+02
		122.06	3.921E+02	(	5.681E+00	8.50E-01	8.56E+01 G
Ce-139	5.9221E+02						1.38E+02
		165.85	5.922E+02	(	6.700E+00	7.27E-01	7.99E+01 G
Hg-203	1.3079E+03						4.66E+01
		279.17	1.308E+03	(	1.542E+01	8.32E-01	8.15E+01 G
SN-113	1.0455E+03						1.15E+02
		391.69	1.045E+03	(	1.083E+01	7.96E-01	6.40E+01 G
CS-137	5.1806E+02						1.10E+04
		661.66	5.181E+02	(	8.219E+00	1.15E+00	8.52E+01 G
Y-898	1.6914E+03						1.07E+02
		898.02	1.691E+03	(	1.289E+01	7.07E-01	9.37E+01 G
Co-1173	7.7829E+02						1.93E+03
		1173.24	7.783E+02	(	6.923E+00	8.76E-01	9.99E+01 G
Co-1332	7.7032E+02						1.93E+03
		1332.50	7.703E+02	(	7.892E+00	9.81E-01	1.00E+02 G
Y-1836	1.7620E+03						1.07E+02
		1836.01	1.762E+03	(	1.026E+01	8.10E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

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

Nuclide Codes:
T - Thermal Neutron Activation

Peak Codes:
G - Gamma Ray

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

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

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
Pb-210	1.5905E+04	1.6003E+04	6.141E-01%	1.96E+02
AM-241	1.2620E+03	1.2624E+03	7.734E-01%	1.78E+01
CD-109	1.6256E+04	1.8113E+04	4.255E-01%	1.18E+02
CO-57	3.2615E+02	3.9206E+02	8.503E-01%	5.68E+00
Ce-139	4.1173E+02	5.9221E+02	7.271E-01%	6.70E+00
Hg-203	4.4729E+02	1.3079E+03	8.318E-01%	1.54E+01
SN-113	6.7689E+02	1.0455E+03	7.961E-01%	1.08E+01
CS-137	5.1570E+02	5.1806E+02	1.148E+00%	8.22E+00
Y-898	1.0578E+03	1.6914E+03	7.071E-01%	1.29E+01
Co-1173	7.5832E+02	7.7829E+02	8.756E-01%	6.92E+00
Co-1332	7.5056E+02	7.7032E+02	9.814E-01%	7.89E+00
Y-1836	1.1019E+03	1.7620E+03	8.103E-01%	1.03E+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) 3.947E+04 Bq/Sample
Total Decayed Activity (37.7 to 1999.4 keV) 4.4235852E+04 Bq/Sample

Initial Calibration Verifications

2nd Source Verification

Detector: **Ge2**
Geometry: **Tunacan**
Reference date: **10/1/2006**
Calibration Standard: **74139-334**
Standard volume g / vial: **1550**
Standard volume transferred in g / geometry: **341.9**
lab ID# of cal standard: **1282974**

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	449	0.359	1250	1220	97.6
Cs-137	1926	425	0.851	499	487.7	97.7
Co-60	3612	797	0.999856	797	797.7	100.1

Reviewed By: Jody Watson

Date: 5/4/2018

Test America St. Louis Spectrum ID: 2_TunaCan_20180038

Sample Description: 2_TunaCan_ICV
Detector: Detector # 2
Batch ID: 2
Work Order Number: TunaCan
Lot Number: ICV

Decay to Time: 10/1/2006 11:00 Live Time: 5000 sec
Acquisition Time: 5/4/2018 10:31:30 Real Time: 5033 sec
Analysis Time: 5/4/2018 13:30 Dead Time: 0.66 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 2_Soil_TunaCan.Clb
Efficiency Cal Desc: 2_Soil_TunaCan_101407
Efficiency Cal Date: 4/20/2018 13:56
Energy Cal Date: 4/20/2018 13:54
Library: DET_EnergyStandardMix & Pb.lib
Bkgd Correction File: 2_2018-04-08_0858.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
Pb-210	1.496E+04	0.6	8.977E+01	9.646E+02	1.664E+02
AM-241	1.220E+03	0.5	6.188E+00	7.751E+01	9.027E+00
CD-109	2.326E+04	27.0	6.277E+03	6.441E+03	1.627E+04
CO-57	1.000E+100	120.1	4.721E-01	4.727E-01	1.245E+00
Ce-139	1.000E+100	434.8	4.997E-01	4.997E-01	1.325E+00
Hg-203	1.000E+100	157.5	7.075E-01	7.080E-01	1.782E+00
SN-113	1.000E+100	845.3	9.492E-01	9.492E-01	2.774E+00
CS-137	4.877E+02	0.8	3.928E+00	2.540E+01	2.869E+00
Y-898	1.000E+100	92.1	1.146E+00	1.148E+00	2.556E+00
Co-1173	7.729E+02	1.5	1.128E+01	4.009E+01	9.216E+00
Co-1332	7.977E+02	1.4	1.131E+01	4.131E+01	5.225E+00
Y-1836	1.000E+100	174.2	5.770E-01	5.773E-01	1.243E+00
Total	6.000E+100				

Analyst: Jody Watson

Sample description
2_TunaCan_ICV

Spectrum Filename: C:\User\SPC\Det2\2_TunaCan_20180038.An1

Acquisition information

Start time:	5/4/2018 10:31:30 AM
Live time:	5000
Real time:	5033
Dead time:	0.66 %
Detector ID:	2

Detector system
Ge 2 SN/164

Calibration

Filename:	2_Soil_TunaCan.Clb

2_Soil_TunaCan_101407

Energy Calibration

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

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.60keV)
Stop channel:	8000 (2000.01keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	2_2018-04-08_0858.PBC 4/8/2018 8:58:33 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1063

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.64	40453.	0.60	0.83	1.831E-02	46.54	4.250	1.496E+04	Pb210
49.47	198.	66.51	0.83	2.193E-02				
59.59	65141.	0.51	0.83	3.052E-02	59.54	35.700	1.220E+03	AM241
74.95	168.	37.79	0.86	3.749E-02				
77.16	320.	19.16	0.86	3.818E-02				
87.99	301.	26.99	1.70	4.075E-02	88.03	3.610	2.326E+04	CD109
92.77	265.	30.03	1.16	4.147E-02				
115.87	87.	63.78	0.45	4.233E-02				
122.06	71.	120.13	0.89	4.201E-02	122.06	85.600	HL>Cutoff	CO57
165.85	17.	434.80	0.93	3.703E-02	165.85	79.900	HL>Cutoff	Ce139
238.69	433.	13.82	0.85	2.807E-02				
257.80	43.	63.39	0.38	2.622E-02				
352.08	189.	28.54	0.95	1.966E-02				
360.48	40.	63.56	0.59	1.924E-02				
583.33	133.	26.24	1.30	1.241E-02				
609.71	130.	24.19	0.90	1.194E-02				
661.79	17680.	0.81	1.34	1.111E-02	661.66	85.210	4.877E+02	CS137
676.63	27.	67.31	0.34	1.090E-02				
726.90	58.	53.21	0.34	1.025E-02				
866.52	24.	59.80	0.30	8.822E-03				
898.02	50.	92.10	1.48	8.558E-03	898.02	93.700	HL>Cutoff	Y898
912.00	135.	32.05	2.38	8.446E-03				
1173.50	5718.	1.46	1.70	6.797E-03	1173.24	99.900	7.729E+02	Co1173
1332.77	5273.	1.42	1.73	6.070E-03	1332.50	99.982	7.977E+02	Co1332

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
197.67	49.43	8615.	236.	1.077E+04	55.95	0.835	- sD
299.39	74.95	1908.	180.	4.809E+03	35.11	0.856	- D
308.22	77.16	1712.	333.	8.731E+03	18.39	0.858	- D
370.65	92.77	1815.	265.	6.383E+03	30.03	1.156	- s
463.05	115.87	1113.	87.	2.048E+03	63.78	0.450	- s
954.29	238.69	996.	433.	1.542E+04	13.82	0.854	-
1030.71	257.80	350.	43.	1.640E+03	63.39	0.377	- c
1407.81	352.08	749.	189.	9.631E+03	28.54	0.953	-
1441.40	360.48	285.	40.	2.097E+03	63.56	0.590	- s
2332.78	583.33	296.	133.	1.072E+04	26.24	1.299	-
2438.29	609.71	248.	130.	1.093E+04	24.19	0.895	- s
2705.95	676.63	117.	27.	2.507E+03	67.31	0.337	- s
2907.04	726.90	218.	58.	5.707E+03	53.21	0.342	- s
3465.51	866.52	91.	24.	2.720E+03	59.80	0.303	- s
3647.47	912.00	370.	135.	1.594E+04	32.05	2.380	- s

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

This section based on library: DET_EnergyStandardMix & Pb.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.74	46.54	9207.	40453.	8.091	0.60	0.832D
AM-241	237.95	59.59	10587.	65141.	13.028	0.51	0.827
CD-109	351.52	87.99	1989.	301.	0.060	26.99	1.698s
CO-57	487.79	122.06	2253.	71.	0.014	120.13	0.895s
Ce-139	662.93	165.85	1720.	17.	0.003	434.80	0.930
Hg-203	1116.18	279.17	1401.	-45.	-0.009	157.47	1.021s
SN-113	1566.22	391.69	1111.	-6.	-0.001	845.30	1.109s
CS-137	2646.59	661.79	472.	17680.	3.536	0.81	1.340
Y-898	3591.54	898.02	458.	50.	0.010	92.10	1.477s
Co-1173	4693.49	1173.50	197.	5718.	1.144	1.46	1.695
Co-1332	5330.65	1332.77	47.	5273.	1.055	1.42	1.729
Y-1836	7343.89	1836.01	28.	-7.	-0.001	174.19	2.042s

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

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

Pb-210    N   1.4964E+04                                   8.15E+03
                           46.54 1.496E+04  (P 1.664E+02 6.00E-01 4.25E+00 G

AM-241        1.2195E+03                                   1.58E+05
                           59.54 1.220E+03  (P 9.027E+00 5.07E-01 3.57E+01 G

CD-109        2.3256E+04                                   4.63E+02
                           88.03 2.326E+04 *(  1.627E+04 2.70E+01 3.61E+00 G

CO-57         3.9303E-01                                   2.72E+02
                          122.06 3.930E-01 &(  1.245E+00 1.20E+02 8.56E+01 G

Ce-139        1.1492E-01                                   1.38E+02
                          165.85 1.149E-01 ?(  1.325E+00 4.35E+02 7.99E+01 G

Hg-203       -4.4930E-01                                   4.66E+01
                          279.17-4.493E-01  (  1.782E+00 1.57E+02 8.15E+01 G

SN-113       -1.1229E-01                                   1.15E+02
                          391.69-1.123E-01 ?(P 2.774E+00 8.45E+02 6.40E+01 G

CS-137        4.8765E+02                                   1.10E+04
                          661.66 4.877E+02  (  2.869E+00 8.05E-01 8.52E+01 G

Y-898         1.2441E+00                                   1.07E+02
                          898.02 1.244E+00 &(P 2.556E+00 9.21E+01 9.37E+01 G

Co-1173       7.7294E+02                                   1.93E+03
                         1173.24 7.729E+02  (  9.216E+00 1.46E+00 9.99E+01 G

Co-1332       7.9768E+02                                   1.93E+03
                         1332.50 7.977E+02  (  5.225E+00 1.42E+00 1.00E+02 G

Y-1836       -3.3123E-01                                   1.07E+02
                         1836.01-3.312E-01 ?(  1.243E+00 1.74E+02 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```

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

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

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

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
CO-57	122.06	2253.	71.	0.014	120.13	0.000E+00	
Ce-139	165.85	1720.	17.	0.003	434.80	0.000E+00	
Hg-203	279.17	1401.	-45.	-0.009	157.47	0.000E+00	
SN-113	391.69	1111.	-6.	-0.001	845.30	0.000E+00	P
Y-898	898.02	458.	50.	0.010	92.10	0.000E+00	P
Y-1836	1836.01	28.	-7.	-0.001	174.19	0.000E+00	

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
Pb-210	1.0438E+04	1.4964E+04	5.999E-01%	1.66E+02
AM-241	1.1971E+03	1.2195E+03	5.074E-01%	9.03E+00
CD-109 #	4.0926E+01	2.3256E+04	2.699E+01%	1.63E+04
CO-57 #A	3.9303E-01	>12 Halflives	1.201E+02%	1.25E+00
Ce-139 #A	1.1492E-01	>12 Halflives	4.348E+02%	1.32E+00
Hg-203 #A	-4.4930E-01	>12 Halflives	1.575E+02%	1.78E+00
SN-113 #A	-1.1229E-01	>12 Halflives	8.453E+02%	2.77E+00
CS-137	3.7333E+02	4.8765E+02	8.054E-01%	2.87E+00
Y-898 #A	1.2441E+00	>12 Halflives	9.210E+01%	2.56E+00

Co-1173	1.6837E+02	7.7294E+02	1.460E+00%	9.22E+00
Co-1332	1.7376E+02	7.9768E+02	1.418E+00%	5.23E+00
Y-1836 #A	-3.3123E-01	>12 Halflives	1.742E+02%	1.24E+00

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

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

Total Activity (37.6 to 2000.0 keV) 1.239E+04 Bq/Sample
Total Decayed Activity (37.6 to 2000.0 keV) 4.1498754E+04 Bq/Sample

2nd Source Verification

Detector:	Ge5
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1160.9	99.7
Cs-137	1926	396	0.851	465	442.36	95.1
Co-60	3611	742	0.99974	742	700.21	94.3
Co-60	3612	742	0.999856	742	701.86	94.6

Reviewed By: Jody Watson

Date: 3/27/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  3/28/2012 7:35:49 AM    Page  1
TestAmerica                     Spectrum name: 5_TunaCan2nd_20120813.An1

Sample description
     5_TunaCan2nd_Rad10_032712


Spectrum Filename: C:\User\SPC\Det5\5_TunaCan2nd_20120813.An1

Acquisition information
       Start time:                 3/27/2012 10:12:05 AM
       Live time:               7200
       Real time:               7250
       Dead time:                  0.69 %
       Detector ID:                    5

Detector system
     Ge 5 SN/157


Calibration
       Filename:                   5_Soil_TunaCan.Clb
     5_Soil_TunaCan_90099_032612


       Energy Calibration
            Created:               3/27/2012 5:20:02 PM
            Zero offset:           0.135 keV
            Gain:                  0.250 keV/channel
            Quadratic:             2.720E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/27/2012 5:20:37 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.87 %
            Log(Eff):              6.466115E-01 + (-7.830454E-01*Log(E) ) +
                                   ( -4.117504E-03*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.43 %
            Log(Eff):             -2.462251E+01 + ( 9.075211E+00*Log(E) ) +
                                   ( -9.664422E-01*Log(E)^2 )

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

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.61keV )
       Stop channel:            8000 (  2000.53keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  3/28/2012 7:35:49 AM    Page  2
TestAmerica                     Spectrum name: 5_TunaCan2nd_20120813.An1
                                      Page 1
```

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

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

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2012-02-26_0305.PBC 2/26/2012 3:05:30 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 33.1557

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.81	1005.	12.08	0.62	1.151E-02				
46.61	72616.	0.49	0.73	1.792E-02	46.54	4.250	1.421E+04	Pb210
49.73	1326.	15.18	0.68	1.987E-02				
59.57	75329.	0.49	0.74	2.535E-02	59.54	35.700	1.161E+03	AM241
87.94	40851.	0.68	0.80	3.460E-02	88.03	3.610	1.542E+04	CD109
96.44	148.	47.31	0.80	3.568E-02				
99.01	160.	48.52	0.81	3.589E-02				
105.59	109.	69.79	0.52	3.619E-02				
121.94	9225.	1.66	0.84	3.583E-02	122.06	85.600	3.348E+02	CO57
129.89	126.	62.97	0.30	3.522E-02				
136.43	1263.	7.42	0.90	3.457E-02				
165.86	1574.	6.14	0.84	3.133E-02	165.85	79.900	5.319E+02	Ce139
238.72	327.	27.04	0.86	2.319E-02				
247.25	57.	84.47	0.31	2.252E-02				
259.02	93.	60.17	0.97	2.167E-02				
260.46	98.	58.62	0.97	2.157E-02				
322.65	45.	91.14	0.46	1.806E-02				
351.63	256.	27.79	1.06	1.681E-02				
391.95	494.	16.33	1.15	1.536E-02	391.69	64.000	9.501E+02	SN113
407.02	43.	90.43	0.56	1.489E-02				
412.80	202.	35.90	0.77	1.471E-02				
420.83	123.	52.91	0.72	1.448E-02				
510.72	188.	44.32	0.50	1.232E-02				
542.81	148.	28.69	0.36	1.171E-02				
583.30	161.	33.50	0.69	1.103E-02				
661.70	25605.	0.71	1.39	9.924E-03	661.66	85.210	4.424E+02	CS137
762.61	129.	36.06	0.79	8.812E-03				
796.90	151.	38.71	0.30	8.493E-03				
886.67	129.	46.77	0.30	7.766E-03				
897.77	428.	19.21	1.38	7.686E-03	898.02	93.700	1.665E+03	Y898
932.49	230.	35.52	0.82	7.445E-03				

1008.65	104.	56.29	0.28	6.970E-03				
1173.15	23044.	0.73	1.79	6.138E-03	1173.24	99.900	7.002E+02	Co1173
1332.39	20769.	0.71	1.87	5.515E-03	1332.50	99.982	7.019E+02	Co1332
1836.05	245.	7.47	1.56	4.208E-03	1836.01	99.200	1.642E+03	Y1836

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

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
146.78	36.81	4847.	1005.	8.731E+04	12.08	0.625	-
198.52	49.73	12365.	1326.	6.673E+04	15.18	0.681	- s
385.40	96.42	1874.	90.	2.532E+03	71.31	0.588	- sc
395.68	98.99	2103.	121.	3.381E+03	58.44	0.394	- s

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 7:35:49 AM Page 3
TestAmerica Spectrum name: 5_TunaCan2nd_20120813.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
422.09	105.59	2271.	109.	3.012E+03	69.79	0.518	- sc
519.32	129.89	2194.	126.	3.592E+03	62.97	0.298	- s
545.51	136.43	2377.	1263.	3.654E+04	7.42	0.900	- s
954.90	238.72	2247.	327.	1.410E+04	27.04	0.863	- sM
989.00	247.25	1031.	57.	2.516E+03	84.47	0.312	- sc
1036.13	259.01	1532.	93.	4.309E+03	60.17	0.968	- D
1041.90	260.46	1588.	98.	4.525E+03	58.62	0.970	- D
1290.76	322.65	744.	45.	2.473E+03	91.14	0.455	- c
1406.70	351.63	1442.	256.	1.523E+04	27.79	1.058	- s
1628.36	407.02	667.	43.	2.866E+03	90.43	0.562	- sc
1651.47	412.80	1438.	202.	1.370E+04	35.90	0.775	- s
1683.60	420.83	1291.	123.	8.472E+03	52.91	0.720	- s
2043.25	510.72	1553.	188.	1.523E+04	44.32	0.503	- s
2171.67	542.81	587.	148.	1.267E+04	28.69	0.362	- s
2333.63	583.30	785.	161.	1.460E+04	33.50	0.694	- s
3050.97	762.61	614.	129.	1.468E+04	36.06	0.794	- s
3188.11	796.90	856.	151.	1.782E+04	38.71	0.295	- s
3547.15	886.67	963.	129.	1.665E+04	46.77	0.296	- s
3730.41	932.49	1438.	230.	3.096E+04	35.52	0.818	- s
4035.01	1008.65	864.	104.	1.490E+04	56.29	0.275	- s

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

This section based on library: DET_EnergyStandardMix & Pb.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.01	46.61	16470.	72552.	10.077	0.49	0.733
AM-241	237.88	59.57	15419.	75329.	10.462	0.49	0.735
CD-109	351.46	87.94	8772.	40851.	5.674	0.68	0.804
CO-57	487.54	121.94	3880.	9225.	1.281	1.66	0.838
Ce-139	663.30	165.86	2329.	1574.	0.219	6.14	0.840
SN-113	1568.04	391.95	1640.	494.	0.069	16.33	1.153
CS-137	2647.28	661.70	1362.	25582.	3.553	0.71	1.394
Y-898	3591.55	897.77	1410.	428.	0.060	19.21	1.376

Co-1173	4692.83	1173.15	788.	23044.	3.201	0.73	1.786
Co-1332	5329.55	1332.39	98.	20769.	2.885	0.71	1.870
Y-1836	7342.76	1836.05	15.	245.	0.034	7.47	1.556s

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

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TestAmerica Spectrum name: 5_TunaCan2nd_20120813.An1

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.4212E+04				8.15E+03	
			46.54	1.421E+04	(P	1.177E+02 4.91E-01 4.25E+00	G
AM-241		1.1609E+03				1.58E+05	
			59.54	1.161E+03	(	8.959E+00 4.87E-01 3.57E+01	G
CD-109		1.5419E+04				4.63E+02	
			88.03	1.542E+04	(	1.658E+02 6.81E-01 3.61E+00	G
CO-57		3.3478E+02				2.72E+02	
			122.06	3.348E+02	(	1.063E+01 1.66E+00 8.56E+01	G
Ce-139		5.3191E+02				1.38E+02	
			165.85	5.319E+02	(	7.689E+01 6.14E+00 7.99E+01	G
Hg-203		-6.5193E-03				4.66E+01	
			279.17	-6.519E-03	%(	1.788E+00 8.22E+03 8.15E+01	G
SN-113		9.5011E+02				1.15E+02	
			391.69	9.501E+02	(	3.682E+02 1.63E+01 6.40E+01	G
CS-137		4.4236E+02				1.10E+04	
			661.66	4.424E+02	(P	3.020E+00 7.12E-01 8.52E+01	G
Y-898		1.6655E+03				1.07E+02	
			898.02	1.665E+03	(	6.908E+02 1.92E+01 9.37E+01	G
Co-1173		7.0021E+02				1.93E+03	
			1173.24	7.002E+02	(	4.056E+00 7.32E-01 9.99E+01	G
Co-1332		7.0186E+02				1.93E+03	
			1332.50	7.019E+02	(	1.651E+00 7.07E-01 1.00E+02	G
Y-1836		1.6424E+03				1.07E+02	
			1836.01	1.642E+03	(	1.392E+02 7.47E+00 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

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

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.3259E+04	1.4212E+04	4.918E-01%		1.18E+02
AM-241	1.1568E+03	1.1609E+03	4.867E-01%		8.96E+00
CD-109	4.5403E+03	1.5419E+04	6.810E-01%		1.66E+02
CO-57	4.1787E+01	3.3478E+02	1.660E+00%		1.06E+01
Ce-139	8.7347E+00	5.3191E+02	6.138E+00%		7.69E+01
Hg-203 #A	-6.5193E-03	>12 Halflives	8.2197E+03%	1.7882E+00	
SN-113	6.9747E+00	9.5011E+02	1.633E+01%		3.68E+02
CS-137	4.2015E+02	4.4236E+02	7.122E-01%		3.02E+00
Y-898	8.2662E+00	1.6655E+03	1.921E+01%		6.91E+02
Co-1173	5.2196E+02	7.0021E+02	7.316E-01%		4.06E+00
Co-1332	5.2320E+02	7.0186E+02	7.069E-01%		1.65E+00
Y-1836	8.1520E+00	1.6424E+03	7.471E+00%		1.39E+02

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

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (  279.0 to  2000.5 keV)     2.050E+04  Bq/Sample
Total Decayed Activity (  279.0 to  2000.5 keV) 3.7761527E+04  Bq/Sample
```

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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TestAmerica                     Spectrum name: 7_1Lmarn2nd_20120523.An1

Sample description
     7_1Lmarn2nd_83924-334_040212


Spectrum Filename: C:\User\SPC\Det7\7_1Lmarn2nd_20120523.An1

Acquisition information
       Start time:                4/2/2012 2:43:08 PM
       Live time:               7200
       Real time:               7709
       Dead time:                 6.60 %
       Detector ID:                   7

Detector system
     Ge 7 SN/154


Calibration
       Filename:                  7_Liquid_Marinelli 1L.Clb
     7_1Lmarn_90062_032612


       Energy Calibration
            Created:              3/28/2012 9:18:12 AM
            Zero offset:          0.187 keV
            Gain:                 0.250 keV/channel
            Quadratic:            7.031E-09 keV/channel^2

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

Library Files
       Main analysis library:     DET_EnergyStandardMix & Mn, Zn.L
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G53W4.25
       Start channel:           150 (    37.68keV )
       Stop channel:           8000 (  2000.10keV )
       Peak rejection level:   1000.000%
       Peak search sensitivity:   3
       Sample Size:               1.0000E+00
       Activity scaling factor:   1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                  1.0000E+00
       Detection limit method:    Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  4/3/2012 8:09:21 AM     Page  2
TestAmerica                     Spectrum name: 7_1Lmarn2nd_20120523.An1
                                      Page 1
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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

ORTEC g v - i (3263) Env32 G53W4.25 4/3/2012 8:09:21 AM Page 4
TestAmerica Spectrum name: 7_1Lmarn2nd_20120523.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	2646.50	661.68	12931.	141450.	19.646	0.32	1.470
Mn-54	3339.35	834.88	17455.	77158.	10.716	0.59	1.627
Y-898	3592.18	898.08	16384.	21460.	2.980	1.63	1.714
Zn-65	4462.19	1115.57	12614.	49573.	6.885	0.78	1.871
Co-1173	4692.95	1173.26	5998.	142414.	19.780	0.30	1.906
Co-1332	5329.99	1332.52	2348.	127020.	17.642	0.30	2.013
Y-1836	7344.06	1836.08	428.	12210.	1.696	1.03	2.425

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

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

- Nuclide - Name	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

```
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
```

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 Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	280.29	2362.	-52.	-0.014	133.84	0.000E+00

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.2947E+04	1.3971E+04	6.459E-01%		1.48E+02
AM-241	1.1648E+03	1.1694E+03	6.156E-01%		1.09E+01
CD-109	4.0954E+03	1.5657E+04	8.713E-01%		2.12E+02
CO-57	3.3792E+01	3.3118E+02	2.862E+00%		1.73E+01
Ce-139	5.9752E+00	5.4173E+02	1.074E+01%		1.36E+02
Hg-203 #A	-5.2429E-01	>12 Halflives	1.3384E+02%	2.3272E+00	
SN-113 #	4.3447E+00	9.5260E+02	2.438E+01%		7.50E+02
CS-137	4.2011E+02	4.4452E+02	7.635E-01%		3.20E+00
Y-898 #	7.1422E+00	2.4057E+03	2.361E+01%		1.12E+03
Co-1173	4.9827E+02	6.8772E+02	8.087E-01%		4.55E+00
Co-1332	5.0178E+02	6.9256E+02	7.487E-01%		2.04E+00
Y-1836	5.1813E+00	1.7452E+03	1.023E+01%		2.39E+02

ORTEC g v - i (3263) Env32 G53W4.25 6/14/2012 1:20:45 PM Page 6
TestAmerica, Inc Spectrum name: 9_TunaCan_20120371.An1

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

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

Total Activity (379.7 to 1999.7 keV) 1.968E+04 Bq/Sample
Total Decayed Activity (379.7 to 1999.7 keV) 3.8598309E+04 Bq/Sample

2nd Source Verification

Detector: **Ge12**
Geometry: **Tunacan**
Reference date: **10/1/2006**
Calibration Standard: **74139-334**
Standard volume g / vial: **1550**
Standard volume transferred in g / geometry: **341.9**
lab ID# of cal standard: **1282974**

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	449	0.359	1250	1288	103.1
Cs-137	1926	425	0.851	499	509.9	102.1
Co-60	3612	797	0.999856	797	833.8	104.6

Reviewed By: Jody Watson

Date: 4/24/2018

Test America St. Louis Spectrum ID: 12_TunaCan_20180012

Sample Description: 12_TunaCan_ICV
Detector: Detector #12
Batch ID: 12
Work Order Number: TunaCan
Lot Number: ICV

Decay to Time: 10/1/2006 11:00 Live Time: 5000 sec
Acquisition Time: 4/24/2018 09:26:18 Real Time: 5018 sec
Analysis Time: 4/24/2018 10:50 Dead Time: 0.36 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: DET_EnergyStandardMix & Pb.lib
Bkgd Correction File: 12_2017-05-07_0806.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
Pb-210	1.634E+04	0.6	9.464E+01	1.053E+03	1.764E+02
AM-241	1.288E+03	0.4	5.772E+00	8.177E+01	8.914E+00
CD-109	2.726E+04	25.0	6.823E+03	7.030E+03	1.764E+04
CO-57	1.000E+100	153.6	5.398E-01	5.402E-01	1.425E+00
Ce-139	1.000E+100	106.9	5.267E-01	5.274E-01	1.390E+00
Hg-203	1.000E+100	297.5	6.855E-01	6.856E-01	1.730E+00
SN-113	1.000E+100	692.4	1.143E+00	1.143E+00	2.762E+00
CS-137	5.099E+02	0.8	3.904E+00	2.652E+01	3.285E+00
Y-898	1.000E+100	140.9	1.086E+00	1.086E+00	2.342E+00
Co-1173	8.106E+02	1.3	1.069E+01	4.173E+01	9.187E+00
Co-1332	8.338E+02	1.3	1.078E+01	4.290E+01	6.803E+00
Y-1836	1.000E+100	127.2	4.662E-01	4.667E-01	9.202E-01
Total	6.000E+100				

Analyst: Jody Watson

Sample description
12_TunaCan_ICV

Spectrum Filename: C:\User\SPC\Det12\12_TunaCan_20180012.An1

Acquisition information

Start time:	4/24/2018 9:26:18 AM
Live time:	5000
Real time:	5018
Dead time:	0.36 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration

Filename:	12_Soil_TunaCan.Clb

12_TunaCan_108513

Energy Calibration

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

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	100 (25.08keV)
Stop channel:	8000 (1999.13keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2017-05-07_0806.PBC 5/7/2017 8:06:54 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 7 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 25.3541

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
28.13	58.	46.71	0.75	4.137E-03				
32.13	394.	18.65	0.81	7.163E-03				
36.69	330.	25.31	0.84	1.059E-02				
46.66	43625.	0.58	0.85	1.811E-02	46.54	4.250	1.634E+04	Pb210
49.83	321.	44.33	0.85	2.160E-02				
59.65	63562.	0.45	0.86	2.820E-02	59.54	35.700	1.288E+03	AM241
70.53	127.	49.58	1.39	3.219E-02				
74.86	220.	28.10	0.88	3.333E-02				
77.21	369.	16.72	0.88	3.387E-02				
87.68	350.	23.71	0.81	3.578E-02	88.03	3.610	3.034E+04	CD109
93.18	213.	27.98	1.16	3.644E-02				
165.85	67.	106.94	0.97	3.405E-02	165.85	79.900	HL>Cutoff	Ce139
238.54	388.	19.10	0.88	2.744E-02				
279.17	23.	297.48	1.09	2.449E-02	279.17	81.500	HL>Cutoff	Hg203
307.48	44.	92.73	0.49	2.278E-02				
312.92	63.	62.15	0.30	2.248E-02				
320.20	50.	55.24	0.61	2.209E-02				
355.42	79.	51.62	0.51	2.040E-02				
384.05	22.	98.42	0.50	1.922E-02				
428.92	42.	63.02	0.59	1.766E-02				
454.01	126.	41.89	2.09	1.692E-02				
493.21	76.	56.00	0.64	1.589E-02				
583.05	231.	19.93	1.19	1.403E-02				
609.57	255.	15.76	1.66	1.358E-02				
661.72	21282.	0.77	1.42	1.279E-02	661.66	85.210	5.099E+02	CS137
898.02	37.	140.94	1.67	1.025E-02	898.02	93.700	HL>Cutoff	Y898
1173.31	7459.	1.32	1.92	8.426E-03	1173.24	99.900	8.106E+02	Co1173

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1332.58	6951.	1.30	1.98	7.647E-03	1332.50	99.982	8.318E+02	Co1332

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

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
112.21	28.13	314.	58.	1.406E+04	46.71	0.750	-	s
128.21	32.13	1577.	394.	5.496E+04	18.65	0.810	-	
146.44	36.67	3332.	330.	3.120E+04	25.31	0.841	-	sD
199.29	49.79	9113.	333.	1.539E+04	40.96	0.855	-	sD
281.70	70.53	1447.	127.	3.956E+03	49.58	1.387	-	s
299.02	74.84	1784.	220.	6.587E+03	28.10	0.880	-	D
308.40	77.19	1706.	369.	1.088E+04	16.72	0.883	-	sD
372.24	93.18	1248.	213.	5.837E+03	27.98	1.163	-	sM
953.35	238.54	1339.	388.	1.414E+04	19.10	0.882	-	s
1229.01	307.48	572.	44.	1.931E+03	92.73	0.491	-	sc
1250.75	312.92	513.	63.	2.788E+03	62.15	0.295	-	s
1279.88	320.20	329.	50.	2.263E+03	55.24	0.611	-	s
1420.71	355.42	528.	79.	3.873E+03	51.62	0.511	-	s
1535.20	384.00	232.	22.	1.118E+03	98.42	0.497	-	sc
1714.62	428.92	312.	42.	2.406E+03	63.02	0.590	-	s
1814.96	454.01	760.	126.	7.448E+03	41.89	2.094	-	s
1971.76	493.21	502.	76.	4.813E+03	56.00	0.640	-	s
2331.07	583.05	403.	231.	1.644E+04	19.93	1.194	-	
2437.14	609.57	326.	255.	1.877E+04	15.76	1.660	-	

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

This section based on library: DET_EnergyStandardMix & Pb.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.79	46.54	10103.	43625.	8.725	0.58	0.851D
AM-241	237.76	59.54	8808.	63562.	12.712	0.45	0.865D
CD-109	350.62	87.77	1861.	315.	0.063	25.03	0.760s
CO-57	487.68	122.06	2320.	-56.	-0.011	153.64	0.928
Ce-139	662.74	165.85	1600.	67.	0.013	106.94	0.973s
Hg-203	1115.81	279.17	1331.	23.	0.005	297.48	1.086s
SN-113	1565.74	391.69	1248.	-10.	-0.002	692.39	1.196s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	2645.75	661.72	832.	21282.	4.256	0.77	1.422
Y-898	3591.15	898.02	555.	37.	0.007	140.94	1.672s
Co-1173	4692.85	1173.31	308.	7459.	1.492	1.32	1.921
Co-1332	5330.42	1332.58	135.	6968.	1.394	1.29	1.978
Y-1836	7346.49	1836.01	27.	-11.	-0.002	127.17	2.459s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.6338E+04				8.15E+03	
			46.54	1.634E+04	(P	1.764E+02 5.79E-01 4.25E+00	G
AM-241		1.2876E+03				1.58E+05	
			59.54	1.288E+03	(	8.914E+00 4.48E-01 3.57E+01	G
CD-109		2.7262E+04				4.63E+02	
			88.03	2.726E+04	*(	1.764E+04 2.50E+01 3.61E+00	G
CO-57		-3.5134E-01				2.72E+02	
			122.06	-3.513E-01	(	1.425E+00 1.54E+02 8.56E+01	G
Ce-139		4.9250E-01				1.38E+02	
			165.85	4.925E-01	?(	1.390E+00 1.07E+02 7.99E+01	G
Hg-203		2.3043E-01				4.66E+01	
			279.17	2.304E-01	&(	1.730E+00 2.97E+02 8.15E+01	G
SN-113		-1.6505E-01				1.15E+02	
			391.69	-1.650E-01	&(	2.762E+00 6.92E+02 6.40E+01	G
CS-137		5.0987E+02				1.10E+04	
			661.66	5.099E+02	(	3.285E+00 7.66E-01 8.52E+01	G
Y-898		7.7025E-01				1.07E+02	
			898.02	7.703E-01	&(	2.342E+00 1.41E+02 9.37E+01	G
Co-1173		8.1058E+02				1.93E+03	
			1173.24	8.106E+02	(	9.187E+00 1.32E+00 9.99E+01	G
Co-1332		8.3376E+02				1.93E+03	
			1332.50	8.338E+02	(	6.803E+00 1.29E+00 1.00E+02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Y-1836	-3.6659E-01					1.07E+02	
		1836.01	-3.666E-01	?(	9.202E-01	1.27E+02	9.92E+01 G

(- This peak used in the nuclide activity average.

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

Nuclide Codes:	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
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	

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                                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: **Ge19**
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	1313	105.1
Cs-137	1926	425	0.851	499	520	104.2
Co-60	3612	797	0.999856	797	852.3	107.0

Reviewed By: Jody Watson

Date: 4/20/2018

Sample description
19_TunaCan_ICV

Spectrum Filename: C:\User\SPC\Det19\19_TunaCan_20180077.An1

Acquisition information

Start time:	4/20/2018 11:09:29 AM
Live time:	5000
Real time:	5017
Dead time:	0.33 %
Detector ID:	19

Detector system
Ge19 SN/11146715

Calibration

Filename:	19_Soil_TunaCan.Clb

19_TunaCan_108513

Energy Calibration

Created:	4/16/2018 11:22:57 AM
Zero offset:	0.177 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/16/2018 12:11:21 PM
Type:	Polynomial
Uncertainty:	0.841 %
Coefficients:	-0.371612 -4.869309 0.466742
	-0.049787 0.002234 -0.000039

Library Files

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

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.71keV)
Stop channel:	8000 (1999.42keV)
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

Test America St. Louis Spectrum ID: 19_TunaCan_20180077

Sample Description: 19_TunaCan_ICV
Detector: Detector #19
Batch ID: 19
Work Order Number: TunaCan
Lot Number: ICV

Decay to Time: 10/1/2006 11:00 Live Time: 5000 sec
Acquisition Time: 4/20/2018 11:09:29 Real Time: 5017 sec
Analysis Time: 4/20/2018 14:51 Dead Time: 0.33 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 19_Soil_TunaCan.Clb
Efficiency Cal Desc: 19_TunaCan_108513
Efficiency Cal Date: 4/16/2018 12:11
Energy Cal Date: 4/16/2018 11:22
Library: DET_EnergyStandardMix & Pb.lib
Bkgd Correction File: 19_2018-04-08_1846.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	1.650E+04	0.6	9.640E+01	1.063E+03	1.744E+02
AM-241	1.313E+03	0.5	6.894E+00	8.344E+01	9.974E+00
CD-109	3.738E+04	20.7	7.737E+03	8.077E+03	1.896E+04
CO-57	1.000E+100	211.0	6.331E-01	6.334E-01	1.592E+00
Ce-139	1.000E+100	99.6	6.348E-01	6.358E-01	1.593E+00
Hg-203	1.000E+100	373.3	7.558E-01	7.559E-01	2.516E+00
SN-113	1.000E+100	155.7	8.400E-01	8.406E-01	3.066E+00
CS-137	5.203E+02	0.8	4.133E+00	2.709E+01	3.044E+00
Y-898	1.000E+100	101.0	1.285E+00	1.287E+00	2.765E+00
Co-1173	8.308E+02	1.4	1.173E+01	4.298E+01	9.972E+00
Co-1332	8.523E+02	1.3	1.136E+01	4.394E+01	5.252E+00
Y-1836	1.000E+100	870.9	3.744E+00	3.744E+00	1.054E+00
Total	6.000E+100				

Analyst: Jody Watson

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	19_2018-04-08_1846.PBC 4/8/2018 6:46:00 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.0720

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
44.25	824.	17.08	0.93	1.551E-02				
46.68	41733.	0.58	0.93	1.715E-02	46.54	4.250	1.650E+04	Pb210
49.79	341.	39.16	0.94	2.016E-02				
59.62	60109.	0.53	0.90	2.617E-02	59.54	35.700	1.313E+03	AM241
74.97	186.	31.71	0.96	3.099E-02				
77.20	287.	21.92	0.96	3.147E-02				
87.56	402.	20.70	1.81	3.319E-02	88.03	3.610	3.738E+04	CD109
165.85	78.	99.62	1.04	3.053E-02	165.85	79.900	HL>Cutoff	Ce139
182.09	60.	62.86	0.35	2.898E-02				
238.45	394.	15.79	1.44	2.415E-02				
274.68	114.	32.95	1.42	2.168E-02				
302.83	39.	62.96	0.34	2.009E-02				
352.06	200.	22.00	1.15	1.782E-02				
438.49	43.	83.30	0.29	1.498E-02				
533.21	81.	44.24	0.90	1.287E-02				
661.74	18571.	0.79	1.47	1.093E-02	661.66	85.210	5.203E+02	CS137
862.76	25.	64.29	0.63	8.983E-03				
878.66	89.	46.18	0.42	8.863E-03				
1173.34	6485.	1.41	1.82	7.138E-03	1173.24	99.900	8.308E+02	Co1173
1332.62	6030.	1.33	1.85	6.465E-03	1332.50	99.982	8.523E+02	Co1332

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
176.55	44.21	10886.	853.	5.501E+04	17.63	0.932	-	sD
198.69	49.75	8765.	357.	1.770E+04	37.47	0.937	-	sD
298.95	74.97	1637.	186.	5.997E+03	31.71	0.960	-	sD
307.87	77.19	1825.	287.	9.107E+03	21.92	0.962	-	sD
727.12	182.09	591.	60.	2.082E+03	62.86	0.346	-	s
952.44	238.45	1002.	394.	1.631E+04	15.79	1.438	-	s
1097.28	274.68	483.	114.	5.242E+03	32.95	1.420	-	s
1209.83	302.83	282.	39.	1.942E+03	62.96	0.340	-	sc
1406.67	352.06	549.	200.	1.122E+04	22.00	1.153	-	
1752.27	438.49	465.	43.	2.871E+03	83.30	0.289	-	c
2131.09	533.21	325.	81.	6.269E+03	44.24	0.897	-	s
3449.28	862.76	100.	25.	2.783E+03	64.29	0.628	-	s
3512.90	878.66	320.	89.	1.004E+04	46.18	0.424	-	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	185.31	46.54	8855.	41733.	8.347	0.58	0.935D
AM-241	237.59	59.62	9494.	60109.	12.022	0.53	0.904
CD-109	349.28	87.56	1868.	402.	0.080	20.70	1.808s
CO-57	487.17	122.06	2413.	-44.	-0.009	210.99	1.003s
Ce-139	662.22	165.85	1690.	78.	0.016	99.62	1.042
Hg-203	1115.25	279.17	2166.	-18.	-0.004	373.28	1.141s
SN-113	1565.13	391.69	1148.	-28.	-0.006	155.72	1.238s
CS-137	2645.14	661.74	517.	18571.	3.714	0.79	1.469
Y-898	3590.37	898.02	560.	-52.	-0.010	101.01	1.642s
Co-1173	4692.11	1173.34	260.	6485.	1.297	1.41	1.816
Co-1332	5329.67	1332.62	55.	6030.	1.206	1.33	1.853
Y-1836	7345.40	1836.01	25.	-11.	-0.002	870.90	2.261s

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	1.6496E+04					8.15E+03
			46.54	1.650E+04	(P	1.744E+02 5.84E-01 4.25E+00 G	
AM-241		1.3126E+03					1.58E+05
			59.54	1.313E+03	(	9.974E+00 5.25E-01 3.57E+01 G	
CD-109		3.7383E+04					4.63E+02
			88.03	3.738E+04	*(	1.896E+04 2.07E+01 3.61E+00 G	
CO-57		-3.0008E-01					2.72E+02
			122.06	-3.001E-01	?(	1.592E+00 2.11E+02 8.56E+01 G	
Ce-139		6.3720E-01					1.38E+02
			165.85	6.372E-01	&(	1.593E+00 9.96E+01 7.99E+01 G	
Hg-203		-2.0247E-01					4.66E+01
			279.17	-2.025E-01	?(	2.516E+00 3.73E+02 8.15E+01 G	
SN-113		-5.3940E-01					1.15E+02
			391.69	-5.394E-01	&(P	3.066E+00 1.56E+02 6.40E+01 G	
CS-137		5.2035E+02					1.10E+04
			661.66	5.203E+02	(	3.044E+00 7.94E-01 8.52E+01 G	
Y-898		-1.2727E+00					1.07E+02
			898.02	-1.273E+00	?(	2.765E+00 1.01E+02 9.37E+01 G	
Co-1173		8.3078E+02					1.93E+03
			1173.24	8.308E+02	(P	9.972E+00 1.41E+00 9.99E+01 G	
Co-1332		8.5225E+02					1.93E+03
			1332.50	8.523E+02	(	5.252E+00 1.33E+00 1.00E+02 G	
Y-1836		-4.2991E-01					1.07E+02
			1836.01	-4.299E-01	?(P	1.054E+00 8.71E+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	2413.	-44.	-0.009	210.99	0.000E+00	
Ce-139	165.85	1690.	78.	0.016	99.62	0.000E+00	
Hg-203	279.17	2166.	-18.	-0.004	373.28	0.000E+00	
SN-113	391.69	1148.	-28.	-0.006	155.72	0.000E+00	P
Y-898	898.02	560.	-52.	-0.010	101.01	0.000E+00	
Y-1836	1836.01	25.	-11.	-0.002	870.90	0.000E+00	P

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
Pb-210		1.1520E+04	1.6496E+04	5.844E-01%	1.74E+02
AM-241		1.2885E+03	1.3126E+03	5.252E-01%	9.97E+00
CD-109	#	6.7177E+01	3.7383E+04	2.070E+01%	1.90E+04
CO-57	#A	-3.0008E-01	>12 Halflives	2.110E+02%	1.59E+00
Ce-139	#A	6.3720E-01	>12 Halflives	9.962E+01%	1.59E+00
Hg-203	#A	-2.0247E-01	>12 Halflives	3.733E+02%	2.52E+00
SN-113	#A	-5.3940E-01	>12 Halflives	1.557E+02%	3.07E+00
CS-137		3.9871E+02	5.2035E+02	7.943E-01%	3.04E+00
Y-898	#A	-1.2727E+00	>12 Halflives	1.010E+02%	2.77E+00

Co-1173	1.8188E+02	8.3078E+02	1.412E+00%	9.97E+00
Co-1332	1.8658E+02	8.5225E+02	1.333E+00%	5.25E+00
Y-1836 #A	-4.2991E-01	>12 Halflives	8.709E+02%	1.05E+00

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

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

Total Activity (37.7 to 1999.4 keV) 1.364E+04 Bq/Sample
Total Decayed Activity (37.7 to 1999.4 keV) 5.7394852E+04 Bq/Sample

Monthly Backgrounds

Test America
St. Louis
Background Check

Spectrum: 2_20181221006_BGLong
Description: Background Long PBC Count
Acquired: 12/21/2018 5:56:21 PM
Detector: Detector # 2
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.69	1.21	1.37	1.57	2.00	2.16	PASS

Analyst: Joey Sausto Reviewer:

(Page 1 of 7)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det2\2_20181221006_BGLong.An1

Acquisition information
Start time: 12/21/2018 5:56:21 PM
Live time: 72000
Real time: 72157
Dead time: 0.22 %
Detector ID: 2

Detector system
Ge 2 SN/164

Calibration
Filename: 2_QC.Clb
2_SourceCheck_B

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

Efficiency Calibration
Created: 11/2/2018 12:44:12 PM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.60keV)
Stop channel: 8000 (2000.01keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

(Page 2 of 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: 0.0843

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
39.63	1282.	5.86	0.80	4.035E-02				
46.54	1237.	5.57	0.82	5.596E-02	46.54	4.250	7.224E+00	PB210
63.34	903.	6.61	0.76	9.392E-02	63.29	3.810	3.509E+00	TH234
72.79	315.	12.39	0.85	1.152E-01				
74.97	720.	6.61	0.86	1.201E-01				
77.28	142.	27.65	0.86	1.254E-01				
84.66	569.	11.28	1.33	1.421E-01				
89.82	121.	29.17	0.87	1.820E-01				
92.54	1196.	4.30	0.87	2.297E-01	92.59	5.584	1.297E+00	TH234
					93.35	5.561	1.231E+00	AC228
185.65	682.	9.06	0.90	6.613E-01	185.72	54.000	2.654E-02	U235
					185.99	3.280	4.372E-01	Ra226
238.47	270.	17.72	1.12	5.917E-01	238.63	43.300	1.462E-02	PB212
351.72	218.	17.43	0.73	4.425E-01	351.93	37.600	1.821E-02	PB214
510.94	1566.	5.71	2.00	2.327E-01	511.86	20.000	4.700E-01	RH106
609.47	143.	26.10	0.98	1.029E-01	609.31	46.090	4.186E-02	BI214
					610.30	5.750	3.398E-01	RU103
1461.00	109.	23.63	0.83	1.404E-02	1460.83	10.670	1.013E+00	K40

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

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
158.09	39.63	1136.	1282.	3.177E+04	5.86	0.798	-	
290.73	72.77	604.	315.	2.734E+03	12.39	0.854	-	D

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Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
299.44	74.95	772.	720.	5.995E+03	6.61	0.856	- D
308.70	77.26	700.	142.	1.133E+03	27.65	0.858	- D
338.22	84.66	968.	569.	4.005E+03	11.28	1.330	- sM
358.89	89.88	562.	122.	6.681E+02	29.03	0.868	- D
2043.20	510.94	654.	1566.	6.732E+03	5.71	2.000	- sM

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

This section based on library: DET_Long Background PBC.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.72	46.54	1005.	1237.	0.017	5.57	0.823
TH-234	252.93	63.34	798.	903.	0.013	6.61	0.759s
TH-234	369.92	92.59	725.	1196.	0.017	4.30	0.870D
Ra-226	742.14	185.65	754.	682.	0.009	9.06	0.904s
PB-212	953.88	238.59	518.	250.	0.003	18.19	1.103
PB-214	1406.35	351.72	350.	218.	0.003	17.43	0.735s
BI-214	2437.32	609.47	301.	143.	0.002	26.10	0.975
K-40	5843.61	1461.00	82.	109.	0.002	23.63	0.826s

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	1.0134E+00				4.66E+11	
			1460.83	1.013E+00	?(	4.154E-01 2.36E+01 1.07E+01	G
PB-210	N	7.2238E+00				8.14E+03	
			46.54	7.224E+00	(	8.785E-01 5.57E+00 4.25E+00	G
PB-212	N	1.3531E-02				6.98E+02	
			238.63	1.353E-02	(	5.896E-03 1.82E+01 4.33E+01	G
			300.03	0.000E+00	%	4.879E-02 1.38E+03 3.28E+00	GA

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PB-214   N   1.8211E-02                                      5.84E+05
                          351.93 1.821E-02 @(  7.509E-03 1.74E+01 3.76E+01 G
                          295.09 0.000E+00 %   8.792E-03 3.64E+01 1.93E+01 G
                          242.00 0.000E+00     3.232E-02 0.00E+00 7.43E+00 GA

BI-214   N   4.1860E-02                                      5.84E+05
                          609.31 4.186E-02 ?(  2.442E-02 2.61E+01 4.61E+01 G
                         1120.29 0.000E+00 %   1.645E-01 6.05E+01 1.51E+01 G
                         1764.49 0.000E+00 %   2.618E-01 3.74E+01 1.54E+01 G

TH-234   N   3.5095E+00                                      1.63E+12
                           63.29 3.509E+00 @(  5.221E-01 6.61E+00 3.81E+00 G
                           92.59 1.297E+00 -   1.389E-01 4.30E+00 5.58E+00 G

Ra-226       4.3723E-01                                      5.84E+05
                          185.99 4.372E-01 @(  8.371E-02 9.06E+00 3.28E+00 G
   ( - This peak used in the nuclide activity average.

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

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	3.5244E-02		
NA-22	<	4.0138E-02		
K-40	#	1.0134E+00	2.3629E+01%	4.154E-01
Sc-46	<	1.8319E-02		
CR-51	<	1.6360E-02		
MN-54	<	1.7437E-02		
FE-59	<	3.4410E-02		
Co-56	<	1.8749E-02		
CO-57	<	2.1536E-03		
CO-58	<	2.8835E-02		
CO-60	<	2.8641E-02		
ZN-65	<	4.6029E-02		
NB-94	<	2.2260E-02		
ZR-95	<	2.9541E-02		
NB-95	<	2.7197E-02		
RU-103	<	2.7806E-03		
RH-106	<	8.0774E-02		
AG-108M	<	2.3269E-03		
AG-110M	<	2.6380E-02		
SN-113	<	2.7344E-03		
SB-124	<	6.8986E-03		
SB-125	<	6.5186E-03		
I-131	<	2.0229E-03		
BA-133	<	1.9258E-03		
CS-134	<	4.2908E-03		
CS-137	<	1.3702E-02		
CE-139	<	1.8363E-03		
Ba-140	<	1.2257E-02		
La-140	<	2.5141E-02		
CE-141	<	3.0470E-03		
CE-144	<	1.0797E-02		
PM-144	<	2.2325E-02		
EU-152	<	6.4951E-03		
EU-154	<	1.5574E-01		
EU-155	<	1.1017E-02		
HF-181	<	2.9098E-03		

Ta-182	<	1.1306E-01		
Hg-203	<	2.0534E-03		
TL-208	<	5.9914E-03		
pm-146	<	4.9272E-02		
y-88	<	2.2134E-02		
PB-210		7.2238E+00	5.5742E+00%	8.785E-01
PB-212		1.3531E-02	1.8195E+01%	5.896E-03
PB-214	#	1.8211E-02	1.7425E+01%	7.509E-03
BI-207	<	7.9374E-03		
BI-212	<	2.5535E-01		
BI-214	#	4.1860E-02	2.6104E+01%	2.442E-02
BI-210M	<	3.1506E-03		
RA-224	<	2.7435E-02		
AC-228	<	7.5026E-02		
TH-227	<	9.4025E-03		
TH-229	<	3.3406E-02		
TH-234		3.5095E+00	6.6103E+00%	5.221E-01
PA-231	<	5.8104E-02		
PA-233	<	4.5742E-03		
PA-234	<	1.3395E-02		
PA-234M	<	2.7618E+00		
Ra-226	#	4.3723E-01	9.0612E+00%	8.371E-02
U-235	<	1.3003E-02		
AM-241	<	3.6322E-02		
Np-237	<	1.0362E-01		

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

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

Total Activity (37.6 to 2000.0 keV) 1.226E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 5_20181221007_BGLong
Description: Background Long PBC Count
Acquired: 12/21/2018 5:55:49 PM
Detector: Detector # 5
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.45	1.30	1.35	1.47	1.55	1.60	PASS

Analyst: Joey Sausto Reviewer:

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Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det5\5_20181221007_BGLong.An1

Acquisition information

Start time:	12/21/2018 5:55:49 PM
Live time:	72000
Real time:	72202
Dead time:	0.28 %
Detector ID:	5

Detector system
Ge 5 SN/157

Calibration

Filename:	5_QC.Clb

Ge5_QC

Energy Calibration

Created:	2/28/2012 7:35:48 PM
Zero offset:	0.158 keV
Gain:	0.250 keV/channel
Quadratic:	3.911E-08 keV/channel^2

Efficiency Calibration

Created:	1/6/2011 8:03:22 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files

Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.62keV)
Stop channel:	8000 (2000.81keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3

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

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1035

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.59	540.	8.85	0.86	5.682E-02	46.54	4.250	3.112E+00	PB210
59.56	222.	18.98	0.54	7.423E-02	59.54	35.900	1.158E-01	AM241
63.27	578.	9.58	0.65	7.921E-02	63.29	3.810	2.658E+00	TH234
74.90	194.	17.70	0.81	9.482E-02				
77.07	225.	14.95	0.81	9.772E-02				
87.01	119.	24.57	0.83	1.111E-01	86.49	13.100	1.145E-01	Np237
					86.54	30.700	4.885E-02	EU155
89.87	105.	29.66	0.83	1.126E-01				
92.53	808.	5.35	0.83	1.129E-01	92.59	5.584	1.780E+00	TH234
					93.35	5.561	1.787E+00	AC228
185.76	396.	12.81	0.78	9.607E-02	185.72	54.000	1.061E-01	U235
					185.99	3.280	1.748E+00	Ra226
238.74	200.	22.08	0.83	8.321E-02	238.63	43.300	7.727E-02	PB212
295.26	158.	23.35	1.02	6.949E-02	295.09	19.300	1.632E-01	PB214
352.02	210.	17.37	0.94	5.571E-02	351.93	37.600	1.392E-01	PB214
558.38	125.	26.17	1.17	3.529E-02				
609.43	240.	16.80	1.48	3.199E-02	609.31	46.090	2.261E-01	BI214
					610.30	5.750	1.816E+00	RU103
661.75	145.	22.60	0.99	2.860E-02	661.66	85.210	8.244E-02	CS137
1120.85	106.	25.67	2.47	1.646E-02	1120.29	15.100	5.922E-01	BI214
					1120.55	99.987	8.946E-02	Sc46
					1121.30	34.900	2.565E-01	Ta182
1461.17	121.	19.73	2.45	1.300E-02	1460.83	10.670	1.208E+00	K40

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.25	74.90	495.	194.	2.049E+03	17.70	0.813	-	D
307.91	77.06	456.	225.	2.307E+03	14.95	0.815	-	D
2234.17	558.38	210.	125.	3.542E+03	26.17	1.167	-	

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	185.88	46.59	552.	540.	0.008	8.85	0.856s
AM-241	237.82	59.56	518.	222.	0.003	18.98	0.543s
TH-234	252.68	63.27	677.	578.	0.008	9.58	0.652s
TH-234	369.83	92.54	546.	916.	0.013	5.71	1.072s
Ra-226	742.99	185.76	595.	396.	0.006	12.81	0.784
PB-212	955.05	238.74	502.	200.	0.003	22.08	0.825
PB-214	1181.29	295.26	359.	158.	0.002	23.35	1.017s
PB-214	1408.45	352.02	336.	210.	0.003	17.37	0.941s
BI-214	2438.42	609.43	297.	240.	0.003	16.80	1.485
CS-137	2647.71	661.75	213.	145.	0.002	22.60	0.987s
BI-214	4483.75	1120.85	112.	106.	0.001	25.67	2.470s
K-40	5844.08	1461.17	72.	121.	0.002	19.73	2.445s

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

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

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	Peak MDA Value DPS	COMMENTS
K-40	N	1.2084E+00				4.66E+11	
			1460.83	1.208E+00	?(	4.240E-01 1.97E+01 1.07E+01	G

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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-137	I	8.2437E-02					1.10E+04	
			661.66	8.244E-02	?(	4.033E-02	2.26E+01	8.52E+01 G
PB-210	N	3.1122E+00					8.14E+03	
			46.54	3.112E+00	*(	6.463E-01	8.85E+00	4.25E+00 G
PB-212	N	7.7269E-02					6.98E+02	
			238.63	7.727E-02	(	4.130E-02	2.21E+01	4.33E+01 G
			300.03	0.000E+00	%	3.554E-01	7.18E+01	3.28E+00 GA
PB-214	N	1.4732E-01					5.84E+05	
			351.93	1.392E-01	@(	5.841E-02	1.74E+01	3.76E+01 G
			295.09	1.632E-01	(	9.423E-02	2.34E+01	1.93E+01 G
			242.00	0.000E+00	?	2.039E-01	0.00E+00	7.43E+00 GA
BI-214	N	2.2605E-01					5.84E+05	
			609.31	2.261E-01	(	7.819E-02	1.68E+01	4.61E+01 G
			1120.29	5.922E-01	+	2.907E-01	2.57E+01	1.51E+01 G
			1764.49	0.000E+00	%	2.406E-01	4.59E+02	1.54E+01 G
TH-234	N	2.6577E+00					1.63E+12	
			63.29	2.658E+00	@(	5.705E-01	9.58E+00	3.81E+00 G
			92.59	2.018E+00	-	2.458E-01	5.71E+00	5.58E+00 G
Ra-226		1.7480E+00					5.84E+05	
			185.99	1.748E+00	(	5.131E-01	1.28E+01	3.28E+00 G
AM-241	T	1.1575E-01					1.58E+05	
			59.54	1.158E-01	(	5.671E-02	1.90E+01	3.59E+01 G

(- This peak used in the nuclide activity average.

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

} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	2.7048E-01		
NA-22	<	4.3476E-02		
K-40	#	1.2084E+00	1.9729E+01%	4.240E-01
Sc-46	<	3.5707E-02		
CR-51	<	1.3301E-01		
MN-54	<	2.3949E-02		
FE-59	<	4.9586E-02		
Co-56	<	2.5678E-02		
CO-57	<	1.4494E-02		
CO-58	<	2.3633E-02		
CO-60	<	3.0237E-02		
ZN-65	<	8.4073E-02		
NB-94	<	2.4309E-02		
ZR-95	<	4.4223E-02		
NB-95	<	3.4209E-02		
RU-103	<	1.7774E-02		
RH-106	<	2.2399E-01		
AG-108M	<	1.7666E-02		
AG-110M	<	4.7355E-02		
SN-113	<	2.2851E-02		
SB-124	<	2.4198E-02		
SB-125	<	5.1200E-02		
I-131	<	1.7907E-02		
BA-133	<	2.2915E-02		
CS-134	<	3.1578E-02		

CS-137	#	8.2437E-02	2.2602E+01%	4.033E-02
CE-139	<	1.3387E-02		
Ba-140	<	7.7138E-02		
La-140	<	3.3885E-02		
CE-141	<	2.1353E-02		
CE-144	<	7.4445E-02		
PM-144	<	2.8417E-02		
EU-152	<	5.3003E-02		
EU-154	<	2.0912E-01		
EU-155	<	4.1635E-02		
HF-181	<	3.5656E-02		
Ta-182	<	1.1354E-01		
Hg-203	<	2.0971E-02		
TL-208	<	2.2155E-02		
pm-146	<	6.2667E-02		
y-88	<	3.2277E-02		
PB-210	#	3.1122E+00	8.8538E+00%	6.463E-01
PB-212		7.7269E-02	2.2077E+01%	4.130E-02
PB-214	#	1.4732E-01	1.4550E+01%	5.841E-02
BI-207	<	2.8816E-02		
BI-212	<	3.9563E-01		
BI-214		2.2605E-01	1.6802E+01%	7.819E-02
BI-210M	<	2.3854E-02		
RA-224	<	2.3135E-01		
AC-228	<	1.0034E-01		
TH-227	<	1.0124E-01		
TH-229	<	2.2342E-01		
TH-234	#	2.6577E+00	9.5779E+00%	5.705E-01
PA-231	<	4.6839E-01		
PA-233	<	3.4879E-02		
PA-234	<	6.3240E-02		
PA-234M	<	3.3201E+00		
Ra-226		1.7480E+00	1.2808E+01%	5.131E-01
U-235	<	7.5157E-02		
AM-241		1.1575E-01	1.8983E+01%	5.671E-02
Np-237	<	9.2798E-02		

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.6 to  2000.8 keV)     9.375E+00  DPS
```

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:

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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.

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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-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	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

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

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

***** 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:

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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

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

This section based on library: DET_Long Background PBC.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.67	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

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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
```

(Page 7 of 7)

Test America
St. Louis
Background Check

Spectrum: 19_20181221005_BGLong
Description: Background Long PBC Count
Acquired: 12/21/2018 5:56:51 PM
Detector: Detector #19
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	2.25	2.07	2.13	2.24	2.37	2.42	PASS

Analyst: Joey Sausto Reviewer:

(Page 1 of 8)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det19\19_20181221005_BGLong.An1

Acquisition information
Start time: 12/21/2018 5:56:51 PM
Live time: 72000
Real time: 72038
Dead time: 0.05 %
Detector ID: 19

Detector system
Ge19 SN/11146715

Calibration
Filename: 19_QC.Clb
19_QC_Source F_83725-334

Energy Calibration
Created: 4/16/2018 11:22:57 AM
Zero offset: 0.177 keV
Gain: 0.250 keV/channel
Quadratic: -3.735E-08 keV/channel^2

Efficiency Calibration
Created: 4/17/2018 2:50:57 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 (37.71keV)
Stop channel: 8000 (1999.42keV)
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. 16 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1301

***** 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
46.73	1388.	4.71	0.85	5.754E-02	46.54	4.250	7.915E+00	PB210
63.43	836.	10.26	0.98	7.736E-02	63.29	3.810	3.948E+00	TH234
75.00	310.	16.16	0.96	9.115E-02				
77.36	208.	25.66	0.96	9.395E-02				
84.72	323.	15.81	0.97	1.027E-01				
86.49	196.	25.56	0.97	1.047E-01	86.49	13.100	1.980E-01	Np237
					86.54	30.700	8.442E-02	EU155
					86.49	13.100	1.980E-01	Np237
87.53	196.	25.56	0.97	1.060E-01				
92.72	1067.	7.68	1.24	1.128E-01	92.59	5.584	2.357E+00	TH234
					93.35	5.561	2.345E+00	AC228
140.07	188.	23.08	1.02	1.474E-01				
143.78	193.	24.71	1.02	1.466E-01	143.79	10.960	1.670E-01	U235
185.77	634.	11.14	1.03	1.371E-01	185.72	54.000	1.189E-01	U235
					185.99	3.280	1.959E+00	Ra226
238.54	316.	15.90	0.87	1.252E-01	238.63	43.300	8.083E-02	PB212
351.92	244.	18.68	1.05	9.964E-02	351.93	37.600	9.052E-02	PB214
					351.93	37.600	9.052E-02	PB214
510.87	2119.	4.60	2.35	6.378E-02	511.86	20.000	2.316E+00	RH106
583.07	132.	28.39	0.95	4.750E-02	583.02	84.500	4.568E-02	TL208
609.15	328.	16.77	1.34	4.160E-02	609.31	46.090	2.378E-01	BI214
					610.30	5.750	1.916E+00	RU103
766.78	130.	24.19	3.13	2.711E-02	766.41	0.294	2.274E+01	PA234M
					765.79	99.790	6.697E-02	NB95
					763.94	22.280	2.994E-01	AG110M
802.87	121.	25.97	0.62	2.619E-02				
1001.33	97.	29.47	0.79	2.118E-02	1001.00	0.837	7.601E+00	PA234M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1119.23	96.	22.96	3.35	1.816E-02	1120.29	15.100	4.862E-01	BI214
					1120.55	99.987	7.345E-02	Sc46
					1121.30	34.900	2.107E-01	Ta182
1460.57	288.	9.98	1.93	1.343E-02	1460.83	10.670	2.786E+00	K40
1763.89	94.	25.65	2.00	9.848E-03	1764.49	15.400	8.608E-01	BI214
1799.66	56.	27.58	0.41	9.434E-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
299.08	75.05	1096.	310.	3.396E+03	16.16	0.960	- sD
308.50	77.40	1326.	208.	2.219E+03	25.66	0.962	- sD
337.91	84.75	1145.	323.	3.149E+03	15.81	0.969	- sD
349.17	87.56	1151.	196.	1.552E+03	25.56	0.972	- lD
559.16	140.08	843.	188.	1.272E+03	23.08	1.019	- D
2041.72	510.87	792.	2119.	3.323E+04	4.60	2.355	- s
3209.68	802.87	200.	121.	4.621E+03	25.97	0.616	- s
7199.79	1799.66	33.	56.	5.972E+03	27.58	0.407	- 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	186.07	46.73	964.	1388.	0.019	4.71	0.855
TH-234	252.82	63.43	1629.	836.	0.012	10.26	0.984s
Np-237	344.99	86.49	1151.	196.	0.003	25.56	0.972D
TH-234	369.90	92.72	1541.	1067.	0.015	7.68	1.244s
U-235	574.02	143.79	1043.	193.	0.003	24.71	1.022D
U-235	741.65	185.72	1314.	553.	0.008	8.86	1.059D
PB-212	952.83	238.54	696.	316.	0.004	15.90	0.874
PB-214	1406.12	351.92	479.	244.	0.003	18.68	1.051s
TL-208	2330.49	583.07	318.	132.	0.002	28.39	0.953s
BI-214	2434.77	609.15	476.	328.	0.005	16.77	1.343s
PA-234M	3065.30	766.78	192.	130.	0.002	24.19	3.128s
PA-234M	4003.76	1001.33	144.	97.	0.001	29.47	0.791s
BI-214	4475.54	1119.23	90.	96.	0.001	22.96	3.345s
K-40	5841.92	1460.57	72.	288.	0.004	9.98	1.930s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	7056.52	1763.89	65.	94.	0.001	25.65	2.004

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

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

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	MDA Value DPS		COMMENTS
K-40	N	2.7865E+00					4.66E+11	
			1460.83	2.786E+00	@(	4.082E-01	9.98E+00	1.07E+01 G
TL-208	N	4.5679E-02					6.98E+02	
			583.02	4.568E-02	(	2.969E-02	2.84E+01	8.45E+01 G
			277.28	0.000E+00	&	1.320E-01	2.88E+02	6.31E+00 G
			860.56	0.000E+00	%	2.294E-01	3.19E+02	1.24E+01 G
PB-210	N	7.9147E+00					8.14E+03	
			46.54	7.915E+00	(	8.405E-01	4.71E+00	4.25E+00 G
PB-212	N	8.0832E-02					6.98E+02	
			238.63	8.083E-02	(	3.218E-02	1.59E+01	4.33E+01 G
			300.03	0.000E+00	%	2.661E-01	2.77E+02	3.28E+00 GA
PB-214	N	9.0522E-02					5.84E+05	
			351.93	9.052E-02	*(	3.881E-02	1.87E+01	3.76E+01 G
BI-214	N	2.3779E-01					5.84E+05	
			609.31	2.378E-01	@(	7.567E-02	1.68E+01	4.61E+01 G
			1120.29	4.862E-01	&	2.376E-01	2.30E+01	1.51E+01 G
			1764.49	8.608E-01	+	3.689E-01	2.57E+01	1.54E+01 G
TH-234	N	3.9480E+00					1.63E+12	
			63.29	3.948E+00	@(	9.010E-01	1.03E+01	3.81E+00 G
			92.59	2.357E+00	-	4.102E-01	7.68E+00	5.58E+00 G
PA-234M	N	7.6007E+00					1.63E+12	
			1001.00	7.601E+00	(	4.594E+00	2.95E+01	8.37E-01 G
			766.41	2.274E+01	+	1.174E+01	2.42E+01	2.94E-01 G
U-235	N	1.6697E-01					2.57E+11	
			185.72	1.037E-01	}	3.219E-02	8.86E+00	5.40E+01 GA
			143.79	1.670E-01	(	1.324E-01	2.47E+01	1.10E+01 G
			205.33	0.000E+00	%	1.802E-01	1.12E+02	5.01E+00 G
			163.38	0.000E+00	%	1.856E-01	1.79E+02	5.08E+00 G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Np-237   F   1.9796E-01                                      2.14E+06
                            86.49 1.980E-01 &(  1.628E-01 2.56E+01 1.31E+01 G
   ( - This peak used in the nuclide activity average.

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

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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


 *************** 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    <    7.3524E-02
 NA-22   <    4.6461E-02
 K-40   #     2.7865E+00   9.9830E+00%               4.082E-01
 Sc-46   <    1.3630E-02
```

CR-51	<	8.0447E-02		
MN-54	<	2.5662E-02		
FE-59	<	5.5563E-02		
Co-56	<	2.8977E-02		
CO-57	<	1.5279E-02		
CO-58	<	2.4881E-02		
CO-60	<	3.2996E-02		
ZN-65	<	8.4152E-02		
NB-94	<	2.8802E-02		
ZR-95	<	4.5796E-02		
NB-95	<	4.3562E-02		
RU-103	<	1.4415E-02		
RH-106	<	3.4007E-01		
AG-108M	<	1.2521E-02		
AG-110M	<	3.6588E-02		
SN-113	<	1.3688E-02		
SB-124	<	3.1605E-02		
SB-125	<	3.7182E-02		
I-131	<	1.1041E-02		
BA-133	<	2.0155E-02		
CS-134	<	3.2146E-02		
CS-137	<	4.1113E-02		
CE-139	<	1.6742E-02		
Ba-140	<	5.8532E-02		
La-140	<	3.5341E-02		
CE-141	<	1.3521E-02		
CE-144	<	1.5498E-01		
PM-144	<	2.8769E-02		
EU-152	<	4.6609E-02		
EU-154	<	3.0010E-01		
EU-155	<	5.0914E-02		
HF-181	<	1.8859E-02		
Ta-182	<	4.5551E-02		
Hg-203	<	1.6830E-02		
TL-208		4.5679E-02	2.8386E+01%	2.969E-02
pm-146	<	6.4087E-02		
y-88	<	2.7371E-02		
PB-210		7.9147E+00	4.7134E+00%	8.405E-01
PB-212		8.0832E-02	1.5905E+01%	3.218E-02
PB-214	#	9.0522E-02	1.8677E+01%	3.881E-02
BI-207	<	2.8484E-02		
BI-212	<	3.0121E-01		
BI-214		2.3779E-01	1.6769E+01%	7.567E-02
BI-210M	<	1.7592E-02		
RA-224	<	3.7523E-01		
AC-228	<	1.3465E-01		
TH-227	<	1.0395E-01		
TH-229	<	1.9942E-01		
TH-234		3.9480E+00	1.0256E+01%	9.010E-01

PA-231	<	3.1139E-01		
PA-233	<	2.4169E-02		
PA-234	<	3.8369E-02		
PA-234M		7.6007E+00	2.9467E+01%	4.594E+00
U-235	#	1.6697E-01	2.4714E+01%	1.324E-01
AM-241	<	8.2817E-02		
Np-237	#	1.9796E-01	2.5560E+01%	1.628E-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 (37.7 to 1999.4 keV) 2.307E+01 DPS

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Run Logs

Gamma Spectroscopy Run Log

Detector: GV2

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/21/18 11:08		ZZZZZ		365000			
03/21/18 11:29		ZZZZZ		365000			
03/22/18 02:01		IC 160-365000/3		365000			JLW
05/04/18 10:31		ICV 160-365000/4		365000			JLW
12/21/18 17:56		ICB 160-407302/1		407302			RTM
12/29/18 03:28		CCV 160-408256/1		408256			
12/29/18 03:49		CCV 160-408256/2		408256			RTM
12/29/18 04:23		CCB 160-408256/3		408256			RTM
12/29/18 11:14	30	MB 160-404682/1-A		408256	404682	901.1	RTM
12/29/18 11:58	30	490-164296-A-2-B DU		408256	404682	901.1	RTM
12/29/18 12:50	30	490-164387-5	CUF-BS-BG10-5.6/7.6-20181205	408256	404682	901.1	RTM

Detector: GV5

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/26/12 15:05		IC 160-12297/1		12297			JLW
03/27/12 10:12		ICV 160-12297/2		12297			JLW
12/21/18 17:55		ICB 160-407299/1		407299			RTM
12/29/18 03:29		CCV 160-408257/1		408257			
12/29/18 03:50		CCV 160-408257/2		408257			CDR
12/29/18 04:27		CCB 160-408257/3		408257			CDR
12/29/18 11:12	30	LCS 160-404682/2-A		408257	404682	901.1	CDR
12/29/18 11:55	30	ZZZZZ		408257			
12/29/18 12:50	30	ZZZZZ		408257			

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
12/29/18 03:34		CCV 160-408258/1		408258			
12/29/18 03:56		CCV 160-408258/2		408258			RTM
12/29/18 04:28		CCB 160-408258/3		408258			RTM
12/29/18 11:07	120	MB 160-404676/1-A		408258	404676	901.1	RTM
12/29/18 13:51	120	490-164387-1	CUF-BS-FB12-20181205	408258	404676	901.1	RTM

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
12/29/18 03:33		CCV 160-408261/1		408261			
12/29/18 03:54		CCV 160-408261/2		408261			CDR
12/29/18 04:59		CCB 160-408261/3		408261			CDR
12/29/18 11:11	30	ZZZZZ		408261			
12/29/18 11:55	30	490-164387-2	CUF-BS-BG10-0.0/0.5-20181205	408261	404682	901.1	CDR
12/29/18 12:50	30	ZZZZZ		408261			

Gamma Spectroscopy Run Log

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
12/29/18 04:25		CCV 160-408260/1		408260			
12/29/18 04:45		CCV 160-408260/2		408260			CDR
12/29/18 05:02		CCB 160-408260/3		408260			CDR
12/29/18 11:12	30	ZZZZZ		408260			
12/29/18 11:56	30	490-164387-3	CUF-BS-BG10-1.0/3.0-20181205	408260	404682	901.1	CDR
12/29/18 12:51	30	ZZZZZ		408260			
12/29/18 13:52	30	ZZZZZ		408260			

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
12/21/18 17:54		ICB 160-407292/1		407292			RTM
12/29/18 03:32		CCB 160-408264/1		408264			RTM
12/29/18 04:58		CCV 160-408264/2		408264			
12/29/18 05:20		CCV 160-408264/3		408264			RTM
12/29/18 11:05	120	LCS 160-404676/2-A		408264	404676	901.1	RTM
12/29/18 13:50	120	490-164296-C-1-B DU		408264	404676	901.1	RTM

Detector: GV19

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/14/18 10:55		ZZZZZ		364044			
03/14/18 15:23		IC 160-364044/1		364044			JLW
04/20/18 09:45		ICV 160-364044/3		364044			JLW
12/21/18 17:56		ICB 160-407294/1		407294			RTM
12/29/18 03:31		CCB 160-408263/1		408263			CDR
12/29/18 04:25		CCV 160-408263/2		408263			
12/29/18 04:45		CCV 160-408263/3		408263			CDR
12/29/18 11:13	30	ZZZZZ		408263			
12/29/18 11:56	30	490-164387-4	CUF-BS-DUP02-20181205	408263	404682	901.1	CDR
12/29/18 12:51	30	ZZZZZ		408263			

Subcontract Data

Shipping and Receiving Documents

TVA Environmental Investigations

Tennessee Valley Authority

Loc: 490
164387

COOLER No.:	1	of	2
COC No:	CUF_BS_20181205_1B		
1 of 1 Pages			
Task Desc:	CUF_BS		

Rev-1
DC 12/7/18

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:	rquinn@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)

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-FB12-20181205	BG-10	NA	NA	W	G	FB	12/5/2018	0845	3			☐		X				
2	CUF-BS-BG10-0.0/0.5-20181205	BG-10	0.0	0.5	S	G	N	12/5/2018	1046	2			☐	X					
3	CUF-BS-BG10-1.0/3.0-20181205	BG-10	1.0	3.0	S	G	N	12/5/2018	1030	2			☐	X					
4	CUF-BS-DUP02-20181205	-	-	-	S	G	~~N~~	12/5/2018	-	2			☐	X					
5	CUF-BS-BG10-5.6/7.6-20181205	BG-10	5.6	7.6	S	G	N	12/5/2018	1042	2			☐	X					

SB 12/5/2018

Additional Comments/Special Instructions:

SB 12/5/2018

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Suama Bolden (Stantec)	12/05/2018	1600	TANAS	12-5-2018	18:48
SB 12/5/2018					
FD DC 12/7/18	SB 12/5/2018				

Sample Receipt Conditions			
☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
Temperature In °C	Sample on Ice?	Sample Intact?	Trip Blank?

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Courier	Suama Bolden
	Walker Padgett
	Matt Edmunds

S.O, S.2

Form TVA 30067A

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Nashville, TN

COOLER RECEIPT FORM

490-164387 Chain of Custody

Cooler Received/Opened On 12-05-2018 @ 1845

Time Samples Removed From Cooler 09:47 Time Samples Placed In Storage 10:36 (2 Hour Window)

1. Tracking # _____ (last 4 digits, FedEx) Courier: Lab

   IR Gun ID 31470368 pH Strip Lot N/A Chlorine Strip Lot N/A

2. Temperature of rep. sample or temp blank when opened: 5.0 *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) ADT

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 # _____

I certify that I unloaded the cooler and answered questions 7-14 (intial) KD

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) KD

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) KD

I certify that I attached a label with the unique LIMS number to each container (intial) KD

21. Were there Non-Conformance issues at login? YES...NO Was a NCM generated? YES...NO...# _____

BIS = Broken in shipment

Cooler Receipt Form.doc LF-1 Revised 8/23/17

End of Form

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Nashville, TN

COOLER RECEIPT FORM

Cooler Received/Opened On____12-05-2018_@ 1846

Time Samples Removed From Cooler 09:47 Time Samples Placed In Storage 10:36 (2 Hour Window)

1. Tracking #_____(last 4 digits, FedEx) Courier: Lab

   IR Gun ID____31470368_____ pH Strip Lot_____ Chlorine Strip Lot_____

2. Temperature of rep. sample or temp blank when opened: 5.2 *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) ADT

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 #_____

I certify that I unloaded the cooler and answered questions 7-14 (intial) CD

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) KD

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) KD

I certify that I attached a label with the unique LIMS number to each container (intial) KD

21. Were there Non-Conformance issues at login? YES...NO Was a NCM generated? YES...NO...#_____

BIS = Broken in shipment

Cooler Receipt Form.doc

LF-1

Revised 8/23/17

End of Form

TVA Environmental Investigations

Tennessee Valley Authority

Loc: 490
164387

COOLER No.:	1	of	2
COC No:	CUF_BS_20181205_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)

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	Filtered N	Preserve None	Preserve HNO3	Analysis BACKGROUNDSOIL_RAD	Analysis BACKGROUNDSOIL_BLANKS_RAD
1	CUF-BS-FB12-20181205	BG-10	NA	NA	W	G	FB	12/5/2018	0845	3			☐					X
2	CUF-BS-BG10-0.0/0.5-20181205	BG-10	0.0	0.5	S	G	N	12/5/2018	1046	2			☐		X		X	
3	CUF-BS-BG10-1.0/3.0-20181205	BG-10	1.0	3.0	S	G	N	12/5/2018	1030	2			☐		X		X	
4	CUF-BS-DUP02-20181205	-	-	-	S	G	N	12/5/2018	-	2			☐		X		X	
5	CUF-BS-BG10-5.6/7.6-20181205	BG-10	5.6	7.6	S	G	N	12/5/2018	1042	2			☐		X		X	

Additional Comments/Special Instructions:

SB 12/5/2018

RELINQISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Suama Bolden (Stantec)	12/05/2018	1600	TA-NAS	12/5/2018	18:48
SB 12/5/2018					
SB 12/5/2018					

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

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Courier	Suama Bolden
	Walker Padgett
	Matt Edmunds

5.0, 5.2

Form TVA 30067A

TVA Environmental Investigations

Loc: 490

164387

Tennessee Valley Authority

COOLER No.:	2	of	2
COC No:	CUF_BS_20181205_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)

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	Filtered N	Preserve None	Preserve HNO3	Analysis BACKGROUNDSOIL_RAD	Analysis BACKGROUNDSOIL_BLANKS_RAD
1	CUF-BS-FB12-20181205	BG-10	NA	NA	W	G	FB	12/5/2018	0845	3		☐			X		
2	CUF-BS-BG10-0.0/0.5-20181205	BG-10	0.0	0.5	S	G	N	12/5/2018	1046	2		☐	X			X	
3	CUF-BS-BG10-1.0/3.0-20181205	BG-10	1.0	3.0	S	G	N	12/5/2018	1030	2		☐	X			X	
4	CUF-BS-DUP02-20181205	-	-	-	S	G	N	12/5/2018	-	2		☐	X			X	
5	CUF-BS-BG10-5.6/7.6-20181205	BG-10	5.6	7.6	S	G	N	12/5/2018	1042	2		☐	X			X	

Additional Comments/Special Instructions:

SB 12/5/2018

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Suama Bolden (Stantec)	12/05/2018	1600	TH-NAS	12/05/2018	1848
SB 12/5/2018					
SB 12/5/2018					

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

510,512

Form TVA 30067A

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 490-164387-1

Login Number: 164387
List Number: 2
Creator: Hellm, Michael

List Source: Eurofins TestAmerica, St. Louis
List Creation: 12/07/18 03:15 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	19.0
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	

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 490-164387-1

Login Number: 164387
List Number: 3
Creator: Hellm, Michael

List Source: Eurofins TestAmerica, St. Louis
List Creation: 12/07/18 03:44 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	19.0
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	