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ANALYTICAL REPORT

Job Number: 180-94764-1

Job Description: JOF_BS_20190823_1B

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

Attention: Amanda Cover

Approved for release.
Gail Lage
Senior Project Manager
9/30/2019 8:41 AM

Gail Lage, Senior Project Manager
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09/30/2019

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The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins TestAmerica Project Manager.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Table of Contents

Cover Title Page 1

Data Summaries 4

- Definitions 4
- Case Narrative 5
- Detection Summary 7
- Client Sample Results 8
- QC Sample Results 11
- QC Association 13
- Chronicle 14
- Certification Summary 15
- Method Summary 18
- Sample Summary 19
- Reagent Traceability 20
  - COAs 23

Radiochemistry Raw Data 75

- Gamma Spectroscopy 75
  - Method 901.1 Ra-226 76
  - Daily Checks 291
  - Initial Calibrations 304
  - Initial Calibration Verifications 350
  - Monthly Backgrounds 392
  - Run Logs 435
- Pre-Preparation Data 440

Subcontracted Data 441

Shipping and Receiving Documents 442

- Client Chain of Custody 443

Table of Contents

Sample Receipt Checklist 447

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)

Comments
No additional comments.

Receipt
The samples were received on 8/27/2019 9:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.5º C.

RAD
Method(s) 901.1: Gamma Prep Batch 160-441817
Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

Inferred from	Reported to Analyte
Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

JOF-BS-BG09-1.5/3.5-20190823 (180-94764-1), JOF-BS-BG09-5.9/7.9-20190823 (180-94764-2), (LCS 160-441817/2-A), (MB 160-441817/1-A) and (180-94764-A-1-C DU)

Method(s) 901.1: Gamma Prep Batch 160-441833
Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

Inferred from	Reported to Analyte
Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232

Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

JOF-BS-FB01-20190823 (180-94764-3), (LCS 160-441833/2-A), (MB 160-441833/1-A) and (180-94764-A-3-B DU)

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

General Chemistry

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

Detection Summary

Client: Environmental Standards Inc.
Project/Site: JOF_BS_20190823_1B

Job ID: 180-94764-1

Client Sample ID: JOF-BS-BG09-1.5/3.5-20190823 — Lab Sample ID: 180-94764-1

No Detections.

Client Sample ID: JOF-BS-BG09-5.9/7.9-20190823 — Lab Sample ID: 180-94764-2

No Detections.

Client Sample ID: JOF-BS-FB01-20190823 — Lab Sample ID: 180-94764-3

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JOF_BS_20190823_1B

Job ID: 180-94764-1

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

Client Sample ID: JOF-BS-BG09-1.5/3.5-20190823
Date Collected: 08/23/19 09:27
Date Received: 08/27/19 09:00

Lab Sample ID: 180-94764-1
Matrix: Solid

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228 (positive only)	1.90		0.398	0.422			pCi/g	09/05/19 13:12	09/26/19 06:46	1
Radium-226	0.981		0.231	0.253	1.00	0.146	pCi/g	09/05/19 13:12	09/26/19 06:46	1
Radium-228	0.923		0.324	0.338		0.203	pCi/g	09/05/19 13:12	09/26/19 06:46	1

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

Client Sample ID: JOF-BS-BG09-5.9/7.9-20190823
Date Collected: 08/23/19 09:34
Date Received: 08/27/19 09:00

Lab Sample ID: 180-94764-2
Matrix: Solid

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228 (positive only)	2.90		0.462	0.510			pCi/g	09/05/19 13:12	09/26/19 06:46	1
Radium-226	1.16		0.304	0.327	1.00	0.256	pCi/g	09/05/19 13:12	09/26/19 06:46	1
Radium-228	1.74		0.348	0.391		0.197	pCi/g	09/05/19 13:12	09/26/19 06:46	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JOF_BS_20190823_1B

Job ID: 180-94764-1

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

Client Sample ID: JOF-BS-FB01-20190823
Date Collected: 08/23/19 10:42
Date Received: 08/27/19 09:00

Lab Sample ID: 180-94764-3
Matrix: Water

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-10.2	U	22.2	22.2	50.0	37.9	pCi/L	09/05/19 15:10	09/26/19 09:00	1
Radium-228	8.95	U	21.2	21.2	50.0	26.0	pCi/L	09/05/19 15:10	09/26/19 09:00	1
Radium 226 and 228 (positive only)	8.95	U	30.7	30.7			pCi/L	09/05/19 15:10	09/26/19 09:00	1

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

Lab Sample ID: MB 160-441817/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 444206 — **Prep Batch: 441817**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.03702	U	0.0646	0.0648	1.00	0.292	pCi/g	09/05/19 13:12	09/26/19 06:44	1
Radium 226 and 228 (positive only)	0.05153	U	0.152	0.152			pCi/g	09/05/19 13:12	09/26/19 06:44	1
Radium-228	0.05153	U	0.138	0.138		0.176	pCi/g	09/05/19 13:12	09/26/19 06:44	1

Lab Sample ID: LCS 160-441817/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 444207 — **Prep Batch: 441817**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.6	97.69		11.5		1.23	pCi/g	101	87 - 116
Cesium-137	27.5	30.75		3.24		0.325	pCi/g	112	87 - 120
Cobalt-60	11.1	12.01		1.26		0.110	pCi/g	108	87 - 115

Lab Sample ID: 180-94764-1 DU — **Client Sample ID: JOF-BS-BG09-1.5/3.5-20190823**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 444206 — **Prep Batch: 441817**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Radium-226	0.981		0.8977		0.202	1.00	0.132	pCi/g	0.18	1
Radium 226 and 228 (positive only)	1.90		1.976		0.330			pCi/g	0.1	
Radium-228	0.923		1.078		0.261		0.109	pCi/g	0.26	1

Lab Sample ID: MB 160-441833/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 444233 — **Prep Batch: 441833**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-9.850	U	18.3	18.4	50.0	31.5	pCi/L	09/05/19 15:10	09/26/19 05:14	1
Radium 226 and 228 (positive only)	19.89	U	24.7	24.8			pCi/L	09/05/19 15:10	09/26/19 05:14	1
Radium-228	19.89		16.6	16.7	50.0	19.3	pCi/L	09/05/19 15:10	09/26/19 05:14	1

Lab Sample ID: LCS 160-441833/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 444234 — **Prep Batch: 441833**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	136000	128200		14800		285	pCi/L	94	90 - 111
Cesium-137	44300	41860		4190		112	pCi/L	95	90 - 111
Cobalt-60	28200	27430		2710		47.7	pCi/L	97	89 - 110

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

Lab Sample ID: 180-94764-3 DU
Matrix: Water
Analysis Batch: 444234

Client Sample ID: JOF-BS-FB01-20190823
Prep Type: Total/NA
Prep Batch: 441833

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Radium-226	-10.2	U		0.9926	U	1.43	50.0	36.8	pCi/L			0.48	1
Radium 226 and 228 (positive only)	8.95	U		0.9926	U	25.9			pCi/L			0.14	
Radium-228	8.95	U		-8.964	U	25.9	50.0	29.1	pCi/L			0.38	1

QC Association Summary

Client: Environmental Standards Inc.
Project/Site: JOF_BS_20190823_1B

Job ID: 180-94764-1

Rad

Leach Batch: 441607

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-94764-1	JOF-BS-BG09-1.5/3.5-20190823	Total/NA	Solid	Dry and Grind	
180-94764-2	JOF-BS-BG09-5.9/7.9-20190823	Total/NA	Solid	Dry and Grind	
180-94764-1 DU	JOF-BS-BG09-1.5/3.5-20190823	Total/NA	Solid	Dry and Grind	

Prep Batch: 441817

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-94764-1	JOF-BS-BG09-1.5/3.5-20190823	Total/NA	Solid	Fill_Geo-21	441607
180-94764-2	JOF-BS-BG09-5.9/7.9-20190823	Total/NA	Solid	Fill_Geo-21	441607
MB 160-441817/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-441817/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
180-94764-1 DU	JOF-BS-BG09-1.5/3.5-20190823	Total/NA	Solid	Fill_Geo-21	441607

Prep Batch: 441833

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-94764-3	JOF-BS-FB01-20190823	Total/NA	Water	Fill_Geo-21	
MB 160-441833/1-A	Method Blank	Total/NA	Water	Fill_Geo-21	
LCS 160-441833/2-A	Lab Control Sample	Total/NA	Water	Fill_Geo-21	
180-94764-3 DU	JOF-BS-FB01-20190823	Total/NA	Water	Fill_Geo-21	

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: JOF_BS_20190823_1B

Job ID: 180-94764-1

Client Sample ID: JOF-BS-BG09-1.5/3.5-20190823 — Lab Sample ID: 180-94764-1

Date Collected: 08/23/19 09:27 — **Matrix: Solid**
Date Received: 08/27/19 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	441607	09/03/19 09:13	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			247.5 g	1.0 g	441817	09/05/19 13:12	KRS	TAL SL
Total/NA	Analysis	901.1		1			444208	09/26/19 06:46	KLS	TAL SL
	Instrument ID:	GAMMAVISION								

Client Sample ID: JOF-BS-BG09-5.9/7.9-20190823 — Lab Sample ID: 180-94764-2

Date Collected: 08/23/19 09:34 — **Matrix: Solid**
Date Received: 08/27/19 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	441607	09/03/19 09:13	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			210 g	1.0 g	441817	09/05/19 13:12	KRS	TAL SL
Total/NA	Analysis	901.1		1			444209	09/26/19 06:46	KLS	TAL SL
	Instrument ID:	GAMMAVISION								

Client Sample ID: JOF-BS-FB01-20190823 — Lab Sample ID: 180-94764-3

Date Collected: 08/23/19 10:42 — **Matrix: Water**
Date Received: 08/27/19 09:00

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 g	441833	09/05/19 15:10	KRS	TAL SL
Total/NA	Analysis	901.1		1			444233	09/26/19 09:00	KLS	TAL SL
	Instrument ID:	GAMMAVISION								

Laboratory References:

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

Analyst References:

Lab: TAL SL
- Batch Type: Leach
  - DRO = David Oetter
- Batch Type: Prep
  - KRS = Kurt Slama
- Batch Type: Analysis
  - KLS = Kody Saulters

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: JOF_BS_20190823_1B

Job ID: 180-94764-1

Laboratory: Eurofins TestAmerica, Pittsburgh

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

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-20
Arkansas DEQ	State Program	88-0690	06-27-20
California	State	2891	04-30-20
California	State Program	2891	04-30-20
Connecticut	State	PH-0688	09-30-20
Connecticut	State Program	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-20
Florida	NELAP	E871008	06-30-20
Illinois	NELAP	200005	06-30-20
Illinois	NELAP	004375	06-30-20
Kansas	NELAP	E-10350	01-31-20
Kansas	NELAP	E-10350	03-31-20
Kentucky (UST)	State	162013	04-30-20
Kentucky (UST)	State Program	162013	04-30-20
Kentucky (WW)	State	KY98043	12-31-19
Kentucky (WW)	State Program	KY98043	12-31-19
Louisiana	NELAP	04041	06-30-20
Louisiana	NELAP	04041	06-30-20
Minnesota	NELAP	042-999-482	12-31-19
Minnesota	NELAP	042-999-482	12-31-19
Nevada	State	PA00164	07-31-20
Nevada	State Program	PA00164	07-31-20
New Hampshire	NELAP	2030	04-04-20
New Jersey	NELAP	PA005	06-30-20
New Jersey	NELAP	PA005	06-30-20
New York	NELAP	11182	03-31-20
New York	NELAP	11182	04-01-20
North Carolina (WW/SW)	State Program	434	12-31-19
North Dakota	State	R-227	04-30-20
North Dakota	State Program	R-227	04-30-20
Oregon	NELAP	PA-2151	02-06-20
Oregon	NELAP	PA-2151	02-06-20
Pennsylvania	NELAP	02-00416	04-30-20
Pennsylvania	NELAP	02-00416	04-30-20
Rhode Island	State	LAO00362	12-30-19
Rhode Island	State Program	LAO00362	12-30-19
South Carolina	State Program	89014	04-30-20
Texas	NELAP	T104704528-15-2	03-31-20
Texas	NELAP	T104704528	03-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462015-4	05-31-20
Utah	NELAP	PA001462019-8	05-31-20
Virginia	NELAP	460189	09-14-20
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	01-31-20
West Virginia DEP	State Program	142	01-31-20
Wisconsin	State	998027800	08-31-20
Wisconsin	State Program	998027800	08-31-20

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: JOF_BS_20190823_1B

Job ID: 180-94764-1

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	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2305	04-06-22
ANAB	Dept. of Energy	L2305.01	04-06-22
ANAB	DoD	L2305	04-06-22
ANAB	DOE	L2305.01	04-06-22
ANAB	ISO/IEC 17025	L2305	04-06-22
Arizona	State	AZ0813	12-08-19
Arizona	State Program	AZ0813	12-08-19 *
California	State	2886	06-30-20
California	State Program	2886	06-30-20
Connecticut	State	PH-0241	03-31-21
Connecticut	State Program	PH-0241	03-31-21
Florida	NELAP	E87689	06-30-20
Florida	NELAP	E87689	06-30-20
Hawaii	State Program	NA	06-30-20
HI - RadChem Recognition	State	n/a	06-30-20
Illinois	NELAP	200023	11-30-19
Illinois	NELAP	004553	11-30-19
Iowa	State Program	373	12-01-20
Kansas	NELAP	E-10236	10-31-19 *
Kentucky (DW)	State	KY90125	12-31-19
Kentucky (DW)	State Program	KY90125	12-31-19
Louisiana	NELAP	04080	06-30-20
Louisiana	NELAP	04080	06-30-20
Louisiana (DW)	NELAP	LA011	12-31-19
Louisiana (DW)	State	LA011	12-31-19
Maryland	State	310	09-30-20
Maryland	State Program	310	09-30-20
MI - RadChem Recognition	State	9005	06-30-20
Michigan	State Program	9005	06-30-20
Missouri	State	780	06-30-22
Missouri	State Program	780	06-30-20
Nevada	State	MO000542020-1	07-31-20
Nevada	State Program	MO000542018-1	07-31-20
New Jersey	NELAP	MO002	06-30-20
New Jersey	NELAP	MO002	06-30-20
New York	NELAP	11616	03-31-20
New York	NELAP	11616	04-01-20
North Dakota	State	R-207	06-30-20
North Dakota	State Program	R207	06-30-20
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-20
Oklahoma	State Program	9997	08-31-20
Pennsylvania	NELAP	68-00540	02-28-20
Pennsylvania	NELAP	68-00540	02-28-20
South Carolina	State	85002001	06-30-20
South Carolina	State Program	85002001	06-30-20
Texas	NELAP	T104704193-19-14	07-31-20
Texas	NELAP	T104704193-19-13	07-31-20
US Fish & Wildlife	Federal	058448	07-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20

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

Laboratory: Eurofins TestAmerica, St. Louis (Continued)

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

Authority	Program	Identification Number	Expiration Date
USDA	Federal	P330-17-0028	02-02-20
USDA	US Federal Programs	P330-17-00028	02-02-20
Utah	NELAP	MO000542019-11	07-31-20
Utah	NELAP	MO000542019-11	07-31-20
Virginia	NELAP	460230	06-14-20
Virginia	NELAP	10310	06-14-20
Washington	State Program	C592	08-30-19 *
West Virginia DEP	State Program	381	10-31-19 *

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

Method Summary

Client: Environmental Standards Inc.
Project/Site: JOF_BS_20190823_1B

Job ID: 180-94764-1

Method	Method Description	Protocol	Laboratory
901.1	Radium-226 & Other Gamma Emitters (GS)	EPA	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	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: JOF_BS_20190823_1B

Job ID: 180-94764-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-94764-1	JOF-BS-BG09-1.5/3.5-20190823	Solid	08/23/19 09:27	08/27/19 09:00	
180-94764-2	JOF-BS-BG09-5.9/7.9-20190823	Solid	08/23/19 09:34	08/27/19 09:00	
180-94764-3	JOF-BS-FB01-20190823	Water	08/23/19 10:42	08/27/19 09:00	

REAGENT TRACEABILITY SUMMARY

Lab Name: Eurofins TestAmerica, St. Louis Job No.: 180-94764-1

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 D_00001	04/01/59	02/23/11	water, Lot 79670-334	0.9781 g	Gamma Ampuole_00001	0.9781 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: Eurofins TestAmerica, St. Louis Job No.: 180-94764-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: Eurofins TestAmerica, St. Louis Job No.: 180-94764-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							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
							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: [signature] 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

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: 2/23/4
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. —

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 D_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

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

This standard will expire one year after the calibration date.

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

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

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source E_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

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

This standard will expire one year after the calibration date.

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

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

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source G_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

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

This standard will expire one year after the calibration date.

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

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

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

83725-334
5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

(Certificate continued on reverse side)

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

This standard will expire one year after the reference date.

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

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

Reagent

Source H_00002

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

83725-334
5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

(Certificate continued on reverse side)

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

This standard will expire one year after the reference date.

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

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

Reagent

Tuna Can LCS_00008

ANALYTICS
An Isotope Products Laboratories Company

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

74139-334

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

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

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

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

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

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

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

Source Prepared by: M. I. Taskaeva, Radiochemist

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

End of Certificate

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

Radionuclide: Am-241

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

Mean = 94.8233333

1 sigma = 2.84345447

1.96 sigma = 5.573171

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

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

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

Standard Reverification Acceptable? **Yes**

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

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

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

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

Radionuclide: Co-60

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

Mean = 12.3366667

1 sigma = 0.45081408

1.96 sigma = 0.883596

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

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

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

Standard Reverification Acceptable? Yes

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

1st Reviewed By/Date: 9.26.18

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

St. Louis Radiological Standard Verification

Printed: 9/26/2018 10:19 AM

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

Radionuclide: Cs-137

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

Mean = 27.01

1 sigma = 1.11216006

1.96 sigma = 2.179834

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

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

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

Standard Reverification Acceptable? **Yes**

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

1st Reviewed By/Date: Judy Watson 9.26.18

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

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 389261 **Operator:**

MQO

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

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

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

Laboratory Control Sample Information

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

Sample Duplicate Information

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

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 389176 **Operator:**

MQO

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

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

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

Laboratory Control Sample Information

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

Sample Duplicate Information

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

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 389018 **Operator:**

MQO

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

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

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

Laboratory Control Sample Information

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

Sample Duplicate Information

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

Reagent

Tuna Can_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: 441817

Fill Geometry, 21-Day In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 441817

Lab Id: MB 160-441817/1-A | Analyzed: 09/26/19 06:44 | Ts: 30 | Sigma: 2
Client ID: | Detector: GV9 | Decay Corrected: No | Ingrowth:

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	-0.03702	0.0646	0.0648	U	pCi/g	1.00	0.292	444206
Radium 226 and 228 (positive only)	0.05153	0.152	0.152	U	pCi/g		0.292	444206
Radium-228	0.05153	0.138	0.138	U	pCi/g		0.176	444206

Lab Id: LCS 160-441817/2-A | Analyzed: 09/26/19 06:47 | Ts: 30 | Sigma: 2
Client ID: | Detector: GV12 | Decay Corrected: No | Ingrowth:

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	97.69	1.67	11.5		pCi/g		1.23	444207
Cesium-137	30.75	0.784	3.24		pCi/g		0.325	444207
Cobalt-60	12.01	0.389	1.26		pCi/g		0.110	444207

Lab Id: 180-94764-1 | Analyzed: 09/26/19 06:46 | Ts: 30 | Sigma: 2
Client ID: JOF-BS-BG09-1.5/3.5-20190823 | Detector: GV5 | Decay Corrected: | Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium 226 and 228 (positive only)	1.90	0.398	0.422		pCi/g		0.203	444208
Radium-226	0.981	0.231	0.253		pCi/g	1.00	0.146	444208
Radium-228	0.923	0.324	0.338		pCi/g		0.203	444208

Lab Id: 180-94764-1 DU | Analyzed: 09/26/19 07:46 | Ts: 30 | Sigma: 2
Client ID: JOF-BS-BG09-1.5/3.5-20190823 | Detector: GV9 | Decay Corrected: No | Ingrowth:

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.8977	0.179	0.202		pCi/g	1.00	0.132	444206
Radium 226 and 228 (positive only)	1.976	0.297	0.330		pCi/g		0.132	444206
Radium-228	1.078	0.237	0.261		pCi/g		0.109	444206

Lab Id: 180-94764-2 | Analyzed: 09/26/19 06:46 | Ts: 30 | Sigma: 2
Client ID: JOF-BS-BG09-5.9/7.9-20190823 | Detector: GV8 | Decay Corrected: | Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium 226 and 228 (positive only)	2.90	0.462	0.510		pCi/g		0.256	444209

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 441817

Lab Id:	180-94764-2	Analyzed:	09/26/19 06:46	Ts:	30	Sigma:	2
Client ID:	JOF-BS-BG09-5.9/7.9-20190823	Detector:	GV8	Decay Corrected:	No	Ingrowth:	

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	1.16	0.304	0.327		pCi/g	1.00	0.256	444209
Radium-228	1.74	0.348	0.391		pCi/g		0.197	444209

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 160-441817/1-A	Radium-226			-0.03702	U	pCi/g							-1.1434
MB 160-441817/1-A	Radium 226 and 228 (positive only)			0.05153	U	pCi/g							
MB 160-441817/1-A	Radium-228			0.05153	U	pCi/g							.7472
Lab Control Sample ID:	**Analyte**	**Parent Result**	**Spike Added**	**LCS Result**	**Qualifier**	**Unit**	**% Rec**	**% Rec Limits**	**RPD**	**RER**	**DER**	**RER Limit**	**Z Factor**
LCS 160-441817/2-A	Americium-241		96.6	97.69		pCi/g	101	87 - 116					.1782
LCS 160-441817/2-A	Cesium-137		27.5	30.75		pCi/g	112	87 - 120					1.9355
LCS 160-441817/2-A	Cobalt-60		11.1	12.01		pCi/g	108	87 - 115					1.366
Duplicate ID:	**Analyte**	**Parent Result**	**Spike Added**	**DU Result**	**Qualifier**	**Unit**	**% Rec**	**% Rec Limits**	**RPD**	**RER**	**DER**	**RER Limit**	**Z Factor**
180-94764-1	Radium-226	0.981		0.8977		pCi/g			9	0.18	0.51	1	.513
180-94764-1	Radium 226 and 228 (positive only)	1.90		1.976		pCi/g			4	0.1	0.27		
180-94764-1	Radium-228	0.923		1.078		pCi/g			15	0.26	0.72	1	.7242

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: Eurofins TestAmerica, St. Loui Job No.: 180-94764-1

SDG No.:

Batch Number: 441817 Batch Start Date: 09/05/19 13:12 Batch Analyst: Slama, Kurt R

Batch Method: Fill_Geo-21 Batch End Date: 09/05/19 13:17

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-441817/1		Fill_Geo-21, 901.1				291.18 g	09/05/19 13:17	09/26/19 13:17	tuna can
LCS 160-441817/2		Fill_Geo-21, 901.1				341.9 g	09/05/19 13:17	09/26/19 13:17	tuna can
180-94764-A-1-A	JOF-BS-BG09-1.5/ 3.5-20190823	Fill_Geo-21, 901.1	T	46.5 g	294.0 g	247.5 g	09/05/19 13:17	09/26/19 13:17	tuna can
180-94764-A-1-A DU	JOF-BS-BG09-1.5/ 3.5-20190823	Fill_Geo-21, 901.1	T	46.5 g	294.0 g	247.5 g	09/05/19 13:17	09/26/19 13:17	tuna can
180-94764-A-2-A	JOF-BS-BG09-5.9/ 7.9-20190823	Fill_Geo-21, 901.1	T	46.6 g	256.6 g	210 g	09/05/19 13:17	09/26/19 13:17	tuna can

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00008					
MB 160-441817/1		Fill_Geo-21, 901.1							
LCS 160-441817/2		Fill_Geo-21, 901.1		# g					
180-94764-A-1-A	JOF-BS-BG09-1.5/ 3.5-20190823	Fill_Geo-21, 901.1	T						
180-94764-A-1-A DU	JOF-BS-BG09-1.5/ 3.5-20190823	Fill_Geo-21, 901.1	T						
180-94764-A-2-A	JOF-BS-BG09-5.9/ 7.9-20190823	Fill_Geo-21, 901.1	T						

Batch Notes	
Balance ID	1121432711
SOP Number	ST-RC-0003, ST-RC-0025

Basis	Basis Description
T	Total/NA

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

Test America St. Louis Spectrum ID: 9_Gamma_20192636

Sample Description: 441817_Gamma_MB 160-441817~1-A
Detector: Detector # 9
Batch ID: 441817
Work Order Number: Gamma
Lot Number: MB 160-441817~1-A

Decay to Time: 9/26/2019 06:44 Live Time: 1800 sec
Acquisition Time: 9/26/2019 06:44:53 Real Time: 1803 sec
Analysis Time: 9/26/2019 07:15 Dead Time: 0.14 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 9_Soil_TunaCan.Clb
Efficiency Cal Desc: 9_Soil_TunaCan_90099_050312
Efficiency Cal Date: 6/14/2012 10:19
Energy Cal Date: 3/1/2012 13:57
Library: Client_Long_Rev15.lib
Bkgd Correction File: 9_2019-09-07_1403.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	8.779E-01	216.1	1.897E+00	1.898E+00	6.687E+00
NA-22	-6.180E-01	56.1	3.468E-01	3.482E-01	1.120E+00
K-40	2.310E+00	98.2	2.269E+00	2.272E+00	7.878E+00
Sc-46	3.270E-01	107.7	3.521E-01	3.525E-01	1.204E+00
CR-51	-2.622E+00	62.5	1.639E+00	1.645E+00	1.118E+01
MN-54	6.532E-02	407.2	2.660E-01	2.660E-01	6.709E-01
FE-59	-4.551E-01	137.6	6.261E-01	6.265E-01	1.440E+00
Co-56	-3.773E-01	71.8	2.708E-01	2.715E-01	9.668E-01
CO-57	9.836E-04	107.1	1.054E-03	1.055E-03	3.893E-01
CO-58	3.960E-01	30.2	1.194E-01	1.211E-01	2.653E-01
CO-60	1.475E-01	39.8	5.873E-02	5.920E-02	3.900E-01
ZN-65	0.000E+00	1.#INF	9.073E-02	9.073E-02	1.447E+00
NB-94	2.725E-02	331.7	9.038E-02	9.039E-02	9.050E-01
ZR-95	-6.238E-02	501.7	3.129E-01	3.129E-01	8.190E-01
NB-95	-1.146E-01	189.6	2.173E-01	2.174E-01	7.786E-01
RU-103	1.914E-01	37.8	7.233E-02	7.300E-02	2.015E-01
RH-106	0.000E+00	1.#INF	5.903E-01	5.903E-01	1.489E+01
AG-108M	-2.865E-01	60.8	1.741E-01	1.747E-01	7.083E-01
AG-110M	2.247E-01	74.1	1.666E-01	1.670E-01	1.844E+00
SN-113	2.595E-01	103.2	2.677E-01	2.681E-01	9.169E-01
SB-124	1.304E-01	137.8	1.796E-01	1.798E-01	1.278E+00
SB-125	-1.895E-01	64.9	1.230E-01	1.234E-01	1.863E+00
I-131	1.897E-01	94.2	1.787E-01	1.790E-01	4.594E-01
Gd-153	2.770E-01	111.4	3.085E-01	3.090E-01	1.447E+00
Ga-68	-5.287E-01	1584.3	8.376E+00	8.376E+00	2.137E+01
Tc-99m	9.200E-02	190.1	1.749E-01	1.750E-01	5.993E-01
BA-133	1.473E-01	181.0	2.665E-01	2.666E-01	9.345E-01
CS-134	2.911E-01	37.7	1.096E-01	1.106E-01	3.042E-01
CS-137	1.939E-01	110.3	2.138E-01	2.141E-01	7.462E-01
CE-139	-2.447E-03	5770.6	1.412E-01	1.412E-01	5.046E-01
Ba-140	-3.183E-01	73.2	2.331E-01	2.337E-01	3.088E+00
La-140	-8.573E-01	81.5	6.986E-01	7.001E-01	1.444E+00
CE-141	-2.351E-01	129.0	3.032E-01	3.035E-01	1.349E+00

CE-144	7.255E-01	161.8	1.174E+00	1.174E+00	4.029E+00
PM-144	8.057E-02	303.3	2.444E-01	2.444E-01	8.749E-01
EU-152	8.712E-01	35.2	3.067E-01	3.101E-01	1.215E+00
EU-154	-1.123E-01	101.2	1.137E-01	1.138E-01	1.010E+00
EU-155	2.958E-01	124.5	3.683E-01	3.687E-01	1.844E+00
HF-181	1.319E-01	153.0	2.019E-01	2.020E-01	9.259E-01
Ta-182	-2.075E-01	406.1	8.427E-01	8.428E-01	3.081E+00
Hg-203	-2.430E-01	89.1	2.165E-01	2.169E-01	7.298E-01
TL-208	3.725E-01	89.2	3.323E-01	3.328E-01	6.464E-01
PM-146	9.497E-02	207.0	1.966E-01	1.967E-01	7.915E-01
Y-88	-3.042E-01	73.8	2.245E-01	2.252E-01	1.004E+00
Cd-113m	1.858E+03	102.0	1.895E+03	1.899E+03	6.519E+03
Cd-109	0.000E+00	1.#INF	1.480E+00	1.480E+00	1.603E+01
Cf-251	5.601E-01	98.6	5.525E-01	5.547E-01	1.477E+00
Cf-249	-2.346E-01	123.4	2.894E-01	2.897E-01	9.960E-01
Sn-126	-1.681E+00	118.6	1.994E+00	1.996E+00	6.758E+00
PB-210	3.753E+00	103.4	3.878E+00	3.885E+00	1.328E+01
PB-212	-6.289E-01	75.2	4.728E-01	4.745E-01	1.835E+00
PB-214	-4.029E-01	130.6	5.261E-01	5.265E-01	1.696E+00
BI-207	-1.714E-01	193.4	3.314E-01	3.316E-01	1.073E+00
BI-212	-3.420E+00	100.1	3.424E+00	3.428E+00	1.172E+01
U-235	5.480E-01	241.4	1.323E+00	1.323E+00	4.558E+00
BI-214	-3.988E-01	87.3	3.482E-01	3.488E-01	3.149E+00
BI-210M	-2.717E-01	53.4	1.451E-01	1.460E-01	1.036E+00
AC-228	5.552E-01	133.7	7.425E-01	7.431E-01	1.894E+00
TH-227	5.682E-01	115.0	6.532E-01	6.542E-01	6.106E+00
TH-229	1.473E+00	197.0	2.901E+00	2.903E+00	7.523E+00
TH-234	9.112E-01	190.1	1.732E+00	1.733E+00	1.066E+01
PA-231	-7.838E+00	176.9	1.387E+01	1.387E+01	4.677E+01
PA-233	-6.637E-01	66.2	4.397E-01	4.411E-01	3.430E+00
PA-234	6.306E-01	145.3	9.160E-01	9.166E-01	2.467E+00
PA-234M	1.656E+01	85.7	1.420E+01	1.422E+01	9.554E+01
AM-241	3.565E-01	128.8	4.591E-01	4.595E-01	1.570E+00
Np-237	6.820E-01	168.7	1.151E+00	1.151E+00	3.938E+00
Ir-192	-2.702E-01	161.8	4.370E-01	4.373E-01	1.475E+00
Cs-136	8.093E-02	122.5	9.912E-02	9.923E-02	6.552E-01
Np-239	1.686E-01	255.2	4.303E-01	4.304E-01	1.512E+00
Nd-147	8.693E-01	146.8	1.276E+00	1.277E+00	3.296E+00
TL-210	0.000E+00	1.#INF	3.580E-02	3.580E-02	5.401E-01
Kr-85	0.000E+00	1.#INF	5.922E+00	5.922E+00	2.333E+02
Total	1.894E+03				

Analyst: Caleb Quinn

Sample description
441817_Gamma_MB 160-441817~1-A

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20192636.An1

Acquisition information

Start time:	9/26/2019 6:44:53 AM
Live time:	1800
Real time:	1803
Dead time:	0.14 %
Detector ID:	9

Detector system
Ge9 S/N100228730

Calibration

Filename:	9_Soil_TunaCan.Clb

9_Soil_TunaCan_90099_050312

Energy Calibration

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

Efficiency Calibration

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

Library Files

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

Analysis parameters

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

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

Corrections	Status	Comments
Decay correct to date:	YES	9/26/2019 6:44:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2019-09-07_1403.PBC 9/7/2019 2:03:30 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 1 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	7.	103.36	1.00	2.577E-02	46.54	4.250	PBC<MDA	PB210
50.14	9.	114.96	1.00	2.900E-02	50.14	8.000	PBC<MDA	TH227
59.54	8.	128.78	1.01	3.659E-02	59.54	35.900	PBC<MDA	AM241
63.29	6.	190.13	1.01	3.921E-02	63.29	3.810	PBC<MDA	TH234
80.99	6.	147.47	1.03	4.830E-02	80.99	34.060	PBC<MDA	BA133
86.49	8.	168.75	1.04	5.008E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	2.909E-01	EU155
					86.94	9.040	9.858E-01	Sn126
86.54	8.	175.95	1.04	5.010E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	2.909E-01	EU155
					86.94	9.040	9.858E-01	Sn126
86.94	9.	177.38	1.04	5.021E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	3.188E-01	EU155
					86.94	9.040	1.080E+00	Sn126
97.50	7.	163.72	1.05	5.240E-02	97.50	30.000	PBC<MDA	Gd153
99.50	6.	140.66	1.05	5.266E-02	99.50	15.000	PBC<MDA	Np239
103.20	6.	151.04	1.05	5.303E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	2.763E-01	Np239
103.70	6.	161.08	1.05	5.307E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	2.764E-01	Np239
105.31	6.	176.23	1.05	5.318E-02	105.31	21.200	PBC<MDA	EU155
106.13	4.	255.18	1.05	5.323E-02	106.13	22.700	PBC<MDA	Np239

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
131.29	8.	145.27	1.08	5.216E-02	131.29	18.000	PBC<MDA	PA234
133.02	8.	153.03	1.08	5.195E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	8.108E-01	CE144
133.54	8.	161.75	1.08	5.189E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	7.255E-01	CE144
136.30	8.	169.38	1.08	5.152E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	7.609E-01	CO57
136.47	8.	177.04	1.08	5.150E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	7.609E-01	CO57
140.51	7.	190.08	1.09	5.091E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	5.	241.36	1.09	5.039E-02	143.79	10.960	PBC<MDA	U235
162.66	9.	99.09	1.11	4.690E-02	162.66	6.220	PBC<MDA	Ba140
176.60	8.	98.63	1.12	4.549E-02	176.60	17.000	PBC<MDA	Cf251
185.72	10.	96.75	1.13	4.403E-02	185.72	54.000	PBC<MDA	U235
193.51	5.	196.98	1.14	4.287E-02	193.51	4.400	PBC<MDA	TH229
244.69	9.	178.91	1.18	3.670E-02	244.69	7.580	PBC<MDA	EU152
263.70	7.	102.02	1.20	3.489E-02	263.70	0.006	PBC<MDA	Cd113m
277.28	9.	89.20	1.21	3.372E-02	277.28	6.310	PBC<MDA	TL208
344.29	9.	154.89	1.28	2.905E-02	344.29	26.500	PBC<MDA	EU152
356.00	5.	180.98	1.29	2.837E-02	356.00	62.050	PBC<MDA	BA133
364.48	8.	94.20	1.29	2.791E-02	364.48	81.700	PBC<MDA	I131
383.84	6.	112.60	1.31	2.691E-02	383.84	8.940	PBC<MDA	BA133
391.69	8.	103.15	1.32	2.653E-02	391.69	64.000	PBC<MDA	SN113
463.37	5.	99.44	1.38	2.352E-02	463.37	10.470	PBC<MDA	SB125
477.60	4.	216.11	1.39	2.301E-02	477.60	10.520	PBC<MDA	BE7
497.05	7.	37.80	1.41	2.236E-02	497.05	90.900	PBC<MDA	RU103
511.86	48.	18.16	2.67	2.188E-02	511.86	20.000	6.093E+00	RH106
531.00	4.	146.76	1.44	2.130E-02	531.00	13.000	PBC<MDA	Nd147
569.32	7.	70.37	1.47	2.024E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.421E+00	PA234
					569.70	97.740	PBC<MDA	BI207
569.47	1.	409.83	1.47	2.024E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.803E-01	PA234
					569.70	97.740	PBC<MDA	BI207
583.02	3.	247.89	1.48	1.989E-02	583.02	84.500	PBC<MDA	TL208
635.89	2.	296.87	1.53	1.864E-02	635.89	11.310	PBC<MDA	SB125
657.76	8.	80.74	1.54	1.818E-02	657.76	94.640	PBC<MDA	AG110M
661.66	5.	110.31	1.55	1.810E-02	661.66	85.210	PBC<MDA	CS137
696.54	2.	303.32	1.58	1.741E-02	696.54	99.000	PBC<MDA	PM144
722.79	4.	137.82	1.60	1.693E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.565E-01	AG108M
					723.36	20.220	7.035E-01	EU154
747.16	2.	207.02	1.62	1.651E-02	747.16	34.000	PBC<MDA	PM146
763.94	6.	74.14	1.63	1.624E-02	763.94	22.280	PBC<MDA	AG110M
766.41	6.	85.71	1.63	1.620E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	6.624E+01	PA234M
795.87	7.	37.65	1.66	1.574E-02	795.87	85.530	PBC<MDA	CS134
810.78	11.	30.15	1.67	1.551E-02	810.78	99.460	3.960E-01	CO58

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
834.85	2.	407.17	1.69	1.517E-02	834.85	99.980	PBC<MDA	MN54
860.56	4.	132.68	1.71	1.482E-02	860.56	12.420	PBC<MDA	TL208
871.10	1.	331.66	1.71	1.468E-02	871.10	99.890	PBC<MDA	NB94
889.28	9.	107.68	1.73	1.445E-02	889.28	99.984	PBC<MDA	Sc46
911.07	4.	133.74	1.75	1.418E-02	911.07	29.000	PBC<MDA	AC228
946.02	3.	173.74	1.77	1.377E-02	946.02	13.400	PBC<MDA	PA234
996.33	1.	357.07	1.81	1.323E-02	996.33	10.600	PBC<MDA	EU154
1037.84	3.	220.44	1.84	1.281E-02	1037.84	14.130	PBC<MDA	Co56
1048.07	3.	122.47	1.85	1.271E-02	1048.07	80.000	PBC<MDA	Cs136
1112.07	8.	35.20	1.89	1.213E-02	1112.07	13.644	2.709E+00	EU152
1120.29	-3.	180.80	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1173.24	7.	39.83	1.94	1.163E-02	1173.24	99.900	PBC<MDA	CO60
1408.00	5.	44.72	2.10	1.004E-02	1408.00	21.005	PBC<MDA	EU152
1460.83	4.	98.24	2.13	9.749E-03	1460.83	10.670	PBC<MDA	K40
1764.49	2.	145.66	2.31	8.350E-03	1764.49	15.400	PBC<MDA	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	185.80	46.54	25.	7.	0.004	103.36	0.998s
TH-227	200.20	50.14	44.	9.	0.005	114.96	1.001s
AM-241	237.77	59.54	55.	8.	0.005	128.78	1.010s
TH-234	252.77	63.29	63.	6.	0.003	190.13	1.014s
Sn-126	256.74	64.28	90.	-12.	-0.007	118.64	1.015s
BA-133	323.56	80.99	18.	6.	0.003	147.47	1.031s
Np-237	345.55	86.49	88.	8.	0.004	168.75	1.036s
EU-155	345.76	86.54	96.	8.	0.004	175.95	1.036s
Sn-126	347.35	86.94	118.	9.	0.005	177.38	1.037s
Cd-109	351.75	88.04	127.	0.	0.000	1000.00	1.038s
Nd-147	363.99	91.10	127.	0.	0.000	1000.00	1.041s
TH-234	369.94	92.59	127.	0.	0.000	1000.00	1.042s
Gd-153	389.58	97.50	67.	7.	0.004	163.72	1.047s
Np-239	397.58	99.50	36.	6.	0.004	140.66	1.049s
Gd-153	412.37	103.20	43.	6.	0.004	151.04	1.052s
Np-239	414.37	103.70	49.	6.	0.004	161.08	1.053s
EU-155	420.82	105.31	55.	6.	0.003	176.23	1.054s
Np-239	424.09	106.13	42.	4.	0.002	255.18	1.055s
CO-57	487.80	122.06	39.	-8.	-0.004	120.73	1.070
EU-154	491.95	123.10	62.	-11.	-0.006	101.20	1.071s
PA-234	524.72	131.29	70.	8.	0.005	145.27	1.079s
HF-181	531.64	133.02	78.	8.	0.005	153.03	1.081s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CE-144	533.69	133.54	70.	8.	0.004	161.75	1.081s
HF-181	544.74	136.30	78.	8.	0.004	169.38	1.084s
CO-57	545.43	136.47	85.	8.	0.004	177.04	1.084s
Tc-99m	561.57	140.51	93.	7.	0.004	190.08	1.088s
U-235	574.67	143.79	84.	5.	0.003	241.36	1.091s
CE-141	581.29	145.44	144.	-10.	-0.006	128.99	1.092s
Ba-140	650.15	162.66	39.	9.	0.005	99.09	1.108s
U-235	653.03	163.38	42.	-4.	-0.002	229.03	1.109s
Cf-251	705.90	176.60	15.	8.	0.004	98.63	1.122s
U-235	742.37	185.72	22.	10.	0.005	96.75	1.130s
TH-229	773.52	193.51	24.	5.	0.003	196.98	1.137s
TH-229	842.87	210.85	36.	-7.	-0.004	178.42	1.153s
Cf-251	907.45	227.00	40.	-13.	-0.007	100.39	1.168s
TH-227	943.33	235.97	100.	-13.	-0.007	112.84	1.176s
PB-212	953.97	238.63	118.	-18.	-0.010	75.18	1.179s
PB-214	967.43	242.00	126.	-3.	-0.002	513.58	1.182s
EU-152	978.21	244.69	118.	9.	0.005	178.91	1.185s
TH-227	1024.39	256.24	28.	-5.	-0.003	211.97	1.195s
Cd-113m	1054.23	263.70	22.	7.	0.004	102.02	1.202s
BI-210M	1062.75	265.83	40.	-8.	-0.005	53.41	1.204s
TL-208	1108.55	277.28	29.	9.	0.005	89.20	1.215s
Hg-203	1116.22	279.20	51.	-12.	-0.007	89.10	1.216
I-131	1136.61	284.30	36.	-3.	-0.002	395.81	1.221s
PB-214	1179.77	295.09	195.	-17.	-0.009	53.10	1.231s
TL-210	1183.41	296.00	203.	-13.	-0.007	159.25	1.231s
PB-212	1199.52	300.03	216.	-13.	-0.007	163.56	1.235s
PA-231	1199.68	300.07	228.	-13.	-0.007	168.24	1.235s
PA-233	1200.12	300.18	241.	-13.	-0.007	172.80	1.235s
PA-231	1210.00	302.65	254.	-13.	-0.007	176.91	1.237s
BA-133	1210.81	302.85	267.	-3.	-0.002	787.18	1.238s
Ir-192	1233.16	308.44	191.	-13.	-0.007	153.42	1.243s
PA-233	1247.44	312.01	203.	-13.	-0.007	66.25	1.246s
Ir-192	1265.35	316.49	216.	-13.	-0.007	161.77	1.250s
CR-51	1279.73	320.08	157.	-14.	-0.008	62.50	1.253s
La-140	1314.43	328.76	111.	-12.	-0.007	75.36	1.261s
Cf-249	1333.15	333.44	122.	-12.	-0.006	137.63	1.265s
AC-228	1352.66	338.32	135.	-10.	-0.005	94.83	1.270s
Cs-136	1361.66	340.57	143.	0.	0.000	1000.00	1.272s
EU-152	1376.53	344.29	90.	9.	0.005	154.89	1.275s
HF-181	1382.70	345.83	132.	-9.	-0.005	107.15	1.276s
PB-214	1407.11	351.93	42.	-8.	-0.004	130.57	1.282s
BA-133	1423.37	356.00	33.	5.	0.003	180.98	1.285s
I-131	1457.31	364.48	12.	8.	0.004	94.20	1.293s
BA-133	1534.73	383.84	20.	6.	0.003	112.60	1.310s
Cf-249	1551.17	387.95	38.	-7.	-0.004	123.40	1.314s
SN-113	1566.12	391.69	30.	8.	0.004	103.15	1.317s
SB-125	1710.86	427.88	22.	-8.	-0.005	83.46	1.349s
AG-108M	1735.10	433.94	31.	-12.	-0.006	60.76	1.354s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	1852.82	463.37	8.	5.	0.003	99.44	1.380s
Ir-192	1871.59	468.06	27.	-3.	-0.002	230.71	1.384s
BE-7	1909.73	477.60	32.	4.	0.002	216.11	1.392s
HF-181	1927.34	482.00	36.	0.	0.000	1000.00	1.396s
RU-103	1987.56	497.05	0.	7.	0.004	37.80	1.409s
RH-106	2046.81	511.86	14.	48.	0.027	18.16	2.672s
Kr-85	2055.27	513.98	62.	0.	0.000	1000.00	1.424s
Nd-147	2123.35	531.00	9.	4.	0.002	146.76	1.438s
Ba-140	2148.39	537.26	31.	-8.	-0.004	107.87	1.444s
CS-134	2252.30	563.24	10.	-3.	-0.001	335.45	1.466s
CS-134	2276.64	569.32	9.	7.	0.004	70.37	1.471s
PA-234	2277.24	569.47	17.	1.	0.001	409.83	1.471s
BI-207	2278.16	569.70	21.	-3.	-0.001	353.05	1.471s
TL-208	2331.45	583.02	13.	3.	0.002	247.89	1.482s
SB-124	2410.29	602.73	78.	0.	0.000	1000.00	1.499s
CS-134	2418.21	604.71	89.	-12.	-0.006	117.95	1.500s
BI-214	2436.61	609.31	104.	-14.	-0.008	96.30	1.505s
RU-103	2440.56	610.30	105.	0.	0.000	1000.00	1.505s
AG-108M	2456.49	614.28	105.	0.	0.000	1000.00	1.508
PM-144	2471.62	618.06	105.	0.	0.000	1000.00	1.512s
RH-106	2487.04	621.92	105.	0.	0.000	1000.00	1.515s
SB-125	2542.94	635.89	15.	2.	0.001	296.87	1.526s
AG-110M	2630.43	657.76	15.	8.	0.004	80.74	1.544s
CS-137	2646.03	661.66	15.	5.	0.003	110.31	1.548s
PM-144	2785.58	696.54	28.	2.	0.001	303.32	1.576s
SB-124	2890.57	722.79	16.	4.	0.002	137.82	1.598s
AG-108M	2891.17	722.94	20.	0.	0.000	1000.00	1.598s
EU-154	2892.86	723.36	20.	0.	0.000	1000.00	1.598s
ZR-95	2896.22	724.20	20.	0.	0.000	1000.00	1.599s
BI-212	2908.11	727.17	27.	-8.	-0.004	100.11	1.601s
PM-146	2942.31	735.72	14.	-3.	-0.002	174.93	1.608s
PM-146	2988.08	747.16	5.	2.	0.001	207.02	1.617s
ZR-95	3026.36	756.73	5.	-1.	-0.001	501.66	1.625s
AG-110M	3055.23	763.94	6.	6.	0.003	74.14	1.631s
NB-95	3062.61	765.79	18.	-3.	-0.002	189.57	1.632s
PA-234M	3065.10	766.41	9.	6.	0.003	85.71	1.633s
EU-152	3115.14	778.92	10.	-1.	-0.001	702.38	1.643s
BI-212	3141.15	785.42	20.	-6.	-0.003	118.38	1.648s
CS-134	3182.96	795.87	0.	7.	0.004	37.65	1.656
TL-210	3197.88	799.60	7.	0.	0.000	1000.00	1.659s
CS-134	3207.29	801.95	7.	0.	0.000	1000.00	1.661s
CO-58	3242.59	810.78	0.	11.	0.006	30.15	1.668s
La-140	3262.58	815.77	11.	0.	0.000	1000.00	1.672s
Cs-136	3273.50	818.50	11.	0.	0.000	1000.00	1.674s
MN-54	3338.91	834.85	11.	2.	0.001	407.17	1.687s
Co-56	3386.61	846.77	25.	-10.	-0.006	71.78	1.696s
TL-208	3441.80	860.56	5.	4.	0.002	132.68	1.707s
NB-94	3483.94	871.10	5.	1.	0.001	331.66	1.715s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	3492.47	873.23	7.	-1.	-0.001	300.00	1.717s
PA-234	3521.68	880.53	32.	-10.	-0.006	83.13	1.722s
PA-234	3532.53	883.24	42.	-6.	-0.003	168.97	1.724s
AG-110M	3538.30	884.68	48.	0.	0.000	1000.00	1.725s
Sc-46	3556.69	889.28	38.	9.	0.005	107.68	1.729s
Y-88	3591.74	898.04	0.	0.	0.000	1000.00	1.736s
AC-228	3643.88	911.07	6.	4.	0.002	133.74	1.746s
AG-110M	3749.60	937.49	16.	-10.	-0.005	58.04	1.766s
PA-234	3783.72	946.02	5.	3.	0.002	173.74	1.772s
EU-152	3856.11	964.11	33.	-14.	-0.008	64.62	1.786s
EU-154	3985.03	996.33	11.	1.	0.001	357.07	1.810s
EU-154	4018.82	1004.77	0.	0.	0.000	1000.00	1.816s
Co-56	4151.13	1037.84	5.	3.	0.001	220.44	1.841s
Cs-136	4192.07	1048.07	7.	3.	0.002	122.47	1.848s
RH-106	4201.23	1050.36	17.	-6.	-0.003	105.41	1.850s
BI-207	4254.46	1063.66	11.	-3.	-0.002	193.36	1.860s
FE-59	4396.88	1099.25	11.	-6.	-0.003	137.58	1.886s
EU-152	4448.20	1112.07	0.	8.	0.004	35.20	1.895s
ZN-65	4462.09	1115.55	8.	0.	0.000	1000.00	1.897s
BI-214	4481.06	1120.29	12.	-3.	-0.002	180.80	1.901s
Sc-46	4482.12	1120.55	8.	0.	0.000	1000.00	1.901s
Ta-182	4485.12	1121.30	20.	-2.	-0.001	406.11	1.901s
CO-60	4692.96	1173.24	0.	7.	0.004	39.83	1.938s
Ta-182	4756.25	1189.05	0.	0.	0.000	1000.00	1.949s
Ta-182	4885.75	1221.41	23.	-11.	-0.006	109.06	1.972s
Co-56	4953.27	1238.28	11.	-5.	-0.003	154.24	1.984s
NA-22	5098.35	1274.53	17.	-12.	-0.007	56.11	2.008s
EU-154	5098.39	1274.54	29.	-2.	-0.001	408.06	2.008s
TL-210	5252.32	1313.00	6.	-2.	-0.001	343.80	2.034s
CO-60	5330.37	1332.50	1.	-1.	0.000	524.77	2.047s
AG-110M	5537.69	1384.30	17.	-13.	-0.007	23.66	2.082s
EU-152	5632.56	1408.00	0.	5.	0.003	44.72	2.097s
K-40	5844.03	1460.83	7.	4.	0.002	98.24	2.131s
La-140	6385.95	1596.21	18.	-13.	-0.007	81.49	2.215s
BI-214	7059.65	1764.49	4.	2.	0.001	145.66	2.314s
Co-56	7087.11	1771.35	6.	0.	0.000	1000.00	2.318s
Y-88	7346.20	1836.06	6.	-4.	-0.002	73.81	2.354s

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

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

BE-7     C   8.7790E-01                                      5.31E+01
                          477.60 8.779E-01 &(P 6.687E+00 2.16E+02 1.05E+01 G

NA-22    C  -6.1804E-01                                      9.50E+02
                         1274.53-6.180E-01 ?(  1.120E+00 5.61E+01 9.99E+01 G

K-40     N   2.3100E+00                                      4.66E+11
                         1460.83 2.310E+00 ?(P 7.878E+00 9.82E+01 1.07E+01 G

Sc-46    F   3.2699E-01                                      8.38E+01
                          889.28 3.270E-01 ?(  1.204E+00 1.08E+02 1.00E+02 G
                         1120.55 0.000E+00 -   7.349E-01 1.00E+03 1.00E+02 G

CR-51    F  -2.6225E+00                                      2.77E+01
                          320.08-2.622E+00 ?(P 1.118E+01 6.25E+01 9.94E+00 G

MN-54    C   6.5323E-02                                      3.12E+02
                          834.85 6.532E-02 ?(P 6.709E-01 4.07E+02 1.00E+02 G

FE-59    F  -4.5510E-01                                      4.45E+01
                         1099.25-4.551E-01 ?(  1.440E+00 1.38E+02 5.65E+01 G
                         1291.60 3.981E-02 %   1.649E+00 1.68E+03 4.32E+01 G

Co-56    C  -3.7729E-01                                      7.73E+01
                          846.77-3.773E-01 ?(P 9.668E-01 7.18E+01 9.99E+01 G
                         1238.28-4.026E-01 +   1.389E+00 1.54E+02 6.61E+01 G
                         1037.84 7.688E-01 + P 4.184E+00 2.20E+02 1.41E+01 G
                         1771.35 0.000E+00 +   6.090E+00 1.00E+03 1.55E+01  A

CO-57    C   9.8357E-04                                      2.72E+02
                          122.06-9.383E-02 ?(  3.893E-01 1.21E+02 8.56E+01 G
                          136.47 7.609E-01 ?(  4.618E+00 1.77E+02 1.07E+01 G

CO-58    C   3.9603E-01                                      7.09E+01
                          810.78 3.960E-01 ?(  2.653E-01 3.02E+01 9.95E+01 G

CO-60    F   1.4747E-01                                      1.93E+03
                         1332.50-2.962E-02 ?(P 3.900E-01 5.25E+02 1.00E+02 G
                         1173.24 3.247E-01 ?(P 3.525E-01 3.98E+01 9.99E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	I	2.7249E-02					7.41E+06	
			702.63	1.640E-02	&(	9.050E-01	1.52E+03	9.79E+01 G
			871.10	3.788E-02	?(	4.974E-01	3.32E+02	9.99E+01 G
ZR-95	I	-6.2379E-02					6.40E+01	
			756.73	-6.238E-02	?(	8.190E-01	5.02E+02	5.45E+01 G
			724.20	0.000E+00	+	1.753E+00	1.00E+03	4.42E+01 G
NB-95	I	-1.1463E-01					6.40E+01	
			765.79	-1.146E-01	?(	7.786E-01	1.90E+02	9.98E+01 G
RU-103	I	1.9137E-01					3.93E+01	
			497.05	1.914E-01	?(	2.015E-01	3.78E+01	9.09E+01 G
			610.30	0.000E+00	&	2.536E+01	1.00E+03	5.75E+00 GA
AG-108M	C	-2.8648E-01					1.53E+05	
			433.94	-2.865E-01	?(P	7.083E-01	6.08E+01	9.05E+01 G
			722.94	0.000E+00	+	8.507E-01	1.00E+03	9.08E+01 G
			614.28	0.000E+00	+	1.631E+00	1.00E+03	8.98E+01 G
AG-110M	F	2.2474E-01					2.50E+02	
			884.68	0.000E+00	?(	1.844E+00	1.00E+03	7.27E+01 G
			657.76	2.452E-01	?(	6.703E-01	8.07E+01	9.46E+01 G
			937.49	-1.135E+00	+ P	2.471E+00	5.80E+01	3.44E+01 G
			1384.30	-2.828E+00	+ P	4.930E+00	2.37E+01	2.43E+01 G
			763.94	8.708E-01	?(	2.169E+00	7.41E+01	2.23E+01 G
SN-113	F	2.5954E-01					1.15E+02	
			391.69	2.595E-01	?(	9.169E-01	1.03E+02	6.40E+01 G
SB-124	F	1.3035E-01					6.02E+01	
			602.73	0.000E+00	?(	1.278E+00	1.00E+03	9.83E+01 G
			1690.98	-1.325E-03	% P	9.906E-01	4.33E+04	4.78E+01 G
			722.79	1.315E+00	?(	6.421E+00	1.38E+02	1.08E+01 G
SB-125	I	-1.8947E-01					1.01E+03	
			427.88	-6.259E-01	(P	1.863E+00	8.35E+01	2.96E+01 G
			600.50	8.575E-02	% P	6.990E+00	2.33E+03	1.79E+01 G
			635.89	5.039E-01	& P	5.483E+00	2.97E+02	1.13E+01 G
			463.37	1.044E+00	?(P	3.616E+00	9.94E+01	1.05E+01 G
I-131	I	1.8969E-01					8.02E+00	
			364.48	1.897E-01	&(	4.594E-01	9.42E+01	8.17E+01 G
			284.30	-8.188E-01	&	8.371E+00	3.96E+02	6.14E+00 G
			636.97	2.081E-01	&	9.468E+00	1.22E+03	7.17E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Gd-153	F	2.7703E-01					2.42E+02	
			97.50	2.572E-01	?(	1.447E+00	1.64E+02	3.00E+01 G
			103.20	3.044E-01	?(	1.592E+00	1.51E+02	2.18E+01 G
Ga-68	C	-5.2871E-01					4.71E-02	
			1077.40	-5.287E-01	%(	2.137E+01	1.58E+03	3.30E+00 G
Tc-99m	I	9.2000E-02					2.51E-01	
			140.51	9.200E-02	?(	5.993E-01	1.90E+02	8.93E+01 G
BA-133	F	1.4726E-01					3.85E+03	
			356.00	1.473E-01	?(	9.345E-01	1.81E+02	6.20E+01 G
			302.85	-2.811E-01	+	7.529E+00	7.87E+02	1.83E+01 G
			383.84	1.397E+00	? P	5.446E+00	1.13E+02	8.94E+00 GA
			80.99	1.914E-01	&	7.653E-01	1.47E+02	3.41E+01 GA
CS-134	I	2.9112E-01					7.54E+02	
			795.87	2.911E-01	?(	3.042E-01	3.77E+01	8.55E+01 G
			604.71	-3.430E-01	-	1.371E+00	1.18E+02	9.76E+01 G
			569.32	1.291E+00	&	3.024E+00	7.04E+01	1.54E+01 G
			801.95	0.000E+00	-	6.164E+00	1.00E+03	8.69E+00 G
			563.24	-8.386E-01	- P	5.586E+00	3.35E+02	8.35E+00 G
CS-137	I	1.9386E-01					1.10E+04	
			661.66	1.939E-01	?(	7.462E-01	1.10E+02	8.52E+01 G
CE-139	F	-2.4469E-03					1.38E+02	
			165.85	-2.447E-03	%(	5.046E-01	5.77E+03	7.99E+01 G
Ba-140	I	-3.1827E-01					1.28E+01	
			537.26	-8.577E-01	?(P	3.088E+00	1.08E+02	2.44E+01 G
			162.66	1.797E+00	?(	6.059E+00	9.91E+01	6.22E+00 G
			304.85	-3.126E-06	%	3.249E+01	3.05E+08	4.29E+00 G
La-140	I	-8.5734E-01					1.28E+01	
			1596.21	-8.573E-01	?(	1.444E+00	8.15E+01	9.54E+01 G
			487.02	1.046E-02	% P	1.646E+00	4.37E+03	4.55E+01 G
			328.76	-1.095E+00	+ P	4.732E+00	7.54E+01	2.03E+01 G
			815.77	0.000E+00	+	2.807E+00	1.00E+03	2.33E+01 G
CE-141	I	-2.3506E-01					3.25E+01	
			145.44	-2.351E-01	&(P	1.349E+00	1.29E+02	4.82E+01 G
CE-144	I	7.2551E-01					2.85E+02	
			133.54	7.255E-01	(	4.029E+00	1.62E+02	1.11E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PM-144	C	8.0568E-02					3.63E+02	
			696.54	8.057E-02	?(	8.749E-01	3.03E+02	9.90E+01 G
			618.06	0.000E+00	-	1.485E+00	1.00E+03	9.91E+01 G
EU-152	F	8.7122E-01					4.94E+03	
			121.78	-2.443E-02	%(	1.215E+00	1.39E+03	2.86E+01 G
			344.29	6.398E-01	&(	3.384E+00	1.55E+02	2.65E+01 G
			1112.07	2.709E+00	?(	2.474E+00	3.52E+01	1.36E+01 G
			778.92	-2.684E-01	+	4.682E+00	7.02E+02	1.29E+01 G
			964.11	-3.893E+00	+	8.301E+00	6.46E+01	1.46E+01 G
			244.69	1.749E+00	?(P	1.066E+01	1.79E+02	7.58E+00 G
			1408.00	1.317E+00	?	1.941E+00	4.47E+01	2.10E+01 GA
EU-154	I	-1.1232E-01					3.14E+03	
			123.10	-2.788E-01	&(P	1.010E+00	1.01E+02	4.08E+01 G
			1274.54	-2.756E-01	+	4.040E+00	4.08E+02	3.52E+01 G
			723.36	0.000E+00	+	3.824E+00	1.00E+03	2.02E+01 G
			873.23	-4.120E-01	+	4.736E+00	3.00E+02	1.23E+01 G
			1004.77	0.000E+00	+	1.730E+00	1.00E+03	1.80E+01 G
			996.33	5.283E-01	?(	7.104E+00	3.57E+02	1.06E+01 G
EU-155	I	2.9583E-01					1.81E+03	
			105.31	3.029E-01	&(P	1.844E+00	1.76E+02	2.12E+01 G
			86.54	2.909E-01	?(	1.750E+00	1.76E+02	3.07E+01 G
HF-181	F	1.3192E-01					4.24E+01	
			482.00	0.000E+00	&(	9.259E-01	1.00E+03	8.05E+01 G
			133.02	2.074E-01	*(	1.086E+00	1.53E+02	4.33E+01 G
			345.83	-1.098E+00	+ P	7.150E+00	1.07E+02	1.51E+01 G
			136.30	1.388E+00	?(	8.068E+00	1.69E+02	5.85E+00 G
Ta-182	F	-2.0752E-01					1.14E+02	
			1121.30	-2.075E-01	?(	3.081E+00	4.06E+02	3.49E+01 G
			1221.41	-1.949E+00	+	4.549E+00	1.09E+02	2.70E+01 G
			1189.05	0.000E+00	+	2.197E+00	1.00E+03	1.62E+01 G
Hg-203	F	-2.4295E-01					4.66E+01	
			279.20	-2.430E-01	?(	7.298E-01	8.91E+01	8.15E+01 G
TL-208	N	3.7248E-01					6.98E+02	
			583.02	9.711E-02	?(P	6.464E-01	2.48E+02	8.45E+01 G
			277.28	2.417E+00	?(P	7.299E+00	8.92E+01	6.31E+00 G
			860.56	1.207E+00	?(	3.963E+00	1.33E+02	1.24E+01 G
PM-146	C	9.4965E-02					2.02E+03	
			453.88	2.386E-02	%(	7.915E-01	1.28E+03	6.50E+01 G
			747.16	2.309E-01	?(	1.264E+00	2.07E+02	3.40E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          735.72-4.857E-01 + P 3.004E+00 1.75E+02 2.25E+01 G

Y-88     F  -3.0420E-01                                     1.07E+02
                         1836.06-3.042E-01 ?(P 1.004E+00 7.38E+01 9.92E+01 G
                          898.04 0.000E+00 +   3.047E-01 1.00E+03 9.37E+01 G

Cd-113m      1.8576E+03                                     5.33E+03
                          263.70 1.858E+03 &(  6.519E+03 1.02E+02 6.00E-03   K

Cf-251   T   5.6010E-01                                     3.28E+05
                          176.60 5.601E-01  (  1.477E+00 9.86E+01 1.70E+01 G
                          227.00-2.935E+00 +   7.355E+00 1.00E+02 6.30E+00 GA

Cf-249   T  -2.3455E-01                                     1.28E+05
                          387.95-2.346E-01 ?(  9.960E-01 1.23E+02 6.60E+01 G
                          333.44-1.403E+00 +   6.545E+00 1.38E+02 1.55E+01 G

Sn-126      -1.6809E+00                                     3.65E+07
                           87.57 1.959E-03 %   1.623E+00 2.39E+04 3.75E+01 GA
                           64.28-1.681E+00 ?(  6.758E+00 1.19E+02 9.70E+00 G
                           86.94 1.080E+00 &   6.530E+00 1.77E+02 9.04E+00 GA

PB-210   N   3.7525E+00                                     8.14E+03
                           46.54 3.753E+00 ?(P 1.328E+01 1.03E+02 4.25E+00 G

PB-212   N  -6.2891E-01                                     6.98E+02
                          238.63-6.289E-01 ?(P 1.835E+00 7.52E+01 4.33E+01 G
                          300.03-6.828E+00 +   3.770E+01 1.64E+02 3.28E+00 GA

PB-214   N  -4.0292E-01                                     5.84E+05
                          351.93-4.029E-01 ?(P 1.696E+00 1.31E+02 3.76E+01 G
                          295.09-1.475E+00 + P 6.036E+00 5.31E+01 1.93E+01 G
                          242.00-6.287E-01 +   1.112E+01 5.14E+02 7.43E+00 GA

BI-207   C  -1.7142E-01                                     1.18E+04
                         1063.66-1.714E-01 ?(P 1.073E+00 1.93E+02 7.45E+01 G
                          569.70-7.094E-02 & P 6.693E-01 3.53E+02 9.77E+01 G

BI-212   N  -3.4196E+00                                     6.98E+02
                          727.17-3.420E+00 ?(  1.172E+01 1.00E+02 7.55E+00 G
                          785.42-1.547E+01 +   6.382E+01 1.18E+02 1.28E+00 GA

U-235    N   5.4797E-01                                     2.57E+11
                          143.79 5.480E-01 ?(P 4.558E+00 2.41E+02 1.10E+01 G
                          205.33-2.843E-01 % P 7.367E+00 1.25E+03 5.01E+00 G
                          163.38-9.597E-01 +   7.706E+00 2.29E+02 5.08E+00 G
                          185.72 2.248E-01 ?   5.741E-01 9.67E+01 5.40E+01 GA
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

BI-214   N  -3.9885E-01                                     5.84E+05
                         609.31-8.497E-01 ?(P 3.149E+00 9.63E+01 4.61E+01 G
                        1120.29-1.057E+00 + P 5.655E+00 1.81E+02 1.51E+01 G
                        1764.49 9.505E-01 ?(P 5.095E+00 1.46E+02 1.54E+01 G

BI-210M  T  -2.7174E-01                                     1.10E+09
                         265.83-2.717E-01 ?(P 1.036E+00 5.34E+01 5.00E+01 G
                         304.90 4.186E-02 %   4.984E+00 3.49E+03 2.80E+01 G

AC-228   N   5.5520E-01                                     2.10E+03
                         911.07 5.552E-01 ?(P 1.894E+00 1.34E+02 2.90E+01 G
                         968.97-1.939E-01 % P 8.363E+00 1.21E+03 1.75E+01 G
                         338.32-1.527E+00 & P 8.950E+00 9.48E+01 1.20E+01 G
                          93.35-1.826E-01 & P 1.071E+01 1.16E+03 5.56E+00 XA

TH-227   N   5.6822E-01                                     7.95E+03
                         256.24-1.115E+00 ?(  6.106E+00 2.12E+02 7.00E+00 G
                         235.97-1.553E+00 +   5.923E+00 1.13E+02 1.23E+01 G
                          50.14 2.041E+00 ?(  8.031E+00 1.15E+02 8.00E+00 G

TH-229   N   1.4728E+00                                     2.68E+06
                         193.51 1.473E+00 &(  7.523E+00 1.97E+02 4.40E+00 G
                         210.85-3.409E+00 + P 1.414E+01 1.78E+02 2.99E+00 G

TH-234   N   9.1120E-01                                     1.63E+12
                          92.59 0.000E+00  (  1.066E+01 1.00E+03 5.58E+00 G
                          63.29 2.247E+00 ?(  1.476E+01 1.90E+02 3.81E+00 G

PA-231   N  -7.8379E+00                                     1.20E+07
                         302.65-7.838E+00 ?(  4.677E+01 1.77E+02 2.88E+00 G
                         300.07-9.105E+00 +   5.170E+01 1.68E+02 2.46E+00 G

PA-233   C  -6.6365E-01                                     7.82E+08
                         312.01-6.637E-01 &(P 3.430E+00 6.62E+01 3.60E+01 G
                         300.18-3.614E+00 +   2.107E+01 1.73E+02 6.20E+00 G

PA-234   N   6.3056E-01                                     1.63E+12
                         131.29 4.961E-01 &(  2.467E+00 1.45E+02 1.80E+01 G
                         946.02 9.031E-01 ?(  3.952E+00 1.74E+02 1.34E+01 G
                         569.47 4.803E-01 &(  7.257E+00 4.10E+02 8.20E+00 G
                         883.24-2.241E+00 +   1.316E+01 1.69E+02 9.60E+00 G
                         880.53-6.597E+00 +   1.849E+01 8.31E+01 6.00E+00 GA

PA-234M  N   1.6564E+01                                     1.63E+12
                        1001.00-8.828E-01 %(P 9.554E+01 5.68E+03 8.37E-01 G
                         766.41 6.624E+01 ?(  1.947E+02 8.57E+01 2.94E-01 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AM-241   T   3.5652E-01                                      1.58E+05
                           59.54 3.565E-01 ?(P 1.570E+00 1.29E+02 3.59E+01 G

Np-237   F   6.8199E-01                                      2.14E+06
                           86.49 6.820E-01 ?(  3.938E+00 1.69E+02 1.31E+01 G

Ir-192   F  -2.7016E-01                                      7.40E+01
                          316.49-2.702E-01 ?(  1.475E+00 1.62E+02 8.70E+01 G
                          468.06-1.516E-01 +   1.244E+00 2.31E+02 5.18E+01 G
                          308.44-7.233E-01 +   3.748E+00 1.53E+02 3.18E+01 G

Cs-136   F   8.0933E-02                                      1.30E+01
                          818.50 0.000E+00 &(  6.552E-01 1.00E+03 1.00E+02 G
                         1048.07 1.821E-01 ?(  8.054E-01 1.22E+02 8.00E+01 G
                          340.57 0.000E+00 -   2.363E+00 1.00E+03 4.69E+01 G

Np-239   T   1.6862E-01                                      2.36E+00
                          103.70 2.764E-01 ?   1.540E+00 1.61E+02 2.40E+01 X
                          106.13 1.686E-01 ?(  1.512E+00 2.55E+02 2.27E+01 G
                           99.50 4.441E-01 ?   2.165E+00 1.41E+02 1.50E+01 X

Nd-147       8.6928E-01                                      1.11E+01
                          531.00 8.693E-01 ?(  3.296E+00 1.47E+02 1.30E+01 G
                           91.10 0.000E+00 &   2.116E+00 1.00E+03 2.83E+01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	25.	7.	0.004	103.36	3.753E+00	P
TH-227	50.14	44.	9.	0.005	114.96	2.041E+00	
AM-241	59.54	55.	8.	0.005	128.78	3.565E-01	P
TH-234	63.29	63.	6.	0.003	190.13	2.247E+00	
Sn-126	64.28	90.	-12.	-0.007	118.64	-1.681E+00	
BA-133	80.99	18.	6.	0.003	147.47	1.914E-01	
Np-237	86.49	88.	8.	0.004	168.75	6.820E-01	
EU-155	86.54	96.	8.	0.004	175.95	2.909E-01	
Sn-126	86.94	118.	9.	0.005	177.38	1.080E+00	
Gd-153	97.50	67.	7.	0.004	163.72	2.572E-01	
Np-239	99.50	36.	6.	0.004	140.66	4.441E-01	
Gd-153	103.20	43.	6.	0.004	151.04	3.044E-01	
Np-239	103.70	49.	6.	0.004	161.08	2.764E-01	
EU-155	105.31	55.	6.	0.003	176.23	3.029E-01	P
Np-239	106.13	42.	4.	0.002	255.18	1.686E-01	
CO-57	122.06	39.	-8.	-0.004	120.73	-9.383E-02	
EU-154	123.10	62.	-11.	-0.006	101.20	-2.788E-01	P
PA-234	131.29	70.	8.	0.005	145.27	4.961E-01	
HF-181	133.02	78.	8.	0.005	153.03	2.074E-01	
CE-144	133.54	70.	8.	0.004	161.75	7.255E-01	
HF-181	136.30	78.	8.	0.004	169.38	1.388E+00	
CO-57	136.47	85.	8.	0.004	177.04	7.609E-01	
Tc-99m	140.51	93.	7.	0.004	190.08	9.200E-02	
U-235	143.79	84.	5.	0.003	241.36	5.480E-01	P
CE-141	145.44	144.	-10.	-0.006	128.99	-2.351E-01	P
Ba-140	162.66	39.	9.	0.005	99.09	1.797E+00	
U-235	163.38	42.	-4.	-0.002	229.03	-9.597E-01	
Cf-251	176.60	15.	8.	0.004	98.63	5.601E-01	
U-235	185.72	22.	10.	0.005	96.75	2.248E-01	
TH-229	193.51	24.	5.	0.003	196.98	1.473E+00	
TH-229	210.85	36.	-7.	-0.004	178.42	-3.409E+00	P
Cf-251	227.00	40.	-13.	-0.007	100.39	-2.935E+00	
TH-227	235.97	100.	-13.	-0.007	112.84	-1.553E+00	
PB-212	238.63	118.	-18.	-0.010	75.18	-6.289E-01	P
PB-214	242.00	126.	-3.	-0.002	513.58	-6.287E-01	
EU-152	244.69	118.	9.	0.005	178.91	1.749E+00	P
TH-227	256.24	28.	-5.	-0.003	211.97	-1.115E+00	
Cd-113m	263.70	22.	7.	0.004	102.02	1.858E+03	
BI-210M	265.83	40.	-8.	-0.005	53.41	-2.717E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	277.28	29.	9.	0.005	89.20	2.417E+00	P
Hg-203	279.20	51.	-12.	-0.007	89.10	-2.430E-01	
I-131	284.30	36.	-3.	-0.002	395.81	-8.188E-01	
PB-214	295.09	195.	-17.	-0.009	53.10	-1.475E+00	P
TL-210	296.00	203.	-13.	-0.007	159.25	-2.800E-01	
PB-212	300.03	216.	-13.	-0.007	163.56	-6.828E+00	
PA-231	300.07	228.	-13.	-0.007	168.24	-9.105E+00	
PA-233	300.18	241.	-13.	-0.007	172.80	-3.614E+00	
PA-231	302.65	254.	-13.	-0.007	176.91	-7.838E+00	
BA-133	302.85	267.	-3.	-0.002	787.18	-2.811E-01	
Ir-192	308.44	191.	-13.	-0.007	153.42	-7.233E-01	
PA-233	312.01	203.	-13.	-0.007	66.25	-6.637E-01	P
Ir-192	316.49	216.	-13.	-0.007	161.77	-2.702E-01	
CR-51	320.08	157.	-14.	-0.008	62.50	-2.622E+00	P
La-140	328.76	111.	-12.	-0.007	75.36	-1.095E+00	P
Cf-249	333.44	122.	-12.	-0.006	137.63	-1.403E+00	
AC-228	338.32	135.	-10.	-0.005	94.83	-1.527E+00	P
EU-152	344.29	90.	9.	0.005	154.89	6.398E-01	
HF-181	345.83	132.	-9.	-0.005	107.15	-1.098E+00	P
PB-214	351.93	42.	-8.	-0.004	130.57	-4.029E-01	P
BA-133	356.00	33.	5.	0.003	180.98	1.473E-01	
I-131	364.48	12.	8.	0.004	94.20	1.897E-01	
BA-133	383.84	20.	6.	0.003	112.60	1.397E+00	P
Cf-249	387.95	38.	-7.	-0.004	123.40	-2.346E-01	
SN-113	391.69	30.	8.	0.004	103.15	2.595E-01	
SB-125	427.88	22.	-8.	-0.005	83.46	-6.259E-01	P
AG-108M	433.94	31.	-12.	-0.006	60.76	-2.865E-01	P
SB-125	463.37	8.	5.	0.003	99.44	1.044E+00	P
Ir-192	468.06	27.	-3.	-0.002	230.71	-1.516E-01	
BE-7	477.60	32.	4.	0.002	216.11	8.779E-01	P
RU-103	497.05	0.	7.	0.004	37.80	1.914E-01	
RH-106	511.86	14.	48.	0.027	18.16	6.093E+00	
Nd-147	531.00	9.	4.	0.002	146.76	8.693E-01	
Ba-140	537.26	31.	-8.	-0.004	107.87	-8.577E-01	P
CS-134	563.24	10.	-3.	-0.001	335.45	-8.386E-01	P
CS-134	569.32	9.	7.	0.004	70.37	1.291E+00	
PA-234	569.47	17.	1.	0.001	409.83	4.803E-01	
BI-207	569.70	21.	-3.	-0.001	353.05	-7.094E-02	P
TL-208	583.02	13.	3.	0.002	247.89	9.711E-02	P
CS-134	604.71	89.	-12.	-0.006	117.95	-3.430E-01	
BI-214	609.31	104.	-14.	-0.008	96.30	-8.497E-01	P
SB-125	635.89	15.	2.	0.001	296.87	5.039E-01	P
AG-110M	657.76	15.	8.	0.004	80.74	2.452E-01	
CS-137	661.66	15.	5.	0.003	110.31	1.939E-01	
PM-144	696.54	28.	2.	0.001	303.32	8.057E-02	
SB-124	722.79	16.	4.	0.002	137.82	1.315E+00	
BI-212	727.17	27.	-8.	-0.004	100.11	-3.420E+00	
PM-146	735.72	14.	-3.	-0.002	174.93	-4.857E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PM-146	747.16	5.	2.	0.001	207.02	2.309E-01		
ZR-95	756.73	5.	-1.	-0.001	501.66	-6.238E-02		
AG-110M	763.94	6.	6.	0.003	74.14	8.708E-01		
NB-95	765.79	18.	-3.	-0.002	189.57	-1.146E-01		
PA-234M	766.41	9.	6.	0.003	85.71	6.624E+01		
EU-152	778.92	10.	-1.	-0.001	702.38	-2.684E-01		
BI-212	785.42	20.	-6.	-0.003	118.38	-1.547E+01		
CS-134	795.87	0.	7.	0.004	37.65	2.911E-01		
MN-54	834.85	11.	2.	0.001	407.17	6.532E-02		P
Co-56	846.77	25.	-10.	-0.006	71.78	-3.773E-01		P
TL-208	860.56	5.	4.	0.002	132.68	1.207E+00		
NB-94	871.10	5.	1.	0.001	331.66	3.788E-02		
EU-154	873.23	7.	-1.	-0.001	300.00	-4.120E-01		
PA-234	880.53	32.	-10.	-0.006	83.13	-6.597E+00		
PA-234	883.24	42.	-6.	-0.003	168.97	-2.241E+00		
Sc-46	889.28	38.	9.	0.005	107.68	3.270E-01		
AC-228	911.07	6.	4.	0.002	133.74	5.552E-01		P
AG-110M	937.49	16.	-10.	-0.005	58.04	-1.135E+00		P
PA-234	946.02	5.	3.	0.002	173.74	9.031E-01		
EU-152	964.11	33.	-14.	-0.008	64.62	-3.893E+00		
EU-154	996.33	11.	1.	0.001	357.07	5.283E-01		
Co-56	1037.84	5.	3.	0.001	220.44	7.688E-01		P
Cs-136	1048.07	7.	3.	0.002	122.47	1.821E-01		
RH-106	1050.36	17.	-6.	-0.003	105.41	-1.684E+01		
BI-207	1063.66	11.	-3.	-0.002	193.36	-1.714E-01		P
FE-59	1099.25	11.	-6.	-0.003	137.58	-4.551E-01		
EU-152	1112.07	0.	8.	0.004	35.20	2.709E+00		
BI-214	1120.29	12.	-3.	-0.002	180.80	-1.057E+00		P
Ta-182	1121.30	20.	-2.	-0.001	406.11	-2.075E-01		
CO-60	1173.24	0.	7.	0.004	39.83	3.247E-01		P
Ta-182	1221.41	23.	-11.	-0.006	109.06	-1.949E+00		
Co-56	1238.28	11.	-5.	-0.003	154.24	-4.026E-01		
NA-22	1274.53	17.	-12.	-0.007	56.11	-6.180E-01		
EU-154	1274.54	29.	-2.	-0.001	408.06	-2.756E-01		
TL-210	1313.00	6.	-2.	-0.001	343.80	-4.149E-01		
CO-60	1332.50	1.	-1.	0.000	524.77	-2.962E-02		P
AG-110M	1384.30	17.	-13.	-0.007	23.66	-2.828E+00		P
EU-152	1408.00	0.	5.	0.003	44.72	1.317E+00		
K-40	1460.83	7.	4.	0.002	98.24	2.310E+00		P
La-140	1596.21	18.	-13.	-0.007	81.49	-8.573E-01		
BI-214	1764.49	4.	2.	0.001	145.66	9.505E-01		P
Y-88	1836.06	6.	-4.	-0.002	73.81	-3.042E-01		P

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	8.7790E-01	8.7790E-01	2.161E+02%	6.69E+00
NA-22	#A	-6.1804E-01	-6.1804E-01	5.611E+01%	1.12E+00
K-40	#A	2.3100E+00	2.3100E+00	9.824E+01%	7.88E+00
Sc-46	#A	3.2699E-01	3.2699E-01	1.077E+02%	1.20E+00
CR-51	#A	-2.6225E+00	-2.6225E+00	6.250E+01%	1.12E+01
MN-54	#A	6.5323E-02	6.5323E-02	4.072E+02%	6.71E-01
FE-59	#A	-4.5510E-01	-4.5510E-01	1.376E+02%	1.44E+00
Co-56	#A	-3.7729E-01	-3.7729E-01	7.178E+01%	9.67E-01
CO-57	#A	9.8357E-04	9.8357E-04	1.071E+02%	3.89E-01
CO-58	#	3.9603E-01	3.9603E-01	3.015E+01%	2.65E-01
CO-60	#A	1.4747E-01	1.4747E-01	3.983E+01%	3.90E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.45E+00
NB-94	#A	2.7249E-02	2.7249E-02	3.317E+02%	9.05E-01
ZR-95	#A	-6.2379E-02	-6.2379E-02	5.017E+02%	8.19E-01
NB-95	#A	-1.1463E-01	-1.1463E-01	1.896E+02%	7.79E-01
RU-103	#A	1.9136E-01	1.9137E-01	3.780E+01%	2.01E-01
RH-106	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.49E+01
AG-108M	#A	-2.8648E-01	-2.8648E-01	6.076E+01%	7.08E-01
AG-110M	#A	2.2474E-01	2.2474E-01	7.414E+01%	1.84E+00
SN-113	#A	2.5954E-01	2.5954E-01	1.032E+02%	9.17E-01
SB-124	#A	1.3035E-01	1.3035E-01	1.378E+02%	1.28E+00
SB-125	#A	-1.8947E-01	-1.8947E-01	6.491E+01%	1.86E+00
I-131	#A	1.8968E-01	1.8969E-01	9.420E+01%	4.59E-01
Gd-153	#A	2.7703E-01	2.7703E-01	1.114E+02%	1.45E+00
Ga-68	#A	-5.2396E-01	-5.2871E-01	1.584E+03%	2.14E+01
Tc-99m	#A	9.1844E-02	9.2000E-02	1.901E+02%	5.99E-01
BA-133	#A	1.4726E-01	1.4726E-01	1.810E+02%	9.34E-01
CS-134	#A	2.9112E-01	2.9112E-01	3.765E+01%	3.04E-01
CS-137	#A	1.9386E-01	1.9386E-01	1.103E+02%	7.46E-01
CE-139	#A	-2.4469E-03	-2.4469E-03	5.771E+03%	5.05E-01
Ba-140	#A	-3.1826E-01	-3.1827E-01	7.324E+01%	3.09E+00
La-140	#A	-8.5731E-01	-8.5734E-01	8.149E+01%	1.44E+00
CE-141	#A	-2.3506E-01	-2.3506E-01	1.290E+02%	1.35E+00
CE-144	#A	7.2551E-01	7.2551E-01	1.618E+02%	4.03E+00
PM-144	#A	8.0568E-02	8.0568E-02	3.033E+02%	8.75E-01
EU-152	#A	8.7122E-01	8.7122E-01	3.520E+01%	1.21E+00
EU-154	#A	-1.1232E-01	-1.1232E-01	1.012E+02%	1.01E+00
EU-155	#A	2.9583E-01	2.9583E-01	1.245E+02%	1.84E+00
HF-181	#A	1.3192E-01	1.3192E-01	1.530E+02%	9.26E-01
Ta-182	#A	-2.0752E-01	-2.0752E-01	4.061E+02%	3.08E+00
Hg-203	#A	-2.4295E-01	-2.4295E-01	8.910E+01%	7.30E-01
TL-208	#A	3.7248E-01	3.7248E-01	8.920E+01%	6.46E-01
PM-146	#A	9.4965E-02	9.4965E-02	2.070E+02%	7.92E-01

Y-88	#A	-3.0419E-01	-3.0420E-01	7.381E+01%	1.00E+00
Cd-113m	#A	1.8576E+03	1.8576E+03	1.020E+02%	6.52E+03
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.60E+01
Cf-251	#A	5.6010E-01	5.6010E-01	9.863E+01%	1.48E+00
Cf-249	#A	-2.3455E-01	-2.3455E-01	1.234E+02%	9.96E-01
Sn-126	#A	-1.6809E+00	-1.6809E+00	1.186E+02%	6.76E+00
PB-210	#A	3.7525E+00	3.7525E+00	1.034E+02%	1.33E+01
PB-212	#A	-6.2891E-01	-6.2891E-01	7.518E+01%	1.84E+00
PB-214	#A	-4.0292E-01	-4.0292E-01	1.306E+02%	1.70E+00
BI-207	#A	-1.7142E-01	-1.7142E-01	1.934E+02%	1.07E+00
BI-212	#A	-3.4196E+00	-3.4196E+00	1.001E+02%	1.17E+01
U-235	#A	5.4797E-01	5.4797E-01	2.414E+02%	4.56E+00
BI-214	#A	-3.9885E-01	-3.9885E-01	8.731E+01%	3.15E+00
BI-210M	#A	-2.7174E-01	-2.7174E-01	5.341E+01%	1.04E+00
AC-228	#A	5.5520E-01	5.5520E-01	1.337E+02%	1.89E+00
TH-227	#A	5.6822E-01	5.6822E-01	1.150E+02%	6.11E+00
TH-229	#A	1.4728E+00	1.4728E+00	1.970E+02%	7.52E+00
TH-234	#A	9.1120E-01	9.1120E-01	1.901E+02%	1.07E+01
PA-231	#A	-7.8379E+00	-7.8379E+00	1.769E+02%	4.68E+01
PA-233	#A	-6.6365E-01	-6.6365E-01	6.625E+01%	3.43E+00
PA-234	#A	6.3056E-01	6.3056E-01	1.453E+02%	2.47E+00
PA-234M	#A	1.6564E+01	1.6564E+01	8.571E+01%	9.55E+01
AM-241	#A	3.5652E-01	3.5652E-01	1.288E+02%	1.57E+00
Np-237	#A	6.8199E-01	6.8199E-01	1.687E+02%	3.94E+00
Ir-192	#A	-2.7016E-01	-2.7016E-01	1.618E+02%	1.47E+00
Cs-136	#A	8.0931E-02	8.0933E-02	1.225E+02%	6.55E-01
Np-239	#A	1.6859E-01	1.6862E-01	2.552E+02%	1.51E+00
Nd-147	#A	8.6925E-01	8.6928E-01	1.468E+02%	3.30E+00
TL-210	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.40E-01
Kr-85	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.33E+02

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

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

Total Activity (25.1 to 1999.3 keV) 0.000E+00 Bq/Sample
Total Decayed Activity (25.1 to 1999.3 keV) 0.0000000E+00 Bq/Sample

441817_Gamma_MB 160-441817~1-A. 9_Gamma_20192636.spc.

Test America St. Louis Spectrum ID: 12_Gamma_20192417

Sample Description: 441817_Gamma_LCS 160-441817~2-A
Detector: Detector #12
Batch ID: 441817
Work Order Number: Gamma
Lot Number: LCS 160-441817~2-A

Decay to Time: 9/26/2019 06:47 Live Time: 1800 sec
Acquisition Time: 9/26/2019 06:47:13 Real Time: 1806 sec
Analysis Time: 9/26/2019 07:17 Dead Time: 0.34 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: Client_Long_Rev15.lib
Bkgd Correction File: 12_2019-09-07_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	1.282E+01	108.5	1.392E+01	1.393E+01	4.624E+01
NA-22	6.923E-01	57.9	4.006E-01	4.021E-01	1.292E+00
K-40	3.660E+00	126.5	4.630E+00	4.634E+00	1.034E+01
Sc-46	-1.762E+00	88.6	1.561E+00	1.564E+00	5.190E+00
CR-51	-1.057E+01	169.6	1.793E+01	1.793E+01	5.951E+01
MN-54	3.256E-01	364.0	1.185E+00	1.185E+00	2.727E+00
FE-59	-4.355E+00	83.1	3.617E+00	3.624E+00	7.578E+00
Co-56	4.771E-01	95.0	4.531E-01	4.538E-01	3.344E+00
CO-57	-6.524E-02	85.5	5.577E-02	5.587E-02	2.487E+00
CO-58	1.265E+00	97.6	1.234E+00	1.236E+00	4.118E+00
CO-60	1.519E+02	1.6	2.458E+00	7.955E+00	1.386E+00
ZN-65	0.000E+00	1.#INF	7.735E-01	7.735E-01	9.984E+00
NB-94	9.338E-01	84.4	7.883E-01	7.898E-01	2.314E+00
ZR-95	-2.908E+00	87.1	2.535E+00	2.539E+00	5.694E+00
NB-95	-1.936E-01	563.5	1.091E+00	1.091E+00	3.711E+00
RU-103	1.315E+00	94.4	1.242E+00	1.244E+00	3.011E+00
RH-106	1.898E+01	76.2	1.447E+01	1.450E+01	2.221E+01
AG-108M	-1.052E-01	1345.1	1.415E+00	1.415E+00	3.460E+00
AG-110M	1.637E+00	37.8	6.189E-01	6.244E-01	6.648E+00
SN-113	-2.036E+00	105.0	2.137E+00	2.139E+00	7.093E+00
SB-124	1.488E+00	44.7	6.655E-01	6.698E-01	5.422E+00
SB-125	4.649E+00	90.3	4.196E+00	4.202E+00	1.056E+01
I-131	-1.054E+00	140.7	1.482E+00	1.483E+00	3.591E+00
Gd-153	1.358E+00	260.5	3.537E+00	3.538E+00	1.176E+01
Ga-68	-3.566E+01	180.6	6.442E+01	6.445E+01	1.367E+02
Tc-99m	7.671E-01	154.1	1.182E+00	1.183E+00	3.923E+00
BA-133	-1.818E+00	101.6	1.847E+00	1.849E+00	6.134E+00
CS-134	3.493E+00	49.2	1.717E+00	1.727E+00	3.596E+00
CS-137	3.889E+02	1.3	4.956E+00	2.046E+01	4.117E+00
CE-139	9.023E-01	100.0	9.023E-01	9.035E-01	2.995E+00
Ba-140	4.920E+00	93.2	4.587E+00	4.594E+00	9.905E+00
La-140	3.021E-01	358.8	1.084E+00	1.084E+00	1.243E+00
CE-141	1.442E+00	153.2	2.209E+00	2.210E+00	7.330E+00

CE-144	-6.445E+00	162.0	1.044E+01	1.044E+01	3.463E+01
PM-144	-9.717E-01	117.7	1.144E+00	1.145E+00	2.593E+00
EU-152	5.447E+00	61.5	3.352E+00	3.364E+00	8.262E+00
EU-154	3.477E+00	67.8	2.358E+00	2.365E+00	5.398E+00
EU-155	9.882E-01	220.2	2.176E+00	2.176E+00	1.654E+01
HF-181	2.497E+00	78.5	1.961E+00	1.965E+00	6.214E+00
Ta-182	2.192E+00	196.5	4.306E+00	4.308E+00	1.453E+01
Hg-203	9.050E-01	117.1	1.059E+00	1.060E+00	3.527E+00
TL-208	1.643E+00	88.2	1.449E+00	1.452E+00	3.538E+00
PM-146	3.301E+00	37.3	1.230E+00	1.241E+00	5.893E+00
Y-88	1.146E+00	28.9	3.307E-01	3.371E-01	7.036E-01
Cd-113m	9.002E+03	141.4	1.273E+04	1.274E+04	4.250E+04
Cd-109	0.000E+00	1.#INF	1.399E+01	1.399E+01	9.597E+01
Cf-251	-1.121E+00	409.6	4.593E+00	4.593E+00	1.168E+01
Cf-249	2.143E+00	105.2	2.255E+00	2.258E+00	6.434E+00
Sn-126	-2.058E+01	230.7	4.747E+01	4.749E+01	1.568E+02
PB-210	1.068E+04	1.0	1.089E+02	6.755E+02	2.138E+02
PB-212	7.482E+00	19.9	1.487E+00	1.537E+00	3.814E+00
PB-214	7.161E+00	36.3	2.602E+00	2.627E+00	5.953E+00
BI-207	-3.082E+00	84.5	2.604E+00	2.609E+00	5.462E+00
BI-212	-1.656E+01	83.3	1.380E+01	1.383E+01	4.591E+01
U-235	5.552E+00	168.5	9.358E+00	9.362E+00	3.108E+01
BI-214	4.248E+00	36.5	1.551E+00	1.566E+00	5.291E+00
BI-210M	6.966E-01	121.6	8.473E-01	8.480E-01	5.396E+00
AC-228	9.669E+00	51.0	4.928E+00	4.952E+00	1.092E+01
TH-227	-1.417E+01	98.1	1.390E+01	1.392E+01	3.507E+01
TH-229	1.875E+01	104.1	1.952E+01	1.954E+01	4.922E+01
TH-234	-9.343E+00	107.8	1.007E+01	1.008E+01	6.457E+01
PA-231	3.456E+01	66.7	2.306E+01	2.313E+01	6.408E+01
PA-233	2.836E+00	169.0	4.793E+00	4.795E+00	1.591E+01
PA-234	1.197E+01	35.2	4.211E+00	4.256E+00	1.613E+01
PA-234M	1.220E+02	74.4	9.076E+01	9.097E+01	5.925E+02
AM-241	1.236E+03	0.9	1.057E+01	7.271E+01	1.557E+01
Np-237	6.331E+00	135.0	8.550E+00	8.557E+00	2.835E+01
Ir-192	2.043E+00	84.2	1.721E+00	1.725E+00	6.416E+00
Cs-136	-1.653E-02	107.1	1.770E-02	1.773E-02	4.489E+00
Np-239	3.189E+00	135.5	4.321E+00	4.325E+00	1.433E+01
Nd-147	2.842E+00	296.1	8.414E+00	8.415E+00	1.987E+01
TL-210	1.208E+00	82.8	1.001E+00	1.003E+00	3.332E+00
Kr-85	-3.102E+02	99.6	3.089E+02	3.094E+02	1.027E+03
Total	2.178E+04				

Analyst: Caleb Quinn

Sample description
441817_Gamma_LCS 160-441817~2-A

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20192417.An1

Acquisition information
Start time: 9/26/2019 6:47:13 AM
Live time: 1800
Real time: 1806
Dead time: 0.34 %
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	9/26/2019 6:47:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2019-09-07_1401.PBC 9/7/2019 2:01:12 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1176

***** 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
28.37	132.	18.65	1.71	4.317E-03				
32.13	111.	37.61	0.61	7.159E-03				
36.41	309.	17.68	1.17	1.039E-02				
46.58	14746.	1.02	0.85	1.801E-02	46.54	4.250	1.068E+04	PB210
49.48	10.	822.78	0.85	2.126E-02	50.14	8.000	3.017E+00	TH227
59.53	22496.	0.86	0.85	2.817E-02	59.54	35.900	1.236E+03	AM241
77.15	100.	35.76	0.96	3.386E-02				
86.49	53.	135.05	0.89	3.559E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	2.701E+00	EU155
86.54	33.	220.15	0.89	3.560E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.671E+00	EU155
					86.94	9.040	5.664E+00	Sn126
92.59	-34.	107.79	0.90	3.637E-02	92.59	5.584	PBC<MDA	TH234
93.35	53.	129.65	0.90	3.645E-02	93.35	5.561	PBC<MDA	AC228
97.50	27.	260.50	0.90	3.683E-02	97.50	30.000	PBC<MDA	Gd153
106.13	49.	135.50	0.91	3.729E-02	106.13	22.700	PBC<MDA	Np239
121.78	48.	99.13	0.93	3.725E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	8.392E-01	CO57
123.10	23.	194.38	0.93	3.721E-02	123.10	40.790	PBC<MDA	EU154
136.47	45.	159.84	0.94	3.651E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	6.449E+00	CO57
140.51	43.	154.07	0.95	3.623E-02	140.51	89.300	PBC<MDA	Tc99m
143.40	39.	168.55	0.95	3.599E-02	143.79	10.960	PBC<MDA	U235
144.72	33.	86.83	0.52	3.587E-02	145.44	48.200	1.072E+00	CE141
162.60	27.	103.67	0.97	3.435E-02	162.66	6.220	PBC<MDA	Ba140
165.85	44.	100.00	0.97	3.405E-02	165.85	79.900	PBC<MDA	CE139
185.94	75.	45.90	1.42	3.215E-02	185.72	54.000	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
193.51	47.	104.11	1.00	3.140E-02	193.51	4.400	PBC<MDA	TH229
227.00	9.	517.00	1.03	2.839E-02	227.00	6.300	PBC<MDA	Cf251
238.42	160.	19.87	1.11	2.745E-02	238.63	43.300	7.482E+00	PB212
242.00	43.	128.14	1.05	2.716E-02	242.00	7.430	PBC<MDA	PB214
263.70	25.	141.41	1.07	2.554E-02	263.70	0.006	PBC<MDA	Cd113m
279.20	32.	117.06	1.09	2.449E-02	279.20	81.460	PBC<MDA	Hg203
300.16	42.	169.95	1.11	2.321E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	4.099E+01	PA231
					300.18	6.200	1.627E+01	PA233
302.74	35.	66.71	1.11	2.306E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	4.570E+00	BA133
304.90	41.	166.81	1.11	2.293E-02	304.85	4.290	2.329E+01	Ba140
					304.90	28.000	3.568E+00	BI210M
304.94	7.	964.60	1.11	2.293E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	6.349E-01	BI210M
308.44	41.	167.73	1.11	2.273E-02	308.44	31.750	PBC<MDA	Ir192
312.01	41.	169.02	1.12	2.253E-02	312.01	36.000	PBC<MDA	PA233
316.49	41.	166.41	1.12	2.229E-02	316.49	87.040	PBC<MDA	Ir192
335.00	20.	194.97	1.14	2.142E-02	333.44	15.510	PBC<MDA	Cf249
338.32	41.	108.82	1.14	2.118E-02	338.32	12.010	PBC<MDA	AC228
340.57	31.	144.39	1.15	2.108E-02	340.57	46.900	PBC<MDA	Cs136
345.83	38.	111.68	1.15	2.083E-02	345.83	15.070	PBC<MDA	HF181
351.60	100.	36.33	0.83	2.057E-02	351.93	37.600	7.161E+00	PB214
371.89	32.	54.50	0.65	1.970E-02				
389.13	42.	105.21	1.19	1.907E-02	387.95	66.000	PBC<MDA	Cf249
450.61	35.	43.05	0.39	1.701E-02				
453.88	11.	320.72	1.26	1.692E-02	453.88	65.000	PBC<MDA	PM146
463.37	44.	90.26	1.27	1.666E-02	463.37	10.470	PBC<MDA	SB125
468.06	43.	89.69	1.27	1.653E-02	468.06	51.750	PBC<MDA	Ir192
477.60	40.	108.52	1.28	1.628E-02	477.60	10.520	PBC<MDA	BE7
482.00	40.	110.46	1.28	1.617E-02	482.00	80.500	PBC<MDA	HF181
487.02	12.	358.80	1.29	1.604E-02	487.02	45.500	PBC<MDA	La140
489.09	32.	46.99	0.43	1.599E-02				
495.35	34.	94.42	1.30	1.580E-02	497.05	90.900	PBC<MDA	RU103
531.00	10.	296.09	1.33	1.504E-02	531.00	13.000	PBC<MDA	Nd147
537.81	30.	93.24	1.34	1.491E-02	537.26	24.390	PBC<MDA	Ba140
563.24	29.	91.67	1.36	1.439E-02	563.24	8.350	PBC<MDA	CS134
569.32	27.	68.19	1.37	1.428E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.281E+01	PA234
					569.70	97.740	1.075E+00	BI207
600.50	29.	134.52	1.40	1.373E-02	600.50	17.860	PBC<MDA	SB125
602.73	29.	136.88	1.40	1.369E-02	602.73	98.260	PBC<MDA	SB124
609.14	51.	36.52	1.41	1.358E-02	609.31	46.090	PBC<MDA	BI214
621.92	26.	88.46	1.42	1.338E-02	621.92	9.930	PBC<MDA	RH106
657.76	31.	410.81	1.45	1.284E-02	657.76	94.640	PBC<MDA	AG110M
661.66	7630.	1.27	1.42	1.279E-02	661.66	85.210	3.889E+02	CS137
702.63	24.	90.58	1.49	1.224E-02	702.63	97.900	PBC<MDA	NB94
722.79	16.	124.81	1.51	1.199E-02	722.79	10.810	PBC<MDA	SB124

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					722.94	90.840	7.990E-01	AG108M
					723.36	20.220	3.591E+00	EU154
723.36	22.	85.15	1.51	1.199E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.139E+00	AG108M
					723.36	20.220	5.119E+00	EU154
735.72	57.	37.26	1.52	1.184E-02	735.72	22.500	1.196E+01	PM146
747.16	20.	108.01	1.53	1.171E-02	747.16	34.000	PBC<MDA	PM146
766.41	29.	74.37	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	4.695E+02	PA234M
778.92	18.	134.37	1.56	1.136E-02	778.92	12.940	PBC<MDA	EU152
795.87	24.	77.81	1.58	1.119E-02	795.87	85.530	PBC<MDA	CS134
799.60	24.	82.83	1.58	1.115E-02	799.60	98.960	PBC<MDA	TL210
801.95	15.	139.89	1.58	1.113E-02	801.95	8.690	PBC<MDA	CS134
810.78	25.	97.57	1.59	1.104E-02	810.78	99.460	PBC<MDA	CO58
834.85	6.	363.96	1.61	1.081E-02	834.85	99.980	PBC<MDA	MN54
860.56	30.	88.22	1.64	1.057E-02	860.56	12.420	PBC<MDA	TL208
871.10	14.	142.50	1.65	1.048E-02	871.10	99.890	PBC<MDA	NB94
873.23	30.	67.81	1.65	1.046E-02	873.23	12.270	PBC<MDA	EU154
880.53	30.	81.58	1.66	1.040E-02	880.53	6.000	PBC<MDA	PA234
883.24	28.	94.52	1.66	1.038E-02	883.24	9.600	PBC<MDA	PA234
911.07	53.	50.97	1.68	1.015E-02	911.07	29.000	PBC<MDA	AC228
937.49	33.	84.56	1.71	9.939E-03	937.49	34.360	PBC<MDA	AG110M
946.02	74.	35.19	1.72	9.873E-03	946.02	13.400	3.107E+01	PA234
964.11	18.	134.80	1.73	9.739E-03	964.11	14.605	PBC<MDA	EU152
1004.77	22.	111.22	1.77	9.450E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	19.	140.30	1.80	9.228E-03	1037.84	14.130	PBC<MDA	Co56
1050.36	18.	124.20	1.81	9.147E-03	1050.36	1.560	PBC<MDA	RH106
1112.07	19.	120.59	1.86	8.770E-03	1112.07	13.644	PBC<MDA	EU152
1121.30	12.	196.50	1.87	8.716E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.192E+00	Ta182
1173.25	2330.	2.33	1.82	8.426E-03	1173.24	99.900	1.538E+02	CO60
1238.28	8.	166.78	1.97	8.090E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	10.	57.87	2.00	7.914E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.966E+00	EU154
1274.54	2.	366.97	2.00	7.914E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	3.614E-01	EU154
1313.00	10.	84.92	2.04	7.735E-03	1313.00	21.000	PBC<MDA	TL210
1332.57	2065.	2.25	1.96	7.647E-03	1332.50	99.980	1.500E+02	CO60
1384.30	7.	37.80	2.10	7.423E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	3.	284.80	2.12	7.324E-03	1408.00	21.005	PBC<MDA	EU152
1460.83	5.	126.49	2.16	7.112E-03	1460.83	10.670	PBC<MDA	K40
1690.98	5.	44.72	2.35	6.302E-03	1690.98	47.790	PBC<MDA	SB124
1766.28	6.	120.12	2.40	6.075E-03	1764.49	15.400	PBC<MDA	BI214
1836.06	12.	28.87	2.46	5.866E-03	1836.06	99.200	1.146E+00	Y88

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
113.16	28.37	158.	132.	3.057E+04	18.65	1.705	-	s
128.19	32.13	544.	111.	1.551E+04	37.61	0.605	-	s
145.29	36.41	892.	309.	2.973E+04	17.68	1.167	-	s
197.57	49.45	3068.	11.	5.222E+02	706.11	0.854	-	sc
308.15	77.15	473.	100.	2.955E+03	35.76	0.955	-	s
579.07	145.31	359.	38.	1.065E+03	71.99	0.951	-	sc
1486.58	371.89	112.	32.	1.650E+03	54.50	0.655	-	s
1801.38	450.65	96.	35.	2.057E+03	43.05	0.389	-	s
1955.26	489.09	81.	32.	1.980E+03	46.99	0.435	-	s

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

This section based on library: Client_Long_Rev15.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.79	46.54	3942.	14746.	8.192	1.02	0.851D
TH-227	200.18	50.14	26363.	-129.	-0.071	178.67	0.855
AM-241	237.71	59.53	3630.	22496.	12.498	0.86	0.848
TH-234	252.74	63.29	30632.	-131.	-0.073	115.03	0.868s
Sn-126	256.71	64.28	31176.	-108.	-0.060	230.71	0.869
BA-133	323.50	80.99	1976.	-56.	-0.031	113.16	0.887s
Np-237	345.49	86.49	2548.	53.	0.030	135.05	0.892s
EU-155	345.70	86.54	2601.	33.	0.018	220.15	0.892s
Sn-126	347.29	86.94	2528.	-54.	-0.030	133.32	0.892s
Cd-109	351.68	88.04	2474.	0.	0.000	1000.00	0.894s
Nd-147	363.92	91.10	2474.	0.	0.000	1000.00	0.897s
TH-234	369.87	92.59	2508.	-34.	-0.019	107.79	0.898s
AC-228	372.91	93.35	2376.	53.	0.030	129.65	0.899s
Gd-153	389.50	97.50	2460.	27.	0.015	260.50	0.903s
Np-239	397.50	99.50	2487.	0.	0.000	1000.00	0.905s
Gd-153	412.29	103.20	2487.	0.	0.000	1000.00	0.909s
Np-239	414.29	103.70	2487.	0.	0.000	1000.00	0.909s
EU-155	420.73	105.31	2487.	0.	0.000	1000.00	0.911s
Np-239	424.00	106.13	2142.	49.	0.027	135.50	0.912s
EU-152	486.56	121.78	1115.	48.	0.027	99.13	0.928s
CO-57	487.69	122.06	902.	-50.	-0.028	85.48	0.928s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	491.84	123.10	965.	23.	0.013	194.38	0.929s
PA-234	524.60	131.29	1658.	-48.	-0.027	119.74	0.938s
HF-181	531.51	133.02	2859.	-47.	-0.026	160.90	0.939s
CE-144	533.57	133.54	2901.	-47.	-0.026	161.99	0.940
HF-181	544.61	136.30	2948.	-20.	-0.011	376.56	0.943s
CO-57	545.30	136.47	2595.	45.	0.025	159.84	0.943s
Tc-99m	561.44	140.51	2213.	43.	0.024	154.07	0.947s
U-235	574.53	143.79	2187.	39.	0.022	168.55	0.950s
CE-141	581.15	145.44	2338.	45.	0.025	153.15	0.952
Ba-140	649.99	162.66	367.	27.	0.015	103.67	0.969D
U-235	652.87	163.38	1217.	-40.	-0.022	123.55	0.970
CE-139	662.76	165.85	954.	44.	0.025	100.00	0.973
Cf-251	705.72	176.60	612.	-11.	-0.006	409.56	0.983
U-235	743.08	185.94	378.	75.	0.042	45.90	1.418s
TH-229	773.32	193.51	660.	47.	0.026	104.11	1.000s
U-235	820.59	205.33	686.	-21.	-0.011	238.06	1.012
TH-229	842.65	210.85	638.	-21.	-0.012	226.08	1.018
Cf-251	907.22	227.00	616.	9.	0.005	517.00	1.034s
TH-227	943.09	235.97	938.	-46.	-0.025	95.97	1.043
PB-212	952.87	238.42	286.	160.	0.089	19.87	1.107
PB-214	967.18	242.00	1462.	43.	0.024	128.14	1.049
EU-152	977.96	244.69	1687.	-46.	-0.026	126.53	1.051s
TH-227	1024.13	256.24	583.	-47.	-0.026	98.08	1.063
Cd-113m	1053.96	263.70	604.	25.	0.014	141.41	1.070s
BI-210M	1062.48	265.83	670.	-21.	-0.012	177.05	1.072s
TL-208	1108.27	277.28	776.	-42.	-0.024	93.93	1.084s
Hg-203	1115.93	279.20	708.	32.	0.018	117.06	1.086
I-131	1136.32	284.30	458.	-25.	-0.014	159.34	1.091s
PB-214	1179.47	295.09	2595.	-46.	-0.026	68.69	1.101s
TL-210	1183.11	296.00	2549.	-41.	-0.023	175.42	1.102s
PA-231	1199.38	300.07	2541.	42.	0.023	169.95	1.106s
PA-231	1209.70	302.65	251.	35.	0.019	66.71	1.109D
Ba-140	1218.49	304.85	2501.	7.	0.004	964.60	1.111s
BI-210M	1218.68	304.90	2345.	41.	0.023	166.81	1.111s
Ir-192	1232.85	308.44	2386.	41.	0.023	167.73	1.115s
PA-233	1247.13	312.01	2428.	41.	0.023	169.02	1.118s
Ir-192	1265.04	316.49	2256.	41.	0.023	166.41	1.123s
CR-51	1279.41	320.08	2491.	-42.	-0.023	169.61	1.126s
La-140	1314.10	328.76	790.	-18.	-0.010	216.18	1.135s
Cf-249	1332.81	333.44	788.	20.	0.011	194.97	1.139s
AC-228	1352.33	338.32	953.	41.	0.023	108.82	1.144
Cs-136	1361.32	340.57	994.	31.	0.017	144.39	1.146s
EU-152	1376.18	344.29	1025.	0.	0.000	1000.00	1.150
HF-181	1382.35	345.83	900.	38.	0.021	111.68	1.151s
PB-214	1405.43	351.60	295.	100.	0.055	36.33	0.832s
BA-133	1423.02	356.00	862.	-41.	-0.023	101.60	1.162s
I-131	1456.95	364.48	488.	-31.	-0.017	140.67	1.170s
BA-133	1534.35	383.84	944.	-42.	-0.023	105.28	1.189s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-249	1550.79	387.95	943.	42.	0.023	105.21	1.193s
SN-113	1565.74	391.69	1064.	-44.	-0.025	104.97	1.196
PM-146	1814.45	453.88	598.	11.	0.006	320.72	1.257s
SB-125	1852.39	463.37	767.	44.	0.024	90.26	1.266s
Ir-192	1871.16	468.06	739.	43.	0.024	89.69	1.271
BE-7	1909.29	477.60	901.	40.	0.022	108.52	1.280s
HF-181	1926.90	482.00	940.	40.	0.022	110.46	1.284s
La-140	1946.98	487.02	967.	12.	0.007	358.80	1.289s
RU-103	1987.11	497.05	260.	34.	0.019	94.42	1.298s
RH-106	2046.35	511.86	560.	-30.	-0.017	113.04	2.563s
Kr-85	2054.81	513.98	660.	-37.	-0.021	99.56	1.315s
Nd-147	2122.88	531.00	208.	10.	0.006	296.09	1.331s
Ba-140	2147.92	537.26	178.	30.	0.017	93.24	1.337s
CS-134	2251.82	563.24	160.	29.	0.016	91.67	1.362s
CS-134	2276.15	569.32	156.	27.	0.015	68.19	1.367s
PA-234	2276.75	569.47	216.	-23.	-0.013	92.74	1.368s
BI-207	2277.68	569.70	209.	-8.	-0.005	247.97	1.368s
SB-125	2400.87	600.50	733.	29.	0.016	134.52	1.397s
SB-124	2409.79	602.73	762.	29.	0.016	136.88	1.399s
CS-134	2417.71	604.71	945.	-32.	-0.018	135.70	1.401s
BI-214	2436.11	609.31	149.	51.	0.028	36.52	1.405D
RU-103	2440.06	610.30	890.	-32.	-0.018	131.30	1.406s
AG-108M	2455.99	614.28	858.	-20.	-0.011	208.72	1.410s
RH-106	2486.54	621.92	117.	26.	0.014	88.46	1.417s
SB-125	2542.43	635.89	182.	-13.	-0.007	149.36	1.430s
AG-110M	2629.92	657.76	7932.	31.	0.017	410.81	1.451s
CS-137	2645.53	661.66	280.	7630.	4.239	1.27	1.416
PM-144	2785.05	696.54	135.	-21.	-0.012	117.69	1.487s
NB-94	2809.41	702.63	103.	24.	0.014	90.58	1.493s
SB-124	2890.04	722.79	183.	16.	0.009	124.81	1.512s
AG-108M	2890.65	722.94	199.	0.	0.000	1000.00	1.512s
EU-154	2892.34	723.36	170.	22.	0.012	85.15	1.512
ZR-95	2895.69	724.20	192.	0.	0.000	1000.00	1.513
BI-212	2907.58	727.17	237.	-27.	-0.015	83.32	1.516s
PM-146	2941.78	735.72	89.	57.	0.032	37.26	1.524s
PM-146	2987.55	747.16	103.	20.	0.011	108.01	1.535s
ZR-95	3025.83	756.73	177.	-33.	-0.018	87.15	1.543s
AG-110M	3054.69	763.94	210.	-30.	-0.017	70.71	1.550s
NB-95	3062.08	765.79	252.	-4.	-0.002	563.47	1.552s
PA-234M	3064.57	766.41	211.	29.	0.016	74.37	1.552s
EU-152	3114.61	778.92	126.	18.	0.010	134.37	1.564s
BI-212	3140.62	785.42	168.	-33.	-0.018	85.75	1.570s
CS-134	3182.43	795.87	162.	24.	0.013	77.81	1.579
TL-210	3197.35	799.60	185.	24.	0.013	82.83	1.583s
CS-134	3206.76	801.95	225.	15.	0.009	139.89	1.585s
CO-58	3242.06	810.78	285.	25.	0.014	97.57	1.593s
La-140	3262.05	815.77	310.	0.	0.000	1000.00	1.598s
Cs-136	3272.97	818.50	340.	-17.	-0.009	158.29	1.600s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
MN-54	3338.38	834.85	117.	6.	0.004	363.96	1.615s
Co-56	3386.08	846.77	175.	-16.	-0.009	183.48	1.626s
TL-208	3441.27	860.56	135.	30.	0.016	88.22	1.638s
NB-94	3483.41	871.10	192.	14.	0.008	142.50	1.648s
EU-154	3491.95	873.23	190.	30.	0.017	67.81	1.650s
PA-234	3521.16	880.53	294.	30.	0.017	81.58	1.657s
PA-234	3532.00	883.24	324.	28.	0.015	94.52	1.659s
AG-110M	3537.78	884.68	352.	0.	0.000	1000.00	1.660s
Sc-46	3556.17	889.28	405.	-33.	-0.018	88.62	1.664s
Y-88	3591.22	898.04	195.	-24.	-0.013	129.54	1.672s
AC-228	3643.36	911.07	140.	53.	0.029	50.97	1.684s
AG-110M	3749.09	937.49	155.	33.	0.018	84.56	1.708s
PA-234	3783.21	946.02	125.	74.	0.041	35.19	1.716
EU-152	3855.60	964.11	270.	18.	0.010	134.80	1.732s
AC-228	3875.05	968.97	287.	0.	0.000	1000.00	1.736s
EU-154	3984.54	996.33	295.	-14.	-0.008	177.59	1.761s
PA-234M	4003.22	1001.00	309.	0.	0.000	1000.00	1.765s
EU-154	4018.33	1004.77	297.	22.	0.012	111.22	1.768
Co-56	4150.66	1037.84	139.	19.	0.011	140.30	1.798s
Cs-136	4191.60	1048.07	260.	-40.	-0.022	58.79	1.807s
RH-106	4200.76	1050.36	252.	18.	0.010	124.20	1.809s
BI-207	4253.99	1063.66	187.	-37.	-0.021	84.50	1.820s
Ga-68	4308.98	1077.40	165.	-16.	-0.009	180.64	1.833
FE-59	4396.44	1099.25	197.	-39.	-0.022	83.06	1.852s
EU-152	4447.76	1112.07	253.	19.	0.011	120.59	1.863s
ZN-65	4461.66	1115.55	272.	0.	0.000	1000.00	1.866s
BI-214	4480.63	1120.29	272.	0.	0.000	1000.00	1.870s
Sc-46	4481.68	1120.55	272.	0.	0.000	1000.00	1.870s
Ta-182	4484.69	1121.30	272.	12.	0.007	196.50	1.871s
CO-60	4692.62	1173.25	80.	2330.	1.294	2.33	1.817
Ta-182	4755.86	1189.05	75.	-22.	-0.012	93.16	1.930s
Ta-182	4885.39	1221.41	68.	-24.	-0.013	84.52	1.957s
Co-56	4952.92	1238.28	28.	8.	0.004	166.78	1.972
NA-22	5098.03	1274.53	11.	10.	0.005	57.87	2.003s
EU-154	5098.08	1274.54	21.	2.	0.001	366.97	2.003s
FE-59	5166.35	1291.60	40.	-17.	-0.009	91.95	2.017s
TL-210	5252.04	1313.00	11.	10.	0.006	84.92	2.036s
CO-60	5330.38	1332.57	12.	2065.	1.147	2.25	1.958
AG-110M	5537.48	1384.30	0.	7.	0.004	37.80	2.096s
EU-152	5632.39	1408.00	12.	3.	0.002	284.80	2.115s
K-40	5843.92	1460.83	6.	5.	0.003	126.49	2.159
La-140	6386.02	1596.21	6.	0.	0.000	1000.00	2.269s
SB-124	6765.58	1690.98	0.	5.	0.003	44.72	2.345s
BI-214	7060.00	1764.49	20.	6.	0.003	120.12	2.403
Co-56	7087.48	1771.35	6.	0.	0.000	1000.00	2.408s
Y-88	7346.69	1836.06	0.	12.	0.007	28.87	2.459s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	1.2823E+01					5.31E+01	
			477.60	1.282E+01	(	4.624E+01	1.09E+02	1.05E+01 G
NA-22	C	6.9225E-01					9.50E+02	
			1274.53	6.923E-01	?(	1.292E+00	5.79E+01	9.99E+01 G
K-40	N	3.6604E+00					4.66E+11	
			1460.83	3.660E+00	?(	1.034E+01	1.26E+02	1.07E+01 G
Sc-46	F	-1.7620E+00					8.38E+01	
			889.28	-1.762E+00	?(	5.190E+00	8.86E+01	1.00E+02 G
			1120.55	0.000E+00	&	5.069E+00	1.00E+03	1.00E+02 G
CR-51	F	-1.0569E+01					2.77E+01	
			320.08	-1.057E+01	?(	5.951E+01	1.70E+02	9.94E+00 G
MN-54	C	3.2561E-01					3.12E+02	
			834.85	3.256E-01	?(	2.727E+00	3.64E+02	1.00E+02 G
FE-59	F	-4.3548E+00					4.45E+01	
			1099.25	-4.355E+00	&(	7.578E+00	8.31E+01	5.65E+01 G
			1291.60	-2.736E+00	+	5.263E+00	9.19E+01	4.32E+01 G
Co-56	C	4.7713E-01					7.73E+01	
			846.77	-8.314E-01	?(	3.344E+00	1.83E+02	9.99E+01 G
			1238.28	7.969E-01	&(	2.860E+00	1.67E+02	6.61E+01 G
			1037.84	8.237E+00	&(	2.453E+01	1.40E+02	1.41E+01 G
			1771.35	0.000E+00	-	8.182E+00	1.00E+03	1.55E+01 A
CO-57	C	-6.5238E-02					2.72E+02	
			122.06	-8.780E-01	(	2.487E+00	8.55E+01	8.56E+01 G
			136.47	6.449E+00	&(	3.421E+01	1.60E+02	1.07E+01 G
CO-58	C	1.2650E+00					7.09E+01	
			810.78	1.265E+00	?(	4.118E+00	9.76E+01	9.95E+01 G
CO-60	F	1.5190E+02					1.93E+03	
			1332.50	1.500E+02	(	1.386E+00	2.25E+00	1.00E+02 G
			1173.24	1.538E+02	(	2.930E+00	2.33E+00	9.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	I	9.3377E-01					7.41E+06	
			702.63	1.129E+00	(	2.314E+00	9.06E+01	9.79E+01 G
			871.10	7.429E-01	&(	3.570E+00	1.42E+02	9.99E+01 G
ZR-95	I	-2.9084E+00					6.40E+01	
			756.73	-2.908E+00	?(	5.694E+00	8.71E+01	5.45E+01 G
			724.20	0.000E+00	+	7.069E+00	1.00E+03	4.42E+01 G
NB-95	I	-1.9359E-01					6.40E+01	
			765.79	-1.936E-01	&(	3.711E+00	5.63E+02	9.98E+01 G
RU-103	I	1.3151E+00					3.93E+01	
			497.05	1.315E+00	&(	3.011E+00	9.44E+01	9.09E+01 G
			610.30	-2.310E+01	+	1.010E+02	1.31E+02	5.75E+00 GA
RH-106	I	1.8981E+01					3.74E+02	
			621.92	1.071E+01	&(	2.221E+01	8.85E+01	9.93E+00 G
			1050.36	7.165E+01	?(	2.986E+02	1.24E+02	1.56E+00 G
			511.86	-5.391E+00	-	2.031E+01	1.13E+02	2.00E+01 GA
AG-108M	C	-1.0520E-01					1.53E+05	
			433.94	-1.052E-01	&(	3.460E+00	1.35E+03	9.05E+01 G
			722.94	0.000E+00	+	3.491E+00	1.00E+03	9.08E+01 G
			614.28	-9.141E-01	+	6.374E+00	2.09E+02	8.98E+01 G
AG-110M	F	1.6374E+00					2.50E+02	
			884.68	0.000E+00	?(	6.648E+00	1.00E+03	7.27E+01 G
			657.76	1.403E+00	?(	1.909E+01	4.11E+02	9.46E+01 G
			937.49	5.381E+00	&(	9.879E+00	8.46E+01	3.44E+01 G
			1384.30	2.157E+00	?(	2.271E+00	3.78E+01	2.43E+01 G
			763.94	-6.492E+00	&	1.520E+01	7.07E+01	2.23E+01 G
SN-113	F	-2.0357E+00					1.15E+02	
			391.69	-2.036E+00	?(	7.093E+00	1.05E+02	6.40E+01 G
SB-124	F	1.4880E+00					6.02E+01	
			602.73	1.188E+00	?(	5.422E+00	1.37E+02	9.83E+01 G
			1690.98	9.223E-01	?(	1.359E+00	4.47E+01	4.78E+01 G
			722.79	6.713E+00	?(	2.820E+01	1.25E+02	1.08E+01 G
SB-125	I	4.6487E+00					1.01E+03	
			427.88	2.121E-01	&(	1.056E+01	2.04E+03	2.96E+01 G
			600.50	6.510E+00	(	2.919E+01	1.35E+02	1.79E+01 G
			635.89	-4.850E+00	+	2.447E+01	1.49E+02	1.13E+01 G
			463.37	1.402E+01	&(	4.196E+01	9.03E+01	1.05E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	I	-1.0536E+00					8.02E+00	
			364.48	-1.054E+00	?(	3.591E+00	1.41E+02	8.17E+01 G
			284.30	-9.486E+00	+	3.837E+01	1.59E+02	6.14E+00 G
			636.97	4.911E-01	%	4.371E+01	2.60E+03	7.17E+00 G
Gd-153	F	1.3577E+00					2.42E+02	
			97.50	1.358E+00	?(	1.176E+01	2.60E+02	3.00E+01 G
			103.20	0.000E+00	&	1.612E+01	1.00E+03	2.18E+01 G
Ga-68	C	-3.5661E+01					4.71E-02	
			1077.40	-3.566E+01	?(	1.367E+02	1.81E+02	3.30E+00 G
Tc-99m	I	7.6713E-01					2.51E-01	
			140.51	7.671E-01	?(	3.923E+00	1.54E+02	8.93E+01 G
BA-133	F	-1.8180E+00					3.85E+03	
			356.00	-1.818E+00	?(	6.134E+00	1.02E+02	6.20E+01 G
			302.85	-1.254E-07	%	3.105E+01	7.43E+09	1.83E+01 G
			383.84	-1.348E+01	+	4.714E+01	1.05E+02	8.94E+00 GA
			80.99	-2.633E+00	+	9.878E+00	1.13E+02	3.41E+01 GA
CS-134	I	3.4928E+00					7.54E+02	
			795.87	1.390E+00	(	3.596E+00	7.78E+01	8.55E+01 G
			604.71	-1.346E+00	-	6.082E+00	1.36E+02	9.76E+01 G
			569.32	6.830E+00	?(	1.541E+01	6.82E+01	1.54E+01 G
			801.95	8.853E+00	?(	4.168E+01	1.40E+02	8.69E+00 G
			563.24	1.331E+01	&(	2.853E+01	9.17E+01	8.35E+00 G
CS-137	I	3.8895E+02					1.10E+04	
			661.66	3.889E+02	(	4.117E+00	1.27E+00	8.52E+01 G
CE-139	F	9.0230E-01					1.38E+02	
			165.85	9.023E-01	&(	2.995E+00	1.00E+02	7.99E+01 G
Ba-140	I	4.9197E+00					1.28E+01	
			537.26	4.547E+00	?(	9.905E+00	9.32E+01	2.44E+01 G
			162.66	6.916E+00	(	2.391E+01	1.04E+02	6.22E+00 G
			304.85	4.144E+00	&(	1.331E+02	9.65E+02	4.29E+00 G
La-140	I	3.0212E-01					1.28E+01	
			1596.21	0.000E+00	?(	1.243E+00	1.00E+03	9.54E+01 G
			487.02	9.356E-01	(	1.123E+01	3.59E+02	4.55E+01 G
			328.76	-2.338E+00	+	1.690E+01	2.16E+02	2.03E+01 G
			815.77	0.000E+00	-	1.840E+01	1.00E+03	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	1.4421E+00					3.25E+01	
			145.44	1.442E+00	&(	7.330E+00	1.53E+02	4.82E+01 G
CE-144	I	-6.4448E+00					2.85E+02	
			133.54	-6.445E+00	&(	3.463E+01	1.62E+02	1.11E+01 G
PM-144	C	-9.7170E-01					3.63E+02	
			696.54	-9.717E-01	(	2.593E+00	1.18E+02	9.90E+01 G
			618.06	-7.954E-08	%	5.739E+00	2.15E+09	9.91E+01 G
EU-152	F	5.4468E+00					4.94E+03	
			121.78	2.513E+00	(	8.262E+00	9.91E+01	2.86E+01 G
			344.29	0.000E+00	-	1.524E+01	1.00E+03	2.65E+01 G
			1112.07	8.822E+00	&(	3.567E+01	1.21E+02	1.36E+01 G
			778.92	6.801E+00	(	2.079E+01	1.34E+02	1.29E+01 G
			964.11	6.836E+00	?(	3.094E+01	1.35E+02	1.46E+01 G
			244.69	-1.257E+01	+	5.279E+01	1.27E+02	7.58E+00 G
			1408.00	1.083E+00	-	6.808E+00	2.85E+02	2.10E+01 GA
EU-154	I	3.4770E+00					3.14E+03	
			123.10	8.321E-01	&(	5.398E+00	1.94E+02	4.08E+01 G
			1274.54	3.614E-01	?(	4.820E+00	3.67E+02	3.52E+01 G
			723.36	5.119E+00	?(	1.453E+01	8.52E+01	2.02E+01 G
			873.23	1.290E+01	?(	2.893E+01	6.78E+01	1.23E+01 G
			1004.77	7.290E+00	&(	2.712E+01	1.11E+02	1.80E+01 G
			996.33	-7.625E+00	+	4.560E+01	1.78E+02	1.06E+01 G
EU-155	I	9.8821E-01					1.81E+03	
			105.31	0.000E+00	?(	1.654E+01	1.00E+03	2.12E+01 G
			86.54	1.671E+00	&(	1.222E+01	2.20E+02	3.07E+01 G
HF-181	F	2.4973E+00					4.24E+01	
			482.00	1.693E+00	?(	6.214E+00	1.10E+02	8.05E+01 G
			133.02	-1.648E+00	+	8.798E+00	1.61E+02	4.33E+01 G
			345.83	6.793E+00	&(	2.522E+01	1.12E+02	1.51E+01 G
			136.30	-5.311E+00	&	6.649E+01	3.77E+02	5.85E+00 G
Ta-182	F	2.1916E+00					1.14E+02	
			1121.30	2.192E+00	?(	1.453E+01	1.96E+02	3.49E+01 G
			1221.41	-5.938E+00	+	1.035E+01	8.45E+01	2.70E+01 G
			1189.05	-8.907E+00	+	1.767E+01	9.32E+01	1.62E+01 G
Hg-203	F	9.0500E-01					4.66E+01	
			279.20	9.050E-01	&(	3.527E+00	1.17E+02	8.15E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N	1.6431E+00				6.98E+02		
			583.02	4.373E-02	%(P	3.538E+00	3.40E+03	8.45E+01 G
			277.28	-1.520E+01	&	4.738E+01	9.39E+01	6.31E+00 G
			860.56	1.252E+01	?(	2.405E+01	8.82E+01	1.24E+01 G
PM-146	C	3.3006E+00				2.02E+03		
			453.88	5.472E-01	&(	5.893E+00	3.21E+02	6.50E+01 G
			747.16	2.837E+00	?(	6.967E+00	1.08E+02	3.40E+01 G
			735.72	1.196E+01	&(	9.715E+00	3.73E+01	2.25E+01 G
Y-88	F	1.1456E+00				1.07E+02		
			1836.06	1.146E+00	?(	7.036E-01	2.89E+01	9.92E+01 G
			898.04	-1.388E+00	-	3.920E+00	1.30E+02	9.37E+01 G
Cd-113m		9.0023E+03				5.33E+03		
			263.70	9.002E+03	?(	4.250E+04	1.41E+02	6.00E-03 K
Cf-251	T	-1.1215E+00				3.28E+05		
			176.60	-1.121E+00	&(	1.168E+01	4.10E+02	1.70E+01 G
			227.00	2.796E+00		3.677E+01	5.17E+02	6.30E+00 GA
Cf-249	T	2.1434E+00				1.28E+05		
			387.95	1.841E+00	&(	6.434E+00	1.05E+02	6.60E+01 G
			333.44	3.428E+00	&(	2.234E+01	1.95E+02	1.55E+01 G
Sn-126		-2.0577E+01				3.65E+07		
			87.57	-9.048E-03	%	9.718E+00	3.22E+04	3.75E+01 GA
			64.28	-2.058E+01	?(	1.568E+02	2.31E+02	9.70E+00 G
			86.94	-9.240E+00	+	4.085E+01	1.33E+02	9.04E+00 GA
PB-210	N	1.0678E+04				8.14E+03		
			46.54	1.068E+04	(P	2.138E+02	1.02E+00	4.25E+00 G
PB-212	N	7.4821E+00				6.98E+02		
			238.63	7.482E+00	(P	3.814E+00	1.99E+01	4.33E+01 G
			300.03	-5.568E-06	%	1.723E+02	9.28E+08	3.28E+00 GA
PB-214	N	7.1613E+00				5.84E+05		
			351.93	7.161E+00	(P	5.953E+00	3.63E+01	3.76E+01 G
			295.09	-5.693E+00	- P	2.941E+01	6.87E+01	1.93E+01 G
			242.00	1.170E+01		4.979E+01	1.28E+02	7.43E+00 GA
BI-207	C	-3.0821E+00				1.18E+04		
			1063.66	-3.082E+00	?(	5.462E+00	8.45E+01	7.45E+01 G
			569.70	-3.319E-01	+	2.793E+00	2.48E+02	9.77E+01 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
BI-212	N	-1.6561E+01						6.98E+02	
			727.17	-1.656E+01	&(	4.591E+01	8.33E+01	7.55E+00	G
			785.42	-1.259E+02	+	2.425E+02	8.58E+01	1.28E+00	GA
U-235	N	5.5520E+00						2.57E+11	
			143.79	5.552E+00	?(P	3.108E+01	1.69E+02	1.10E+01	G
			205.33	-7.564E+00	+	4.565E+01	2.38E+02	5.01E+00	G
			163.38	-1.284E+01	+	5.273E+01	1.24E+02	5.08E+00	G
			185.72	2.410E+00	P	2.985E+00	4.59E+01	5.40E+01	GA
BI-214	N	4.2476E+00						5.84E+05	
			609.31	4.543E+00	(	5.291E+00	3.65E+01	4.61E+01	G
			1120.29	0.000E+00	-	3.356E+01	1.00E+03	1.51E+01	G
			1764.49	3.365E+00	&(	1.409E+01	1.20E+02	1.54E+01	G
BI-210M	T	6.9662E-01						1.10E+09	
			265.83	-9.116E-01	&(	5.396E+00	1.77E+02	5.00E+01	G
			304.90	3.568E+00	&(	1.976E+01	1.67E+02	2.80E+01	G
AC-228	N	9.6693E+00						2.10E+03	
			911.07	1.001E+01	(	1.092E+01	5.10E+01	2.90E+01	G
			968.97	0.000E+00	-	2.678E+01	1.00E+03	1.75E+01	G
			338.32	8.855E+00	&(	3.201E+01	1.09E+02	1.20E+01	G
			93.35	1.465E+01		6.299E+01	1.30E+02	5.56E+00	XA
TH-227	N	-1.4175E+01						7.95E+03	
			256.24	-1.417E+01	(	3.507E+01	9.81E+01	7.00E+00	G
			235.97	-7.466E+00	+	2.377E+01	9.60E+01	1.23E+01	G
			50.14	-4.074E+01	&	2.404E+02	1.79E+02	8.00E+00	G
TH-229	N	1.8748E+01						2.68E+06	
			193.51	1.875E+01	&(	4.922E+01	1.04E+02	4.40E+00	G
			210.85	-1.310E+01	&	7.509E+01	2.26E+02	2.99E+00	G
TH-234	N	-9.3429E+00						1.63E+12	
			92.59	-9.343E+00	(P	6.457E+01	1.08E+02	5.58E+00	G
			63.29	-6.412E+01	& P	4.007E+02	1.15E+02	3.81E+00	G
PA-231	N	3.4563E+01						1.20E+07	
			302.65	2.907E+01	(	6.408E+01	6.67E+01	2.88E+00	G
			300.07	4.099E+01	?(	2.312E+02	1.70E+02	2.46E+00	G
PA-233	C	2.8357E+00						7.82E+08	
			312.01	2.836E+00	*(	1.591E+01	1.69E+02	3.60E+01	G
			300.18	2.545E+00	%	9.107E+01	1.07E+03	6.20E+00	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	N	1.1967E+01					1.63E+12	
			131.29	-4.059E+00	&(	1.613E+01	1.20E+02	1.80E+01 G
			946.02	3.107E+01	&(	2.302E+01	3.52E+01	1.34E+01 G
			569.47	-1.091E+01	+	3.378E+01	9.27E+01	8.20E+00 G
			883.24	1.535E+01	?(	4.832E+01	9.45E+01	9.60E+00 G
			880.53	2.714E+01	?	7.355E+01	8.16E+01	6.00E+00 GA
PA-234M	N	1.2203E+02					1.63E+12	
			1001.00	0.000E+00	&(	5.925E+02	1.00E+03	8.37E-01 G
			766.41	4.695E+02	&(	1.158E+03	7.44E+01	2.94E-01 G
AM-241	T	1.2358E+03					1.58E+05	
			59.54	1.236E+03	(	1.557E+01	8.55E-01	3.59E+01 G
Np-237	F	6.3310E+00					2.14E+06	
			86.49	6.331E+00	(	2.835E+01	1.35E+02	1.31E+01 G
Ir-192	F	2.0426E+00					7.40E+01	
			316.49	1.161E+00	&(	6.416E+00	1.66E+02	8.70E+01 G
			468.06	2.824E+00	&(	8.403E+00	8.97E+01	5.18E+01 G
			308.44	3.185E+00	&(	1.773E+01	1.68E+02	3.18E+01 G
Cs-136	F	-1.6527E-02					1.30E+01	
			818.50	-8.446E-01	?(	4.489E+00	1.58E+02	1.00E+02 G
			1048.07	-3.050E+00	+	5.897E+00	5.88E+01	8.00E+01 G
			340.57	1.749E+00	(	8.410E+00	1.44E+02	4.69E+01 G
Np-239	T	3.1886E+00					2.36E+00	
			103.70	0.000E+00	-	1.463E+01	1.00E+03	2.40E+01 X
			106.13	3.189E+00	?(	1.433E+01	1.36E+02	2.27E+01 G
			99.50	0.000E+00	-	2.355E+01	1.00E+03	1.50E+01 X
Nd-147		2.8417E+00					1.11E+01	
			531.00	2.842E+00	&(	1.987E+01	2.96E+02	1.30E+01 G
			91.10	0.000E+00	-	1.271E+01	1.00E+03	2.83E+01 G
TL-210	N	1.2078E+00					5.84E+05	
			799.60	1.208E+00	?(	3.332E+00	8.28E+01	9.90E+01 G
			296.00	-1.226E+00	-	7.138E+00	1.75E+02	7.90E+01 G
			1313.00	3.426E+00	&	6.293E+00	8.49E+01	2.10E+01 GA
Kr-85	I	-3.1023E+02					3.92E+03	
			513.98	-3.102E+02	?(	1.027E+03	9.96E+01	4.30E-01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.

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

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

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

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	26363.	-129.	-0.071	178.67	-4.074E+01	
TH-234	63.29	30632.	-131.	-0.073	115.03	-6.412E+01	P
Sn-126	64.28	31176.	-108.	-0.060	230.71	-2.058E+01	
BA-133	80.99	1976.	-56.	-0.031	113.16	-2.633E+00	
Np-237	86.49	2548.	53.	0.030	135.05	6.331E+00	
EU-155	86.54	2601.	33.	0.018	220.15	1.671E+00	
Sn-126	86.94	2528.	-54.	-0.030	133.32	-9.240E+00	
TH-234	92.59	2508.	-34.	-0.019	107.79	-9.343E+00	P
AC-228	93.35	2376.	53.	0.030	129.65	1.465E+01	
Gd-153	97.50	2460.	27.	0.015	260.50	1.358E+00	
Np-239	106.13	2142.	49.	0.027	135.50	3.189E+00	
EU-152	121.78	1115.	48.	0.027	99.13	2.513E+00	
CO-57	122.06	902.	-50.	-0.028	85.48	-8.780E-01	
EU-154	123.10	965.	23.	0.013	194.38	8.321E-01	
PA-234	131.29	1658.	-48.	-0.027	119.74	-4.059E+00	
HF-181	133.02	2859.	-47.	-0.026	160.90	-1.648E+00	
CE-144	133.54	2901.	-47.	-0.026	161.99	-6.445E+00	
HF-181	136.30	2948.	-20.	-0.011	376.56	-5.311E+00	
CO-57	136.47	2595.	45.	0.025	159.84	6.449E+00	
Tc-99m	140.51	2213.	43.	0.024	154.07	7.671E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CE-139	165.85	954.	44.	0.025	100.00	9.023E-01	
Cf-251	176.60	612.	-11.	-0.006	409.56	-1.121E+00	
TH-229	193.51	660.	47.	0.026	104.11	1.875E+01	
TH-229	210.85	638.	-21.	-0.012	226.08	-1.310E+01	
Cf-251	227.00	616.	9.	0.005	517.00	2.796E+00	
TH-227	235.97	938.	-46.	-0.025	95.97	-7.466E+00	
EU-152	244.69	1687.	-46.	-0.026	126.53	-1.257E+01	
TH-227	256.24	583.	-47.	-0.026	98.08	-1.417E+01	
Cd-113m	263.70	604.	25.	0.014	141.41	9.002E+03	
BI-210M	265.83	670.	-21.	-0.012	177.05	-9.116E-01	
TL-208	277.28	776.	-42.	-0.024	93.93	-1.520E+01	
Hg-203	279.20	708.	32.	0.018	117.06	9.050E-01	
I-131	284.30	458.	-25.	-0.014	159.34	-9.486E+00	
TL-210	296.00	2549.	-41.	-0.023	175.42	-1.226E+00	
BI-210M	304.90	2345.	41.	0.023	166.81	3.568E+00	
Ir-192	308.44	2386.	41.	0.023	167.73	3.185E+00	
PA-233	312.01	2428.	41.	0.023	169.02	2.836E+00	
Ir-192	316.49	2256.	41.	0.023	166.41	1.161E+00	
CR-51	320.08	2491.	-42.	-0.023	169.61	-1.057E+01	
La-140	328.76	790.	-18.	-0.010	216.18	-2.338E+00	
AC-228	338.32	953.	41.	0.023	108.82	8.855E+00	
Cs-136	340.57	994.	31.	0.017	144.39	1.749E+00	
HF-181	345.83	900.	38.	0.021	111.68	6.793E+00	
BA-133	356.00	862.	-41.	-0.023	101.60	-1.818E+00	
I-131	364.48	488.	-31.	-0.017	140.67	-1.054E+00	
BA-133	383.84	944.	-42.	-0.023	105.28	-1.348E+01	
SN-113	391.69	1064.	-44.	-0.025	104.97	-2.036E+00	
PM-146	453.88	598.	11.	0.006	320.72	5.472E-01	
SB-125	463.37	767.	44.	0.024	90.26	1.402E+01	
Ir-192	468.06	739.	43.	0.024	89.69	2.824E+00	
BE-7	477.60	901.	40.	0.022	108.52	1.282E+01	
HF-181	482.00	940.	40.	0.022	110.46	1.693E+00	
La-140	487.02	967.	12.	0.007	358.80	9.356E-01	
RH-106	511.86	560.	-30.	-0.017	113.04	-5.391E+00	
Kr-85	513.98	660.	-37.	-0.021	99.56	-3.102E+02	
Nd-147	531.00	208.	10.	0.006	296.09	2.842E+00	
CS-134	563.24	160.	29.	0.016	91.67	1.331E+01	
CS-134	569.32	156.	27.	0.015	68.19	6.830E+00	
PA-234	569.47	216.	-23.	-0.013	92.74	-1.091E+01	
BI-207	569.70	209.	-8.	-0.005	247.97	-3.319E-01	
SB-125	600.50	733.	29.	0.016	134.52	6.510E+00	
SB-124	602.73	762.	29.	0.016	136.88	1.188E+00	
CS-134	604.71	945.	-32.	-0.018	135.70	-1.346E+00	
AG-108M	614.28	858.	-20.	-0.011	208.72	-9.141E-01	
RH-106	621.92	117.	26.	0.014	88.46	1.071E+01	
SB-125	635.89	182.	-13.	-0.007	149.36	-4.850E+00	
AG-110M	657.76	7932.	31.	0.017	410.81	1.403E+00	
PM-144	696.54	135.	-21.	-0.012	117.69	-9.717E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
NB-94	702.63	103.	24.	0.014	90.58	1.129E+00	
SB-124	722.79	183.	16.	0.009	124.81	6.713E+00	
EU-154	723.36	170.	22.	0.012	85.15	5.119E+00	
BI-212	727.17	237.	-27.	-0.015	83.32	-1.656E+01	
PM-146	735.72	89.	57.	0.032	37.26	1.196E+01	
PM-146	747.16	103.	20.	0.011	108.01	2.837E+00	
ZR-95	756.73	177.	-33.	-0.018	87.15	-2.908E+00	
AG-110M	763.94	210.	-30.	-0.017	70.71	-6.492E+00	
NB-95	765.79	252.	-4.	-0.002	563.47	-1.936E-01	
PA-234M	766.41	211.	29.	0.016	74.37	4.695E+02	
EU-152	778.92	126.	18.	0.010	134.37	6.801E+00	
BI-212	785.42	168.	-33.	-0.018	85.75	-1.259E+02	
CS-134	795.87	162.	24.	0.013	77.81	1.390E+00	
TL-210	799.60	185.	24.	0.013	82.83	1.208E+00	
CS-134	801.95	225.	15.	0.009	139.89	8.853E+00	
CO-58	810.78	285.	25.	0.014	97.57	1.265E+00	
Cs-136	818.50	340.	-17.	-0.009	158.29	-8.446E-01	
MN-54	834.85	117.	6.	0.004	363.96	3.256E-01	
Co-56	846.77	175.	-16.	-0.009	183.48	-8.314E-01	
TL-208	860.56	135.	30.	0.016	88.22	1.252E+01	
NB-94	871.10	192.	14.	0.008	142.50	7.429E-01	
EU-154	873.23	190.	30.	0.017	67.81	1.290E+01	
PA-234	880.53	294.	30.	0.017	81.58	2.714E+01	
PA-234	883.24	324.	28.	0.015	94.52	1.535E+01	
Sc-46	889.28	405.	-33.	-0.018	88.62	-1.762E+00	
AC-228	911.07	140.	53.	0.029	50.97	1.001E+01	
AG-110M	937.49	155.	33.	0.018	84.56	5.381E+00	
PA-234	946.02	125.	74.	0.041	35.19	3.107E+01	
EU-152	964.11	270.	18.	0.010	134.80	6.836E+00	
EU-154	996.33	295.	-14.	-0.008	177.59	-7.625E+00	
EU-154	1004.77	297.	22.	0.012	111.22	7.290E+00	
Co-56	1037.84	139.	19.	0.011	140.30	8.237E+00	
Cs-136	1048.07	260.	-40.	-0.022	58.79	-3.050E+00	
RH-106	1050.36	252.	18.	0.010	124.20	7.165E+01	
BI-207	1063.66	187.	-37.	-0.021	84.50	-3.082E+00	
Ga-68	1077.40	165.	-16.	-0.009	180.64	-3.566E+01	
FE-59	1099.25	197.	-39.	-0.022	83.06	-4.355E+00	
EU-152	1112.07	253.	19.	0.011	120.59	8.822E+00	
Ta-182	1121.30	272.	12.	0.007	196.50	2.192E+00	
Ta-182	1189.05	75.	-22.	-0.012	93.16	-8.907E+00	
Ta-182	1221.41	68.	-24.	-0.013	84.52	-5.938E+00	
Co-56	1238.28	28.	8.	0.004	166.78	7.969E-01	
NA-22	1274.53	11.	10.	0.005	57.87	6.923E-01	
EU-154	1274.54	21.	2.	0.001	366.97	3.614E-01	
FE-59	1291.60	40.	-17.	-0.009	91.95	-2.736E+00	
TL-210	1313.00	11.	10.	0.006	84.92	3.426E+00	
AG-110M	1384.30	0.	7.	0.004	37.80	2.157E+00	
EU-152	1408.00	12.	3.	0.002	284.80	1.083E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	1460.83	6.	5.	0.003	126.49	3.660E+00	
SB-124	1690.98	0.	5.	0.003	44.72	9.223E-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	1.2823E+01	1.2823E+01	1.085E+02%	4.62E+01
NA-22	#A	6.9225E-01	6.9225E-01	5.787E+01%	1.29E+00
K-40	#A	3.6604E+00	3.6604E+00	1.265E+02%	1.03E+01
Sc-46	#A	-1.7620E+00	-1.7620E+00	8.862E+01%	5.19E+00
CR-51	#A	-1.0569E+01	-1.0569E+01	1.696E+02%	5.95E+01
MN-54	#A	3.2561E-01	3.2561E-01	3.640E+02%	2.73E+00
FE-59	#A	-4.3548E+00	-4.3548E+00	8.306E+01%	7.58E+00
Co-56	#A	4.7713E-01	4.7713E-01	9.497E+01%	3.34E+00
CO-57	#A	-6.5238E-02	-6.5238E-02	8.548E+01%	2.49E+00
CO-58	#A	1.2650E+00	1.2650E+00	9.757E+01%	4.12E+00
CO-60		1.5190E+02	1.5190E+02	1.618E+00%	1.39E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	9.98E+00
NB-94	#A	9.3377E-01	9.3377E-01	8.443E+01%	2.31E+00
ZR-95	#A	-2.9084E+00	-2.9084E+00	8.715E+01%	5.69E+00
NB-95	#A	-1.9359E-01	-1.9359E-01	5.635E+02%	3.71E+00
RU-103	A	1.3151E+00	1.3151E+00	9.442E+01%	3.01E+00
RH-106	#A	1.8981E+01	1.8981E+01	7.624E+01%	2.22E+01
AG-108M	#A	-1.0520E-01	-1.0520E-01	1.345E+03%	3.46E+00
AG-110M	#A	1.6374E+00	1.6374E+00	3.780E+01%	6.65E+00
SN-113	#A	-2.0357E+00	-2.0357E+00	1.050E+02%	7.09E+00
SB-124	#A	1.4880E+00	1.4880E+00	4.472E+01%	5.42E+00
SB-125	#A	4.6487E+00	4.6487E+00	9.026E+01%	1.06E+01
I-131	#A	-1.0536E+00	-1.0536E+00	1.407E+02%	3.59E+00
Gd-153	#A	1.3577E+00	1.3577E+00	2.605E+02%	1.18E+01
Ga-68	#A	-3.5582E+01	-3.5661E+01	1.806E+02%	1.37E+02
Tc-99m	#A	7.6681E-01	7.6713E-01	1.541E+02%	3.92E+00
BA-133	#A	-1.8180E+00	-1.8180E+00	1.016E+02%	6.13E+00
CS-134	#A	3.4928E+00	3.4928E+00	4.917E+01%	3.60E+00
CS-137		3.8895E+02	3.8895E+02	1.274E+00%	4.12E+00
CE-139	#A	9.0230E-01	9.0230E-01	1.000E+02%	2.99E+00
Ba-140	#A	4.9197E+00	4.9197E+00	9.324E+01%	9.90E+00
La-140	#A	3.0211E-01	3.0212E-01	3.588E+02%	1.24E+00
CE-141	#A	1.4421E+00	1.4421E+00	1.532E+02%	7.33E+00
CE-144	#A	-6.4448E+00	-6.4448E+00	1.620E+02%	3.46E+01
PM-144	#A	-9.7170E-01	-9.7170E-01	1.177E+02%	2.59E+00
EU-152	#A	5.4468E+00	5.4468E+00	6.154E+01%	8.26E+00
EU-154	#A	3.4770E+00	3.4770E+00	6.781E+01%	5.40E+00
EU-155	#A	9.8821E-01	9.8821E-01	2.202E+02%	1.65E+01

HF-181 #A	2.4973E+00	2.4973E+00	7.854E+01%		6.21E+00
Ta-182 #A	2.1916E+00	2.1916E+00	1.965E+02%		1.45E+01
Hg-203 #A	9.0500E-01	9.0500E-01	1.171E+02%		3.53E+00
TL-208 #A	1.6431E+00	1.6431E+00	8.822E+01%		3.54E+00
PM-146 #A	3.3006E+00	3.3006E+00	3.726E+01%		5.89E+00
Y-88 #	1.1456E+00	1.1456E+00	2.887E+01%		7.04E-01
Cd-113m#A	9.0023E+03	9.0023E+03	1.414E+02%		4.25E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		9.60E+01
Cf-251 #A	-1.1215E+00	-1.1215E+00	4.096E+02%		1.17E+01
Cf-249 #A	2.1434E+00	2.1434E+00	1.052E+02%		6.43E+00
Sn-126 #A	-2.0577E+01	-2.0577E+01	2.307E+02%		1.57E+02
PB-210	1.0678E+04	1.0678E+04	1.020E+00%		2.14E+02
PB-212	7.4821E+00	7.4821E+00	1.987E+01%		3.81E+00
PB-214	7.1613E+00	7.1613E+00	3.633E+01%		5.95E+00
BI-207 #A	-3.0821E+00	-3.0821E+00	8.450E+01%		5.46E+00
BI-212 #A	-1.6561E+01	-1.6561E+01	8.332E+01%		4.59E+01
U-235 A	5.5520E+00	5.5520E+00	1.685E+02%		3.11E+01
BI-214 #A	4.2476E+00	4.2476E+00	3.652E+01%		5.29E+00
BI-210M#A	6.9662E-01	6.9662E-01	1.216E+02%		5.40E+00
AC-228 #A	9.6693E+00	9.6693E+00	5.097E+01%		1.09E+01
TH-227 #A	-1.4175E+01	-1.4175E+01	9.808E+01%		3.51E+01
TH-229 #A	1.8748E+01	1.8748E+01	1.041E+02%		4.92E+01
TH-234 #A	-9.3429E+00	-9.3429E+00	1.078E+02%		6.46E+01
PA-231 A	3.4563E+01	3.4563E+01	6.671E+01%		6.41E+01
PA-233 #A	2.8357E+00	2.8357E+00	1.690E+02%		1.59E+01
PA-234 #A	1.1967E+01	1.1967E+01	3.519E+01%		1.61E+01
PA-234M#A	1.2203E+02	1.2203E+02	7.437E+01%		5.92E+02
AM-241	1.2358E+03	1.2358E+03	8.552E-01%		1.56E+01
Np-237 #A	6.3310E+00	6.3310E+00	1.350E+02%		2.84E+01
Ir-192 #A	2.0426E+00	2.0426E+00	8.424E+01%		6.42E+00
Cs-136 #A	-1.6526E-02	-1.6527E-02	1.071E+02%		4.49E+00
Np-239 #A	3.1885E+00	3.1886E+00	1.355E+02%		1.43E+01
Nd-147 #A	2.8417E+00	2.8417E+00	2.961E+02%		1.99E+01
TL-210 #A	1.2078E+00	1.2078E+00	8.283E+01%		3.33E+00
Kr-85 #A	-3.1023E+02	-3.1023E+02	9.956E+01%		1.03E+03

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

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

Total Activity (25.1 to 1999.1 keV) 1.247E+04 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 1.2473892E+04 Bq/Sample

441817_Gamma_LCS 160-441817~2-A. 12_Gamma_20192417.spc.

Test America St. Louis Spectrum ID: 5_Gamma_20192348

Sample Description: 441817_Gamma_180-94764-A-1-B
Detector: Detector # 5
Batch ID: 441817
Work Order Number: Gamma
Lot Number: 180-94764-A-1-B

Decay to Time: 9/26/2019 06:45 Live Time: 1800 sec
Acquisition Time: 9/26/2019 06:46:04 Real Time: 1806 sec
Analysis Time: 9/26/2019 07:16 Dead Time: 0.33 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 5_Soil_TunaCan.Clb
Efficiency Cal Desc: 5_Soil_TunaCan_90099_032612
Efficiency Cal Date: 3/27/2012 17:20
Energy Cal Date: 2/28/2012 19:35
Library: Client_Long_Rev15.lib
Bkgd Correction File: 5_2019-09-07_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	-4.489E+00	95.3	4.278E+00	4.284E+00	1.448E+01
NA-22	-4.531E-01	109.3	4.951E-01	4.956E-01	1.741E+00
K-40	3.533E+01	18.6	6.583E+00	6.827E+00	1.150E+01
Sc-46	-6.699E-01	94.4	6.321E-01	6.330E-01	2.148E+00
CR-51	3.198E+00	114.1	3.648E+00	3.652E+00	1.240E+01
MN-54	-3.628E-01	196.9	7.145E-01	7.148E-01	1.716E+00
FE-59	4.204E-01	173.7	7.305E-01	7.308E-01	1.991E+00
Co-56	3.154E-01	63.2	1.994E-01	2.000E-01	1.410E+00
CO-57	2.053E-01	119.9	2.462E-01	2.465E-01	8.352E-01
CO-58	2.002E-01	213.4	4.272E-01	4.274E-01	1.536E+00
CO-60	4.426E-01	35.9	1.588E-01	1.603E-01	7.427E-01
ZN-65	0.000E+00	1.#INF	3.429E-01	3.429E-01	4.767E+00
NB-94	-1.748E-02	90.0	1.574E-02	1.576E-02	1.727E+00
ZR-95	-3.834E-01	260.8	9.997E-01	9.999E-01	2.543E+00
NB-95	-9.055E-01	71.5	6.474E-01	6.491E-01	2.154E+00
RU-103	2.913E-01	100.8	2.937E-01	2.941E-01	7.706E-01
RH-106	3.505E+00	234.9	8.233E+00	8.235E+00	2.820E+01
AG-108M	-5.568E-01	100.7	5.607E-01	5.615E-01	1.400E+00
AG-110M	-3.457E-02	831.7	2.875E-01	2.875E-01	2.494E+00
SN-113	5.411E-01	134.0	7.251E-01	7.256E-01	2.472E+00
SB-124	4.716E-01	84.1	3.967E-01	3.975E-01	2.975E+00
SB-125	1.229E+00	98.9	1.216E+00	1.217E+00	3.357E+00
I-131	3.562E-01	99.8	3.553E-01	3.558E-01	9.444E-01
Gd-153	7.529E-01	113.6	8.551E-01	8.564E-01	2.882E+00
Ga-68	-1.799E+01	147.7	2.657E+01	2.659E+01	6.224E+01
Tc-99m	-3.257E-01	112.6	3.666E-01	3.671E-01	1.231E+00
BA-133	5.380E-01	180.6	9.714E-01	9.718E-01	3.297E+00
CS-134	7.093E-01	41.3	2.928E-01	2.951E-01	5.630E-01
CS-137	3.561E-01	180.7	6.436E-01	6.439E-01	2.227E+00
CE-139	1.381E-01	222.3	3.070E-01	3.073E-01	1.055E+00
Ba-140	1.785E+00	77.2	1.377E+00	1.380E+00	3.636E+00
La-140	-1.238E-01	207.1	2.563E-01	2.564E-01	2.270E+00
CE-141	4.737E-01	135.8	6.434E-01	6.438E-01	2.171E+00

CE-144	0.000E+00	1.#INF	7.038E-01	7.038E-01	9.785E+00
PM-144	-5.903E-02	742.7	4.384E-01	4.384E-01	1.152E+00
EU-152	1.247E+00	121.9	1.519E+00	1.521E+00	2.694E+00
EU-154	1.300E+00	25.8	3.357E-01	3.426E-01	1.861E+00
EU-155	2.245E+00	34.6	7.766E-01	7.863E-01	1.982E+00
HF-181	4.701E-01	152.8	7.181E-01	7.185E-01	1.957E+00
Ta-182	0.000E+00	1.#INF	4.281E-01	4.281E-01	4.453E+00
Hg-203	-4.221E-01	121.2	5.117E-01	5.123E-01	1.731E+00
TL-208	4.677E+00	13.3	6.229E-01	6.685E-01	9.232E-01
PM-146	2.515E-01	176.8	4.445E-01	4.447E-01	1.185E+00
Y-88	-2.885E-01	254.8	7.351E-01	7.353E-01	1.901E+00
Cd-113m	4.337E+03	104.9	4.548E+03	4.557E+03	1.547E+04
Cd-109	1.306E+00	989.5	1.292E+01	1.292E+01	4.365E+01
Cf-251	-1.025E+00	166.5	1.707E+00	1.710E+00	4.682E+00
Cf-249	-6.699E-01	122.2	8.184E-01	8.191E-01	2.770E+00
Sn-126	-2.942E+00	148.6	4.370E+00	4.373E+00	1.473E+01
PB-210	1.538E+01	77.9	1.198E+01	1.201E+01	3.167E+01
PB-212	1.015E+01	8.4	8.544E-01	1.078E+00	1.502E+00
PB-214	1.030E+01	10.2	1.054E+00	1.182E+00	2.032E+00
BI-207	4.080E-01	146.7	5.986E-01	5.990E-01	1.509E+00
BI-212	-1.254E-01	6346.5	7.960E+00	7.960E+00	2.497E+01
U-235	-2.613E+00	117.2	3.062E+00	3.065E+00	1.028E+01
BI-214	8.981E+00	11.8	1.059E+00	1.157E+00	1.335E+00
BI-210M	-6.713E-01	78.8	5.287E-01	5.302E-01	2.290E+00
AC-228	8.454E+00	17.6	1.484E+00	1.546E+00	1.860E+00
TH-227	1.159E+00	142.4	1.649E+00	1.651E+00	1.266E+01
TH-229	-7.629E-01	807.5	6.160E+00	6.160E+00	1.730E+01
TH-234	-1.257E+01	43.0	5.401E+00	5.446E+00	3.227E+01
PA-231	0.000E+00	1.#INF	4.052E+00	4.052E+00	7.632E+01
PA-233	-1.093E+00	177.1	1.937E+00	1.938E+00	6.530E+00
PA-234	-2.087E-01	196.5	4.100E-01	4.101E-01	6.143E+00
PA-234M	2.655E+01	194.7	5.171E+01	5.172E+01	1.989E+02
AM-241	3.253E-01	317.5	1.033E+00	1.033E+00	3.008E+00
Np-237	-2.296E+00	170.0	3.904E+00	3.906E+00	1.308E+01
Ir-192	-1.875E-02	88.5	1.659E-02	1.663E-02	1.401E+00
Cs-136	-6.023E-01	95.5	5.755E-01	5.765E-01	1.958E+00
Np-239	-1.013E+00	155.2	1.573E+00	1.574E+00	5.293E+00
Nd-147	-7.166E-01	397.9	2.852E+00	2.852E+00	7.650E+00
TL-210	3.410E-01	110.0	3.753E-01	3.758E-01	1.313E+00
Kr-85	6.412E+01	193.4	1.240E+02	1.241E+02	4.282E+02
Total	4.546E+03				

Analyst: Caleb Quinn

Sample description
441817_Gamma_180-94764-A-1-B

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20192348.An1

Acquisition information

Start time:	9/26/2019 6:46:04 AM
Live time:	1800
Real time:	1806
Dead time:	0.33 %
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	9/26/2019 6:45:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2019-09-07_1400.PBC 9/7/2019 2:00:08 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1375

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.52	21.	77.88	0.83	1.788E-02	46.54	4.250	PBC<MDA	PB210
50.14	7.	207.51	0.79	2.012E-02	50.14	8.000	PBC<MDA	TH227
59.54	5.	317.46	0.80	2.533E-02	59.54	35.900	PBC<MDA	AM241
63.22	49.	37.37	0.58	2.709E-02	63.29	3.810	PBC<MDA	TH234
74.76	117.	14.53	0.81	3.148E-02				
77.08	134.	12.27	0.81	3.217E-02				
87.07	47.	29.61	0.56	3.445E-02	86.49	13.100	5.803E+00	Np237
					86.54	30.700	2.475E+00	EU155
					86.94	9.040	8.389E+00	Sn126
					87.57	37.500	2.016E+00	Sn126
87.97	3.	989.52	0.83	3.462E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	1.306E+00	Cd109
92.81	22.	143.34	0.83	3.536E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	6.118E+00	AC228
97.50	15.	113.57	0.84	3.577E-02	97.50	30.000	PBC<MDA	Gd153
99.50	13.	116.46	0.84	3.592E-02	99.50	15.000	PBC<MDA	Np239
105.43	31.	34.59	1.03	3.618E-02	105.31	21.200	2.245E+00	EU155
121.78	8.	193.45	0.86	3.584E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.359E-01	CO57
122.06	11.	119.90	0.86	3.582E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.053E-01	CO57
128.92	41.	27.93	0.57	3.531E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
145.44	14.	135.84	0.88	3.351E-02	145.44	48.200	PBC<MDA	CE141
162.66	12.	114.01	0.90	3.113E-02	162.66	6.220	PBC<MDA	Ba140
165.85	6.	222.31	0.91	3.133E-02	165.85	79.900	PBC<MDA	CE139
185.72	17.	103.78	0.93	2.854E-02	185.72	54.000	PBC<MDA	U235
235.97	10.	246.12	0.98	2.341E-02	235.97	12.300	PBC<MDA	TH227
238.73	185.	9.52	1.21	2.319E-02	238.63	43.300	1.022E+01	PB212
242.08	37.	27.08	0.98	2.293E-02	242.00	7.430	1.211E+01	PB214
263.70	10.	104.88	1.00	2.135E-02	263.70	0.006	PBC<MDA	Cd113m
295.21	78.	16.55	1.20	1.944E-02	295.09	19.300	1.154E+01	PB214
					296.00	79.000	2.826E+00	TL210
300.19	17.	40.25	1.43	1.918E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.947E+01	PA231
					300.18	6.200	PBC<MDA	PA233
320.08	10.	114.09	1.06	1.818E-02	320.08	9.940	PBC<MDA	CR51
338.60	55.	18.56	1.32	1.736E-02	338.32	12.010	1.461E+01	AC228
345.83	8.	164.34	1.08	1.705E-02	345.83	15.070	PBC<MDA	HF181
352.08	110.	12.04	1.46	1.680E-02	351.93	37.600	9.659E+00	PB214
356.00	10.	180.55	1.09	1.664E-02	356.00	62.050	PBC<MDA	BA133
364.48	9.	99.77	1.10	1.632E-02	364.48	81.700	PBC<MDA	I131
391.69	10.	134.00	1.12	1.537E-02	391.69	64.000	PBC<MDA	SN113
427.88	5.	196.98	1.16	1.428E-02	427.88	29.600	PBC<MDA	SB125
453.88	4.	176.78	1.18	1.360E-02	453.88	65.000	PBC<MDA	PM146
463.37	7.	98.91	1.19	1.336E-02	463.37	10.470	PBC<MDA	SB125
468.06	6.	118.95	1.20	1.325E-02	468.06	51.750	PBC<MDA	Ir192
482.00	4.	257.56	1.21	1.293E-02	482.00	80.500	PBC<MDA	HF181
487.02	3.	316.76	1.21	1.282E-02	487.02	45.500	PBC<MDA	La140
497.05	6.	100.81	1.22	1.260E-02	497.05	90.900	PBC<MDA	RU103
511.86	52.	18.61	2.48	1.230E-02	511.86	20.000	1.186E+01	RH106
513.98	6.	193.43	1.24	1.226E-02	513.98	0.430	PBC<MDA	Kr85
537.26	7.	104.00	1.26	1.181E-02	537.26	24.390	PBC<MDA	Ba140
568.42	6.	99.44	1.29	1.125E-02	569.32	15.380	PBC<MDA	CS134
583.31	78.	13.32	1.09	1.103E-02	583.02	84.500	4.677E+00	TL208
609.44	79.	11.79	1.08	1.063E-02	609.31	46.090	8.981E+00	BI214
					610.30	5.750	7.208E+01	RU103
621.92	7.	234.90	1.33	1.045E-02	621.92	9.930	PBC<MDA	RH106
661.66	5.	180.71	1.37	9.924E-03	661.66	85.210	PBC<MDA	CS137
722.79	9.	84.12	1.42	9.217E-03	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.663E-01	AG108M
					723.36	20.220	2.545E+00	EU154
722.94	7.	117.53	1.42	9.215E-03	722.79	10.810	3.884E+00	SB124
					722.94	90.840	4.623E-01	AG108M
					723.36	20.220	2.078E+00	EU154
766.41	5.	194.74	1.45	8.776E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.138E+02	PA234M
785.42	1.	800.00	1.47	8.597E-03	785.42	1.280	PBC<MDA	BI212
796.32	6.	41.29	1.48	8.503E-03	795.87	85.530	PBC<MDA	CS134
799.60	5.	110.04	1.48	8.469E-03	799.60	98.960	PBC<MDA	TL210
810.78	3.	213.44	1.49	8.371E-03	810.78	99.460	PBC<MDA	CO58

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
859.81	5.	96.53	1.53	7.963E-03	860.56	12.420	PBC<MDA	TL208
871.10	6.	115.71	1.54	7.882E-03	871.10	99.890	PBC<MDA	NB94
873.23	5.	123.68	1.54	7.866E-03	873.23	12.270	PBC<MDA	EU154
884.68	0.	831.65	1.55	7.781E-03	884.68	72.680	PBC<MDA	AG110M
911.25	34.	17.56	2.28	7.591E-03	911.07	29.000	8.454E+00	AC228
946.02	1.	354.44	1.60	7.355E-03	946.02	13.400	PBC<MDA	PA234
964.11	6.	148.27	1.61	7.239E-03	964.11	14.605	PBC<MDA	EU152
968.93	6.	101.38	1.61	7.209E-03	968.97	17.460	PBC<MDA	AC228
996.33	15.	25.82	1.63	7.042E-03	996.33	10.600	1.116E+01	EU154
1063.66	4.	146.72	1.68	6.666E-03	1063.66	74.500	PBC<MDA	BI207
1099.25	3.	173.74	1.71	6.484E-03	1099.25	56.500	PBC<MDA	FE59
1120.35	4.	151.42	1.72	6.381E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1120.55	6.	104.40	1.72	6.380E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	5.215E-01	Sc46
					1121.30	34.900	1.495E+00	Ta182
1173.24	5.	44.72	1.76	6.138E-03	1173.24	99.900	PBC<MDA	CO60
1238.28	8.	98.76	1.80	5.866E-03	1238.28	66.070	PBC<MDA	Co56
1291.60	2.	327.64	1.84	5.661E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	4.	56.11	1.87	5.514E-03	1332.50	99.980	PBC<MDA	CO60
1408.00	4.	152.39	1.91	5.264E-03	1408.00	21.005	PBC<MDA	EU152
1460.99	35.	18.63	1.95	5.103E-03	1460.83	10.670	3.533E+01	K40
1764.27	4.	123.09	2.11	4.351E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	5.	123.84	2.12	4.337E-03	1771.35	15.480	PBC<MDA	Co56

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
252.45	63.22	77.	64.	2.362E+03	27.98	0.578	-	sM
298.67	74.72	86.	117.	3.716E+03	14.53	0.813	-	D
307.97	77.05	68.	134.	4.163E+03	12.27	0.815	-	D
347.70	87.07	84.	42.	1.232E+03	34.15	0.825	-	sD
515.47	128.92	28.	41.	1.157E+03	27.93	0.572	-	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	185.62	46.52	76.	21.	0.012	77.88	0.827
TH-227	200.11	50.14	72.	7.	0.004	207.51	0.787s
AM-241	237.72	59.54	100.	5.	0.003	317.46	0.797s
TH-234	252.74	63.29	216.	-33.	-0.018	54.65	0.801s
Sn-126	256.71	64.28	214.	-14.	-0.008	148.56	0.802
BA-133	323.61	80.99	120.	-2.	-0.001	977.24	0.819s
Np-237	345.63	86.49	491.	-19.	-0.010	170.01	0.825
EU-155	345.84	86.54	472.	-5.	-0.003	623.36	0.825
Sn-126	347.43	86.94	467.	0.	0.000	1000.00	0.825
Sn-126	349.95	87.57	467.	0.	0.000	1000.00	0.826
Cd-109	351.83	88.04	464.	3.	0.002	989.52	0.826s
Nd-147	364.08	91.10	592.	-22.	-0.012	156.66	0.829s
TH-234	370.05	92.59	575.	-45.	-0.025	42.98	0.831s
AC-228	373.09	93.35	471.	22.	0.012	143.34	0.832s
Gd-153	389.70	97.50	129.	15.	0.008	113.57	0.836s
Np-239	397.71	99.50	103.	13.	0.007	116.46	0.838s
Gd-153	412.52	103.20	159.	-14.	-0.008	132.69	0.842s
Np-239	414.52	103.70	148.	-16.	-0.009	113.76	0.842s
EU-155	421.43	105.43	28.	31.	0.017	34.59	1.035s
Np-239	424.25	106.13	263.	-15.	-0.008	155.19	0.845s
EU-152	486.90	121.78	102.	8.	0.004	193.45	0.861s
CO-57	488.03	122.06	87.	11.	0.006	119.90	0.861s
EU-154	492.18	123.10	98.	0.	0.000	1000.00	0.862s
PA-234	524.99	131.29	208.	-11.	-0.006	196.45	0.871s
HF-181	531.91	133.02	197.	0.	0.000	1000.00	0.872s
CE-144	533.97	133.54	197.	0.	0.000	1000.00	0.873
HF-181	545.02	136.30	197.	0.	0.000	1000.00	0.876s
CO-57	545.72	136.47	197.	0.	0.000	1000.00	0.876s
Tc-99m	561.88	140.51	181.	-17.	-0.010	112.56	0.880s
U-235	574.99	143.79	199.	-17.	-0.010	117.15	0.883s
CE-141	581.61	145.44	168.	14.	0.008	135.84	0.885s
Ba-140	650.54	162.66	90.	12.	0.007	114.01	0.902s
U-235	653.42	163.38	105.	-14.	-0.008	106.79	0.903s
CE-139	663.32	165.85	93.	6.	0.003	222.31	0.905s
Cf-251	706.34	176.60	73.	-9.	-0.005	166.52	0.916s
U-235	742.85	185.72	93.	17.	0.009	103.78	0.925s
TH-229	774.03	193.51	57.	-2.	-0.001	807.46	0.933
U-235	821.35	205.33	60.	-2.	-0.001	848.22	0.945
TH-229	843.44	210.85	67.	-5.	-0.003	391.43	0.950s
Cf-251	908.08	227.00	60.	-3.	-0.002	463.08	0.966s
TH-227	943.98	235.97	309.	10.	0.006	246.12	0.975s
PB-212	954.64	238.63	28.	183.	0.102	8.42	0.978D
PB-214	968.10	242.00	32.	37.	0.021	27.08	0.981D
TH-227	1025.11	256.24	48.	-5.	-0.003	280.62	0.995s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cd-113m	1054.97	263.70	50.	10.	0.006	104.88	1.002s
BI-210M	1063.50	265.83	77.	-13.	-0.007	78.76	1.005s
TL-208	1109.33	277.28	98.	-15.	-0.009	94.50	1.016s
Hg-203	1117.00	279.20	110.	-13.	-0.007	121.23	1.017s
I-131	1137.41	284.30	44.	-10.	-0.006	128.06	1.022s
PB-214	1181.09	295.21	27.	78.	0.043	16.55	1.198s
TL-210	1184.24	296.00	265.	-12.	-0.007	195.21	1.034s
PB-212	1201.01	300.19	10.	17.	0.009	40.25	1.432s
PA-231	1200.53	300.07	253.	-10.	-0.006	225.51	1.038s
PA-233	1200.97	300.18	243.	0.	0.000	1000.00	1.038s
PA-231	1210.86	302.65	243.	0.	0.000	1000.00	1.040s
BA-133	1211.66	302.85	243.	0.	0.000	1000.00	1.040s
Ba-140	1219.66	304.85	243.	0.	0.000	1000.00	1.042s
BI-210M	1219.85	304.90	243.	0.	0.000	1000.00	1.042s
Ir-192	1234.03	308.44	243.	0.	0.000	1000.00	1.046s
PA-233	1248.32	312.01	265.	-13.	-0.007	177.14	1.049s
Ir-192	1266.25	316.49	65.	-9.	-0.005	131.00	1.053
CR-51	1280.63	320.08	65.	10.	0.006	114.09	1.057s
La-140	1315.35	328.76	48.	-4.	-0.002	322.29	1.065s
Cf-249	1334.08	333.44	44.	-13.	-0.007	100.24	1.070s
AC-228	1354.72	338.60	11.	55.	0.030	18.56	1.318s
Cs-136	1362.62	340.57	110.	-8.	-0.005	181.59	1.077
EU-152	1377.49	344.29	102.	0.	0.000	1000.00	1.080s
HF-181	1383.66	345.83	91.	8.	0.005	164.34	1.082s
PB-214	1408.67	352.08	19.	110.	0.061	12.04	1.463s
BA-133	1424.36	356.00	158.	10.	0.006	180.55	1.091s
I-131	1458.32	364.48	18.	9.	0.005	99.77	1.099s
BA-133	1535.78	383.84	95.	-12.	-0.007	115.74	1.117s
Cf-249	1552.22	387.95	107.	-12.	-0.007	122.17	1.121s
SN-113	1567.19	391.69	78.	10.	0.005	134.00	1.125
SB-125	1711.99	427.88	24.	5.	0.003	196.98	1.158s
AG-108M	1736.25	433.94	40.	-13.	-0.007	100.70	1.164s
PM-146	1816.05	453.88	12.	4.	0.002	176.78	1.182s
SB-125	1854.01	463.37	22.	7.	0.004	98.91	1.191s
Ir-192	1872.79	468.06	22.	6.	0.003	118.95	1.195s
BE-7	1910.94	477.59	50.	-11.	-0.006	95.29	1.204s
HF-181	1928.56	482.00	53.	4.	0.002	257.56	1.208s
La-140	1948.65	487.02	16.	3.	0.001	316.76	1.212s
RU-103	1988.80	497.05	8.	6.	0.003	100.81	1.221s
RH-106	2048.06	511.86	22.	52.	0.029	18.61	2.485s
Kr-85	2056.53	513.98	66.	6.	0.003	193.43	1.237
Nd-147	2124.62	531.00	16.	-2.	-0.001	397.91	1.252s
Ba-140	2149.67	537.26	12.	7.	0.004	104.00	1.258s
CS-134	2253.60	563.24	24.	-2.	-0.001	484.77	1.280
CS-134	2277.94	569.32	17.	6.	0.004	99.44	1.286s
PA-234	2278.54	569.47	23.	0.	0.000	1000.00	1.286s
BI-207	2279.47	569.70	23.	0.	0.000	1000.00	1.286s
TL-208	2333.93	583.31	8.	78.	0.044	13.32	1.087

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	2402.69	600.50	138.	-5.	-0.003	335.26	1.313s
SB-124	2411.61	602.73	133.	0.	0.000	1000.00	1.315s
CS-134	2419.53	604.71	133.	0.	0.000	1000.00	1.317s
BI-214	2438.47	609.44	4.	79.	0.044	11.79	1.083
RU-103	2441.89	610.30	133.	0.	0.000	1000.00	1.322s
AG-108M	2457.82	614.28	133.	0.	0.000	1000.00	1.325s
PM-144	2472.94	618.06	133.	0.	0.000	1000.00	1.328s
RH-106	2488.37	621.92	115.	7.	0.004	234.90	1.332s
AG-110M	2631.76	657.76	43.	-13.	-0.007	74.16	1.362s
CS-137	2647.36	661.66	45.	5.	0.003	180.71	1.366s
PM-144	2786.90	696.54	13.	-1.	-0.001	742.74	1.395s
NB-94	2811.25	702.63	31.	-7.	-0.004	137.92	1.400s
SB-124	2891.88	722.79	22.	9.	0.005	84.12	1.417s
AG-108M	2892.48	722.94	30.	7.	0.004	117.53	1.417s
EU-154	2894.17	723.36	37.	0.	0.000	1000.00	1.418s
ZR-95	2897.53	724.20	37.	0.	0.000	1000.00	1.418s
PM-146	2943.61	735.72	17.	-5.	-0.003	181.00	1.428s
PM-146	2989.37	747.16	22.	-1.	-0.001	764.88	1.437s
ZR-95	3027.65	756.73	17.	-3.	-0.002	260.77	1.445s
AG-110M	3056.50	763.94	13.	-1.	-0.001	519.62	1.451s
NB-95	3063.89	765.79	45.	-14.	-0.008	71.50	1.453s
PA-234M	3066.38	766.41	50.	5.	0.003	194.74	1.453s
EU-152	3116.41	778.92	19.	-3.	-0.001	349.11	1.463s
BI-212	3142.41	785.42	14.	1.	0.001	800.00	1.468s
CS-134	3184.20	795.87	0.	6.	0.003	41.29	1.477s
TL-210	3199.12	799.60	13.	5.	0.003	110.04	1.480s
CS-134	3208.53	801.95	11.	0.	0.000	1000.00	1.482s
CO-58	3243.82	810.78	19.	3.	0.002	213.44	1.489s
La-140	3263.80	815.77	22.	0.	0.000	1000.00	1.493s
Cs-136	3274.72	818.50	32.	-9.	-0.005	95.55	1.495s
MN-54	3340.10	834.85	23.	-5.	-0.003	196.95	1.508s
Co-56	3387.78	846.77	15.	-4.	-0.002	78.94	1.518s
TL-208	3442.95	860.56	5.	5.	0.003	96.53	1.529s
NB-94	3485.08	871.10	18.	6.	0.003	115.71	1.537s
EU-154	3493.61	873.23	18.	5.	0.003	123.68	1.539s
PA-234	3522.80	880.53	21.	-3.	-0.001	248.75	1.544s
PA-234	3533.64	883.24	23.	0.	0.000	1000.00	1.547s
AG-110M	3539.41	884.68	24.	0.	0.000	831.65	1.547s
Sc-46	3557.79	889.28	34.	-9.	-0.005	94.37	1.551s
Y-88	3592.83	898.04	10.	-2.	-0.001	167.81	1.558s
AC-228	3645.65	911.25	0.	34.	0.019	17.56	2.282s
PA-234	3784.70	946.02	5.	1.	0.001	354.44	1.595s
EU-152	3857.05	964.11	30.	6.	0.003	148.27	1.609s
AC-228	3876.48	968.97	13.	6.	0.003	101.38	1.612
EU-154	3985.88	996.33	0.	15.	0.008	25.82	1.633s
EU-154	4019.65	1004.77	10.	-4.	-0.002	180.85	1.639s
Cs-136	4192.77	1048.07	6.	-1.	-0.001	360.56	1.671s
RH-106	4201.93	1050.36	14.	-5.	-0.003	114.89	1.673s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-207	4255.11	1063.66	5.	4.	0.002	146.72	1.682
Ga-68	4310.04	1077.40	15.	-6.	-0.003	147.67	1.692s
FE-59	4397.41	1099.25	5.	3.	0.002	173.74	1.708s
EU-152	4448.68	1112.07	30.	-1.	-0.001	548.00	1.717s
ZN-65	4462.56	1115.55	29.	0.	0.000	1000.00	1.720s
BI-214	4481.51	1120.29	13.	4.	0.002	151.42	1.723s
Sc-46	4482.57	1120.55	17.	6.	0.003	104.40	1.723
Ta-182	4485.56	1121.30	11.	0.	0.000	1000.00	1.724s
CO-60	4693.21	1173.24	0.	5.	0.003	44.72	1.760s
Ta-182	4756.42	1189.05	5.	0.	0.000	1000.00	1.771s
Ta-182	4885.79	1221.41	21.	-12.	-0.007	89.76	1.793s
Co-56	4953.23	1238.28	11.	8.	0.004	98.76	1.804s
NA-22	5098.13	1274.53	11.	-5.	-0.003	109.26	1.828s
EU-154	5098.17	1274.54	15.	0.	0.000	1000.00	1.828s
FE-59	5166.35	1291.60	5.	2.	0.001	327.64	1.840s
CO-60	5329.85	1332.50	1.	4.	0.002	56.11	1.866s
AG-110M	5536.88	1384.30	0.	0.	0.000	1000.00	1.899s
EU-152	5631.62	1408.00	5.	4.	0.002	152.39	1.914s
K-40	5842.75	1460.83	3.	35.	0.019	18.63	1.946
La-140	6383.73	1596.21	11.	-2.	-0.001	266.82	2.024s
SB-124	6762.39	1690.98	6.	-4.	-0.002	160.96	2.076s
BI-214	7056.06	1764.49	13.	4.	0.002	123.09	2.114s
Co-56	7083.46	1771.35	18.	5.	0.003	123.84	2.117s
Y-88	7341.96	1836.06	6.	-2.	-0.001	254.77	2.149s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-4.4892E+00				5.31E+01	
			477.60	-4.489E+00	(	1.448E+01 9.53E+01 1.05E+01	G
NA-22	C	-4.5314E-01				9.50E+02	
			1274.53	-4.531E-01	?(	1.741E+00 1.09E+02 9.99E+01	G
K-40	N	3.5327E+01				4.66E+11	
			1460.83	3.533E+01	?(P	1.150E+01 1.86E+01 1.07E+01	G
Sc-46	F	-6.6986E-01				8.38E+01	
			889.28	-6.699E-01	?(	2.148E+00 9.44E+01 1.00E+02	G
			1120.55	5.215E-01	+	1.887E+00 1.04E+02 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	3.1979E+00					2.77E+01	
			320.08	3.198E+00	&(P	1.240E+01	1.14E+02	9.94E+00 G
MN-54	C	-3.6280E-01					3.12E+02	
			834.85	-3.628E-01	?(	1.716E+00	1.97E+02	1.00E+02 G
FE-59	F	4.2044E-01					4.45E+01	
			1099.25	4.550E-01	?(	1.991E+00	1.74E+02	5.65E+01 G
			1291.60	3.753E-01	?(P	3.064E+00	3.28E+02	4.32E+01 G
Co-56	C	3.1540E-01					7.73E+01	
			846.77	-2.424E-01	?(P	1.410E+00	7.89E+01	9.99E+01 G
			1238.28	1.159E+00	?(P	2.595E+00	9.88E+01	6.61E+01 G
			1037.84	-1.319E-01	% P	1.018E+01	2.63E+03	1.41E+01 G
			1771.35	4.270E+00	?	1.853E+01	1.24E+02	1.55E+01 A
CO-57	C	2.0535E-01					2.72E+02	
			122.06	2.053E-01	?(	8.352E-01	1.20E+02	8.56E+01 G
			136.47	0.000E+00	&	1.025E+01	1.00E+03	1.07E+01 G
CO-58	C	2.0017E-01					7.09E+01	
			810.78	2.002E-01	?(	1.536E+00	2.13E+02	9.95E+01 G
CO-60	F	4.4262E-01					1.93E+03	
			1332.50	4.322E-01	?(P	7.427E-01	5.61E+01	1.00E+02 G
			1173.24	4.530E-01	?(	6.677E-01	4.47E+01	9.99E+01 G
NB-94	I	-1.7482E-02					7.41E+06	
			702.63	-4.313E-01	?(P	1.727E+00	1.38E+02	9.79E+01 G
			871.10	3.881E-01	?(	1.567E+00	1.16E+02	9.99E+01 G
ZR-95	I	-3.8338E-01					6.40E+01	
			756.73	-3.834E-01	?(	2.543E+00	2.61E+02	5.45E+01 G
			724.20	0.000E+00	+	4.247E+00	1.00E+03	4.42E+01 G
NB-95	I	-9.0553E-01					6.40E+01	
			765.79	-9.055E-01	?(	2.154E+00	7.15E+01	9.98E+01 G
RU-103	I	2.9131E-01					3.93E+01	
			497.05	2.913E-01	?(	7.706E-01	1.01E+02	9.09E+01 G
			610.30	0.000E+00	-	5.137E+01	1.00E+03	5.75E+00 GA
RH-106	I	3.5048E+00					3.74E+02	
			621.92	3.505E+00	?(	2.820E+01	2.35E+02	9.93E+00 G
			1050.36	-2.643E+01	+	1.065E+02	1.15E+02	1.56E+00 G
			511.86	1.186E+01	?	5.493E+00	1.86E+01	2.00E+01 GA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-108M	C -5.5682E-01					1.53E+05	
		433.94	-5.568E-01	?(	1.400E+00	1.01E+02	9.05E+01 G
		722.94	4.623E-01	+	1.875E+00	1.18E+02	9.08E+01 G
		614.28	0.000E+00	+	3.305E+00	1.00E+03	8.98E+01 G
AG-110M	F -3.4570E-02					2.50E+02	
		884.68	-3.457E-02	?(P	2.494E+00	8.32E+02	7.27E+01 G
		657.76	-7.886E-01	+	1.951E+00	7.42E+01	9.46E+01 G
		937.49	-7.272E-02	%	3.697E+00	1.95E+03	3.44E+01 G
		1384.30	0.000E+00	+	3.157E+00	1.00E+03	2.43E+01 G
		763.94	-2.834E-01	+	5.529E+00	5.20E+02	2.23E+01 G
SN-113	F 5.4108E-01					1.15E+02	
		391.69	5.411E-01	?(	2.472E+00	1.34E+02	6.40E+01 G
SB-124	F 4.7159E-01					6.02E+01	
		602.73	0.000E+00	?(	2.975E+00	1.00E+03	9.83E+01 G
		1690.98	-9.450E-01	+	3.557E+00	1.61E+02	4.78E+01 G
		722.79	4.758E+00	?(	1.356E+01	8.41E+01	1.08E+01 G
SB-125	I 1.2292E+00					1.01E+03	
		427.88	6.572E-01	?(	3.357E+00	1.97E+02	2.96E+01 G
		600.50	-1.445E+00	+	1.660E+01	3.35E+02	1.79E+01 G
		635.89	-3.352E-01	% P	1.014E+01	1.34E+03	1.13E+01 G
		463.37	2.846E+00	?(P	9.657E+00	9.89E+01	1.05E+01 G
I-131	I 3.5618E-01					8.02E+00	
		364.48	3.562E-01	&(	9.444E-01	9.98E+01	8.17E+01 G
		284.30	-4.511E+00	+	1.517E+01	1.28E+02	6.14E+00 G
		636.97	-3.782E-01	&	1.500E+01	1.51E+03	7.17E+00 G
Gd-153	F 7.5294E-01					2.42E+02	
		97.50	7.529E-01	&(	2.882E+00	1.14E+02	3.00E+01 G
		103.20	-9.695E-01	+	4.342E+00	1.33E+02	2.18E+01 G
Ga-68	C -1.7991E+01					4.71E-02	
		1077.40	-1.799E+01	?(	6.224E+01	1.48E+02	3.30E+00 G
Tc-99m	I -3.2573E-01					2.51E-01	
		140.51	-3.257E-01	&(	1.231E+00	1.13E+02	8.93E+01 G
BA-133	F 5.3800E-01					3.85E+03	
		356.00	5.380E-01	?(	3.297E+00	1.81E+02	6.20E+01 G
		302.85	0.000E+00	-	1.200E+01	1.00E+03	1.83E+01 G
		383.84	-4.885E+00	+	1.913E+01	1.16E+02	8.94E+00 GA
		80.99	-9.826E-02	-	2.641E+00	9.77E+02	3.41E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	I	7.0930E-01				7.54E+02		
			795.87	4.713E-01	?(P	5.630E-01	4.13E+01	8.55E+01 G
			604.71	0.000E+00	&	3.002E+00	1.00E+03	9.76E+01 G
			569.32	2.033E+00	&(	6.977E+00	9.94E+01	1.54E+01 G
			801.95	0.000E+00	-	1.397E+01	1.00E+03	8.69E+00 G
			563.24	-1.172E+00	-	1.497E+01	4.85E+02	8.35E+00 G
CS-137	I	3.5614E-01				1.10E+04		
			661.66	3.561E-01	?(P	2.227E+00	1.81E+02	8.52E+01 G
CE-139	F	1.3809E-01				1.38E+02		
			165.85	1.381E-01	?(	1.055E+00	2.22E+02	7.99E+01 G
Ba-140	I	1.7846E+00				1.28E+01		
			537.26	1.350E+00	?(	3.636E+00	1.04E+02	2.44E+01 G
			162.66	3.489E+00	?(	1.346E+01	1.14E+02	6.22E+00 G
			304.85	0.000E+00	-	5.155E+01	1.00E+03	4.29E+00 G
La-140	I	-1.2377E-01				1.28E+01		
			1596.21	-2.983E-01	?(P	2.270E+00	2.67E+02	9.54E+01 G
			487.02	2.422E-01	?(P	2.059E+00	3.17E+02	4.55E+01 G
			328.76	-5.675E-01	+ P	5.371E+00	3.22E+02	2.03E+01 G
			815.77	0.000E+00	+	7.040E+00	1.00E+03	2.33E+01 G
CE-141	I	4.7365E-01				3.25E+01		
			145.44	4.737E-01	&(	2.171E+00	1.36E+02	4.82E+01 G
PM-144	C	-5.9028E-02				3.63E+02		
			696.54	-5.903E-02	?(	1.152E+00	7.43E+02	9.90E+01 G
			618.06	0.000E+00	+	3.012E+00	1.00E+03	9.91E+01 G
EU-152	F	1.2466E+00				4.94E+03		
			121.78	4.068E-01	?(	2.694E+00	1.93E+02	2.86E+01 G
			344.29	0.000E+00	-	6.098E+00	1.00E+03	2.65E+01 G
			1112.07	-9.136E-01	+	1.802E+01	5.48E+02	1.36E+01 G
			778.92	-1.322E+00	&	1.133E+01	3.49E+02	1.29E+01 G
			964.11	2.890E+00	?(	1.495E+01	1.48E+02	1.46E+01 G
			244.69	-1.026E-01	%	2.845E+01	8.16E+03	7.58E+00 G
			1408.00	1.842E+00	?	6.769E+00	1.52E+02	2.10E+01 GA
EU-154	I	1.3003E+00				3.14E+03		
			123.10	0.000E+00	&(	1.861E+00	1.00E+03	4.08E+01 G
			1274.54	0.000E+00	?(	5.779E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	?(	9.264E+00	1.00E+03	2.02E+01 G
			873.23	2.974E+00	?(	1.289E+01	1.24E+02	1.23E+01 G
			1004.77	-1.765E+00	+	7.697E+00	1.81E+02	1.80E+01 G
			996.33	1.116E+01	?(	5.485E+00	2.58E+01	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	2.2451E+00					1.81E+03	
			105.31	2.245E+00	@(	1.982E+00	3.46E+01	2.12E+01 G
			86.54	-2.603E-01	&	5.474E+00	6.23E+02	3.07E+01 G
HF-181	F	4.7008E-01					4.24E+01	
			482.00	2.176E-01	?(	1.957E+00	2.58E+02	8.05E+01 G
			133.02	0.000E+00	-	2.503E+00	1.00E+03	4.33E+01 G
			345.83	1.819E+00	?(	1.022E+01	1.64E+02	1.51E+01 G
			136.30	0.000E+00	&	1.870E+01	1.00E+03	5.85E+00 G
Hg-203	F	-4.2208E-01					4.66E+01	
			279.20	-4.221E-01	?(	1.731E+00	1.21E+02	8.15E+01 G
TL-208	N	4.6771E+00					6.98E+02	
			583.02	4.677E+00	(P	9.232E-01	1.33E+01	8.45E+01 G
			277.28	-6.620E+00	-	2.101E+01	9.45E+01	6.31E+00 G
			860.56	2.985E+00	-	7.177E+00	9.65E+01	1.24E+01 G
PM-146	C	2.5147E-01					2.02E+03	
			453.88	2.515E-01	?(	1.185E+00	1.77E+02	6.50E+01 G
			747.16	-2.388E-01	+ P	4.506E+00	7.65E+02	3.40E+01 G
			735.72	-1.494E+00	+ P	6.036E+00	1.81E+02	2.25E+01 G
Y-88	F	-2.8854E-01					1.07E+02	
			1836.06	-2.885E-01	?(P	1.901E+00	2.55E+02	9.92E+01 G
			898.04	-1.440E-01	+ P	1.339E+00	1.68E+02	9.37E+01 G
Cd-113m		4.3368E+03					5.33E+03	
			263.70	4.337E+03	?(	1.547E+04	1.05E+02	6.00E-03 K
Cd-109	F	1.3056E+00					4.53E+02	
			88.04	1.306E+00	?(	4.365E+01	9.90E+02	3.79E+00 G
Cf-251	T	-1.0253E+00					3.28E+05	
			176.60	-1.025E+00	?(	4.682E+00	1.67E+02	1.70E+01 G
			227.00	-1.094E+00	&	1.416E+01	4.63E+02	6.30E+00 GA
Cf-249	T	-6.6989E-01					1.28E+05	
			387.95	-6.699E-01	?(	2.770E+00	1.22E+02	6.60E+01 G
			333.44	-2.627E+00	+	6.853E+00	1.00E+02	1.55E+01 G
Sn-126		-2.9419E+00					3.65E+07	
			87.57	0.000E+00	+	4.436E+00	1.00E+03	3.75E+01 GA
			64.28	-2.942E+00	(	1.473E+01	1.49E+02	9.70E+00 G
			86.94	0.000E+00	+	1.846E+01	1.00E+03	9.04E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	1.5379E+01					8.14E+03	
			46.54	1.538E+01	(P	3.167E+01	7.79E+01	4.25E+00 G
PB-212	N	1.0151E+01					6.98E+02	
			238.63	1.015E+01	(	1.502E+00	8.42E+00	4.33E+01 G
			300.03	1.460E+01	+ P	1.570E+01	4.03E+01	3.28E+00 GA
PB-214	N	1.0296E+01					5.84E+05	
			351.93	9.659E+00	(P	2.032E+00	1.20E+01	3.76E+01 G
			295.09	1.154E+01	@(P	3.989E+00	1.66E+01	1.93E+01 G
			242.00	1.211E+01	P	9.465E+00	2.71E+01	7.43E+00 GA
BI-207	C	4.0799E-01					1.18E+04	
			1063.66	4.080E-01	?(P	1.509E+00	1.47E+02	7.45E+01 G
			569.70	0.000E+00	&	1.266E+00	1.00E+03	9.77E+01 G
BI-212	N	-1.2542E-01					6.98E+02	
			727.17	-1.254E-01	&(P	2.497E+01	6.35E+03	7.55E+00 G
			785.42	5.048E+00	?	1.017E+02	8.00E+02	1.28E+00 GA
U-235	N	-2.6134E+00					2.57E+11	
			143.79	-2.613E+00	?(	1.028E+01	1.17E+02	1.10E+01 G
			205.33	-9.543E-01	+ P	1.642E+01	8.48E+02	5.01E+00 G
			163.38	-4.952E+00	+	1.783E+01	1.07E+02	5.08E+00 G
			185.72	6.142E-01	+	1.721E+00	1.04E+02	5.40E+01 GA
BI-214	N	8.9805E+00					5.84E+05	
			609.31	8.981E+00	(P	1.335E+00	1.18E+01	4.61E+01 G
			1120.29	2.090E+00	- P	1.130E+01	1.51E+02	1.51E+01 G
			1764.49	3.694E+00	- P	1.602E+01	1.23E+02	1.54E+01 G
BI-210M	T	-6.7131E-01					1.10E+09	
			265.83	-6.713E-01	?(P	2.290E+00	7.88E+01	5.00E+01 G
			304.90	0.000E+00	+	7.899E+00	1.00E+03	2.80E+01 G
AC-228	N	8.4544E+00					2.10E+03	
			911.07	8.454E+00	(P	1.860E+00	1.76E+01	2.90E+01 G
			968.97	2.473E+00	-	8.707E+00	1.01E+02	1.75E+01 G
			338.32	1.461E+01	+ P	4.872E+00	1.86E+01	1.20E+01 G
			93.35	6.118E+00	&	2.933E+01	1.43E+02	5.56E+00 XA
TH-227	N	1.1585E+00					7.95E+03	
			256.24	-1.694E+00	?(	1.266E+01	2.81E+02	7.00E+00 G
			235.97	1.964E+00	?(	1.632E+01	2.46E+02	1.23E+01 G
			50.14	2.416E+00	*(	1.459E+01	2.08E+02	8.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	-7.6291E-01					2.68E+06	
			193.51	-7.629E-01	?(	1.730E+01	8.07E+02	4.40E+00 G
			210.85	-3.546E+00	+ P	2.952E+01	3.91E+02	2.99E+00 G
TH-234	N	-1.2565E+01					1.63E+12	
			92.59	-1.257E+01	*(P	3.227E+01	4.30E+01	5.58E+00 G
			63.29	-1.757E+01	+ P	3.824E+01	5.46E+01	3.81E+00 G
PA-233	C	-1.0934E+00					7.82E+08	
			312.01	-1.093E+00	(	6.530E+00	1.77E+02	3.60E+01 G
			300.18	0.000E+00	+	3.521E+01	1.00E+03	6.20E+00 G
PA-234	N	-2.0868E-01					1.63E+12	
			131.29	-9.235E-01	&(	6.143E+00	1.96E+02	1.80E+01 G
			946.02	7.516E-01	?(	7.202E+00	3.54E+02	1.34E+01 G
			569.47	0.000E+00	&	1.509E+01	1.00E+03	8.20E+00 G
			883.24	0.000E+00	+	1.873E+01	1.00E+03	9.60E+00 G
			880.53	-3.161E+00	+	2.832E+01	2.49E+02	6.00E+00 GA
PA-234M	N	2.6552E+01					1.63E+12	
			1001.00	-4.081E+00	%(P	1.989E+02	1.38E+03	8.37E-01 G
			766.41	1.138E+02	?(	7.699E+02	1.95E+02	2.94E-01 G
AM-241	T	3.2529E-01					1.58E+05	
			59.54	3.253E-01	?(P	3.008E+00	3.17E+02	3.59E+01 G
Np-237	F	-2.2961E+00					2.14E+06	
			86.49	-2.296E+00	(	1.308E+01	1.70E+02	1.31E+01 G
Ir-192	F	-1.8752E-02					7.40E+01	
			316.49	-3.130E-01	(	1.401E+00	1.31E+02	8.70E+01 G
			468.06	4.762E-01	?(	1.970E+00	1.19E+02	5.18E+01 G
			308.44	0.000E+00	+	7.033E+00	1.00E+03	3.18E+01 G
Cs-136	F	-6.0229E-01					1.30E+01	
			818.50	-6.023E-01	?(	1.958E+00	9.55E+01	1.00E+02 G
			1048.07	-1.029E-01	+	1.453E+00	3.61E+02	8.00E+01 G
			340.57	-5.717E-01	+	3.544E+00	1.82E+02	4.69E+01 G
Np-239	T	-1.0134E+00					2.36E+00	
			103.70	-9.938E-01	+	3.805E+00	1.14E+02	2.40E+01 X
			106.13	-1.013E+00	&(	5.293E+00	1.55E+02	2.27E+01 G
			99.50	1.311E+00	?	5.162E+00	1.16E+02	1.50E+01 X
Nd-147		-7.1663E-01					1.11E+01	
			531.00	-7.166E-01	?(	7.650E+00	3.98E+02	1.30E+01 G
			91.10	-1.241E+00	+	6.496E+00	1.57E+02	2.83E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-210 N	3.4104E-01					5.84E+05	
		799.60	3.410E-01	?(	1.313E+00	1.10E+02	9.90E+01 G
		296.00	-4.323E-01	+	2.848E+00	1.95E+02	7.90E+01 G
		1313.00	-1.579E-01	%	6.383E+00	1.58E+03	2.10E+01 GA
Kr-85 I	6.4117E+01					3.92E+03	
		513.98	6.412E+01	&(	4.282E+02	1.93E+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 **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	72.	7.	0.004	207.51	2.416E+00	
AM-241	59.54	100.	5.	0.003	317.46	3.253E-01	P
TH-234	63.29	216.	-33.	-0.018	54.65	-1.757E+01	P
Sn-126	64.28	214.	-14.	-0.008	148.56	-2.942E+00	
BA-133	80.99	120.	-2.	-0.001	977.24	-9.826E-02	
Np-237	86.49	491.	-19.	-0.010	170.01	-2.296E+00	
Nd-147	91.10	592.	-22.	-0.012	156.66	-1.241E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-234	92.59	575.	-45.	-0.025	42.98	-1.257E+01	P
Gd-153	97.50	129.	15.	0.008	113.57	7.529E-01	
Np-239	99.50	103.	13.	0.007	116.46	1.311E+00	
Gd-153	103.20	159.	-14.	-0.008	132.69	-9.695E-01	
Np-239	103.70	148.	-16.	-0.009	113.76	-9.938E-01	
Np-239	106.13	263.	-15.	-0.008	155.19	-1.013E+00	
EU-152	121.78	102.	8.	0.004	193.45	4.068E-01	
CO-57	122.06	87.	11.	0.006	119.90	2.053E-01	
PA-234	131.29	208.	-11.	-0.006	196.45	-9.235E-01	
Tc-99m	140.51	181.	-17.	-0.010	112.56	-3.257E-01	
U-235	143.79	199.	-17.	-0.010	117.15	-2.613E+00	
CE-141	145.44	168.	14.	0.008	135.84	4.737E-01	
Ba-140	162.66	90.	12.	0.007	114.01	3.489E+00	
U-235	163.38	105.	-14.	-0.008	106.79	-4.952E+00	
CE-139	165.85	93.	6.	0.003	222.31	1.381E-01	
Cf-251	176.60	73.	-9.	-0.005	166.52	-1.025E+00	
U-235	185.72	93.	17.	0.009	103.78	6.142E-01	
TH-229	193.51	57.	-2.	-0.001	807.46	-7.629E-01	
U-235	205.33	60.	-2.	-0.001	848.22	-9.543E-01	P
TH-229	210.85	67.	-5.	-0.003	391.43	-3.546E+00	P
Cf-251	227.00	60.	-3.	-0.002	463.08	-1.094E+00	
TH-227	235.97	309.	10.	0.006	246.12	1.964E+00	
TH-227	256.24	48.	-5.	-0.003	280.62	-1.694E+00	
Cd-113m	263.70	50.	10.	0.006	104.88	4.337E+03	
BI-210M	265.83	77.	-13.	-0.007	78.76	-6.713E-01	P
Hg-203	279.20	110.	-13.	-0.007	121.23	-4.221E-01	
I-131	284.30	44.	-10.	-0.006	128.06	-4.511E+00	
TL-210	296.00	265.	-12.	-0.007	195.21	-4.323E-01	
PA-231	300.07	253.	-10.	-0.006	225.51	-1.186E+01	
PA-233	312.01	265.	-13.	-0.007	177.14	-1.093E+00	
Ir-192	316.49	65.	-9.	-0.005	131.00	-3.130E-01	
CR-51	320.08	65.	10.	0.006	114.09	3.198E+00	P
La-140	328.76	48.	-4.	-0.002	322.29	-5.675E-01	P
Cf-249	333.44	44.	-13.	-0.007	100.24	-2.627E+00	
Cs-136	340.57	110.	-8.	-0.005	181.59	-5.717E-01	
HF-181	345.83	91.	8.	0.005	164.34	1.819E+00	
BA-133	356.00	158.	10.	0.006	180.55	5.380E-01	
I-131	364.48	18.	9.	0.005	99.77	3.562E-01	
BA-133	383.84	95.	-12.	-0.007	115.74	-4.885E+00	
Cf-249	387.95	107.	-12.	-0.007	122.17	-6.699E-01	
SN-113	391.69	78.	10.	0.005	134.00	5.411E-01	
SB-125	427.88	24.	5.	0.003	196.98	6.572E-01	
AG-108M	433.94	40.	-13.	-0.007	100.70	-5.568E-01	
PM-146	453.88	12.	4.	0.002	176.78	2.515E-01	
SB-125	463.37	22.	7.	0.004	98.91	2.846E+00	P
Ir-192	468.06	22.	6.	0.003	118.95	4.762E-01	
BE-7	477.59	50.	-11.	-0.006	95.29	-4.489E+00	
HF-181	482.00	53.	4.	0.002	257.56	2.176E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	487.02	16.	3.	0.001	316.76	2.422E-01	P
RU-103	497.05	8.	6.	0.003	100.81	2.913E-01	
RH-106	511.86	22.	52.	0.029	18.61	1.186E+01	
Kr-85	513.98	66.	6.	0.003	193.43	6.412E+01	
Nd-147	531.00	16.	-2.	-0.001	397.91	-7.166E-01	
Ba-140	537.26	12.	7.	0.004	104.00	1.350E+00	
SB-125	600.50	138.	-5.	-0.003	335.26	-1.445E+00	
RH-106	621.92	115.	7.	0.004	234.90	3.505E+00	
AG-110M	657.76	43.	-13.	-0.007	74.16	-7.886E-01	
CS-137	661.66	45.	5.	0.003	180.71	3.561E-01	P
PM-144	696.54	13.	-1.	-0.001	742.74	-5.903E-02	
NB-94	702.63	31.	-7.	-0.004	137.92	-4.313E-01	P
SB-124	722.79	22.	9.	0.005	84.12	4.758E+00	
AG-108M	722.94	30.	7.	0.004	117.53	4.623E-01	
PM-146	735.72	17.	-5.	-0.003	181.00	-1.494E+00	P
PM-146	747.16	22.	-1.	-0.001	764.88	-2.388E-01	P
ZR-95	756.73	17.	-3.	-0.002	260.77	-3.834E-01	
AG-110M	763.94	13.	-1.	-0.001	519.62	-2.834E-01	
NB-95	765.79	45.	-14.	-0.008	71.50	-9.055E-01	
PA-234M	766.41	50.	5.	0.003	194.74	1.138E+02	
EU-152	778.92	19.	-3.	-0.001	349.11	-1.322E+00	
BI-212	785.42	14.	1.	0.001	800.00	5.048E+00	
TL-210	799.60	13.	5.	0.003	110.04	3.410E-01	
CO-58	810.78	19.	3.	0.002	213.44	2.002E-01	
Cs-136	818.50	32.	-9.	-0.005	95.55	-6.023E-01	
MN-54	834.85	23.	-5.	-0.003	196.95	-3.628E-01	
Co-56	846.77	15.	-4.	-0.002	78.94	-2.424E-01	P
NB-94	871.10	18.	6.	0.003	115.71	3.881E-01	
EU-154	873.23	18.	5.	0.003	123.68	2.974E+00	
PA-234	880.53	21.	-3.	-0.001	248.75	-3.161E+00	
AG-110M	884.68	24.	0.	0.000	831.65	-3.457E-02	P
Sc-46	889.28	34.	-9.	-0.005	94.37	-6.699E-01	
Y-88	898.04	10.	-2.	-0.001	167.81	-1.440E-01	P
PA-234	946.02	5.	1.	0.001	354.44	7.516E-01	
EU-152	964.11	30.	6.	0.003	148.27	2.890E+00	
EU-154	996.33	0.	15.	0.008	25.82	1.116E+01	
EU-154	1004.77	10.	-4.	-0.002	180.85	-1.765E+00	
Cs-136	1048.07	6.	-1.	-0.001	360.56	-1.029E-01	
RH-106	1050.36	14.	-5.	-0.003	114.89	-2.643E+01	
BI-207	1063.66	5.	4.	0.002	146.72	4.080E-01	P
Ga-68	1077.40	15.	-6.	-0.003	147.67	-1.799E+01	
FE-59	1099.25	5.	3.	0.002	173.74	4.550E-01	
EU-152	1112.07	30.	-1.	-0.001	548.00	-9.136E-01	
Sc-46	1120.55	17.	6.	0.003	104.40	5.215E-01	
CO-60	1173.24	0.	5.	0.003	44.72	4.530E-01	
Ta-182	1221.41	21.	-12.	-0.007	89.76	-4.277E+00	
Co-56	1238.28	11.	8.	0.004	98.76	1.159E+00	P
NA-22	1274.53	11.	-5.	-0.003	109.26	-4.531E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
FE-59	1291.60	5.	2.	0.001	327.64	3.753E-01	P
CO-60	1332.50	1.	4.	0.002	56.11	4.322E-01	P
EU-152	1408.00	5.	4.	0.002	152.39	1.842E+00	
La-140	1596.21	11.	-2.	-0.001	266.82	-2.983E-01	P
SB-124	1690.98	6.	-4.	-0.002	160.96	-9.450E-01	
Co-56	1771.35	18.	5.	0.003	123.84	4.270E+00	
Y-88	1836.06	6.	-2.	-0.001	254.77	-2.885E-01	P

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-4.4891E+00	-4.4892E+00	9.529E+01%	1.45E+01
NA-22	#A	-4.5314E-01	-4.5314E-01	1.093E+02%	1.74E+00
K-40	#	3.5327E+01	3.5327E+01	1.863E+01%	1.15E+01
Sc-46	#A	-6.6985E-01	-6.6986E-01	9.437E+01%	2.15E+00
CR-51	#A	3.1978E+00	3.1979E+00	1.141E+02%	1.24E+01
MN-54	#A	-3.6280E-01	-3.6280E-01	1.969E+02%	1.72E+00
FE-59	#A	4.2043E-01	4.2044E-01	1.737E+02%	1.99E+00
Co-56	#A	3.1540E-01	3.1540E-01	6.321E+01%	1.41E+00
CO-57	#A	2.0535E-01	2.0535E-01	1.199E+02%	8.35E-01
CO-58	#A	2.0017E-01	2.0017E-01	2.134E+02%	1.54E+00
CO-60	#A	4.4262E-01	4.4262E-01	3.588E+01%	7.43E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.77E+00
NB-94	#A	-1.7482E-02	-1.7482E-02	9.002E+01%	1.73E+00
ZR-95	#A	-3.8338E-01	-3.8338E-01	2.608E+02%	2.54E+00
NB-95	#A	-9.0552E-01	-9.0553E-01	7.150E+01%	2.15E+00
RU-103	#A	2.9131E-01	2.9131E-01	1.008E+02%	7.71E-01
RH-106	#A	3.5048E+00	3.5048E+00	2.349E+02%	2.82E+01
AG-108M	#A	-5.5682E-01	-5.5682E-01	1.007E+02%	1.40E+00
AG-110M	#A	-3.4570E-02	-3.4570E-02	8.317E+02%	2.49E+00
SN-113	#A	5.4108E-01	5.4108E-01	1.340E+02%	2.47E+00
SB-124	#A	4.7158E-01	4.7159E-01	8.412E+01%	2.97E+00
SB-125	#A	1.2292E+00	1.2292E+00	9.891E+01%	3.36E+00
I-131	#A	3.5616E-01	3.5618E-01	9.977E+01%	9.44E-01
Gd-153	#A	7.5294E-01	7.5294E-01	1.136E+02%	2.88E+00
Ga-68	#A	-1.7796E+01	-1.7991E+01	1.477E+02%	6.22E+01
Tc-99m	#A	-3.2506E-01	-3.2573E-01	1.126E+02%	1.23E+00
BA-133	#A	5.3800E-01	5.3800E-01	1.806E+02%	3.30E+00
CS-134	#	7.0930E-01	7.0930E-01	4.129E+01%	5.63E-01
CS-137	#A	3.5614E-01	3.5614E-01	1.807E+02%	2.23E+00
CE-139	#A	1.3809E-01	1.3809E-01	2.223E+02%	1.06E+00
Ba-140	#A	1.7846E+00	1.7846E+00	7.716E+01%	3.64E+00
La-140	#A	-1.2377E-01	-1.2377E-01	2.071E+02%	2.27E+00
CE-141	#A	4.7365E-01	4.7365E-01	1.358E+02%	2.17E+00

CE-144 #A	0.0000E+00	0.0000E+00	1.000E+03%		9.79E+00
PM-144 #A	-5.9028E-02	-5.9028E-02	7.427E+02%		1.15E+00
EU-152 #A	1.2466E+00	1.2466E+00	1.219E+02%		2.69E+00
EU-154 #A	1.3003E+00	1.3003E+00	2.582E+01%		1.86E+00
EU-155 #	2.2451E+00	2.2451E+00	3.459E+01%		1.98E+00
HF-181 #A	4.7007E-01	4.7008E-01	1.528E+02%		1.96E+00
Ta-182 #A	0.0000E+00	0.0000E+00	7.071E+02%		4.45E+00
Hg-203 #A	-4.2208E-01	-4.2208E-01	1.212E+02%		1.73E+00
TL-208	4.6771E+00	4.6771E+00	1.332E+01%		9.23E-01
PM-146 #A	2.5147E-01	2.5147E-01	1.768E+02%		1.19E+00
Y-88 #A	-2.8854E-01	-2.8854E-01	2.548E+02%		1.90E+00
Cd-113m#A	4.3368E+03	4.3368E+03	1.049E+02%		1.55E+04
Cd-109 #A	1.3056E+00	1.3056E+00	9.895E+02%		4.36E+01
Cf-251 #A	-1.0253E+00	-1.0253E+00	1.665E+02%		4.68E+00
Cf-249 #A	-6.6989E-01	-6.6989E-01	1.222E+02%		2.77E+00
Sn-126 #A	-2.9419E+00	-2.9419E+00	1.486E+02%		1.47E+01
PB-210 A	1.5379E+01	1.5379E+01	7.788E+01%		3.17E+01
PB-212	1.0151E+01	1.0151E+01	8.416E+00%		1.50E+00
PB-214	1.0296E+01	1.0296E+01	1.024E+01%		2.03E+00
BI-207 #A	4.0799E-01	4.0799E-01	1.467E+02%		1.51E+00
BI-212 #A	-1.2542E-01	-1.2542E-01	6.346E+03%		2.50E+01
U-235 #A	-2.6134E+00	-2.6134E+00	1.172E+02%		1.03E+01
BI-214	8.9805E+00	8.9805E+00	1.179E+01%		1.33E+00
BI-210M#A	-6.7131E-01	-6.7131E-01	7.876E+01%		2.29E+00
AC-228	8.4544E+00	8.4544E+00	1.756E+01%		1.86E+00
TH-227 #A	1.1585E+00	1.1585E+00	1.424E+02%		1.27E+01
TH-229 #A	-7.6291E-01	-7.6291E-01	8.075E+02%		1.73E+01
TH-234 #A	-1.2565E+01	-1.2565E+01	4.298E+01%		3.23E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%		7.63E+01
PA-233 #A	-1.0934E+00	-1.0934E+00	1.771E+02%		6.53E+00
PA-234 #A	-2.0868E-01	-2.0868E-01	1.965E+02%		6.14E+00
PA-234M#A	2.6552E+01	2.6552E+01	1.947E+02%		1.99E+02
AM-241 #A	3.2529E-01	3.2529E-01	3.175E+02%		3.01E+00
Np-237 #A	-2.2961E+00	-2.2961E+00	1.700E+02%		1.31E+01
Ir-192 #A	-1.8752E-02	-1.8752E-02	8.847E+01%		1.40E+00
Cs-136 #A	-6.0227E-01	-6.0229E-01	9.555E+01%		1.96E+00
Np-239 #A	-1.0132E+00	-1.0134E+00	1.552E+02%		5.29E+00
Nd-147 #A	-7.1659E-01	-7.1663E-01	3.979E+02%		7.65E+00
TL-210 #A	3.4104E-01	3.4104E-01	1.100E+02%		1.31E+00
Kr-85 #A	6.4117E+01	6.4117E+01	1.934E+02%		4.28E+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) 9.622E+01 Bq/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 9.6219521E+01 Bq/Sample

441817_Gamma_180-94764-A-1-B. 5_Gamma_20192348.spc.

Test America St. Louis Spectrum ID: 9_Gamma_20192637

Sample Description: 441817_Gamma_180-94764-A-1-C DU
Detector: Detector # 9
Batch ID: 441817
Work Order Number: Gamma
Lot Number: 180-94764-A-1-C DU

Decay to Time: 9/26/2019 07:45 Live Time: 1800 sec
Acquisition Time: 9/26/2019 07:46:08 Real Time: 1803 sec
Analysis Time: 9/26/2019 08:16 Dead Time: 0.16 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 9_Soil_TunaCan.Clb
Efficiency Cal Desc: 9_Soil_TunaCan_90099_050312
Efficiency Cal Date: 6/14/2012 10:19
Energy Cal Date: 3/1/2012 13:57
Library: Client_Long_Rev15.lib
Bkgd Correction File: 9_2019-09-07_1403.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	-2.832E+00	96.8	2.741E+00	2.745E+00	1.009E+01
NA-22	6.129E-01	28.9	1.769E-01	1.796E-01	3.764E-01
K-40	3.008E+01	23.5	7.066E+00	7.232E+00	1.381E+01
Sc-46	4.273E-01	63.4	2.709E-01	2.717E-01	1.030E+00
CR-51	1.574E+00	183.9	2.894E+00	2.896E+00	9.861E+00
MN-54	-1.544E-01	225.7	3.485E-01	3.486E-01	1.053E+00
FE-59	7.424E-01	28.9	2.143E-01	2.175E-01	1.082E+00
Co-56	3.507E-01	93.7	3.288E-01	3.293E-01	4.935E-01
CO-57	-2.915E-01	94.7	2.761E-01	2.765E-01	9.212E-01
CO-58	-4.669E-01	82.0	3.827E-01	3.834E-01	1.284E+00
CO-60	-3.118E-01	210.2	6.555E-01	6.557E-01	9.938E-01
ZN-65	-1.152E+00	91.2	1.051E+00	1.052E+00	3.540E+00
NB-94	-2.460E-01	148.8	3.660E-01	3.662E-01	1.258E+00
ZR-95	-6.238E-02	1103.8	6.885E-01	6.885E-01	1.622E+00
NB-95	-6.871E-02	587.4	4.036E-01	4.036E-01	1.413E+00
RU-103	-9.113E-03	3377.1	3.077E-01	3.077E-01	7.757E-01
RH-106	4.312E+00	92.1	3.973E+00	3.980E+00	2.234E+01
AG-108M	3.334E-01	78.1	2.605E-01	2.610E-01	6.611E-01
AG-110M	0.000E+00	1.#INF	5.269E-02	5.269E-02	1.636E+00
SN-113	3.670E-01	106.7	3.916E-01	3.921E-01	1.328E+00
SB-124	3.342E-01	79.4	2.653E-01	2.659E-01	2.243E+00
SB-125	1.237E+00	85.1	1.053E+00	1.055E+00	2.158E+00
I-131	3.566E-01	76.9	2.740E-01	2.746E-01	8.527E-01
Gd-153	8.050E-01	175.1	1.409E+00	1.410E+00	4.706E+00
Ga-68	7.421E+00	121.6	9.027E+00	9.036E+00	2.142E+01
Tc-99m	-2.976E-01	139.6	4.153E-01	4.157E-01	1.388E+00
BA-133	-5.276E-01	154.8	8.164E-01	8.169E-01	2.742E+00
CS-134	1.141E+00	24.8	2.836E-01	2.896E-01	6.889E-01
CS-137	-1.981E-01	210.3	4.166E-01	4.167E-01	9.938E-01
CE-139	1.468E-01	203.6	2.990E-01	2.993E-01	1.013E+00
Ba-140	1.874E+00	25.0	4.677E-01	4.776E-01	7.948E-01
La-140	-3.352E-02	101.2	3.391E-02	3.396E-02	1.211E+00
CE-141	-5.351E-01	84.9	4.545E-01	4.553E-01	2.420E+00

CE-144	1.740E+00	150.3	2.616E+00	2.617E+00	8.774E+00
PM-144	2.778E-01	115.4	3.204E-01	3.208E-01	1.007E+00
EU-152	8.453E-01	77.8	6.578E-01	6.593E-01	2.624E+00
EU-154	2.004E+00	20.0	4.008E-01	4.144E-01	1.695E+00
EU-155	-1.385E+00	144.3	1.998E+00	1.999E+00	6.823E+00
HF-181	4.706E-01	83.0	3.905E-01	3.912E-01	1.226E+00
Ta-182	2.203E-01	44.7	9.851E-02	9.913E-02	5.074E+00
Hg-203	9.144E-02	296.1	2.707E-01	2.708E-01	9.357E-01
TL-208	3.265E+00	12.6	4.104E-01	4.440E-01	6.707E-01
PM-146	-9.695E-02	163.2	1.582E-01	1.583E-01	1.139E+00
Y-88	-3.825E-03	12791.8	4.893E-01	4.893E-01	5.109E-01
Cd-113m	-3.494E+03	110.5	3.859E+03	3.866E+03	1.303E+04
Cd-109	2.999E+00	386.6	1.159E+01	1.159E+01	3.886E+01
Cf-251	-8.382E-01	181.4	1.521E+00	1.522E+00	3.933E+00
Cf-249	0.000E+00	1.#INF	2.923E-01	2.923E-01	1.619E+00
Sn-126	1.020E-01	3667.0	3.739E+00	3.739E+00	1.270E+01
PB-210	-1.059E+01	74.5	7.890E+00	7.914E+00	3.841E+01
PB-212	8.938E+00	7.4	6.625E-01	8.793E-01	1.282E+00
PB-214	1.063E+01	7.2	7.693E-01	9.471E-01	1.483E+00
BI-207	3.707E-01	93.9	3.479E-01	3.484E-01	8.126E-01
BI-212	4.210E+00	92.2	3.883E+00	3.889E+00	1.317E+01
U-235	-2.471E+00	80.4	1.985E+00	1.989E+00	1.084E+01
BI-214	8.221E+00	10.0	8.203E-01	9.248E-01	1.211E+00
BI-210M	-1.703E-01	552.6	9.414E-01	9.414E-01	1.670E+00
AC-228	9.869E+00	11.0	1.083E+00	1.195E+00	9.956E-01
TH-227	1.988E+00	110.7	2.200E+00	2.203E+00	1.036E+01
TH-229	6.024E-01	87.1	5.248E-01	5.270E-01	1.633E+01
TH-234	7.266E+00	50.5	3.669E+00	3.692E+00	1.080E+01
PA-231	0.000E+00	1.#INF	2.849E+00	2.849E+00	5.775E+01
PA-233	-1.898E-02	3431.0	6.512E-01	6.512E-01	4.721E+00
PA-234	8.562E-01	143.1	1.225E+00	1.226E+00	5.108E+00
PA-234M	1.653E+01	207.6	3.432E+01	3.433E+01	1.314E+02
AM-241	-5.441E-01	121.5	6.610E-01	6.616E-01	2.653E+00
Np-237	-2.091E+00	175.1	3.661E+00	3.662E+00	1.221E+01
Ir-192	8.109E-03	65.3	5.297E-03	5.318E-03	1.013E+00
Cs-136	-5.555E-01	88.3	4.902E-01	4.913E-01	1.093E+00
Np-239	9.539E-01	113.1	1.079E+00	1.081E+00	3.613E+00
Nd-147	-6.018E-01	351.7	2.117E+00	2.117E+00	5.310E+00
TL-210	0.000E+00	1.#INF	3.580E-02	3.580E-02	1.098E+00
Kr-85	-7.755E+01	137.2	1.064E+02	1.065E+02	3.595E+02
Total	1.346E+02				

Analyst: Kellene Robbs

Sample description
441817_Gamma_180-94764-A-1-C DU

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20192637.An1

Acquisition information
Start time: 9/26/2019 7:46:08 AM
Live time: 1800
Real time: 1803
Dead time: 0.16 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

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

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

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

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

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

Corrections	Status	Comments
Decay correct to date:	YES	9/26/2019 7:45:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2019-09-07_1403.PBC 9/7/2019 2:03:30 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2038

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
50.14	16.	110.66	1.00	2.900E-02	50.14	8.000	PBC<MDA	TH227
63.29	22.	104.21	1.01	3.921E-02	63.29	3.810	PBC<MDA	TH234
74.79	135.	13.73	1.03	4.572E-02				
77.11	229.	9.72	1.03	4.676E-02				
87.60	10.	386.57	1.04	5.051E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	2.999E+00	Cd109
92.50	34.	50.50	1.04	5.156E-02	92.59	5.584	PBC<MDA	TH234
93.26	24.	171.47	1.04	5.171E-02	93.35	5.561	PBC<MDA	AC228
97.50	23.	175.08	1.05	5.240E-02	97.50	30.000	PBC<MDA	Gd153
106.13	21.	113.13	1.05	5.323E-02	106.13	22.700	PBC<MDA	Np239
123.10	19.	102.39	1.07	5.296E-02	123.10	40.790	PBC<MDA	EU154
131.29	18.	143.06	1.08	5.216E-02	131.29	18.000	PBC<MDA	PA234
133.02	18.	146.68	1.08	5.195E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	1.739E+00	CE144
133.54	18.	150.35	1.08	5.189E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	1.740E+00	CE144
136.30	18.	153.63	1.08	5.152E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.825E+00	CO57
165.85	10.	203.63	1.11	4.736E-02	165.85	79.900	PBC<MDA	CE139
185.72	67.	28.53	1.13	4.403E-02	185.72	54.000	1.558E+00	U235
205.33	9.	217.22	1.15	4.123E-02	205.33	5.010	PBC<MDA	U235
210.85	18.	102.83	1.15	4.052E-02	210.85	2.990	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
238.47	252.	9.10	0.96	3.734E-02	238.63	43.300	8.652E+00	PB212
241.83	20.	159.40	1.18	3.697E-02	242.00	7.430	PBC<MDA	PB214
244.69	16.	186.78	1.18	3.670E-02	244.69	7.580	PBC<MDA	EU152
277.40	21.	47.07	2.47	3.372E-02	277.28	6.310	PBC<MDA	TL208
279.20	4.	296.06	1.22	3.356E-02	279.20	81.460	PBC<MDA	Hg203
294.97	119.	12.83	1.21	3.233E-02	295.09	19.300	1.059E+01	PB214
					296.00	79.000	2.594E+00	TL210
320.08	9.	183.86	1.25	3.056E-02	320.08	9.940	PBC<MDA	CR51
338.37	75.	18.13	1.46	2.940E-02	338.32	12.010	1.181E+01	AC228
351.79	209.	9.06	1.36	2.861E-02	351.93	37.600	1.079E+01	PB214
383.84	9.	168.19	1.31	2.691E-02	383.84	8.940	PBC<MDA	BA133
391.69	11.	106.70	1.32	2.653E-02	391.69	64.000	PBC<MDA	SN113
427.88	8.	145.21	1.35	2.491E-02	427.88	29.600	PBC<MDA	SB125
433.94	9.	122.91	1.35	2.466E-02	433.94	90.480	PBC<MDA	AG108M
463.37	13.	88.90	1.38	2.352E-02	463.37	10.470	PBC<MDA	SB125
468.06	13.	94.54	1.38	2.335E-02	468.06	51.750	PBC<MDA	Ir192
482.00	9.	129.77	1.40	2.286E-02	482.00	80.500	PBC<MDA	HF181
487.02	11.	104.55	1.40	2.269E-02	487.02	45.500	PBC<MDA	La140
510.85	64.	24.23	1.79	2.191E-02	511.86	20.000	8.125E+00	RH106
537.26	17.	24.95	1.44	2.112E-02	537.26	24.390	1.874E+00	Ba140
569.32	7.	70.37	1.47	2.024E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.421E+00	PA234
					569.70	97.740	PBC<MDA	BI207
569.47	2.	244.96	1.47	2.024E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	8.151E-01	PA234
					569.70	97.740	PBC<MDA	BI207
582.84	99.	12.57	0.97	1.989E-02	583.02	84.500	3.265E+00	TL208
609.23	131.	9.98	1.40	1.925E-02	609.31	46.090	8.221E+00	BI214
614.28	12.	179.96	1.51	1.913E-02	614.28	89.850	PBC<MDA	AG108M
618.06	12.	184.24	1.51	1.904E-02	618.06	99.100	PBC<MDA	PM144
621.92	10.	230.92	1.51	1.896E-02	621.92	9.930	PBC<MDA	RH106
636.97	11.	76.85	1.53	1.862E-02	636.97	7.170	PBC<MDA	I131
696.54	6.	138.89	1.58	1.741E-02	696.54	99.000	PBC<MDA	PM144
722.79	11.	79.37	1.60	1.693E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.014E-01	AG108M
					723.36	20.220	1.804E+00	EU154
722.94	11.	86.33	1.60	1.693E-02	722.79	10.810	3.372E+00	SB124
					722.94	90.840	4.014E-01	AG108M
					723.36	20.220	1.804E+00	EU154
723.36	8.	125.07	1.60	1.692E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.051E-01	AG108M
					723.36	20.220	1.371E+00	EU154
727.14	10.	92.23	1.60	1.686E-02	727.17	7.550	PBC<MDA	BI212
735.72	3.	307.43	1.61	1.671E-02	735.72	22.500	PBC<MDA	PM146
766.41	6.	207.56	1.63	1.620E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	6.611E+01	PA234M
795.87	27.	24.85	1.66	1.574E-02	795.87	85.530	1.114E+00	CS134
846.77	6.	96.53	1.70	1.501E-02	846.77	99.935	PBC<MDA	Co56

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
861.36	8.	89.73	1.71	1.482E-02	860.56	12.420	PBC<MDA	TL208
889.28	9.	92.48	1.73	1.445E-02	889.28	99.984	PBC<MDA	Sc46
910.98	67.	12.38	1.98	1.418E-02	911.07	29.000	9.066E+00	AC228
946.02	2.	354.73	1.77	1.377E-02	946.02	13.400	PBC<MDA	PA234
964.11	11.	107.10	1.79	1.357E-02	964.11	14.605	PBC<MDA	EU152
968.90	10.	94.97	1.79	1.352E-02	968.97	17.460	PBC<MDA	AC228
996.33	25.	20.00	1.81	1.323E-02	996.33	10.600	9.906E+00	EU154
1004.77	6.	92.13	1.82	1.314E-02	1004.77	18.010	PBC<MDA	EU154
1037.84	6.	93.75	1.84	1.281E-02	1037.84	14.130	PBC<MDA	Co56
1050.36	5.	92.14	1.85	1.269E-02	1050.36	1.560	PBC<MDA	RH106
1063.66	6.	93.87	1.86	1.257E-02	1063.66	74.500	PBC<MDA	BI207
1077.40	5.	121.64	1.87	1.244E-02	1077.40	3.300	PBC<MDA	Ga68
1099.25	3.	206.16	1.89	1.224E-02	1099.25	56.500	PBC<MDA	FE59
1120.37	10.	126.19	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	11.	86.72	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
1188.74	5.	44.72	1.95	1.150E-02	1189.05	16.200	PBC<MDA	Ta182
1221.39	2.	480.00	1.97	1.126E-02	1221.41	27.000	PBC<MDA	Ta182
1238.28	3.	327.45	1.98	1.114E-02	1238.28	66.070	PBC<MDA	Co56
1274.53	12.	28.87	2.01	1.088E-02	1274.53	99.940	6.129E-01	NA22
					1274.54	35.190	1.741E+00	EU154
1291.60	12.	28.87	2.02	1.077E-02	1291.60	43.200	1.433E+00	FE59
1313.00	8.	35.36	2.03	1.063E-02	1313.00	21.000	1.992E+00	TL210
1408.00	12.	28.87	2.10	1.004E-02	1408.00	21.005	3.160E+00	EU152
1460.66	56.	23.49	2.13	9.749E-03	1460.83	10.670	3.008E+01	K40
1764.18	25.	28.32	2.31	8.350E-03	1764.49	15.400	1.074E+01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.77	74.78	104.	135.	2.949E+03	13.73	1.025	-	sD
308.04	77.10	132.	229.	4.887E+03	9.72	1.027	-	sD
2042.76	510.85	65.	64.	2.921E+03	24.23	1.793	-	s

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

This section based on library: Client_Long_Rev15.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.80	46.54	245.	-21.	-0.012	74.49	0.998
TH-227	200.20	50.14	141.	16.	0.009	110.66	1.001s
AM-241	237.77	59.54	166.	-13.	-0.007	121.50	1.010s
TH-234	252.77	63.29	259.	22.	0.012	104.21	1.014
BA-133	323.56	80.99	821.	-28.	-0.016	145.99	1.031
Np-237	345.55	86.49	922.	-25.	-0.014	175.06	1.036
EU-155	345.76	86.54	849.	-24.	-0.014	169.89	1.036s
Sn-126	347.35	86.94	825.	-22.	-0.012	189.16	1.037
Cd-109	351.75	88.04	793.	10.	0.006	386.57	1.038s
Nd-147	363.99	91.10	803.	0.	0.000	1000.00	1.041s
TH-234	369.94	92.59	131.	34.	0.019	50.50	1.042D
AC-228	372.98	93.35	809.	24.	0.013	171.47	1.043s
Gd-153	389.58	97.50	784.	23.	0.013	175.08	1.047s
Gd-153	412.37	103.20	793.	-28.	-0.015	144.22	1.052s
Np-239	414.37	103.70	821.	-28.	-0.015	146.63	1.053s
EU-155	420.82	105.31	849.	-28.	-0.016	144.25	1.054s
Np-239	424.09	106.13	265.	21.	0.012	113.13	1.055s
EU-152	486.67	121.78	219.	-24.	-0.013	90.19	1.070s
CO-57	487.80	122.06	242.	-24.	-0.013	94.71	1.070s
EU-154	491.95	123.10	184.	19.	0.011	102.39	1.071s
PA-234	524.72	131.29	322.	18.	0.010	143.06	1.079s
HF-181	531.64	133.02	340.	18.	0.010	146.68	1.081
CE-144	533.69	133.54	358.	18.	0.010	150.35	1.081
HF-181	544.74	136.30	376.	18.	0.010	153.63	1.084s
CO-57	545.43	136.47	525.	-22.	-0.012	149.14	1.084s
Tc-99m	561.57	140.51	531.	-24.	-0.013	139.58	1.088
U-235	574.67	143.79	508.	-25.	-0.014	80.36	1.091
CE-141	581.29	145.44	484.	-23.	-0.013	84.93	1.092s
Ba-140	650.15	162.66	214.	-10.	-0.006	199.66	1.108s
U-235	653.03	163.38	169.	-5.	-0.003	358.72	1.109s
CE-139	662.92	165.85	202.	10.	0.006	203.63	1.111s
Cf-251	705.90	176.60	125.	-12.	-0.006	181.42	1.122s
U-235	742.37	185.72	84.	67.	0.037	28.53	1.130
TH-229	773.52	193.51	128.	-16.	-0.009	140.68	1.137s
U-235	820.80	205.33	96.	9.	0.005	217.22	1.148s
TH-229	842.87	210.85	88.	18.	0.010	102.83	1.153s
Cf-251	907.45	227.00	76.	-8.	-0.004	216.27	1.168s
TH-227	943.33	235.97	567.	-20.	-0.011	173.19	1.176
PB-212	953.97	238.63	55.	260.	0.144	7.41	1.179D
PB-214	967.43	242.00	483.	20.	0.011	159.40	1.182
EU-152	978.21	244.69	423.	16.	0.009	186.78	1.185s
TH-227	1024.39	256.24	88.	0.	0.000	1000.00	1.195s
Cd-113m	1054.23	263.70	99.	-13.	-0.007	110.45	1.202s
BI-210M	1062.75	265.83	113.	-5.	-0.003	552.60	1.204s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1109.00	277.40	23.	21.	0.012	47.07	2.473s
Hg-203	1116.22	279.20	86.	4.	0.002	296.06	1.216s
I-131	1136.61	284.30	60.	-7.	-0.004	219.93	1.221s
PB-214	1179.77	295.09	27.	116.	0.064	11.29	1.231D
TL-210	1183.41	296.00	438.	-17.	-0.009	180.13	1.231s
PB-212	1199.52	300.03	400.	-7.	-0.004	380.93	1.235
PA-231	1199.68	300.07	393.	0.	0.000	1000.00	1.235
PA-233	1200.12	300.18	393.	0.	0.000	1000.00	1.235
PA-231	1210.00	302.65	393.	0.	0.000	1000.00	1.237s
BA-133	1210.81	302.85	393.	0.	0.000	1000.00	1.238s
Ba-140	1218.80	304.85	393.	0.	0.000	1000.00	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
Ir-192	1265.35	316.49	98.	-16.	-0.009	90.17	1.250s
CR-51	1279.73	320.08	121.	9.	0.005	183.86	1.253s
La-140	1314.43	328.76	282.	-16.	-0.009	97.94	1.261s
Cf-249	1333.15	333.44	266.	-16.	-0.009	147.66	1.265s
AC-228	1352.85	338.37	22.	75.	0.042	18.13	1.459s
Cs-136	1361.66	340.57	262.	-17.	-0.009	140.43	1.272s
EU-152	1376.53	344.29	245.	-8.	-0.004	280.19	1.275s
PB-214	1406.53	351.79	31.	209.	0.116	9.06	1.360
BA-133	1423.37	356.00	326.	-17.	-0.009	154.75	1.285s
I-131	1457.31	364.48	48.	0.	0.000	1000.00	1.293s
BA-133	1534.73	383.84	100.	9.	0.005	168.19	1.310s
Cf-249	1551.17	387.95	109.	0.	0.000	1000.00	1.314s
SN-113	1566.12	391.69	66.	11.	0.006	106.70	1.317s
SB-125	1710.86	427.88	31.	8.	0.004	145.21	1.349s
AG-108M	1735.10	433.94	26.	9.	0.005	122.91	1.354
PM-146	1814.87	453.88	39.	-8.	-0.004	163.22	1.372s
SB-125	1852.82	463.37	64.	13.	0.007	88.90	1.380s
Ir-192	1871.59	468.06	66.	13.	0.007	94.54	1.384s
BE-7	1909.73	477.60	78.	-12.	-0.007	96.79	1.392s
HF-181	1927.34	482.00	66.	9.	0.005	129.77	1.396s
La-140	1947.43	487.02	56.	11.	0.006	104.55	1.400s
RH-106	2046.81	511.86	180.	-25.	-0.014	79.69	2.672s
Kr-85	2055.27	513.98	155.	-13.	-0.007	137.23	1.424s
Nd-147	2123.35	531.00	26.	-3.	-0.002	351.72	1.438s
Ba-140	2148.39	537.26	1.	17.	0.010	24.95	1.444s
CS-134	2276.64	569.32	9.	7.	0.004	70.37	1.471s
PA-234	2277.24	569.47	17.	2.	0.001	244.96	1.471s
BI-207	2278.16	569.70	26.	-6.	-0.004	165.79	1.471s
TL-208	2330.70	582.84	14.	99.	0.055	12.57	0.973s
SB-125	2401.36	600.50	266.	-12.	-0.006	107.46	1.497s
SB-124	2410.29	602.73	254.	0.	0.000	1000.00	1.499s
CS-134	2418.21	604.71	254.	0.	0.000	1000.00	1.500s
BI-214	2436.29	609.23	13.	131.	0.073	9.98	1.398
AG-108M	2456.49	614.28	217.	12.	0.007	179.96	1.508s
PM-144	2471.62	618.06	229.	12.	0.007	184.24	1.512s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RH-106	2487.04	621.92	245.	10.	0.005	230.92	1.515s
SB-125	2542.94	635.89	33.	-7.	-0.004	181.34	1.526s
I-131	2547.28	636.97	28.	11.	0.006	76.85	1.527s
CS-137	2646.03	661.66	28.	-6.	-0.003	210.27	1.548s
PM-144	2785.58	696.54	38.	6.	0.004	138.89	1.576s
NB-94	2809.93	702.63	58.	-8.	-0.004	148.77	1.581s
SB-124	2890.57	722.79	33.	11.	0.006	79.37	1.598s
AG-108M	2891.17	722.94	40.	11.	0.006	86.33	1.598s
EU-154	2892.86	723.36	52.	8.	0.005	125.07	1.598s
ZR-95	2896.22	724.20	91.	-18.	-0.010	76.79	1.599s
BI-212	2908.11	727.17	35.	10.	0.005	92.23	1.601s
PM-146	2942.31	735.72	19.	3.	0.002	307.43	1.608s
AG-110M	3055.23	763.94	54.	-11.	-0.006	99.17	1.631s
NB-95	3062.61	765.79	68.	-2.	-0.001	587.37	1.632s
PA-234M	3065.10	766.41	66.	6.	0.003	207.56	1.633s
EU-152	3115.14	778.92	25.	-7.	-0.004	161.52	1.643s
BI-212	3141.15	785.42	72.	-15.	-0.008	83.40	1.648s
CS-134	3182.96	795.87	9.	27.	0.015	24.85	1.656s
TL-210	3197.88	799.60	36.	0.	0.000	1000.00	1.659s
CS-134	3207.29	801.95	36.	-1.	-0.001	854.40	1.661s
CO-58	3242.59	810.78	50.	-13.	-0.007	81.95	1.668s
Cs-136	3273.50	818.50	35.	-15.	-0.009	88.26	1.674s
MN-54	3338.91	834.85	31.	-4.	-0.002	225.65	1.687s
Co-56	3386.61	846.77	5.	6.	0.003	96.53	1.696s
TL-208	3441.80	860.56	10.	8.	0.005	89.73	1.707s
NB-94	3483.94	871.10	28.	0.	0.000	1000.00	1.715s
EU-154	3492.47	873.23	38.	-11.	-0.006	84.79	1.717s
PA-234	3521.68	880.53	32.	-5.	-0.003	166.13	1.722s
PA-234	3532.53	883.24	37.	0.	0.000	1000.00	1.724s
AG-110M	3538.30	884.68	37.	0.	0.000	1000.00	1.725s
Sc-46	3556.69	889.28	27.	9.	0.005	92.48	1.729s
Y-88	3591.74	898.04	20.	-4.	-0.002	250.83	1.736s
AC-228	3643.51	910.98	1.	67.	0.037	12.38	1.984
AG-110M	3749.60	937.49	31.	-16.	-0.009	53.31	1.766s
PA-234	3783.72	946.02	10.	2.	0.001	354.73	1.772s
EU-152	3856.11	964.11	61.	11.	0.006	107.10	1.786s
AC-228	3875.56	968.97	38.	10.	0.005	94.97	1.790
EU-154	3985.03	996.33	0.	25.	0.014	20.00	1.810s
EU-154	4018.82	1004.77	5.	6.	0.004	92.13	1.816s
Co-56	4151.13	1037.84	5.	6.	0.003	93.75	1.841s
Cs-136	4192.07	1048.07	11.	-1.	0.000	703.56	1.848s
RH-106	4201.23	1050.36	8.	5.	0.003	92.14	1.850s
BI-207	4254.46	1063.66	6.	6.	0.003	93.87	1.860s
Ga-68	4309.44	1077.40	5.	5.	0.003	121.64	1.870s
FE-59	4396.88	1099.25	5.	3.	0.001	206.16	1.886s
EU-152	4448.20	1112.07	74.	-13.	-0.007	96.25	1.895s
ZN-65	4462.09	1115.55	61.	-13.	-0.007	91.17	1.897s
BI-214	4481.06	1120.29	71.	10.	0.005	126.19	1.901

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Sc-46	4482.12	1120.55	44.	11.	0.006	86.72	1.901
Ta-182	4485.12	1121.30	59.	-3.	-0.002	333.95	1.901s
CO-60	4692.96	1173.24	11.	-3.	-0.002	428.59	1.938s
Ta-182	4756.25	1189.05	0.	5.	0.003	44.72	1.949s
Ta-182	4885.75	1221.41	11.	2.	0.001	480.00	1.972s
Co-56	4953.27	1238.28	17.	3.	0.002	327.45	1.984
NA-22	5098.35	1274.53	0.	12.	0.007	28.87	2.008s
EU-154	5098.39	1274.54	12.	0.	0.000	1000.00	2.008s
FE-59	5166.65	1291.60	0.	12.	0.007	28.87	2.020s
TL-210	5252.32	1313.00	0.	8.	0.004	35.36	2.034s
CO-60	5330.37	1332.50	12.	-6.	-0.003	210.22	2.047s
AG-110M	5537.69	1384.30	11.	-4.	-0.002	283.04	2.082s
EU-152	5632.56	1408.00	0.	12.	0.007	28.87	2.097s
K-40	5844.03	1460.83	25.	56.	0.031	23.49	2.131s
La-140	6385.95	1596.21	12.	-5.	-0.003	173.21	2.215s
SB-124	6765.35	1690.98	19.	-13.	-0.007	101.74	2.272s
BI-214	7059.65	1764.49	12.	25.	0.014	28.32	2.314
Co-56	7087.11	1771.35	50.	-11.	-0.006	92.81	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	-2.8319E+00				5.31E+01	
			477.60	-2.832E+00	?(P	1.009E+01 9.68E+01 1.05E+01	G
NA-22	C	6.1292E-01				9.50E+02	
			1274.53	6.129E-01	?(	3.764E-01 2.89E+01 9.99E+01	G
K-40	N	3.0083E+01				4.66E+11	
			1460.83	3.008E+01	?(P	1.381E+01 2.35E+01 1.07E+01	G
Sc-46	F	4.2731E-01				8.38E+01	
			889.28	3.270E-01	?(	1.030E+00 9.25E+01 1.00E+02	G
			1120.55	5.276E-01	?(	1.542E+00 8.67E+01 1.00E+02	G
CR-51	F	1.5743E+00				2.77E+01	
			320.08	1.574E+00	?(P	9.861E+00 1.84E+02 9.94E+00	G
MN-54	C	-1.5445E-01				3.12E+02	
			834.85	-1.544E-01	?(P	1.053E+00 2.26E+02 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F	7.4236E-01					4.45E+01	
			1099.25	2.142E-01	?(	1.082E+00	2.06E+02	5.65E+01 G
			1291.60	1.433E+00	?(	8.802E-01	2.89E+01	4.32E+01 G
Co-56	C	3.5074E-01					7.73E+01	
			846.77	2.117E-01	?(P	4.935E-01	9.65E+01	9.99E+01 G
			1238.28	2.265E-01	?(	1.655E+00	3.27E+02	6.61E+01 G
			1037.84	1.915E+00	&(P	4.184E+00	9.37E+01	1.41E+01 G
			1771.35	-4.918E+00	+	1.542E+01	9.28E+01	1.55E+01 A
CO-57	C	-2.9148E-01					2.72E+02	
			122.06	-2.915E-01	?(	9.212E-01	9.47E+01	8.56E+01 G
			136.47	-2.218E+00	+	1.106E+01	1.49E+02	1.07E+01 G
CO-58	C	-4.6692E-01					7.09E+01	
			810.78	-4.669E-01	?(	1.284E+00	8.20E+01	9.95E+01 G
CO-60	F	-3.1182E-01					1.93E+03	
			1332.50	-3.118E-01	?(P	9.938E-01	2.10E+02	1.00E+02 G
			1173.24	-1.376E-01	+ P	8.647E-01	4.29E+02	9.99E+01 G
ZN-65	F	-1.1524E+00					2.44E+02	
			1115.55	-1.152E+00	?(	3.540E+00	9.12E+01	5.06E+01 G
NB-94	I	-2.4603E-01					7.41E+06	
			702.63	-2.460E-01	?(	1.258E+00	1.49E+02	9.79E+01 G
			871.10	0.000E+00	+	1.037E+00	1.00E+03	9.99E+01 G
ZR-95	I	-6.2379E-02					6.40E+01	
			756.73	-6.238E-02	%(	1.622E+00	1.10E+03	5.45E+01 G
			724.20	-1.372E+00	+	3.510E+00	7.68E+01	4.42E+01 G
NB-95	I	-6.8706E-02					6.40E+01	
			765.79	-6.871E-02	?(	1.413E+00	5.87E+02	9.98E+01 G
RU-103	I	-9.1127E-03					3.93E+01	
			497.05	-9.113E-03	%(	7.757E-01	3.38E+03	9.09E+01 G
			610.30	-3.834E-06	%	3.869E+01	2.95E+08	5.75E+00 GA
RH-106	I	4.3122E+00					3.74E+02	
			621.92	2.859E+00	(	2.234E+01	2.31E+02	9.93E+00 G
			1050.36	1.356E+01	?(	4.342E+01	9.21E+01	1.56E+00 G
			511.86	-3.120E+00	+	8.269E+00	7.97E+01	2.00E+01 GA
AG-108M	C	3.3338E-01					1.53E+05	
			433.94	2.198E-01	&(P	6.611E-01	1.23E+02	9.05E+01 G
			722.94	4.014E-01	&(	1.168E+00	8.63E+01	9.08E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          614.28 3.790E-01 &(  2.305E+00 1.80E+02 8.98E+01 G

SN-113   F   3.6704E-01                                     1.15E+02
                          391.69 3.670E-01 &(  1.328E+00 1.07E+02 6.40E+01 G

SB-124   F   3.3422E-01                                     6.02E+01
                          602.73 0.000E+00 ?(  2.243E+00 1.00E+03 9.83E+01 G
                         1690.98-1.749E+00 + P 3.095E+00 1.02E+02 4.78E+01 G
                          722.79 3.372E+00 &(  8.988E+00 7.94E+01 1.08E+01 G

SB-125   I   1.2367E+00                                     1.01E+03
                          427.88 6.049E-01 &(P 2.158E+00 1.45E+02 2.96E+01 G
                          600.50-1.859E+00 + P 1.258E+01 1.07E+02 1.79E+01 G
                          635.89-1.911E+00 + P 7.794E+00 1.81E+02 1.13E+01 G
                          463.37 3.023E+00 ?(P 9.032E+00 8.89E+01 1.05E+01 G

I-131    I   3.5657E-01                                     8.02E+00
                          364.48 0.000E+00 ?(  8.527E-01 1.00E+03 8.17E+01 G
                          284.30-1.911E+00 +   1.059E+01 2.20E+02 6.14E+00 G
                          636.97 4.420E+00 ?(  1.139E+01 7.69E+01 7.17E+00 G

Gd-153   F   8.0499E-01                                     2.42E+02
                           97.50 8.050E-01 &(  4.706E+00 1.75E+02 3.00E+01 G
                          103.20-1.338E+00 &   6.435E+00 1.44E+02 2.18E+01 G

Ga-68    C   7.4211E+00                                     4.71E-02
                         1077.40 7.421E+00 ?(  2.142E+01 1.22E+02 3.30E+00 G

Tc-99m   I  -2.9755E-01                                     2.51E-01
                          140.51-2.976E-01 &(  1.388E+00 1.40E+02 8.93E+01 G

BA-133   F  -5.2757E-01                                     3.85E+03
                          356.00-5.276E-01 ?(  2.742E+00 1.55E+02 6.20E+01 G
                          302.85 0.000E+00 +   9.079E+00 1.00E+03 1.83E+01 G
                          383.84 1.988E+00 & P 1.141E+01 1.68E+02 8.94E+00 GA
                           80.99-9.452E-01 +   4.600E+00 1.46E+02 3.41E+01 GA

CS-134   I   1.1413E+00                                     7.54E+02
                          795.87 1.114E+00 ?(  6.889E-01 2.48E+01 8.55E+01 G
                          604.71 0.000E+00 -   2.263E+00 1.00E+03 9.76E+01 G
                          569.32 1.291E+00 ?(  3.024E+00 7.04E+01 1.54E+01 G
                          801.95-4.086E-01 &   1.253E+01 8.54E+02 8.69E+00 G
                          563.24 1.398E-01 % P 8.262E+00 2.40E+03 8.35E+00 G

CS-137   I  -1.9813E-01                                     1.10E+04
                          661.66-1.981E-01 ?(  9.938E-01 2.10E+02 8.52E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	1.4681E-01					1.38E+02	
			165.85	1.468E-01	&(	1.013E+00	2.04E+02	7.99E+01 G
Ba-140	I	1.8743E+00					1.28E+01	
			537.26	1.874E+00	?(P	7.948E-01	2.50E+01	2.44E+01 G
			162.66	-2.000E+00	-	1.351E+01	2.00E+02	6.22E+00 G
			304.85	0.000E+00	-	3.897E+01	1.00E+03	4.29E+00 G
La-140	I	-3.3524E-02					1.28E+01	
			1596.21	-3.211E-01	?(	1.211E+00	1.73E+02	9.54E+01 G
			487.02	5.694E-01	?(P	2.019E+00	1.05E+02	4.55E+01 G
			328.76	-1.478E+00	+ P	7.393E+00	9.79E+01	2.03E+01 G
			815.77	-4.777E-03	%	6.134E+00	3.63E+04	2.33E+01 G
CE-141	I	-5.3513E-01					3.25E+01	
			145.44	-5.351E-01	?(P	2.420E+00	8.49E+01	4.82E+01 G
CE-144	I	1.7397E+00					2.85E+02	
			133.54	1.740E+00	&(	8.774E+00	1.50E+02	1.11E+01 G
PM-144	C	2.7776E-01					3.63E+02	
			696.54	2.095E-01	&(	1.007E+00	1.39E+02	9.90E+01 G
			618.06	3.460E-01	?(	2.154E+00	1.84E+02	9.91E+01 G
EU-152	F	8.4532E-01					4.94E+03	
			121.78	-8.725E-01	?(	2.624E+00	9.02E+01	2.86E+01 G
			344.29	-5.748E-01	+	5.460E+00	2.80E+02	2.65E+01 G
			1112.07	-4.424E+00	+	1.435E+01	9.63E+01	1.36E+01 G
			778.92	-1.879E+00	+	6.980E+00	1.62E+02	1.29E+01 G
			964.11	3.015E+00	?(	1.096E+01	1.07E+02	1.46E+01 G
			244.69	3.141E+00	?(P	1.969E+01	1.87E+02	7.58E+00 G
			1408.00	3.160E+00	?	1.941E+00	2.89E+01	2.10E+01 GA
EU-154	I	2.0040E+00					3.14E+03	
			123.10	4.942E-01	&(P	1.695E+00	1.02E+02	4.08E+01 G
			1274.54	0.000E+00	-	2.735E+00	1.00E+03	3.52E+01 G
			723.36	1.371E+00	?(	5.872E+00	1.25E+02	2.02E+01 G
			873.23	-3.399E+00	+	9.713E+00	8.48E+01	1.23E+01 G
			1004.77	1.483E+00	?(	3.163E+00	9.21E+01	1.80E+01 G
			996.33	9.906E+00	?(	2.920E+00	2.00E+01	1.06E+01 G
EU-155	I	-1.3849E+00					1.81E+03	
			105.31	-1.385E+00	?(P	6.823E+00	1.44E+02	2.12E+01 G
			86.54	-8.824E-01	+	5.003E+00	1.70E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	4.7061E-01					4.24E+01	
			482.00	2.767E-01	?(	1.226E+00	1.30E+02	8.05E+01 G
			133.02	4.448E-01	?(	2.189E+00	1.47E+02	4.33E+01 G
			345.83	-1.187E-02	& P	9.481E+00	1.46E+04	1.51E+01 G
			136.30	3.329E+00	?(	1.716E+01	1.54E+02	5.85E+00 G
Ta-182	F	2.2028E-01					1.14E+02	
			1121.30	-4.345E-01	?(	5.074E+00	3.34E+02	3.49E+01 G
			1221.41	3.045E-01	?(	3.362E+00	4.80E+02	2.70E+01 G
			1189.05	1.490E+00	?(	2.197E+00	4.47E+01	1.62E+01 G
Hg-203	F	9.1438E-02					4.66E+01	
			279.20	9.144E-02	?(	9.357E-01	2.96E+02	8.15E+01 G
TL-208	N	3.2653E+00					6.98E+02	
			583.02	3.265E+00	@(P	6.707E-01	1.26E+01	8.45E+01 G
			277.28	5.566E+00	+ P	6.502E+00	4.71E+01	6.31E+00 G
			860.56	2.533E+00	-	5.266E+00	8.97E+01	1.24E+01 G
PM-146	C	-9.6950E-02					2.02E+03	
			453.88	-2.864E-01	?(	1.139E+00	1.63E+02	6.50E+01 G
			747.16	9.895E-02	%	2.708E+00	1.13E+03	3.40E+01 G
			735.72	4.503E-01	?(P	3.399E+00	3.07E+02	2.25E+01 G
Y-88	F	-3.8250E-03					1.07E+02	
			1836.06	-3.825E-03	%(P	5.109E-01	1.28E+04	9.92E+01 G
			898.04	-1.654E-01	+	9.737E-01	2.51E+02	9.37E+01 G
Cd-113m		-3.4940E+03					5.33E+03	
			263.70	-3.494E+03	?(	1.303E+04	1.10E+02	6.00E-03 K
Cd-109	F	2.9990E+00					4.53E+02	
			88.04	2.999E+00	?(	3.886E+01	3.87E+02	3.79E+00 G
Cf-251	T	-8.3819E-01					3.28E+05	
			176.60	-8.382E-01	&(	3.933E+00	1.81E+02	1.70E+01 G
			227.00	-1.828E+00	+	9.904E+00	2.16E+02	6.30E+00 GA
Sn-126		1.0196E-01					3.65E+07	
			87.57	-1.122E-07	%	3.963E+00	1.05E+09	3.75E+01 GA
			64.28	1.020E-01	%(	1.270E+01	3.67E+03	9.70E+00 G
			86.94	-2.645E+00	+	1.671E+01	1.89E+02	9.04E+00 GA
PB-210	N	-1.0591E+01					8.14E+03	
			46.54	-1.059E+01	(P	3.841E+01	7.45E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	8.9382E+00					6.98E+02	
			238.63	8.938E+00	(P	1.282E+00	7.41E+00	4.33E+01 G
			300.03	-3.957E+00	&	5.087E+01	3.81E+02	3.28E+00 GA
PB-214	N	1.0629E+01					5.84E+05	
			351.93	1.079E+01	(P	1.483E+00	9.06E+00	3.76E+01 G
			295.09	1.032E+01	(P	2.405E+00	1.13E+01	1.93E+01 G
			242.00	3.985E+00	-	2.127E+01	1.59E+02	7.43E+00 GA
BI-207	C	3.7068E-01					1.18E+04	
			1063.66	3.707E-01	?(P	8.126E-01	9.39E+01	7.45E+01 G
			569.70	-1.786E-01	- P	7.484E-01	1.66E+02	9.77E+01 G
BI-212	N	4.2096E+00					6.98E+02	
			727.17	4.210E+00	?(	1.317E+01	9.22E+01	7.55E+00 G
			785.42	-4.139E+01	+	1.156E+02	8.34E+01	1.28E+00 GA
U-235	N	-2.4707E+00					2.57E+11	
			143.79	-2.471E+00	?(P	1.084E+01	8.04E+01	1.10E+01 G
			205.33	2.405E+00	+ P	1.301E+01	2.17E+02	5.01E+00 G
			163.38	-1.208E+00	&	1.481E+01	3.59E+02	5.08E+00 G
			185.72	1.558E+00	+	1.063E+00	2.85E+01	5.40E+01 GA
BI-214	N	8.2206E+00					5.84E+05	
			609.31	8.221E+00	(P	1.211E+00	9.98E+00	4.61E+01 G
			1120.29	2.976E+00	- P	1.277E+01	1.26E+02	1.51E+01 G
			1764.49	1.074E+01	+ P	8.184E+00	2.83E+01	1.54E+01 G
BI-210M	T	-1.7035E-01					1.10E+09	
			265.83	-1.703E-01	?(P	1.670E+00	5.53E+02	5.00E+01 G
			304.90	0.000E+00	+	5.971E+00	1.00E+03	2.80E+01 G
AC-228	N	9.8692E+00					2.10E+03	
			911.07	9.066E+00	(P	9.956E-01	1.24E+01	2.90E+01 G
			968.97	2.292E+00	- P	7.382E+00	9.50E+01	1.75E+01 G
			338.32	1.181E+01	*(P	3.860E+00	1.81E+01	1.20E+01 G
			93.35	4.567E+00	- P	2.614E+01	1.71E+02	5.56E+00 XA
TH-227	N	1.9878E+00					7.95E+03	
			256.24	0.000E+00	&(	1.036E+01	1.00E+03	7.00E+00 G
			235.97	-2.356E+00	+	1.366E+01	1.73E+02	1.23E+01 G
			50.14	3.727E+00	?(	1.388E+01	1.11E+02	8.00E+00 G
TH-229	N	6.0236E-01					2.68E+06	
			193.51	-4.713E+00	?(	1.633E+01	1.41E+02	4.40E+00 G
			210.85	8.424E+00	?(P	2.134E+01	1.03E+02	2.99E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	7.2662E+00					1.63E+12	
			92.59	6.569E+00	(	1.080E+01	5.05E+01	5.58E+00 G
			63.29	8.289E+00	(	2.888E+01	1.04E+02	3.81E+00 G
PA-233	C	-1.8979E-02					7.82E+08	
			312.01	-1.898E-02	&(P	4.721E+00	3.43E+03	3.60E+01 G
			300.18	0.000E+00	+	2.668E+01	1.00E+03	6.20E+00 G
PA-234	N	8.5620E-01					1.63E+12	
			131.29	1.064E+00	?(	5.108E+00	1.43E+02	1.80E+01 G
			946.02	6.020E-01	?(	5.252E+00	3.55E+02	1.34E+01 G
			569.47	8.151E-01	?(	7.257E+00	2.45E+02	8.20E+00 G
			883.24	0.000E+00	-	1.237E+01	1.00E+03	9.60E+00 G
			880.53	-3.180E+00	+	1.849E+01	1.66E+02	6.00E+00 GA
PA-234M	N	1.6533E+01					1.63E+12	
			1001.00	-8.828E-01	%(P	1.314E+02	5.29E+03	8.37E-01 G
			766.41	6.611E+01	?(	4.744E+02	2.08E+02	2.94E-01 G
AM-241	T	-5.4405E-01					1.58E+05	
			59.54	-5.441E-01	&(P	2.653E+00	1.21E+02	3.59E+01 G
Np-237	F	-2.0909E+00					2.14E+06	
			86.49	-2.091E+00	(	1.221E+01	1.75E+02	1.31E+01 G
Ir-192	F	8.1085E-03					7.40E+01	
			316.49	-3.351E-01	?(	1.013E+00	9.02E+01	8.70E+01 G
			468.06	5.853E-01	&(	1.866E+00	9.45E+01	5.18E+01 G
			308.44	0.000E+00	&	5.308E+00	1.00E+03	3.18E+01 G
Cs-136	F	-5.5547E-01					1.30E+01	
			818.50	-5.555E-01	?(	1.093E+00	8.83E+01	1.00E+02 G
			1048.07	-3.642E-02	+	9.795E-01	7.04E+02	8.00E+01 G
			340.57	-6.695E-01	+	3.160E+00	1.40E+02	4.69E+01 G
Np-239	T	9.5392E-01					2.36E+00	
			103.70	-1.216E+00	+	5.942E+00	1.47E+02	2.40E+01 X
			106.13	9.539E-01	?(	3.613E+00	1.13E+02	2.27E+01 G
			99.50	6.709E-07	&	9.480E+00	4.20E+08	1.50E+01 X
Nd-147		-6.0182E-01					1.11E+01	
			531.00	-6.018E-01	?(	5.310E+00	3.52E+02	1.30E+01 G
			91.10	0.000E+00	+	5.163E+00	1.00E+03	2.83E+01 G
Kr-85	I	-7.7548E+01					3.92E+03	
			513.98	-7.755E+01	?(	3.595E+02	1.37E+02	4.30E-01 G

(- This peak used in the nuclide activity average.

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

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

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	245.	-21.	-0.012	74.49	-1.059E+01	P
TH-227	50.14	141.	16.	0.009	110.66	3.727E+00	
AM-241	59.54	166.	-13.	-0.007	121.50	-5.441E-01	P
BA-133	80.99	821.	-28.	-0.016	145.99	-9.452E-01	
Np-237	86.49	922.	-25.	-0.014	175.06	-2.091E+00	
EU-155	86.54	849.	-24.	-0.014	169.89	-8.824E-01	
Sn-126	86.94	825.	-22.	-0.012	189.16	-2.645E+00	
Gd-153	97.50	784.	23.	0.013	175.08	8.050E-01	
Gd-153	103.20	793.	-28.	-0.015	144.22	-1.338E+00	
Np-239	103.70	821.	-28.	-0.015	146.63	-1.216E+00	
EU-155	105.31	849.	-28.	-0.016	144.25	-1.385E+00	P
Np-239	106.13	265.	21.	0.012	113.13	9.539E-01	
EU-152	121.78	219.	-24.	-0.013	90.19	-8.725E-01	
CO-57	122.06	242.	-24.	-0.013	94.71	-2.915E-01	
PA-234	131.29	322.	18.	0.010	143.06	1.064E+00	
HF-181	133.02	340.	18.	0.010	146.68	4.448E-01	
CE-144	133.54	358.	18.	0.010	150.35	1.740E+00	
HF-181	136.30	376.	18.	0.010	153.63	3.329E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-57	136.47	525.	-22.	-0.012	149.14	-2.218E+00	
Tc-99m	140.51	531.	-24.	-0.013	139.58	-2.976E-01	
U-235	143.79	508.	-25.	-0.014	80.36	-2.471E+00	P
CE-141	145.44	484.	-23.	-0.013	84.93	-5.351E-01	P
U-235	163.38	169.	-5.	-0.003	358.72	-1.208E+00	
CE-139	165.85	202.	10.	0.006	203.63	1.468E-01	
Cf-251	176.60	125.	-12.	-0.006	181.42	-8.382E-01	
U-235	185.72	84.	67.	0.037	28.53	1.558E+00	
TH-229	193.51	128.	-16.	-0.009	140.68	-4.713E+00	
U-235	205.33	96.	9.	0.005	217.22	2.405E+00	P
TH-229	210.85	88.	18.	0.010	102.83	8.424E+00	P
Cf-251	227.00	76.	-8.	-0.004	216.27	-1.828E+00	
TH-227	235.97	567.	-20.	-0.011	173.19	-2.356E+00	
EU-152	244.69	423.	16.	0.009	186.78	3.141E+00	P
Cd-113m	263.70	99.	-13.	-0.007	110.45	-3.494E+03	
BI-210M	265.83	113.	-5.	-0.003	552.60	-1.703E-01	P
Hg-203	279.20	86.	4.	0.002	296.06	9.144E-02	
I-131	284.30	60.	-7.	-0.004	219.93	-1.911E+00	
TL-210	296.00	438.	-17.	-0.009	180.13	-3.615E-01	
Ir-192	316.49	98.	-16.	-0.009	90.17	-3.351E-01	
CR-51	320.08	121.	9.	0.005	183.86	1.574E+00	P
La-140	328.76	282.	-16.	-0.009	97.94	-1.478E+00	P
Cf-249	333.44	266.	-16.	-0.009	147.66	-1.912E+00	
Cs-136	340.57	262.	-17.	-0.009	140.43	-6.695E-01	
EU-152	344.29	245.	-8.	-0.004	280.19	-5.748E-01	
BA-133	356.00	326.	-17.	-0.009	154.75	-5.276E-01	
BA-133	383.84	100.	9.	0.005	168.19	1.988E+00	P
SN-113	391.69	66.	11.	0.006	106.70	3.670E-01	
SB-125	427.88	31.	8.	0.004	145.21	6.049E-01	P
AG-108M	433.94	26.	9.	0.005	122.91	2.198E-01	P
PM-146	453.88	39.	-8.	-0.004	163.22	-2.864E-01	
SB-125	463.37	64.	13.	0.007	88.90	3.023E+00	P
Ir-192	468.06	66.	13.	0.007	94.54	5.853E-01	
BE-7	477.60	78.	-12.	-0.007	96.79	-2.832E+00	P
HF-181	482.00	66.	9.	0.005	129.77	2.767E-01	
La-140	487.02	56.	11.	0.006	104.55	5.694E-01	P
RH-106	511.86	180.	-25.	-0.014	79.69	-3.120E+00	
Kr-85	513.98	155.	-13.	-0.007	137.23	-7.755E+01	
Nd-147	531.00	26.	-3.	-0.002	351.72	-6.018E-01	
PA-234	569.47	17.	2.	0.001	244.96	8.151E-01	
BI-207	569.70	26.	-6.	-0.004	165.79	-1.786E-01	P
SB-125	600.50	266.	-12.	-0.006	107.46	-1.859E+00	P
AG-108M	614.28	217.	12.	0.007	179.96	3.790E-01	
PM-144	618.06	229.	12.	0.007	184.24	3.460E-01	
RH-106	621.92	245.	10.	0.005	230.92	2.859E+00	
SB-125	635.89	33.	-7.	-0.004	181.34	-1.911E+00	P
I-131	636.97	28.	11.	0.006	76.85	4.420E+00	
CS-137	661.66	28.	-6.	-0.003	210.27	-1.981E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PM-144	696.54	38.	6.	0.004	138.89	2.095E-01		
NB-94	702.63	58.	-8.	-0.004	148.77	-2.460E-01		
SB-124	722.79	33.	11.	0.006	79.37	3.372E+00		
AG-108M	722.94	40.	11.	0.006	86.33	4.014E-01		
ZR-95	724.20	91.	-18.	-0.010	76.79	-1.372E+00		
PM-146	735.72	19.	3.	0.002	307.43	4.503E-01		P
AG-110M	763.94	54.	-11.	-0.006	99.17	-1.689E+00		
NB-95	765.79	68.	-2.	-0.001	587.37	-6.871E-02		
PA-234M	766.41	66.	6.	0.003	207.56	6.611E+01		
EU-152	778.92	25.	-7.	-0.004	161.52	-1.879E+00		
CO-58	810.78	50.	-13.	-0.007	81.95	-4.669E-01		
Cs-136	818.50	35.	-15.	-0.009	88.26	-5.555E-01		
MN-54	834.85	31.	-4.	-0.002	225.65	-1.544E-01		P
Co-56	846.77	5.	6.	0.003	96.53	2.117E-01		P
PA-234	880.53	32.	-5.	-0.003	166.13	-3.180E+00		
Sc-46	889.28	27.	9.	0.005	92.48	3.270E-01		
Y-88	898.04	20.	-4.	-0.002	250.83	-1.654E-01		
AG-110M	937.49	31.	-16.	-0.009	53.31	-1.839E+00		P
PA-234	946.02	10.	2.	0.001	354.73	6.020E-01		
EU-152	964.11	61.	11.	0.006	107.10	3.015E+00		
Co-56	1037.84	5.	6.	0.003	93.75	1.915E+00		P
Cs-136	1048.07	11.	-1.	0.000	703.56	-3.642E-02		
RH-106	1050.36	8.	5.	0.003	92.14	1.356E+01		
BI-207	1063.66	6.	6.	0.003	93.87	3.707E-01		P
Ga-68	1077.40	5.	5.	0.003	121.64	7.421E+00		
FE-59	1099.25	5.	3.	0.001	206.16	2.142E-01		
EU-152	1112.07	74.	-13.	-0.007	96.25	-4.424E+00		
ZN-65	1115.55	61.	-13.	-0.007	91.17	-1.152E+00		
Sc-46	1120.55	44.	11.	0.006	86.72	5.276E-01		
CO-60	1173.24	11.	-3.	-0.002	428.59	-1.376E-01		P
Co-56	1238.28	17.	3.	0.002	327.45	2.265E-01		
FE-59	1291.60	0.	12.	0.007	28.87	1.433E+00		
TL-210	1313.00	0.	8.	0.004	35.36	1.992E+00		
CO-60	1332.50	12.	-6.	-0.003	210.22	-3.118E-01		P
AG-110M	1384.30	11.	-4.	-0.002	283.04	-9.839E-01		P
EU-152	1408.00	0.	12.	0.007	28.87	3.160E+00		
La-140	1596.21	12.	-5.	-0.003	173.21	-3.211E-01		
SB-124	1690.98	19.	-13.	-0.007	101.74	-1.749E+00		P
Co-56	1771.35	50.	-11.	-0.006	92.81	-4.918E+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	-2.8318E+00	-2.8319E+00	9.679E+01%	1.01E+01
NA-22	#	6.1292E-01	6.1292E-01	2.887E+01%	3.76E-01
K-40	#	3.0083E+01	3.0083E+01	2.349E+01%	1.38E+01
Sc-46	#A	4.2731E-01	4.2731E-01	6.339E+01%	1.03E+00
CR-51	#A	1.5742E+00	1.5743E+00	1.839E+02%	9.86E+00
MN-54	#A	-1.5444E-01	-1.5445E-01	2.257E+02%	1.05E+00
FE-59	#A	7.4235E-01	7.4236E-01	2.887E+01%	1.08E+00
Co-56	#A	3.5074E-01	3.5074E-01	9.375E+01%	4.93E-01
CO-57	#A	-2.9148E-01	-2.9148E-01	9.471E+01%	9.21E-01
CO-58	#A	-4.6692E-01	-4.6692E-01	8.195E+01%	1.28E+00
CO-60	#A	-3.1182E-01	-3.1182E-01	2.102E+02%	9.94E-01
ZN-65	#A	-1.1524E+00	-1.1524E+00	9.117E+01%	3.54E+00
NB-94	#A	-2.4603E-01	-2.4603E-01	1.488E+02%	1.26E+00
ZR-95	#A	-6.2379E-02	-6.2379E-02	1.104E+03%	1.62E+00
NB-95	#A	-6.8705E-02	-6.8706E-02	5.874E+02%	1.41E+00
RU-103	#A	-9.1125E-03	-9.1127E-03	3.377E+03%	7.76E-01
RH-106	#A	4.3122E+00	4.3122E+00	9.214E+01%	2.23E+01
AG-108M	#A	3.3338E-01	3.3338E-01	7.814E+01%	6.61E-01
AG-110M	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.64E+00
SN-113	#A	3.6704E-01	3.6704E-01	1.067E+02%	1.33E+00
SB-124	#A	3.3422E-01	3.3422E-01	7.937E+01%	2.24E+00
SB-125	#A	1.2367E+00	1.2367E+00	8.513E+01%	2.16E+00
I-131	#A	3.5655E-01	3.5657E-01	7.685E+01%	8.53E-01
Gd-153	#A	8.0498E-01	8.0499E-01	1.751E+02%	4.71E+00
Ga-68	#A	7.3356E+00	7.4211E+00	1.216E+02%	2.14E+01
Tc-99m	#A	-2.9691E-01	-2.9755E-01	1.396E+02%	1.39E+00
BA-133	#A	-5.2757E-01	-5.2757E-01	1.548E+02%	2.74E+00
CS-134	#	1.1413E+00	1.1413E+00	2.485E+01%	6.89E-01
CS-137	#A	-1.9813E-01	-1.9813E-01	2.103E+02%	9.94E-01
CE-139	#A	1.4681E-01	1.4681E-01	2.036E+02%	1.01E+00
Ba-140	#	1.8743E+00	1.8743E+00	2.495E+01%	7.95E-01
La-140	#A	-3.3523E-02	-3.3524E-02	1.012E+02%	1.21E+00
CE-141	#A	-5.3512E-01	-5.3513E-01	8.493E+01%	2.42E+00
CE-144	#A	1.7397E+00	1.7397E+00	1.503E+02%	8.77E+00
PM-144	#A	2.7776E-01	2.7776E-01	1.154E+02%	1.01E+00
EU-152	#A	8.4532E-01	8.4532E-01	7.781E+01%	2.62E+00
EU-154	#C	2.0040E+00	2.0040E+00	2.000E+01%	1.69E+00
EU-155	#A	-1.3849E+00	-1.3849E+00	1.443E+02%	6.82E+00
HF-181	#A	4.7061E-01	4.7061E-01	8.297E+01%	1.23E+00
Ta-182	#A	2.2028E-01	2.2028E-01	4.472E+01%	5.07E+00
Hg-203	#A	9.1437E-02	9.1438E-02	2.961E+02%	9.36E-01
TL-208	#	3.2653E+00	3.2653E+00	1.257E+01%	6.71E-01
PM-146	#A	-9.6950E-02	-9.6950E-02	1.632E+02%	1.14E+00

Y-88	#A	-3.8250E-03	-3.8250E-03	1.279E+04%	5.11E-01
Cd-113m	#A	-3.4940E+03	-3.4940E+03	1.105E+02%	1.30E+04
Cd-109	#A	2.9990E+00	2.9990E+00	3.866E+02%	3.89E+01
Cf-251	#A	-8.3819E-01	-8.3819E-01	1.814E+02%	3.93E+00
Cf-249	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.62E+00
Sn-126	A	1.0196E-01	1.0196E-01	3.667E+03%	1.27E+01
PB-210	#A	-1.0591E+01	-1.0591E+01	7.449E+01%	3.84E+01
PB-212		8.9382E+00	8.9382E+00	7.412E+00%	1.28E+00
PB-214		1.0629E+01	1.0629E+01	7.238E+00%	1.48E+00
BI-207	#A	3.7068E-01	3.7068E-01	9.387E+01%	8.13E-01
BI-212	#A	4.2096E+00	4.2096E+00	9.223E+01%	1.32E+01
U-235	#A	-2.4707E+00	-2.4707E+00	8.036E+01%	1.08E+01
BI-214		8.2206E+00	8.2206E+00	9.978E+00%	1.21E+00
BI-210M	#A	-1.7035E-01	-1.7035E-01	5.526E+02%	1.67E+00
AC-228		9.8692E+00	9.8692E+00	1.098E+01%	9.96E-01
TH-227	#A	1.9878E+00	1.9878E+00	1.107E+02%	1.04E+01
TH-229	#A	6.0236E-01	6.0236E-01	8.713E+01%	1.63E+01
TH-234	A	7.2662E+00	7.2662E+00	5.050E+01%	1.08E+01
PA-231	#A	0.0000E+00	0.0000E+00	7.071E+02%	5.78E+01
PA-233	#A	-1.8979E-02	-1.8979E-02	3.431E+03%	4.72E+00
PA-234	#A	8.5620E-01	8.5620E-01	1.431E+02%	5.11E+00
PA-234M	#A	1.6533E+01	1.6533E+01	2.076E+02%	1.31E+02
AM-241	#A	-5.4405E-01	-5.4405E-01	1.215E+02%	2.65E+00
Np-237	#A	-2.0909E+00	-2.0909E+00	1.751E+02%	1.22E+01
Ir-192	#A	8.1084E-03	8.1085E-03	6.532E+01%	1.01E+00
Cs-136	#A	-5.5545E-01	-5.5547E-01	8.826E+01%	1.09E+00
Np-239	#A	9.5370E-01	9.5392E-01	1.131E+02%	3.61E+00
Nd-147	#A	-6.0179E-01	-6.0182E-01	3.517E+02%	5.31E+00
TL-210	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.10E+00
Kr-85	#A	-7.7548E+01	-7.7548E+01	1.372E+02%	3.60E+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) 7.827E+01 Bq/Sample
Total Decayed Activity (25.1 to 1999.3 keV) 7.8271111E+01 Bq/Sample

441817_Gamma_180-94764-A-1-C DU. 9_Gamma_20192637.spc.

Test America St. Louis Spectrum ID: 8_Gamma_20191414

Sample Description: 441817_Gamma_180-94764-A-2-B
Detector: Detector # 8
Batch ID: 441817
Work Order Number: Gamma
Lot Number: 180-94764-A-2-B

Decay to Time: 9/26/2019 06:46 Live Time: 1800 sec
Acquisition Time: 9/26/2019 06:46:49 Real Time: 1844 sec
Analysis Time: 9/26/2019 07:17 Dead Time: 2.41 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 8_Soil_TunaCan.Clb
Efficiency Cal Desc: 8_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 10:35
Energy Cal Date: 2/28/2012 10:34
Library: Client_Long_Rev15.lib
Bkgd Correction File: 8_2019-09-07_1408.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	-1.337E+00	276.1	3.691E+00	3.692E+00	1.287E+01
NA-22	4.539E-01	71.3	3.237E-01	3.245E-01	1.079E+00
K-40	3.073E+01	17.8	5.460E+00	5.682E+00	8.655E+00
Sc-46	-9.714E-02	79.2	7.693E-02	7.709E-02	2.781E+00
CR-51	3.397E+00	177.9	6.043E+00	6.046E+00	2.037E+01
MN-54	4.466E-01	105.3	4.703E-01	4.709E-01	1.125E+00
FE-59	-3.743E-01	238.8	8.939E-01	8.941E-01	2.177E+00
Co-56	4.861E-01	96.5	4.693E-01	4.700E-01	1.300E+00
CO-57	0.000E+00	1.#INF	1.917E-01	1.917E-01	9.565E-01
CO-58	-2.464E-01	177.1	4.363E-01	4.365E-01	1.534E+00
CO-60	-1.862E-01	373.4	6.953E-01	6.954E-01	8.056E-01
ZN-65	0.000E+00	1.#INF	1.411E-01	1.411E-01	4.643E+00
NB-94	-5.747E-01	72.9	4.191E-01	4.202E-01	1.545E+00
ZR-95	-3.079E-01	160.6	4.946E-01	4.948E-01	2.594E+00
NB-95	3.901E-01	95.4	3.720E-01	3.726E-01	1.273E+00
RU-103	-4.096E-01	108.8	4.457E-01	4.462E-01	1.149E+00
RH-106	2.187E+00	351.3	7.684E+00	7.684E+00	2.630E+01
AG-108M	2.245E-01	98.6	2.215E-01	2.218E-01	9.527E-01
AG-110M	1.852E-01	80.2	1.486E-01	1.489E-01	3.541E+00
SN-113	4.368E-01	129.8	5.667E-01	5.672E-01	1.934E+00
SB-124	5.261E-01	83.8	4.407E-01	4.415E-01	2.378E+00
SB-125	1.465E+00	102.5	1.502E+00	1.504E+00	2.578E+00
I-131	4.666E-01	78.7	3.674E-01	3.681E-01	8.838E-01
Gd-153	-1.182E+00	163.6	1.933E+00	1.934E+00	6.446E+00
Ga-68	1.974E+01	35.4	6.979E+00	7.066E+00	1.819E+01
Tc-99m	4.066E-02	1090.7	4.435E-01	4.435E-01	1.503E+00
BA-133	-2.236E-02	4164.1	9.309E-01	9.309E-01	3.187E+00
CS-134	5.829E-01	84.9	4.947E-01	4.956E-01	1.673E+00
CS-137	1.793E-01	254.0	4.554E-01	4.555E-01	1.604E+00
CE-139	-3.751E-01	92.6	3.474E-01	3.492E-01	1.162E+00
Ba-140	1.557E+00	75.3	1.172E+00	1.175E+00	2.720E+00
La-140	-6.464E-01	130.8	8.457E-01	8.464E-01	1.878E+00
CE-141	0.000E+00	1.#INF	2.694E-01	2.694E-01	1.637E+00

CE-144	0.000E+00	1.#INF	8.235E-01	8.235E-01	1.154E+01
PM-144	-4.844E-01	141.1	6.833E-01	6.838E-01	1.594E+00
EU-152	1.069E+00	105.3	1.126E+00	1.127E+00	2.739E+00
EU-154	9.861E-01	66.9	6.600E-01	6.620E-01	1.512E+00
EU-155	-1.022E+00	119.1	1.216E+00	1.218E+00	9.197E+00
HF-181	0.000E+00	1.#INF	6.222E-02	6.222E-02	1.747E+00
Ta-182	1.759E+00	96.0	1.689E+00	1.691E+00	5.757E+00
Hg-203	-3.744E-01	76.1	2.849E-01	2.857E-01	1.250E+00
TL-208	3.465E+00	12.5	4.321E-01	4.680E-01	5.442E-01
PM-146	6.568E-01	73.5	4.829E-01	4.841E-01	1.282E+00
Y-88	-5.180E-01	128.3	6.644E-01	6.651E-01	1.532E+00
Cd-113m	3.648E+03	104.9	3.826E+03	3.833E+03	1.301E+04
Cd-109	-9.615E+00	173.9	1.672E+01	1.673E+01	5.575E+01
Cf-251	9.445E-02	1644.7	1.553E+00	1.553E+00	4.118E+00
Cf-249	1.274E-01	417.1	5.312E-01	5.313E-01	1.855E+00
Sn-126	-4.727E+00	115.8	5.474E+00	5.480E+00	1.827E+01
PB-210	2.975E+01	30.7	9.137E+00	9.302E+00	2.177E+01
PB-212	1.159E+01	7.4	8.591E-01	1.140E+00	1.578E+00
PB-214	1.216E+01	7.4	8.996E-01	1.099E+00	1.624E+00
BI-207	-6.492E-01	117.7	7.641E-01	7.648E-01	1.913E+00
BI-212	-4.718E+00	132.0	6.229E+00	6.233E+00	2.147E+01
U-235	2.250E+00	91.7	2.064E+00	2.067E+00	6.851E+00
BI-214	9.019E+00	13.1	1.183E+00	1.272E+00	1.987E+00
BI-210M	3.817E-01	134.2	5.124E-01	5.129E-01	1.753E+00
AC-228	1.353E+01	10.0	1.353E+00	1.519E+00	1.527E+00
TH-227	-6.060E+00	92.9	5.632E+00	5.644E+00	1.425E+01
TH-229	-7.436E+00	105.8	7.866E+00	7.889E+00	2.019E+01
TH-234	2.151E+01	24.7	5.304E+00	5.438E+00	1.511E+01
PA-231	0.000E+00	1.#INF	3.972E+00	3.972E+00	7.420E+01
PA-233	-3.608E-01	499.2	1.801E+00	1.801E+00	6.100E+00
PA-234	1.546E+00	30.2	4.663E-01	4.730E-01	6.926E+00
PA-234M	-1.354E+01	474.1	6.420E+01	6.421E+01	2.346E+02
AM-241	-1.917E+00	41.7	7.986E-01	8.048E-01	5.216E+00
Np-237	1.916E+00	225.9	4.330E+00	4.331E+00	1.448E+01
Ir-192	-4.428E-01	171.0	7.569E-01	7.574E-01	2.545E+00
Cs-136	7.601E-01	26.7	2.032E-01	2.078E-01	1.406E+00
Np-239	1.461E+00	174.4	2.549E+00	2.550E+00	8.502E+00
Nd-147	-1.573E+00	165.1	2.597E+00	2.598E+00	6.520E+00
TL-210	-4.967E-01	109.2	5.422E-01	5.430E-01	1.850E+00
Kr-85	5.497E+01	212.8	1.170E+02	1.170E+02	4.022E+02
Total	3.880E+03				

Analyst: Caleb Quinn

Sample description
441817_Gamma_180-94764-A-2-B

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20191414.An1

Acquisition information
Start time: 9/26/2019 6:46:49 AM
Live time: 1800
Real time: 1844
Dead time: 2.41 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

Energy Calibration
Created: 2/28/2012 10:34:41 AM
Zero offset: 0.052 keV
Gain: 0.250 keV/channel
Quadratic: 5.282E-10 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 10:35:20 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.39 %
Log(Eff): -1.098764E-01 + (-4.958544E-01*Log(E)) + (-2.572270E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.71 %
Log(Eff): -2.525301E+01 + (9.398253E+00*Log(E)) + (-1.000034E+00*Log(E)^2)

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

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.97keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

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

Corrections	Status	Comments
Decay correct to date:	YES	9/26/2019 6:46:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2019-09-07_1408.PBC 9/7/2019 2:08:18 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1444

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.48	46.	30.71	0.52	2.005E-02	46.54	4.250	2.975E+01	PB210
62.93	101.	21.55	2.00	3.074E-02	63.29	3.810	3.531E+01	TH234
74.70	124.	14.71	1.03	3.611E-02				
77.21	187.	10.07	1.04	3.701E-02				
86.48	18.	225.93	1.04	3.959E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	8.175E-01	EU155
					86.94	9.040	2.770E+00	Sn126
89.92	72.	18.58	1.05	4.029E-02				
92.70	65.	27.78	1.05	4.074E-02	92.59	5.584	1.581E+01	TH234
					93.35	5.561	1.583E+01	AC228
106.13	25.	174.40	1.06	4.187E-02	106.13	22.700	PBC<MDA	Np239
123.10	15.	91.74	1.07	4.138E-02	123.10	40.790	PBC<MDA	EU154
143.79	11.	142.28	1.09	3.899E-02	143.79	10.960	PBC<MDA	U235
162.66	16.	98.50	1.10	3.593E-02	162.66	6.220	PBC<MDA	Ba140
186.09	109.	17.65	1.39	3.324E-02	185.72	54.000	3.382E+00	U235
205.33	11.	115.76	1.13	3.083E-02	205.33	5.010	PBC<MDA	U235
210.85	7.	265.09	1.14	3.020E-02	210.85	2.990	PBC<MDA	TH229
227.00	4.	406.71	1.15	2.853E-02	227.00	6.300	PBC<MDA	Cf251
235.97	16.	193.88	1.16	2.768E-02	235.97	12.300	PBC<MDA	TH227
238.70	224.	9.00	1.00	2.744E-02	238.63	43.300	1.049E+01	PB212
242.09	38.	29.37	1.16	2.714E-02	242.00	7.430	1.037E+01	PB214
244.69	13.	217.01	1.16	2.691E-02	244.69	7.580	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
263.70	10.	104.88	1.18	2.539E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	9.	134.23	1.18	2.523E-02	265.83	50.000	PBC<MDA	BI210M
277.50	27.	36.99	0.34	2.440E-02	277.28	6.310	9.840E+00	TL208
295.28	100.	12.44	1.09	2.323E-02	295.09	19.300	1.237E+01	PB214
					296.00	79.000	3.028E+00	TL210
300.23	35.	20.37	1.20	2.294E-02	300.03	3.280	2.591E+01	PB212
					300.07	2.460	3.455E+01	PA231
					300.18	6.200	1.371E+01	PA233
320.08	13.	177.92	1.22	2.179E-02	320.08	9.940	PBC<MDA	CR51
338.77	73.	15.27	1.03	2.085E-02	338.32	12.010	1.619E+01	AC228
344.29	12.	105.33	1.24	2.057E-02	344.29	26.500	PBC<MDA	EU152
351.96	165.	9.35	1.06	2.021E-02	351.93	37.600	1.210E+01	PB214
364.48	1.	964.37	1.25	1.965E-02	364.48	81.700	PBC<MDA	I131
383.84	9.	111.02	1.27	1.885E-02	383.84	8.940	PBC<MDA	BA133
387.95	3.	417.08	1.27	1.869E-02	387.95	66.000	PBC<MDA	Cf249
391.69	9.	129.76	1.27	1.855E-02	391.69	64.000	PBC<MDA	SN113
427.88	5.	194.66	1.30	1.728E-02	427.88	29.600	PBC<MDA	SB125
453.88	10.	104.76	1.32	1.647E-02	453.88	65.000	PBC<MDA	PM146
463.37	10.	112.52	1.32	1.620E-02	463.37	10.470	PBC<MDA	SB125
511.86	59.	19.25	2.61	1.494E-02	511.86	20.000	1.097E+01	RH106
513.98	6.	212.82	1.36	1.489E-02	513.98	0.430	PBC<MDA	Kr85
537.26	6.	113.79	1.37	1.436E-02	537.26	24.390	PBC<MDA	Ba140
569.47	3.	232.38	1.40	1.369E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.650E+00	PA234
					569.70	97.740	1.385E-01	BI207
583.31	71.	12.47	1.54	1.342E-02	583.02	84.500	3.465E+00	TL208
600.50	9.	209.79	1.42	1.310E-02	600.50	17.860	PBC<MDA	SB125
602.73	5.	324.55	1.42	1.306E-02	602.73	98.260	PBC<MDA	SB124
604.71	5.	330.43	1.42	1.303E-02	604.71	97.620	PBC<MDA	CS134
609.31	95.	13.11	1.32	1.294E-02	609.31	46.090	8.849E+00	BI214
610.30	5.	335.64	1.42	1.293E-02	610.30	5.750	PBC<MDA	RU103
614.28	5.	340.97	1.43	1.286E-02	614.28	89.850	PBC<MDA	AG108M
618.06	5.	346.23	1.43	1.279E-02	618.06	99.100	PBC<MDA	PM144
621.92	5.	351.34	1.43	1.273E-02	621.92	9.930	PBC<MDA	RH106
636.97	9.	78.74	1.44	1.248E-02	636.97	7.170	PBC<MDA	I131
657.76	2.	583.10	1.45	1.215E-02	657.76	94.640	PBC<MDA	AG110M
661.66	3.	253.99	1.46	1.209E-02	661.66	85.210	PBC<MDA	CS137
722.79	7.	83.76	1.50	1.123E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.009E-01	AG108M
					723.36	20.220	1.802E+00	EU154
722.94	7.	98.64	1.50	1.123E-02	722.79	10.810	3.369E+00	SB124
					722.94	90.840	4.010E-01	AG108M
					723.36	20.220	1.802E+00	EU154
735.72	5.	103.19	1.51	1.107E-02	735.72	22.500	PBC<MDA	PM146
763.94	7.	80.25	1.52	1.072E-02	763.94	22.280	PBC<MDA	AG110M
765.79	7.	95.37	1.53	1.070E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	1.	979.80	1.53	1.055E-02	778.92	12.940	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
785.42	8.	93.11	1.54	1.048E-02	785.42	1.280	PBC<MDA	BI212
795.87	9.	84.87	1.54	1.036E-02	795.87	85.530	PBC<MDA	CS134
818.50	8.	97.64	1.56	1.012E-02	818.50	100.000	PBC<MDA	Cs136
834.85	8.	105.33	1.57	9.955E-03	834.85	99.980	PBC<MDA	MN54
860.42	5.	107.28	1.59	9.703E-03	860.56	12.420	PBC<MDA	TL208
898.04	5.	101.51	1.61	9.360E-03	898.04	93.700	PBC<MDA	Y88
911.49	60.	12.91	1.85	9.247E-03	911.07	29.000	1.243E+01	AC228
946.02	11.	30.15	1.64	8.957E-03	946.02	13.400	5.092E+00	PA234
964.11	8.	120.53	1.65	8.814E-03	964.11	14.605	PBC<MDA	EU152
969.22	10.	87.75	1.65	8.776E-03	968.97	17.460	PBC<MDA	AC228
1001.00	-2.	474.11	1.67	8.537E-03	1001.00	0.837	PBC<MDA	PA234M
1004.77	6.	97.49	1.67	8.509E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	5.	108.01	1.69	8.278E-03	1037.84	14.130	PBC<MDA	Co56
1048.07	14.	26.73	1.70	8.209E-03	1048.07	80.000	1.184E+00	Cs136
1077.40	8.	35.36	1.72	8.017E-03	1077.40	3.300	1.974E+01	Ga68
1120.45	9.	95.01	1.74	7.754E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	6.133E-01	Sc46
1120.55	6.	89.96	1.74	7.752E-03	1120.29	15.100	2.871E+00	BI214
					1120.55	99.987	4.337E-01	Sc46
1121.46	9.	96.04	1.74	7.748E-03	1121.30	34.900	PBC<MDA	Ta182
1173.24	-2.	514.26	1.77	7.453E-03	1173.24	99.900	PBC<MDA	CO60
1238.28	8.	96.54	1.81	7.114E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	6.	71.32	1.83	6.939E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.289E+00	EU154
1313.00	5.	44.72	1.85	6.763E-03	1313.00	21.000	PBC<MDA	TL210
1332.50	-2.	373.43	1.86	6.678E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	2.	324.35	1.88	6.460E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	6.	101.72	1.90	6.366E-03	1408.00	21.005	PBC<MDA	EU152
1461.00	36.	17.77	1.38	6.165E-03	1460.83	10.670	3.073E+01	K40
1764.47	14.	29.28	2.07	5.226E-03	1764.49	15.400	9.527E+00	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.63	74.65	104.	124.	3.432E+03	14.71	1.034	-	D
308.64	77.15	84.	187.	5.055E+03	10.07	1.036	-	D
359.76	90.00	76.	72.	1.795E+03	20.71	1.046	-	sD
744.19	186.09	55.	109.	3.293E+03	17.65	1.392	-	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	46.48	43.	46.	0.025	30.71	0.520s
TH-227	200.36	50.14	178.	-6.	-0.003	346.17	1.015s
AM-241	237.95	59.54	410.	-36.	-0.020	41.66	1.022s
TH-234	251.53	62.93	113.	75.	0.042	29.99	2.000s
Sn-126	256.93	64.28	439.	-26.	-0.014	115.80	1.026
BA-133	323.77	80.99	701.	-24.	-0.013	92.76	1.039s
Np-237	345.77	86.49	808.	18.	0.010	225.93	1.043s
EU-155	345.98	86.54	1145.	-26.	-0.015	183.97	1.043s
Sn-126	347.57	86.94	1119.	-26.	-0.015	181.81	1.044
Sn-126	350.09	87.57	1092.	-26.	-0.015	179.63	1.044
Cd-109	351.97	88.04	1024.	-26.	-0.015	173.91	1.044s
Nd-147	364.21	91.10	998.	-26.	-0.015	171.32	1.047s
TH-234	370.17	92.59	161.	49.	0.027	39.15	1.048D
AC-228	373.21	93.35	944.	-26.	-0.015	166.41	1.049s
Gd-153	389.81	97.50	917.	-26.	-0.015	163.60	1.052s
Np-239	397.81	99.50	891.	-26.	-0.015	161.03	1.053s
Gd-153	412.62	103.20	903.	-26.	-0.015	161.68	1.056s
Np-239	414.62	103.70	930.	-26.	-0.015	163.94	1.057s
EU-155	421.07	105.31	957.	-16.	-0.009	119.08	1.058s
Np-239	424.34	106.13	938.	25.	0.014	174.40	1.058
EU-152	486.94	121.78	143.	-14.	-0.008	123.72	1.071s
CO-57	488.06	122.06	157.	0.	0.000	1000.00	1.071
EU-154	492.22	123.10	86.	15.	0.008	91.74	1.072s
PA-234	525.00	131.29	360.	-15.	-0.008	180.74	1.078s
HF-181	531.92	133.02	375.	0.	0.000	1000.00	1.079s
CE-144	533.98	133.54	375.	0.	0.000	1000.00	1.080s
HF-181	545.02	136.30	375.	0.	0.000	1000.00	1.082s
CO-57	545.72	136.47	375.	0.	0.000	1000.00	1.082s
U-235	574.97	143.79	115.	11.	0.006	142.28	1.087s
CE-141	581.59	145.44	126.	0.	0.000	1000.00	1.089s
Ba-140	650.47	162.66	120.	16.	0.009	98.50	1.102s
U-235	653.35	163.38	149.	-22.	-0.012	70.70	1.102s
CE-139	663.24	165.85	155.	-20.	-0.011	92.62	1.104s
U-235	742.71	185.72	234.	-44.	-0.025	39.67	1.119s
TH-229	773.87	193.51	110.	-19.	-0.011	105.79	1.125
U-235	821.17	205.33	46.	11.	0.006	115.76	1.134s
TH-229	843.24	210.85	88.	7.	0.004	265.09	1.138s
Cf-251	907.84	227.00	68.	4.	0.002	406.71	1.151s
TH-227	943.73	235.97	449.	16.	0.009	193.88	1.157s
PB-212	954.37	238.63	44.	248.	0.138	7.41	1.159D
PB-214	967.84	242.00	42.	38.	0.021	29.37	1.162D
EU-152	978.62	244.69	417.	13.	0.007	217.01	1.164s
TH-227	1024.81	256.24	89.	-20.	-0.011	92.93	1.172s
Cd-113m	1054.65	263.70	50.	10.	0.006	104.88	1.178s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	1063.18	265.83	63.	9.	0.005	134.23	1.179s
TL-208	1109.84	277.50	18.	27.	0.015	36.99	0.345s
Hg-203	1116.66	279.20	80.	-13.	-0.007	76.09	1.189s
I-131	1137.05	284.30	76.	-18.	-0.010	55.14	1.193s
PB-214	1180.22	295.09	15.	99.	0.055	11.47	1.201D
TL-210	1183.86	296.00	352.	-13.	-0.007	202.58	1.202s
PB-212	1199.98	300.03	8.	35.	0.019	20.37	1.205D
PA-231	1200.14	300.07	338.	-6.	-0.004	410.21	1.205s
PA-233	1200.58	300.18	332.	0.	0.000	1000.00	1.205
PA-231	1210.46	302.65	332.	0.	0.000	1000.00	1.207s
BA-133	1211.27	302.85	332.	0.	0.000	1000.00	1.207s
Ba-140	1219.26	304.85	332.	0.	0.000	1000.00	1.208s
BI-210M	1219.45	304.90	368.	-15.	-0.008	188.36	1.208s
Ir-192	1233.62	308.44	354.	-15.	-0.008	184.26	1.211s
PA-233	1247.91	312.01	334.	-5.	-0.003	499.23	1.214s
Ir-192	1265.82	316.49	332.	-15.	-0.008	170.95	1.217s
CR-51	1280.20	320.08	271.	13.	0.007	177.92	1.219s
La-140	1314.91	328.76	229.	-14.	-0.008	166.81	1.226s
Cf-249	1333.63	333.44	215.	-7.	-0.004	319.90	1.229s
AC-228	1354.94	338.77	11.	73.	0.041	15.27	1.027
EU-152	1377.01	344.29	76.	12.	0.007	105.33	1.237
HF-181	1383.19	345.83	52.	-9.	-0.005	116.25	1.238s
PB-214	1407.70	351.96	18.	165.	0.092	9.35	1.056
I-131	1457.81	364.48	24.	1.	0.001	964.37	1.252s
BA-133	1535.24	383.84	49.	9.	0.005	111.02	1.266s
Cf-249	1551.68	387.95	68.	3.	0.002	417.08	1.269
SN-113	1566.64	391.69	69.	9.	0.005	129.76	1.271s
SB-125	1711.39	427.88	20.	5.	0.003	194.66	1.297s
PM-146	1815.41	453.88	22.	10.	0.005	104.76	1.315s
SB-125	1853.36	463.37	56.	10.	0.005	112.52	1.322s
Ir-192	1872.14	468.06	78.	-14.	-0.007	96.15	1.325
BE-7	1910.28	477.60	59.	-4.	-0.002	276.13	1.332s
HF-181	1927.89	482.00	63.	0.	0.000	1000.00	1.335s
La-140	1947.98	487.02	89.	-13.	-0.007	105.22	1.339s
RU-103	1988.12	497.05	31.	-10.	-0.006	108.80	1.346s
RH-106	2047.36	511.86	35.	59.	0.033	19.25	2.606s
Kr-85	2055.83	513.98	88.	6.	0.004	212.82	1.357s
Nd-147	2123.91	531.00	17.	-5.	-0.003	165.12	1.369s
Ba-140	2148.95	537.26	10.	6.	0.003	113.79	1.373s
CS-134	2252.86	563.24	35.	-5.	-0.003	136.15	1.391s
CS-134	2277.20	569.32	30.	-1.	-0.001	590.55	1.395s
PA-234	2277.80	569.47	28.	3.	0.002	232.38	1.395s
BI-207	2278.73	569.70	30.	-1.	-0.001	781.02	1.396s
TL-208	2333.15	583.31	3.	71.	0.039	12.47	1.536
SB-125	2401.92	600.50	156.	9.	0.005	209.79	1.416s
SB-124	2410.85	602.73	126.	5.	0.003	324.55	1.418
CS-134	2418.76	604.71	130.	5.	0.003	330.43	1.419s
BI-214	2437.16	609.31	16.	95.	0.053	13.11	1.325

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RU-103	2441.12	610.30	135.	5.	0.003	335.64	1.423s
AG-108M	2457.05	614.28	140.	5.	0.003	340.97	1.426s
PM-144	2472.18	618.06	145.	5.	0.003	346.23	1.428
RH-106	2487.60	621.92	150.	5.	0.003	351.34	1.431s
SB-125	2543.49	635.89	28.	-4.	-0.002	347.23	1.440s
I-131	2547.83	636.97	19.	9.	0.005	78.74	1.441s
AG-110M	2630.98	657.76	38.	2.	0.001	583.10	1.455s
CS-137	2646.58	661.66	34.	3.	0.002	253.99	1.457s
PM-144	2786.11	696.54	42.	-10.	-0.006	141.07	1.480s
NB-94	2810.46	702.63	38.	-12.	-0.006	72.92	1.484s
SB-124	2891.09	722.79	15.	7.	0.004	83.76	1.497s
AG-108M	2891.70	722.94	23.	7.	0.004	98.64	1.498s
EU-154	2893.39	723.36	37.	-4.	-0.002	209.89	1.498s
ZR-95	2896.74	724.20	33.	0.	0.000	1000.00	1.498s
BI-212	2908.63	727.17	41.	-7.	-0.004	132.01	1.500s
PM-146	2942.83	735.72	5.	5.	0.003	103.19	1.506s
PM-146	2988.59	747.16	19.	-11.	-0.006	49.05	1.513s
ZR-95	3026.87	756.73	28.	-3.	-0.002	160.64	1.519s
AG-110M	3055.73	763.94	14.	7.	0.004	80.25	1.524s
NB-95	3063.11	765.79	22.	7.	0.004	95.37	1.525s
PA-234M	3065.60	766.41	35.	-5.	-0.003	115.89	1.526s
EU-152	3115.64	778.92	9.	1.	0.000	979.80	1.534s
BI-212	3141.64	785.42	9.	8.	0.004	93.11	1.538s
CS-134	3183.44	795.87	26.	9.	0.005	84.87	1.544
TL-210	3198.36	799.60	45.	-9.	-0.005	109.16	1.547s
CS-134	3207.77	801.95	44.	-3.	-0.002	287.75	1.548s
CO-58	3243.06	810.78	30.	-4.	-0.002	177.08	1.554s
La-140	3263.04	815.77	34.	0.	0.000	1000.00	1.557s
Cs-136	3273.97	818.50	24.	8.	0.004	97.64	1.559s
MN-54	3339.36	834.85	14.	8.	0.004	105.33	1.569
Co-56	3387.05	846.77	19.	-2.	-0.001	279.64	1.577s
TL-208	3442.23	860.56	5.	5.	0.003	107.28	1.585s
NB-94	3484.36	871.10	12.	-1.	-0.001	382.43	1.592s
EU-154	3492.89	873.23	20.	-6.	-0.003	109.78	1.593s
PA-234	3522.10	880.53	53.	-12.	-0.007	87.87	1.598s
PA-234	3532.94	883.24	66.	-12.	-0.007	96.50	1.599s
AG-110M	3538.71	884.68	78.	-3.	-0.002	363.23	1.600s
Sc-46	3557.10	889.28	91.	-11.	-0.006	130.35	1.603s
Y-88	3592.14	898.04	5.	5.	0.003	101.51	1.608s
AC-228	3645.93	911.49	0.	60.	0.033	12.91	1.850
AG-110M	3749.96	937.49	25.	-13.	-0.007	91.05	1.633s
PA-234	3784.07	946.02	0.	11.	0.006	30.15	1.638s
EU-152	3856.43	964.11	44.	8.	0.005	120.53	1.649s
AC-228	3875.88	968.97	33.	10.	0.006	87.75	1.652
EU-154	3985.31	996.33	32.	-4.	-0.002	182.57	1.668s
PA-234M	4003.99	1001.00	35.	-2.	-0.001	474.11	1.671s
EU-154	4019.10	1004.77	13.	6.	0.003	97.49	1.673s
Co-56	4151.36	1037.84	5.	5.	0.003	108.01	1.693s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cs-136	4192.29	1048.07	0.	14.	0.008	26.73	1.698s
BI-207	4254.65	1063.66	15.	-7.	-0.004	117.70	1.708s
Ga-68	4309.61	1077.40	0.	8.	0.004	35.36	1.716s
FE-59	4397.02	1099.25	10.	-3.	-0.002	238.82	1.728s
EU-152	4448.32	1112.07	49.	-7.	-0.004	138.67	1.736s
ZN-65	4462.20	1115.55	42.	0.	0.000	1000.00	1.738s
BI-214	4481.17	1120.29	29.	9.	0.005	95.01	1.740s
Sc-46	4482.22	1120.55	12.	6.	0.003	89.96	1.740s
Ta-182	4485.22	1121.30	30.	9.	0.005	96.04	1.741s
CO-60	4692.97	1173.24	19.	-2.	-0.001	514.26	1.770s
Ta-182	4756.23	1189.05	15.	-5.	-0.003	176.07	1.779
Ta-182	4885.67	1221.41	11.	-5.	-0.003	165.68	1.797s
Co-56	4953.16	1238.28	11.	8.	0.005	96.54	1.806s
NA-22	5098.16	1274.53	5.	6.	0.003	71.32	1.826s
EU-154	5098.20	1274.54	11.	0.	0.000	1000.00	1.826s
FE-59	5166.43	1291.60	5.	-2.	-0.001	234.30	1.835s
TL-210	5252.05	1313.00	0.	5.	0.003	44.72	1.847s
CO-60	5330.06	1332.50	2.	-2.	-0.001	373.43	1.857s
AG-110M	5537.25	1384.30	5.	2.	0.001	324.35	1.884s
EU-152	5632.07	1408.00	5.	6.	0.003	101.72	1.896s
K-40	5844.08	1461.00	3.	36.	0.020	17.77	1.375s
La-140	6384.93	1596.21	11.	-6.	-0.004	130.84	1.990s
SB-124	6764.03	1690.98	0.	0.	0.000	1000.00	2.034s
BI-214	7058.07	1764.49	1.	14.	0.008	29.28	2.067s
Co-56	7085.51	1771.35	15.	0.	0.000	1000.00	2.070s
Y-88	7344.36	1836.06	6.	-5.	-0.003	128.27	2.098s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.3367E+00				5.31E+01	
			477.60	-1.337E+00	?(	1.287E+01 2.76E+02 1.05E+01	G
NA-22	C	4.5393E-01				9.50E+02	
			1274.53	4.539E-01	?(	1.079E+00 7.13E+01 9.99E+01	G
K-40	N	3.0727E+01				4.66E+11	
			1460.83	3.073E+01	(P	8.655E+00 1.78E+01 1.07E+01	G
Sc-46	F	-9.7143E-02				8.38E+01	
			889.28	-6.280E-01	?(	2.781E+00 1.30E+02 1.00E+02	G
			1120.55	4.337E-01	?(	1.341E+00 9.00E+01 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	3.3968E+00					2.77E+01	
			320.08	3.397E+00	?(P	2.037E+01	1.78E+02	9.94E+00 G
MN-54	C	4.4656E-01					3.12E+02	
			834.85	4.466E-01	?(	1.125E+00	1.05E+02	1.00E+02 G
FE-59	F	-3.7431E-01					4.45E+01	
			1099.25	-3.743E-01	?(	2.177E+00	2.39E+02	5.65E+01 G
			1291.60	-4.374E-01	+	2.525E+00	2.34E+02	4.32E+01 G
Co-56	C	4.8613E-01					7.73E+01	
			846.77	-1.102E-01	?(P	1.300E+00	2.80E+02	9.99E+01 G
			1238.28	9.842E-01	?(P	2.165E+00	9.65E+01	6.61E+01 G
			1037.84	2.375E+00	?(	6.236E+00	1.08E+02	1.41E+01 G
			1771.35	0.000E+00	-	1.431E+01	1.00E+03	1.55E+01 A
CO-58	C	-2.4637E-01					7.09E+01	
			810.78	-2.464E-01	?(	1.534E+00	1.77E+02	9.95E+01 G
CO-60	F	-1.8619E-01					1.93E+03	
			1332.50	-1.862E-01	?(P	8.056E-01	3.73E+02	1.00E+02 G
			1173.24	-1.287E-01	+ P	1.707E+00	5.14E+02	9.99E+01 G
NB-94	I	-5.7471E-01					7.41E+06	
			702.63	-5.747E-01	?(P	1.545E+00	7.29E+01	9.79E+01 G
			871.10	-7.721E-02	+	1.105E+00	3.82E+02	9.99E+01 G
ZR-95	I	-3.0788E-01					6.40E+01	
			756.73	-3.079E-01	?(P	2.594E+00	1.61E+02	5.45E+01 G
			724.20	0.000E+00	+	3.308E+00	1.00E+03	4.42E+01 G
NB-95	I	3.9007E-01					6.40E+01	
			765.79	3.901E-01	?(	1.273E+00	9.54E+01	9.98E+01 G
RU-103	I	-4.0963E-01					3.93E+01	
			497.05	-4.096E-01	?(P	1.149E+00	1.09E+02	9.09E+01 G
			610.30	3.698E+00	?	4.255E+01	3.36E+02	5.75E+00 GA
RH-106	I	2.1869E+00					3.74E+02	
			621.92	2.187E+00	?(	2.630E+01	3.51E+02	9.93E+00 G
			1050.36	-6.168E-01	& P	8.795E+01	5.84E+03	1.56E+00 G
			511.86	1.097E+01	?	5.631E+00	1.93E+01	2.00E+01 GA
AG-108M	C	2.2451E-01					1.53E+05	
			433.94	3.358E-02	%(P	9.527E-01	1.12E+03	9.05E+01 G
			722.94	4.010E-01	?(	1.356E+00	9.86E+01	9.08E+01 G
			614.28	2.384E-01	?(	2.785E+00	3.41E+02	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	1.8519E-01					2.50E+02	
			884.68	-2.807E-01	?(	3.541E+00	3.63E+02	7.27E+01 G
			657.76	7.247E-02	?(	1.510E+00	5.83E+02	9.46E+01 G
			937.49	-2.274E+00	+	4.660E+00	9.10E+01	3.44E+01 G
			1384.30	5.901E-01	?(	4.769E+00	3.24E+02	2.43E+01 G
			763.94	1.742E+00	?(	4.732E+00	8.02E+01	2.23E+01 G
SN-113	F	4.3676E-01					1.15E+02	
			391.69	4.368E-01	?(	1.934E+00	1.30E+02	6.40E+01 G
SB-124	F	5.2612E-01					6.02E+01	
			602.73	2.134E-01	?(	2.378E+00	3.25E+02	9.83E+01 G
			1690.98	0.000E+00	-	1.579E+00	1.00E+03	4.78E+01 G
			722.79	3.369E+00	?(	9.588E+00	8.38E+01	1.08E+01 G
SB-125	I	1.4650E+00					1.01E+03	
			427.88	5.060E-01	&(P	2.578E+00	1.95E+02	2.96E+01 G
			600.50	2.025E+00	?(	1.446E+01	2.10E+02	1.79E+01 G
			635.89	-1.413E+00	+ P	1.069E+01	3.47E+02	1.13E+01 G
			463.37	3.220E+00	?(P	1.233E+01	1.13E+02	1.05E+01 G
I-131	I	4.6656E-01					8.02E+00	
			364.48	3.460E-02	?(	8.838E-01	9.64E+02	8.17E+01 G
			284.30	-6.990E+00	+ P	1.643E+01	5.51E+01	6.14E+00 G
			636.97	5.389E+00	?(	1.430E+01	7.87E+01	7.17E+00 G
Gd-153	F	-1.1816E+00					2.42E+02	
			97.50	-1.182E+00	?(	6.446E+00	1.64E+02	3.00E+01 G
			103.20	-1.616E+00	&	8.713E+00	1.62E+02	2.18E+01 G
Ga-68	C	1.9740E+01					4.71E-02	
			1077.40	1.974E+01	?(	1.819E+01	3.54E+01	3.30E+00 G
Tc-99m	I	4.0660E-02					2.51E-01	
			140.51	4.066E-02	%(	1.503E+00	1.09E+03	8.93E+01 G
BA-133	F	-2.2356E-02					3.85E+03	
			356.00	-2.236E-02	%(	3.187E+00	4.16E+03	6.20E+01 G
			302.85	0.000E+00	+	1.166E+01	1.00E+03	1.83E+01 G
			383.84	3.074E+00	& P	1.163E+01	1.11E+02	8.94E+00 GA
			80.99	-1.035E+00	+ P	5.383E+00	9.28E+01	3.41E+01 GA
CS-134	I	5.8292E-01					7.54E+02	
			795.87	5.829E-01	(	1.673E+00	8.49E+01	8.55E+01 G
			604.71	2.156E-01	-	2.444E+00	3.30E+02	9.76E+01 G
			569.32	-3.518E-01	-	7.488E+00	5.91E+02	1.54E+01 G
			801.95	-2.070E+00	+	2.095E+01	2.88E+02	8.69E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	-2.365E+00	+ P	1.457E+01	1.36E+02	8.35E+00 G
CS-137	I	1.7931E-01					1.10E+04	
			661.66	1.793E-01	&(P	1.604E+00	2.54E+02	8.52E+01 G
CE-139	F	-3.7508E-01					1.38E+02	
			165.85	-3.751E-01	&(	1.162E+00	9.26E+01	7.99E+01 G
Ba-140	I	1.5574E+00					1.28E+01	
			537.26	9.242E-01	?(P	2.720E+00	1.14E+02	2.44E+01 G
			162.66	4.040E+00	?(	1.336E+01	9.85E+01	6.22E+00 G
			304.85	0.000E+00	-	5.010E+01	1.00E+03	4.29E+00 G
La-140	I	-6.4637E-01					1.28E+01	
			1596.21	-6.464E-01	?(	1.878E+00	1.31E+02	9.54E+01 G
			487.02	-1.033E+00	+	3.670E+00	1.05E+02	4.55E+01 G
			328.76	-1.815E+00	+ P	9.387E+00	1.67E+02	2.03E+01 G
			815.77	0.000E+00	+	7.026E+00	1.00E+03	2.33E+01 G
PM-144	C	-4.8440E-01					3.63E+02	
			696.54	-4.844E-01	?(	1.594E+00	1.41E+02	9.90E+01 G
			618.06	2.176E-01	&	2.580E+00	3.46E+02	9.91E+01 G
EU-152	F	1.0688E+00					4.94E+03	
			121.78	-6.561E-01	?(	2.739E+00	1.24E+02	2.86E+01 G
			344.29	1.240E+00	&(	4.417E+00	1.05E+02	2.65E+01 G
			1112.07	-3.880E+00	+	1.851E+01	1.39E+02	1.36E+01 G
			778.92	2.713E-01	(	6.895E+00	9.80E+02	1.29E+01 G
			964.11	3.498E+00	?(	1.446E+01	1.21E+02	1.46E+01 G
			244.69	3.655E+00	(	2.666E+01	2.17E+02	7.58E+00 G
			1408.00	2.354E+00	?	5.597E+00	1.02E+02	2.10E+01 GA
EU-154	I	9.8605E-01					3.14E+03	
			123.10	4.905E-01	?(	1.512E+00	9.17E+01	4.08E+01 G
			1274.54	0.000E+00	-	4.133E+00	1.00E+03	3.52E+01 G
			723.36	-1.034E+00	+	7.622E+00	2.10E+02	2.02E+01 G
			873.23	-2.913E+00	+	1.108E+01	1.10E+02	1.23E+01 G
			1004.77	2.108E+00	?(	7.112E+00	9.75E+01	1.80E+01 G
			996.33	-2.752E+00	+	1.765E+01	1.83E+02	1.06E+01 G
EU-155	I	-1.0215E+00					1.81E+03	
			105.31	-1.022E+00	&(P	9.197E+00	1.19E+02	2.12E+01 G
			86.54	-1.195E+00	&	7.327E+00	1.84E+02	3.07E+01 G
Ta-182	F	1.7585E+00					1.14E+02	
			1121.30	1.759E+00	?(	5.757E+00	9.60E+01	3.49E+01 G
			1221.41	-1.334E+00	-	5.125E+00	1.66E+02	2.70E+01 G
			1189.05	-2.327E+00	+	9.662E+00	1.76E+02	1.62E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Hg-203	F	-3.7437E-01					4.66E+01	
			279.20	-3.744E-01	?(P	1.250E+00	7.61E+01	8.15E+01 G
TL-208	N	3.4652E+00					6.98E+02	
			583.02	3.465E+00	(P	5.442E-01	1.25E+01	8.45E+01 G
			277.28	9.840E+00	+ P	8.055E+00	3.70E+01	6.31E+00 G
			860.56	2.243E+00	- P	6.201E+00	1.07E+02	1.24E+01 G
PM-146	C	6.5682E-01					2.02E+03	
			453.88	4.985E-01	&(P	1.282E+00	1.05E+02	6.50E+01 G
			747.16	-1.578E+00	+ P	3.419E+00	4.90E+01	3.40E+01 G
			735.72	1.114E+00	?(P	2.908E+00	1.03E+02	2.25E+01 G
Y-88	F	-5.1798E-01					1.07E+02	
			1836.06	-5.180E-01	?(	1.532E+00	1.28E+02	9.92E+01 G
			898.04	3.223E-01	+ P	8.258E-01	1.02E+02	9.37E+01 G
Cd-113m		3.6475E+03					5.33E+03	
			263.70	3.648E+03	&(	1.301E+04	1.05E+02	6.00E-03 K
Cd-109	F	-9.6154E+00					4.53E+02	
			88.04	-9.615E+00	?(	5.575E+01	1.74E+02	3.79E+00 G
Cf-251	T	9.4454E-02					3.28E+05	
			176.60	9.445E-02	%(	4.118E+00	1.64E+03	1.70E+01 G
			227.00	1.236E+00	?	1.272E+01	4.07E+02	6.30E+00 GA
Cf-249	T	1.2736E-01					1.28E+05	
			387.95	1.274E-01	?(	1.855E+00	4.17E+02	6.60E+01 G
			333.44	-1.108E+00	&	1.205E+01	3.20E+02	1.55E+01 G
Sn-126		-4.7272E+00					3.65E+07	
			87.57	-9.738E-01	+	5.830E+00	1.80E+02	3.75E+01 GA
			64.28	-4.727E+00	(	1.827E+01	1.16E+02	9.70E+00 G
			86.94	-4.051E+00	+	2.455E+01	1.82E+02	9.04E+00 GA
PB-210	N	2.9754E+01					8.14E+03	
			46.54	2.975E+01	(P	2.177E+01	3.07E+01	4.25E+00 G
PB-212	N	1.1588E+01					6.98E+02	
			238.63	1.159E+01	(P	1.578E+00	7.41E+00	4.33E+01 G
			300.03	2.591E+01	+ P	1.168E+01	2.04E+01	3.28E+00 GA
PB-214	N	1.2155E+01					5.84E+05	
			351.93	1.210E+01	(P	1.624E+00	9.35E+00	3.76E+01 G
			295.09	1.226E+01	(	2.571E+00	1.15E+01	1.93E+01 G
			242.00	1.037E+01		9.099E+00	2.94E+01	7.43E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-207	C	-6.4920E-01					1.18E+04	
			1063.66	-6.492E-01	?(P	1.913E+00	1.18E+02	7.45E+01 G
			569.70	-4.155E-02	+	1.173E+00	7.81E+02	9.77E+01 G
BI-212	N	-4.7184E+00					6.98E+02	
			727.17	-4.718E+00	?(	2.147E+01	1.32E+02	7.55E+00 G
			785.42	3.132E+01		7.019E+01	9.31E+01	1.28E+00 GA
U-235	N	2.2503E+00					2.57E+11	
			143.79	1.423E+00	?(P	6.851E+00	1.42E+02	1.10E+01 G
			205.33	4.061E+00	(P	1.239E+01	1.16E+02	5.01E+00 G
			163.38	-6.851E+00	+ P	1.818E+01	7.07E+01	5.08E+00 G
			185.72	-1.367E+00	+ P	2.286E+00	3.97E+01	5.40E+01 GA
BI-214	N	9.0187E+00					5.84E+05	
			609.31	8.849E+00	(P	1.987E+00	1.31E+01	4.61E+01 G
			1120.29	4.060E+00	-	1.315E+01	9.50E+01	1.51E+01 G
			1764.49	9.527E+00	?(P	5.395E+00	2.93E+01	1.54E+01 G
BI-210M	T	3.8174E-01					1.10E+09	
			265.83	3.817E-01	?(	1.753E+00	1.34E+02	5.00E+01 G
			304.90	-1.275E+00	+	8.073E+00	1.88E+02	2.80E+01 G
AC-228	N	1.3532E+01					2.10E+03	
			911.07	1.243E+01	(	1.527E+00	1.29E+01	2.90E+01 G
			968.97	3.606E+00	-	1.070E+01	8.77E+01	1.75E+01 G
			338.32	1.619E+01	(	4.029E+00	1.53E+01	1.20E+01 G
			93.35	-6.433E+00	-	3.569E+01	1.66E+02	5.56E+00 XA
TH-227	N	-6.0603E+00					7.95E+03	
			256.24	-6.060E+00	?(P	1.425E+01	9.29E+01	7.00E+00 G
			235.97	2.542E+00	&	1.655E+01	1.94E+02	1.23E+01 G
			50.14	-1.685E+00	+	1.990E+01	3.46E+02	8.00E+00 G
TH-229	N	-7.4358E+00					2.68E+06	
			193.51	-7.436E+00	?(	2.019E+01	1.06E+02	4.40E+00 G
			210.85	4.306E+00	+	2.856E+01	2.65E+02	2.99E+00 G
TH-234	N	2.1512E+01					1.63E+12	
			92.59	1.209E+01	(P	1.511E+01	3.91E+01	5.58E+00 G
			63.29	3.531E+01	*(P	2.464E+01	3.00E+01	3.81E+00 G
PA-233	C	-3.6078E-01					7.82E+08	
			312.01	-3.608E-01	&(	6.100E+00	4.99E+02	3.60E+01 G
			300.18	0.000E+00	+	3.424E+01	1.00E+03	6.20E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234   N   1.5465E+00                                     1.63E+12
                          131.29-1.140E+00 ?(  6.926E+00 1.81E+02 1.80E+01 G
                          946.02 5.092E+00 ?(  3.412E+00 3.02E+01 1.34E+01 G
                          569.47 1.650E+00 ?(  1.362E+01 2.32E+02 8.20E+00 G
                          883.24-7.580E+00 +   2.469E+01 9.65E+01 9.60E+00 G
                          880.53-1.208E+01 +   3.575E+01 8.79E+01 6.00E+00 GA

PA-234M  N  -1.3542E+01                                     1.63E+12
                         1001.00-1.354E+01 ?(P 2.346E+02 4.74E+02 8.37E-01 G
                          766.41-8.208E+01 & P 5.325E+02 1.16E+02 2.94E-01 G

AM-241   T  -1.9168E+00                                     1.58E+05
                           59.54-1.917E+00  (P 5.216E+00 4.17E+01 3.59E+01 G

Np-237   F   1.9164E+00                                     2.14E+06
                           86.49 1.916E+00 &(  1.448E+01 2.26E+02 1.31E+01 G

Ir-192   F  -4.4277E-01                                     7.40E+01
                          316.49-4.428E-01 ?(  2.545E+00 1.71E+02 8.70E+01 G
                          468.06-9.022E-01 +   2.923E+00 9.62E+01 5.18E+01 G
                          308.44-1.137E+00 +   7.046E+00 1.84E+02 3.18E+01 G

Cs-136   F   7.6012E-01                                     1.30E+01
                          818.50 4.207E-01 ?(  1.406E+00 9.76E+01 1.00E+02 G
                         1048.07 1.184E+00 ?(  6.235E-01 2.67E+01 8.00E+01 G
                          340.57 2.178E-07 %   3.993E+00 5.35E+08 4.69E+01 G

Np-239   T   1.4615E+00                                     2.36E+00
                          103.70-1.468E+00 +   8.024E+00 1.64E+02 2.40E+01 X
                          106.13 1.461E+00 ?(  8.502E+00 1.74E+02 2.27E+01 G
                           99.50-2.357E+00 +   1.265E+01 1.61E+02 1.50E+01 X

Nd-147      -1.5726E+00                                     1.11E+01
                          531.00-1.573E+00 ?(  6.520E+00 1.65E+02 1.30E+01 G
                           91.10-1.273E+00 +   7.270E+00 1.71E+02 2.83E+01 G

TL-210   N  -4.9673E-01                                     5.84E+05
                          799.60-4.967E-01 ?(  1.850E+00 1.09E+02 9.90E+01 G
                          296.00-4.008E-01 +   2.733E+00 2.03E+02 7.90E+01 G
                         1313.00 1.956E+00 ?   2.883E+00 4.47E+01 2.10E+01 GA

Kr-85    I   5.4971E+01                                     3.92E+03
                          513.98 5.497E+01 ?(  4.022E+02 2.13E+02 4.30E-01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
```

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

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

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

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	178.	-6.	-0.003	346.17	-1.685E+00	
AM-241	59.54	410.	-36.	-0.020	41.66	-1.917E+00	P
Sn-126	64.28	439.	-26.	-0.014	115.80	-4.727E+00	
BA-133	80.99	701.	-24.	-0.013	92.76	-1.035E+00	P
EU-155	86.54	1145.	-26.	-0.015	183.97	-1.195E+00	
Sn-126	86.94	1119.	-26.	-0.015	181.81	-4.051E+00	
Sn-126	87.57	1092.	-26.	-0.015	179.63	-9.738E-01	
Cd-109	88.04	1024.	-26.	-0.015	173.91	-9.615E+00	
Nd-147	91.10	998.	-26.	-0.015	171.32	-1.273E+00	
Gd-153	97.50	917.	-26.	-0.015	163.60	-1.182E+00	
Np-239	99.50	891.	-26.	-0.015	161.03	-2.357E+00	
Gd-153	103.20	903.	-26.	-0.015	161.68	-1.616E+00	
Np-239	103.70	930.	-26.	-0.015	163.94	-1.468E+00	
EU-155	105.31	957.	-16.	-0.009	119.08	-1.022E+00	P
Np-239	106.13	938.	25.	0.014	174.40	1.461E+00	
EU-152	121.78	143.	-14.	-0.008	123.72	-6.561E-01	
EU-154	123.10	86.	15.	0.008	91.74	4.905E-01	
PA-234	131.29	360.	-15.	-0.008	180.74	-1.140E+00	
U-235	143.79	115.	11.	0.006	142.28	1.423E+00	P
Ba-140	162.66	120.	16.	0.009	98.50	4.040E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	163.38	149.	-22.	-0.012	70.70	-6.851E+00	P
CE-139	165.85	155.	-20.	-0.011	92.62	-3.751E-01	
U-235	185.72	234.	-44.	-0.025	39.67	-1.367E+00	P
TH-229	193.51	110.	-19.	-0.011	105.79	-7.436E+00	
U-235	205.33	46.	11.	0.006	115.76	4.061E+00	P
TH-229	210.85	88.	7.	0.004	265.09	4.306E+00	
Cf-251	227.00	68.	4.	0.002	406.71	1.236E+00	
TH-227	235.97	449.	16.	0.009	193.88	2.542E+00	
EU-152	244.69	417.	13.	0.007	217.01	3.655E+00	
TH-227	256.24	89.	-20.	-0.011	92.93	-6.060E+00	P
Cd-113m	263.70	50.	10.	0.006	104.88	3.648E+03	
BI-210M	265.83	63.	9.	0.005	134.23	3.817E-01	
Hg-203	279.20	80.	-13.	-0.007	76.09	-3.744E-01	P
I-131	284.30	76.	-18.	-0.010	55.14	-6.990E+00	P
TL-210	296.00	352.	-13.	-0.007	202.58	-4.008E-01	
PA-231	300.07	338.	-6.	-0.004	410.21	-6.274E+00	
BI-210M	304.90	368.	-15.	-0.008	188.36	-1.275E+00	
Ir-192	308.44	354.	-15.	-0.008	184.26	-1.137E+00	
PA-233	312.01	334.	-5.	-0.003	499.23	-3.608E-01	
Ir-192	316.49	332.	-15.	-0.008	170.95	-4.428E-01	
CR-51	320.08	271.	13.	0.007	177.92	3.397E+00	P
La-140	328.76	229.	-14.	-0.008	166.81	-1.815E+00	P
Cf-249	333.44	215.	-7.	-0.004	319.90	-1.108E+00	
EU-152	344.29	76.	12.	0.007	105.33	1.240E+00	
HF-181	345.83	52.	-9.	-0.005	116.25	-1.649E+00	
I-131	364.48	24.	1.	0.001	964.37	3.460E-02	
BA-133	383.84	49.	9.	0.005	111.02	3.074E+00	P
Cf-249	387.95	68.	3.	0.002	417.08	1.274E-01	
SN-113	391.69	69.	9.	0.005	129.76	4.368E-01	
SB-125	427.88	20.	5.	0.003	194.66	5.060E-01	P
PM-146	453.88	22.	10.	0.005	104.76	4.985E-01	P
SB-125	463.37	56.	10.	0.005	112.52	3.220E+00	P
Ir-192	468.06	78.	-14.	-0.007	96.15	-9.022E-01	
BE-7	477.60	59.	-4.	-0.002	276.13	-1.337E+00	
La-140	487.02	89.	-13.	-0.007	105.22	-1.033E+00	
RU-103	497.05	31.	-10.	-0.006	108.80	-4.096E-01	P
RH-106	511.86	35.	59.	0.033	19.25	1.097E+01	
Kr-85	513.98	88.	6.	0.004	212.82	5.497E+01	
Nd-147	531.00	17.	-5.	-0.003	165.12	-1.573E+00	
Ba-140	537.26	10.	6.	0.003	113.79	9.242E-01	P
CS-134	563.24	35.	-5.	-0.003	136.15	-2.365E+00	P
CS-134	569.32	30.	-1.	-0.001	590.55	-3.518E-01	
PA-234	569.47	28.	3.	0.002	232.38	1.650E+00	
BI-207	569.70	30.	-1.	-0.001	781.02	-4.155E-02	
SB-125	600.50	156.	9.	0.005	209.79	2.025E+00	
SB-124	602.73	126.	5.	0.003	324.55	2.134E-01	
CS-134	604.71	130.	5.	0.003	330.43	2.156E-01	
RU-103	610.30	135.	5.	0.003	335.64	3.698E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-108M	614.28	140.	5.	0.003	340.97	2.384E-01	
PM-144	618.06	145.	5.	0.003	346.23	2.176E-01	
RH-106	621.92	150.	5.	0.003	351.34	2.187E+00	
SB-125	635.89	28.	-4.	-0.002	347.23	-1.413E+00	P
I-131	636.97	19.	9.	0.005	78.74	5.389E+00	
AG-110M	657.76	38.	2.	0.001	583.10	7.247E-02	
CS-137	661.66	34.	3.	0.002	253.99	1.793E-01	P
PM-144	696.54	42.	-10.	-0.006	141.07	-4.844E-01	
NB-94	702.63	38.	-12.	-0.006	72.92	-5.747E-01	P
SB-124	722.79	15.	7.	0.004	83.76	3.369E+00	
AG-108M	722.94	23.	7.	0.004	98.64	4.010E-01	
EU-154	723.36	37.	-4.	-0.002	209.89	-1.034E+00	
BI-212	727.17	41.	-7.	-0.004	132.01	-4.718E+00	
PM-146	735.72	5.	5.	0.003	103.19	1.114E+00	P
PM-146	747.16	19.	-11.	-0.006	49.05	-1.578E+00	P
ZR-95	756.73	28.	-3.	-0.002	160.64	-3.079E-01	P
AG-110M	763.94	14.	7.	0.004	80.25	1.742E+00	
NB-95	765.79	22.	7.	0.004	95.37	3.901E-01	
PA-234M	766.41	35.	-5.	-0.003	115.89	-8.208E+01	P
EU-152	778.92	9.	1.	0.000	979.80	2.713E-01	
BI-212	785.42	9.	8.	0.004	93.11	3.132E+01	
CS-134	795.87	26.	9.	0.005	84.87	5.829E-01	
TL-210	799.60	45.	-9.	-0.005	109.16	-4.967E-01	
CS-134	801.95	44.	-3.	-0.002	287.75	-2.070E+00	
CO-58	810.78	30.	-4.	-0.002	177.08	-2.464E-01	
Cs-136	818.50	24.	8.	0.004	97.64	4.207E-01	
MN-54	834.85	14.	8.	0.004	105.33	4.466E-01	
Co-56	846.77	19.	-2.	-0.001	279.64	-1.102E-01	P
NB-94	871.10	12.	-1.	-0.001	382.43	-7.721E-02	
EU-154	873.23	20.	-6.	-0.003	109.78	-2.913E+00	
PA-234	880.53	53.	-12.	-0.007	87.87	-1.208E+01	
PA-234	883.24	66.	-12.	-0.007	96.50	-7.580E+00	
AG-110M	884.68	78.	-3.	-0.002	363.23	-2.807E-01	
Sc-46	889.28	91.	-11.	-0.006	130.35	-6.280E-01	
Y-88	898.04	5.	5.	0.003	101.51	3.223E-01	P
AG-110M	937.49	25.	-13.	-0.007	91.05	-2.274E+00	
PA-234	946.02	0.	11.	0.006	30.15	5.092E+00	
EU-152	964.11	44.	8.	0.005	120.53	3.498E+00	
EU-154	996.33	32.	-4.	-0.002	182.57	-2.752E+00	
PA-234M	1001.00	35.	-2.	-0.001	474.11	-1.354E+01	P
EU-154	1004.77	13.	6.	0.003	97.49	2.108E+00	
Co-56	1037.84	5.	5.	0.003	108.01	2.375E+00	
Cs-136	1048.07	0.	14.	0.008	26.73	1.184E+00	
BI-207	1063.66	15.	-7.	-0.004	117.70	-6.492E-01	P
FE-59	1099.25	10.	-3.	-0.002	238.82	-3.743E-01	
EU-152	1112.07	49.	-7.	-0.004	138.67	-3.880E+00	
Sc-46	1120.55	12.	6.	0.003	89.96	4.337E-01	
CO-60	1173.24	19.	-2.	-0.001	514.26	-1.287E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Co-56	1238.28	11.	8.	0.005	96.54	9.842E-01	P
NA-22	1274.53	5.	6.	0.003	71.32	4.539E-01	
FE-59	1291.60	5.	-2.	-0.001	234.30	-4.374E-01	
TL-210	1313.00	0.	5.	0.003	44.72	1.956E+00	
CO-60	1332.50	2.	-2.	-0.001	373.43	-1.862E-01	P
AG-110M	1384.30	5.	2.	0.001	324.35	5.901E-01	
EU-152	1408.00	5.	6.	0.003	101.72	2.354E+00	
La-140	1596.21	11.	-6.	-0.004	130.84	-6.464E-01	
Y-88	1836.06	6.	-5.	-0.003	128.27	-5.180E-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	-1.3367E+00	-1.3367E+00	2.761E+02%	1.29E+01
NA-22	#A	4.5393E-01	4.5393E-01	7.132E+01%	1.08E+00
K-40		3.0727E+01	3.0727E+01	1.777E+01%	8.65E+00
Sc-46	#A	-9.7143E-02	-9.7143E-02	7.919E+01%	2.78E+00
CR-51	#A	3.3967E+00	3.3968E+00	1.779E+02%	2.04E+01
MN-54	#A	4.4656E-01	4.4656E-01	1.053E+02%	1.12E+00
FE-59	#A	-3.7430E-01	-3.7431E-01	2.388E+02%	2.18E+00
Co-56	#A	4.8613E-01	4.8613E-01	9.654E+01%	1.30E+00
CO-57	#A	0.0000E+00	0.0000E+00	7.071E+02%	9.57E-01
CO-58	#A	-2.4636E-01	-2.4637E-01	1.771E+02%	1.53E+00
CO-60	#A	-1.8619E-01	-1.8619E-01	3.734E+02%	8.06E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.64E+00
NB-94	#A	-5.7471E-01	-5.7471E-01	7.292E+01%	1.54E+00
ZR-95	#A	-3.0788E-01	-3.0788E-01	1.606E+02%	2.59E+00
NB-95	#A	3.9007E-01	3.9007E-01	9.537E+01%	1.27E+00
RU-103	#A	-4.0963E-01	-4.0963E-01	1.088E+02%	1.15E+00
RH-106	#A	2.1869E+00	2.1869E+00	3.513E+02%	2.63E+01
AG-108M	#A	2.2451E-01	2.2451E-01	9.864E+01%	9.53E-01
AG-110M	#A	1.8519E-01	1.8519E-01	8.025E+01%	3.54E+00
SN-113	#A	4.3676E-01	4.3676E-01	1.298E+02%	1.93E+00
SB-124	#A	5.2611E-01	5.2612E-01	8.376E+01%	2.38E+00
SB-125	#A	1.4650E+00	1.4650E+00	1.025E+02%	2.58E+00
I-131	#A	4.6654E-01	4.6656E-01	7.874E+01%	8.84E-01
Gd-153	#A	-1.1816E+00	-1.1816E+00	1.636E+02%	6.45E+00
Ga-68	#	1.9576E+01	1.9740E+01	3.536E+01%	1.82E+01
Tc-99m	#A	4.0596E-02	4.0660E-02	1.091E+03%	1.50E+00
BA-133	#A	-2.2356E-02	-2.2356E-02	4.164E+03%	3.19E+00
CS-134	#A	5.8292E-01	5.8292E-01	8.487E+01%	1.67E+00
CS-137	#A	1.7931E-01	1.7931E-01	2.540E+02%	1.60E+00
CE-139	#A	-3.7507E-01	-3.7508E-01	9.262E+01%	1.16E+00
Ba-140	#A	1.5573E+00	1.5574E+00	7.525E+01%	2.72E+00

La-140 #A	-6.4635E-01	-6.4637E-01	1.308E+02%	1.88E+00
CE-141 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.64E+00
CE-144 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.15E+01
PM-144 #A	-4.8440E-01	-4.8440E-01	1.411E+02%	1.59E+00
EU-152 #A	1.0688E+00	1.0688E+00	1.053E+02%	2.74E+00
EU-154 #A	9.8605E-01	9.8605E-01	6.693E+01%	1.51E+00
EU-155 #A	-1.0215E+00	-1.0215E+00	1.191E+02%	9.20E+00
HF-181 #A	0.0000E+00	0.0000E+00	5.774E+02%	1.75E+00
Ta-182 #A	1.7585E+00	1.7585E+00	9.604E+01%	5.76E+00
Hg-203 #A	-3.7437E-01	-3.7437E-01	7.609E+01%	1.25E+00
TL-208	3.4652E+00	3.4652E+00	1.247E+01%	5.44E-01
PM-146 #A	6.5682E-01	6.5682E-01	7.352E+01%	1.28E+00
Y-88 #A	-5.1798E-01	-5.1798E-01	1.283E+02%	1.53E+00
Cd-113m#A	3.6475E+03	3.6475E+03	1.049E+02%	1.30E+04
Cd-109 #A	-9.6154E+00	-9.6154E+00	1.739E+02%	5.57E+01
Cf-251 #A	9.4454E-02	9.4454E-02	1.645E+03%	4.12E+00
Cf-249 #A	1.2736E-01	1.2736E-01	4.171E+02%	1.85E+00
Sn-126 #A	-4.7272E+00	-4.7272E+00	1.158E+02%	1.83E+01
PB-210	2.9754E+01	2.9754E+01	3.071E+01%	2.18E+01
PB-212	1.1588E+01	1.1588E+01	7.414E+00%	1.58E+00
PB-214	1.2155E+01	1.2155E+01	7.401E+00%	1.62E+00
BI-207 #A	-6.4920E-01	-6.4920E-01	1.177E+02%	1.91E+00
BI-212 #A	-4.7184E+00	-4.7184E+00	1.320E+02%	2.15E+01
U-235 #A	2.2503E+00	2.2503E+00	9.171E+01%	6.85E+00
BI-214	9.0187E+00	9.0187E+00	1.311E+01%	1.99E+00
BI-210M#A	3.8174E-01	3.8174E-01	1.342E+02%	1.75E+00
AC-228	1.3532E+01	1.3532E+01	1.000E+01%	1.53E+00
TH-227 #A	-6.0603E+00	-6.0603E+00	9.293E+01%	1.42E+01
TH-229 #A	-7.4358E+00	-7.4358E+00	1.058E+02%	2.02E+01
TH-234	2.1512E+01	2.1512E+01	2.466E+01%	1.51E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%	7.42E+01
PA-233 #A	-3.6078E-01	-3.6078E-01	4.992E+02%	6.10E+00
PA-234 #A	1.5465E+00	1.5465E+00	3.015E+01%	6.93E+00
PA-234M#A	-1.3542E+01	-1.3542E+01	4.741E+02%	2.35E+02
AM-241 #A	-1.9168E+00	-1.9168E+00	4.166E+01%	5.22E+00
Np-237 #A	1.9164E+00	1.9164E+00	2.259E+02%	1.45E+01
Ir-192 #A	-4.4277E-01	-4.4277E-01	1.710E+02%	2.54E+00
Cs-136 #A	7.6010E-01	7.6012E-01	2.673E+01%	1.41E+00
Np-239 #A	1.4612E+00	1.4615E+00	1.744E+02%	8.50E+00
Nd-147 #A	-1.5725E+00	-1.5726E+00	1.651E+02%	6.52E+00
TL-210 #A	-4.9673E-01	-4.9673E-01	1.092E+02%	1.85E+00
Kr-85 #A	5.4971E+01	5.4971E+01	2.128E+02%	4.02E+02

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

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   37.5 to  2000.0 keV)     1.318E+02  Bq/Sample
Total Decayed Activity (   37.5 to  2000.0 keV) 1.3175188E+02  Bq/Sample
```

441817_Gamma_180-94764-A-2-B. 8_Gamma_20191414.spc.

Prep Batch: 441833

Fill Geometry, 21-Day In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 441833

Lab Id: MB 160-441833/1-A | Analyzed: 09/26/19 05:14 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV14 | Decay Corrected: No | Ingrowth:

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	-9.850	18.3	18.4	U	pCi/L	50.0	31.5	444233
Radium 226 and 228 (positive only)	19.89	24.7	24.8	U	pCi/L		31.5	444233
Radium-228	19.89	16.6	16.7		pCi/L	50.0	19.3	444233

Lab Id: LCS 160-441833/2-A | Analyzed: 09/26/19 05:14 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV16 | Decay Corrected: No | Ingrowth:

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	128200	404	14800		pCi/L		285	444234
Cesium-137	41860	202	4190		pCi/L		112	444234
Cobalt-60	27430	141	2710		pCi/L		47.7	444234

Lab Id: 180-94764-3 | Analyzed: 09/26/19 09:00 | Ts: 120 | Sigma: 2
Client ID: JOF-BS-FB01-20190823 | Detector: GV14 | Decay Corrected: No | Ingrowth:

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	-10.2	22.2	22.2	U	pCi/L	50.0	37.9	444233
Radium-228	8.95	21.2	21.2	U	pCi/L	50.0	26.0	444233
Radium 226 and 228 (positive only)	8.95	30.7	30.7	U	pCi/L		37.9	444233

Lab Id: 180-94764-3 DU | Analyzed: 09/26/19 14:13 | Ts: 120 | Sigma: 2
Client ID: JOF-BS-FB01-20190823 | Detector: GV16 | Decay Corrected: No | Ingrowth:

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.9926	1.43	1.43	U	pCi/L	50.0	36.8	444234
Radium 226 and 228 (positive only)	0.9926	25.9	25.9	U	pCi/L		36.8	444234
Radium-228	-8.964	25.9	25.9	U	pCi/L	50.0	29.1	444234

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 441833

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 160-441833/1-A	Radium-226			-9.850	U	pCi/L							-1.0722
MB 160-441833/1-A	Radium 226 and 228 (positive only)			19.89	U	pCi/L							
MB 160-441833/1-A	Radium-228			19.89		pCi/L							2.3802
Lab Control Sample ID:	**Analyte**	**Parent Result**	**Spike Added**	**LCS Result**	**Qualifier**	**Unit**	**% Rec**	**% Rec Limits**	**RPD**	**RER**	**DER**	**RER Limit**	**Z Factor**
LCS 160-441833/2-A	Americium-241		136000	128200		pCi/L	94	90 - 111					-.9791
LCS 160-441833/2-A	Cesium-137		44300	41860		pCi/L	95	90 - 111					-1.0617
LCS 160-441833/2-A	Cobalt-60		28200	27430		pCi/L	97	89 - 110					-.5454
Duplicate ID:	**Analyte**	**Parent Result**	**Spike Added**	**DU Result**	**Qualifier**	**Unit**	**% Rec**	**% Rec Limits**	**RPD**	**RER**	**DER**	**RER Limit**	**Z Factor**
180-94764-3	Radium-226	-10.2		0.9926	U	pCi/L			243	0.48	1.01	1	1.0092
180-94764-3	Radium 226 and 228 (positive only)	8.95		0.9926	U	pCi/L			160	0.14	0.40		
180-94764-3	Radium-228	8.95		-8.964	U	pCi/L			218308	0.38	1.07	1	1.0693

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: Eurofins TestAmerica, St. Loui Job No.: 180-94764-1

SDG No.:

Batch Number: 441833 Batch Start Date: 09/05/19 15:10 Batch Analyst: Slama, Kurt R

Batch Method: Fill_Geo-21 Batch End Date: 09/05/19 15:34

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	IngDecDate1	IngDecDate3	Geometry	1L Marn LCS 00005	
MB 160-441833/1		Fill_Geo-21, 901.1		1000 mL	09/05/19 15:34	09/26/19 15:34	1L Marn		
LCS 160-441833/2		Fill_Geo-21, 901.1		1000 mL	09/05/19 15:34	09/26/19 15:34	1L Marn	# mL	
180-94764-A-3	JOF-BS-FB01-2019 0823	Fill_Geo-21, 901.1	T	1000 mL	09/05/19 15:34	09/26/19 15:34	1L Marn		
180-94764-A-3 DU	JOF-BS-FB01-2019 0823	Fill_Geo-21, 901.1	T	1000 mL	09/05/19 15:34	09/26/19 15:34	1L Marn		

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

Basis	Basis Description
T	Total/NA

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

Test America St. Louis Spectrum ID: 14_Gamma_20192010

Sample Description: 441833_Gamma_MB 160-441833~1-A
Detector: Detector #14
Batch ID: 441833
Work Order Number: Gamma
Lot Number: MB 160-441833~1-A

Decay to Time: 9/26/2019 05:13 Live Time: 7200 sec
Acquisition Time: 9/26/2019 05:14:01 Real Time: 7204 sec
Analysis Time: 9/26/2019 07:14 Dead Time: 0.05 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 14_Liquid_Marinelli 1L.Clb
Efficiency Cal Desc: 14_1LMarinelli_90062_030612
Efficiency Cal Date: 3/14/2012 16:58
Energy Cal Date: 2/28/2012 10:48
Library: Client_Long_Rev15.lib
Bkgd Correction File: 14_2019-09-07_1325.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	8.779E-01	103.0	9.041E-01	9.052E-01	3.038E+00
NA-22	2.185E-02	357.1	7.802E-02	7.803E-02	2.938E-01
K-40	-1.566E+00	85.2	1.335E+00	1.337E+00	4.221E+00
Sc-46	-1.228E-01	84.4	1.037E-01	1.038E-01	4.830E-01
CR-51	-4.374E-02	3070.6	1.343E+00	1.343E+00	2.721E+00
MN-54	-1.005E-01	95.6	9.613E-02	9.626E-02	3.809E-01
FE-59	-1.017E-01	279.3	2.841E-01	2.842E-01	6.615E-01
Co-56	1.954E-01	50.4	9.845E-02	9.892E-02	3.371E-01
CO-57	-5.686E-03	1325.6	7.538E-02	7.538E-02	2.573E-01
CO-58	-1.669E-02	773.2	1.290E-01	1.290E-01	4.530E-01
CO-60	2.244E-02	595.3	1.336E-01	1.336E-01	3.291E-01
ZN-65	1.229E-02	2450.3	3.011E-01	3.011E-01	1.068E+00
NB-94	-6.356E-02	245.1	1.558E-01	1.559E-01	3.782E-01
ZR-95	-2.814E-01	99.6	2.802E-01	2.805E-01	6.692E-01
NB-95	0.000E+00	1.#INF	2.590E-02	2.590E-02	3.518E-01
RU-103	2.621E-01	21.5	5.634E-02	5.786E-02	9.852E-02
RH-106	1.597E+00	100.0	1.596E+00	1.598E+00	4.860E+00
AG-108M	2.222E-02	466.1	1.036E-01	1.036E-01	2.761E-01
AG-110M	4.851E-02	206.2	1.000E-01	1.000E-01	6.005E-01
SN-113	1.277E-01	124.0	1.584E-01	1.585E-01	5.351E-01
SB-124	1.428E-01	141.5	2.021E-01	2.023E-01	6.796E-01
SB-125	1.467E-01	36.9	5.406E-02	5.456E-02	8.372E-01
I-131	8.174E-02	115.4	9.435E-02	9.444E-02	2.466E-01
Gd-153	2.028E-02	219.5	4.452E-02	4.454E-02	6.253E-01
Ga-68	-6.004E+00	154.6	9.284E+00	9.290E+00	2.119E+01
Tc-99m	7.721E-02	101.9	7.869E-02	7.881E-02	2.635E-01
BA-133	8.926E-02	152.7	1.363E-01	1.363E-01	4.640E-01
CS-134	2.778E-01	61.4	1.707E-01	1.713E-01	3.738E-01
CS-137	-1.422E-02	1408.9	2.003E-01	2.003E-01	4.677E-01
CE-139	6.559E-02	115.7	7.590E-02	7.613E-02	2.555E-01
Ba-140	4.596E-01	82.4	3.787E-01	3.794E-01	8.449E-01
La-140	-1.543E-02	92.7	1.431E-02	1.433E-02	4.616E-01
CE-141	9.677E-02	138.4	1.339E-01	1.340E-01	4.512E-01

CE-144	0.000E+00	1.#INF	3.173E-01	3.173E-01	2.206E+00
PM-144	8.216E-02	120.4	9.892E-02	9.901E-02	2.971E-01
EU-152	4.042E-01	78.2	3.162E-01	3.170E-01	7.388E-01
EU-154	3.681E-01	84.4	3.107E-01	3.113E-01	5.159E-01
EU-155	-2.701E-01	110.1	2.974E-01	2.978E-01	9.962E-01
HF-181	7.623E-02	163.1	1.243E-01	1.244E-01	4.249E-01
Ta-182	-6.074E-01	74.8	4.541E-01	4.551E-01	1.515E+00
Hg-203	-1.077E-01	97.5	1.049E-01	1.051E-01	3.517E-01
TL-208	9.994E-03	1112.1	1.111E-01	1.111E-01	2.905E-01
PM-146	-3.065E-02	89.0	2.727E-02	2.732E-02	4.337E-01
Y-88	6.295E-03	619.7	3.901E-02	3.901E-02	3.332E-01
Cd-113m	-1.149E+03	107.1	1.231E+03	1.233E+03	4.144E+03
Cd-109	0.000E+00	1.#INF	6.415E-01	6.415E-01	7.736E+00
Cf-251	-1.941E-01	196.6	3.815E-01	3.819E-01	1.042E+00
Cf-249	6.079E-02	247.1	1.502E-01	1.503E-01	5.399E-01
Sn-126	-1.298E-01	496.8	6.448E-01	6.449E-01	2.199E+00
PB-210	-3.591E+00	52.8	1.895E+00	1.923E+00	5.802E+00
PB-212	4.744E-02	265.9	1.261E-01	1.262E-01	4.180E-01
PB-214	-2.273E-01	96.9	2.202E-01	2.205E-01	7.543E-01
BI-207	-9.370E-02	244.9	2.295E-01	2.296E-01	5.291E-01
BI-212	1.093E+00	174.8	1.911E+00	1.912E+00	6.534E+00
U-235	4.834E-01	121.7	5.885E-01	5.890E-01	2.052E+00
BI-214	-3.644E-01	93.1	3.394E-01	3.399E-01	1.167E+00
BI-210M	-1.331E-02	104.7	1.394E-02	1.396E-02	5.354E-01
AC-228	7.359E-01	41.7	3.071E-01	3.092E-01	7.138E-01
TH-227	-1.342E+00	99.6	1.336E+00	1.338E+00	3.588E+00
TH-229	-1.579E+00	106.5	1.682E+00	1.686E+00	4.529E+00
TH-234	1.134E+00	97.1	1.102E+00	1.104E+00	3.151E+00
PA-231	1.187E-01	3751.0	4.452E+00	4.452E+00	1.514E+01
PA-233	-1.267E-02	2120.1	2.687E-01	2.687E-01	9.238E-01
PA-234	1.322E-01	87.1	1.152E-01	1.154E-01	1.290E+00
PA-234M	-1.841E+00	383.8	7.066E+00	7.067E+00	5.340E+01
AM-241	-5.215E-02	317.5	1.656E-01	1.656E-01	4.782E-01
Np-237	-3.347E-01	202.6	6.783E-01	6.786E-01	2.276E+00
Ir-192	1.298E-01	65.3	8.480E-02	8.515E-02	2.653E-01
Cs-136	-2.351E-02	121.3	2.852E-02	2.855E-02	4.739E-01
Np-239	-1.263E-01	232.2	2.931E-01	2.932E-01	9.914E-01
Nd-147	6.294E-01	97.0	6.105E-01	6.115E-01	1.540E+00
TL-210	1.032E-01	95.4	9.850E-02	9.867E-02	3.670E-01
Kr-85	2.479E+01	142.4	3.529E+01	3.532E+01	1.190E+02
Total	3.505E+01				

Analyst: kody Saulters

Sample description
441833_Gamma_MB 160-441833~1-A

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20192010.An1

Acquisition information
Start time: 9/26/2019 5:14:01 AM
Live time: 7200
Real time: 7204
Dead time: 0.05 %
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	9/26/2019 5:13:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2019-09-07_1325.PBC 9/7/2019 1:25:07 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 9 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.4712

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.42	-42.	52.79	0.75	3.849E-02	46.54	4.250	PBC<MDA	PB210
63.68	-11.	213.58	0.77	4.569E-02	63.29	3.810	PBC<MDA	TH234
91.10	17.	168.16	0.79	4.919E-02	91.10	28.300	PBC<MDA	Nd147
92.59	22.	97.12	1.21	4.919E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	1.139E+00	AC228
103.20	9.	244.70	0.81	4.884E-02	103.20	21.800	PBC<MDA	Gd153
123.10	12.	171.04	0.83	4.702E-02	123.10	40.790	PBC<MDA	EU154
140.51	20.	101.91	0.85	4.472E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	10.	221.05	0.85	4.425E-02	143.79	10.960	PBC<MDA	U235
145.44	15.	138.39	0.85	4.401E-02	145.44	48.200	PBC<MDA	CE141
163.38	13.	135.95	0.87	4.129E-02	163.38	5.080	PBC<MDA	U235
165.85	15.	115.72	0.87	4.093E-02	165.85	79.900	PBC<MDA	CE139
185.72	20.	107.25	0.89	3.800E-02	185.72	54.000	PBC<MDA	U235
205.33	7.	257.01	0.91	3.553E-02	205.33	5.010	PBC<MDA	U235
210.85	8.	202.07	0.92	3.489E-02	210.85	2.990	PBC<MDA	TH229
227.00	4.	385.31	0.93	3.318E-02	227.00	6.300	PBC<MDA	Cf251
238.63	5.	265.89	0.94	3.205E-02	238.63	43.300	PBC<MDA	PB212
242.00	5.	507.92	0.95	3.174E-02	242.00	7.430	PBC<MDA	PB214
244.69	5.	475.96	0.95	3.150E-02	244.69	7.580	PBC<MDA	EU152
295.09	-5.	481.66	1.00	2.759E-02	295.09	19.300	PBC<MDA	PB214
296.00	14.	164.84	1.00	2.753E-02	296.00	79.000	PBC<MDA	TL210
304.85	11.	123.79	1.01	2.695E-02	304.85	4.290	PBC<MDA	Ba140

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					304.90	28.000	2.045E-01	BI210M
304.90	11.	130.86	1.01	2.694E-02	304.85	4.290	1.335E+00	Ba140
					304.90	28.000	2.045E-01	BI210M
308.44	14.	129.88	1.01	2.672E-02	308.44	31.750	PBC<MDA	Ir192
316.49	13.	99.41	1.02	2.622E-02	316.49	87.040	PBC<MDA	Ir192
328.76	11.	147.11	1.03	2.551E-02	328.76	20.300	PBC<MDA	La140
333.44	1.	972.59	1.04	2.524E-02	333.44	15.510	PBC<MDA	Cf249
338.32	14.	118.95	1.04	2.498E-02	338.32	12.010	PBC<MDA	AC228
340.57	9.	183.94	1.05	2.485E-02	340.57	46.900	PBC<MDA	Cs136
351.62	-15.	96.91	1.06	2.426E-02	351.93	37.600	PBC<MDA	PB214
356.00	10.	152.65	1.06	2.405E-02	356.00	62.050	PBC<MDA	BA133
364.48	11.	115.42	1.07	2.364E-02	364.48	81.700	PBC<MDA	I131
383.84	14.	119.69	1.09	2.274E-02	383.84	8.940	PBC<MDA	BA133
387.95	7.	247.12	1.09	2.256E-02	387.95	66.000	PBC<MDA	Cf249
391.69	13.	123.99	1.09	2.240E-02	391.69	64.000	PBC<MDA	SN113
433.94	3.	466.07	1.13	2.072E-02	433.94	90.480	PBC<MDA	AG108M
468.06	11.	108.05	1.17	1.955E-02	468.06	51.750	PBC<MDA	Ir192
477.60	13.	102.99	1.18	1.925E-02	477.60	10.520	PBC<MDA	BE7
482.00	8.	163.08	1.18	1.911E-02	482.00	80.500	PBC<MDA	HF181
497.05	32.	21.50	1.19	1.866E-02	497.05	90.900	2.621E-01	RU103
511.86	101.	17.27	2.46	1.823E-02	511.86	20.000	3.865E+00	RH106
513.98	14.	142.37	1.21	1.817E-02	513.98	0.430	PBC<MDA	Kr85
531.00	10.	96.99	1.23	1.771E-02	531.00	13.000	PBC<MDA	Nd147
537.26	9.	108.79	1.23	1.755E-02	537.26	24.390	PBC<MDA	Ba140
563.24	6.	177.43	1.25	1.691E-02	563.24	8.350	PBC<MDA	CS134
569.32	11.	76.11	1.26	1.676E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.085E+00	PA234
					569.70	97.740	9.104E-02	BI207
569.47	10.	87.15	1.26	1.676E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	9.905E-01	PA234
					569.70	97.740	8.312E-02	BI207
569.70	1.	662.31	1.26	1.675E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.484E-01	PA234
					569.70	97.740	1.245E-02	BI207
602.73	16.	141.55	1.29	1.601E-02	602.73	98.260	PBC<MDA	SB124
609.31	-19.	93.13	1.30	1.587E-02	609.31	46.090	PBC<MDA	BI214
610.30	6.	273.92	1.30	1.585E-02	610.30	5.750	PBC<MDA	RU103
618.06	7.	241.17	1.30	1.569E-02	618.06	99.100	PBC<MDA	PM144
621.92	13.	124.78	1.31	1.561E-02	621.92	9.930	PBC<MDA	RH106
635.89	18.	36.85	1.32	1.534E-02	635.89	11.310	PBC<MDA	SB125
696.54	10.	120.40	1.37	1.424E-02	696.54	99.000	PBC<MDA	PM144
727.17	8.	174.82	1.40	1.374E-02	727.17	7.550	PBC<MDA	BI212
735.72	5.	96.12	1.41	1.361E-02	735.72	22.500	PBC<MDA	PM146
766.41	1.	921.95	1.43	1.315E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	3.591E+00	PA234M
785.42	8.	95.21	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

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
801.95	7.	125.66	1.46	1.267E-02	801.95	8.690	PBC<MDA	CS134
815.77	6.	187.63	1.48	1.249E-02	815.77	23.280	PBC<MDA	La140
846.77	5.	231.42	1.50	1.210E-02	846.77	99.935	PBC<MDA	Co56
873.23	11.	84.39	1.52	1.179E-02	873.23	12.270	PBC<MDA	EU154
880.53	11.	90.17	1.53	1.171E-02	880.53	6.000	PBC<MDA	PA234
883.24	2.	601.33	1.53	1.167E-02	883.24	9.600	PBC<MDA	PA234
898.04	2.	619.68	1.54	1.151E-02	898.04	93.700	PBC<MDA	Y88
911.07	19.	41.73	1.55	1.137E-02	911.07	29.000	7.863E-01	AC228
964.11	10.	78.23	1.60	1.083E-02	964.11	14.605	PBC<MDA	EU152
968.97	10.	90.35	1.60	1.079E-02	968.97	17.460	PBC<MDA	AC228
996.33	1.	681.91	1.62	1.053E-02	996.33	10.600	PBC<MDA	EU154
1004.77	9.	94.37	1.63	1.045E-02	1004.77	18.010	PBC<MDA	EU154
1037.84	6.	147.67	1.65	1.016E-02	1037.84	14.130	PBC<MDA	Co56
1048.07	2.	360.56	1.66	1.008E-02	1048.07	80.000	PBC<MDA	Cs136
1050.36	5.	156.21	1.66	1.006E-02	1050.36	1.560	PBC<MDA	RH106
1112.07	12.	82.82	1.71	9.569E-03	1112.07	13.644	PBC<MDA	EU152
1120.29	2.	504.89	1.72	9.507E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1189.05	8.	101.17	1.77	9.021E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	8.	138.85	1.79	8.808E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	13.	50.37	1.80	8.702E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	1.	357.07	1.83	8.481E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	6.205E-02	EU154
1313.00	6.	90.26	1.86	8.258E-03	1313.00	21.000	PBC<MDA	TL210
1332.50	1.	595.27	1.87	8.149E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	3.	206.16	1.91	7.874E-03	1384.30	24.290	PBC<MDA	AG110M
1460.83	-9.	85.22	1.96	7.499E-03	1460.83	10.670	PBC<MDA	K40
1764.49	-3.	196.24	2.14	6.302E-03	1764.49	15.400	PBC<MDA	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	185.58	46.54	198.	-42.	-0.006	52.79	0.750s
TH-227	199.98	50.14	117.	-16.	-0.002	114.36	0.751s
AM-241	237.55	59.54	126.	-6.	-0.001	317.54	0.761s
TH-234	252.55	63.29	250.	-11.	-0.001	213.58	0.765s
Sn-126	256.52	64.28	212.	-4.	-0.001	496.81	0.766s
BA-133	323.33	80.99	163.	-10.	-0.001	220.64	0.784s
Np-237	345.33	86.49	486.	-16.	-0.002	202.64	0.789s
EU-155	345.54	86.54	470.	0.	0.000	1000.00	0.790s
Sn-126	347.13	86.94	470.	0.	0.000	1000.00	0.790s
Sn-126	349.65	87.57	470.	0.	0.000	1000.00	0.791s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cd-109	351.53	88.04	470.	0.	0.000	1000.00	0.791s
Nd-147	363.77	91.10	401.	17.	0.002	168.16	0.794s
TH-234	369.71	92.59	164.	22.	0.003	97.12	1.215s
AC-228	372.76	93.35	442.	-4.	-0.001	685.20	0.797s
Gd-153	389.36	97.50	186.	-5.	-0.001	364.54	0.801s
Np-239	397.36	99.50	192.	0.	0.000	1000.00	0.803s
Gd-153	412.15	103.20	238.	9.	0.001	244.70	0.807s
Np-239	414.15	103.70	191.	-4.	-0.001	491.17	0.807
EU-155	420.60	105.31	234.	-20.	-0.003	110.12	0.809s
Np-239	423.87	106.13	260.	-10.	-0.001	232.18	0.810s
EU-152	486.45	121.78	219.	-20.	-0.003	108.78	0.826
EU-154	491.73	123.10	216.	12.	0.002	171.04	0.828s
PA-234	524.50	131.29	253.	-18.	-0.002	127.86	0.836s
HF-181	531.42	133.02	271.	-7.	-0.001	316.00	0.838s
CE-144	533.47	133.54	279.	0.	0.000	1000.00	0.838s
HF-181	544.52	136.30	279.	0.	0.000	1000.00	0.841s
CO-57	545.21	136.47	279.	0.	0.000	1000.00	0.841s
Tc-99m	561.35	140.51	194.	20.	0.003	101.91	0.845s
U-235	574.45	143.79	219.	10.	0.001	221.05	0.849s
CE-141	581.07	145.44	202.	15.	0.002	138.39	0.850s
Ba-140	649.93	162.66	198.	-7.	-0.001	286.78	0.868s
U-235	652.81	163.38	150.	13.	0.002	135.95	0.869s
CE-139	662.70	165.85	152.	15.	0.002	115.72	0.871s
Cf-251	705.68	176.60	103.	-9.	-0.001	196.56	0.882
U-235	742.15	185.72	133.	20.	0.003	107.25	0.892s
TH-229	773.30	193.51	117.	-18.	-0.003	106.50	0.899s
U-235	820.58	205.33	100.	7.	0.001	257.01	0.912s
TH-229	842.65	210.85	80.	8.	0.001	202.07	0.917
Cf-251	907.23	227.00	87.	4.	0.001	385.31	0.933s
TH-227	943.11	235.97	161.	-16.	-0.002	112.24	0.942s
PB-212	953.75	238.63	70.	5.	0.001	265.89	0.945D
PB-214	967.21	242.00	268.	5.	0.001	507.92	0.948
EU-152	977.99	244.69	283.	5.	0.001	475.96	0.951s
TH-227	1024.17	256.24	127.	-21.	-0.003	99.58	0.962s
Cd-113m	1054.01	263.70	119.	-15.	-0.002	107.13	0.970s
BI-210M	1062.53	265.83	137.	-14.	-0.002	163.48	0.972s
TL-208	1108.33	277.28	110.	-7.	-0.001	329.48	0.983s
Hg-203	1115.99	279.20	147.	-18.	-0.003	97.49	0.985s
I-131	1136.39	284.30	84.	-5.	-0.001	325.03	0.990s
PB-214	1179.54	295.09	278.	-5.	-0.001	481.66	1.001
TL-210	1183.18	296.00	273.	14.	0.002	164.84	1.002s
PA-231	1199.46	300.07	291.	-3.	0.000	1026.78	1.006D
PA-233	1199.90	300.18	317.	-4.	-0.001	1000.00	1.006s
Ba-140	1218.57	304.85	89.	11.	0.002	123.79	1.011s
BI-210M	1218.76	304.90	100.	11.	0.002	130.86	1.011s
Ir-192	1232.94	308.44	150.	14.	0.002	129.88	1.014s
Ir-192	1265.13	316.49	77.	13.	0.002	99.41	1.022s
La-140	1314.21	328.76	66.	11.	0.001	147.11	1.034s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-249	1332.92	333.44	48.	1.	0.000	972.59	1.039s
AC-228	1352.44	338.32	132.	14.	0.002	118.95	1.043s
Cs-136	1361.44	340.57	147.	9.	0.001	183.94	1.045s
EU-152	1376.30	344.29	156.	0.	0.000	1000.00	1.049s
HF-181	1382.47	345.83	171.	-15.	-0.002	127.29	1.050s
PB-214	1406.88	351.93	101.	-15.	-0.002	96.91	1.056s
BA-133	1423.15	356.00	102.	10.	0.001	152.65	1.060s
I-131	1457.08	364.48	46.	11.	0.002	115.42	1.069
BA-133	1534.50	383.84	126.	14.	0.002	119.69	1.087s
Cf-249	1550.94	387.95	140.	7.	0.001	247.12	1.091s
SN-113	1565.90	391.69	127.	13.	0.002	123.99	1.095s
SB-125	1710.63	427.88	55.	-16.	-0.002	106.42	1.129
AG-108M	1734.87	433.94	55.	3.	0.000	466.07	1.135s
PM-146	1814.64	453.88	66.	-11.	-0.002	149.74	1.154s
SB-125	1852.59	463.37	79.	-15.	-0.002	110.98	1.163s
Ir-192	1871.36	468.06	71.	11.	0.002	108.05	1.167s
BE-7	1909.50	477.60	80.	13.	0.002	102.99	1.176
HF-181	1927.10	482.00	91.	8.	0.001	163.08	1.180s
La-140	1947.19	487.02	44.	-9.	-0.001	148.10	1.185s
RU-103	1987.33	497.05	4.	32.	0.004	21.50	1.194s
RH-106	2046.57	511.86	89.	101.	0.014	17.27	2.458s
Kr-85	2055.03	513.98	190.	14.	0.002	142.37	1.210
Nd-147	2123.11	531.00	24.	10.	0.001	96.99	1.225s
Ba-140	2148.15	537.26	25.	9.	0.001	108.79	1.231s
CS-134	2252.06	563.24	28.	6.	0.001	177.43	1.255s
CS-134	2276.40	569.32	28.	11.	0.001	76.11	1.260s
PA-234	2276.99	569.47	32.	10.	0.001	87.15	1.261s
BI-207	2277.92	569.70	47.	1.	0.000	662.31	1.261s
SB-125	2401.12	600.50	293.	-18.	-0.002	137.22	1.289s
SB-124	2410.04	602.73	254.	16.	0.002	141.55	1.291s
BI-214	2436.36	609.31	159.	-19.	-0.003	93.13	1.296s
RU-103	2440.31	610.30	140.	6.	0.001	273.92	1.297s
AG-108M	2456.25	614.28	96.	-7.	-0.001	201.52	1.301s
PM-144	2471.37	618.06	139.	7.	0.001	241.17	1.304
RH-106	2486.79	621.92	122.	13.	0.002	124.78	1.308s
SB-125	2542.69	635.89	13.	18.	0.002	36.85	1.320s
I-131	2547.03	636.97	68.	-15.	-0.002	84.46	1.321s
AG-110M	2630.18	657.76	62.	-11.	-0.002	165.85	1.339s
PM-144	2785.32	696.54	35.	10.	0.001	120.40	1.374
NB-94	2809.67	702.63	56.	-6.	-0.001	245.15	1.379
SB-124	2890.31	722.79	82.	-16.	-0.002	83.58	1.396s
AG-108M	2890.91	722.94	99.	-8.	-0.001	170.74	1.397s
EU-154	2892.60	723.36	107.	0.	0.000	1000.00	1.397s
ZR-95	2895.96	724.20	107.	0.	0.000	1000.00	1.398s
BI-212	2907.84	727.17	98.	8.	0.001	174.82	1.400s
PM-146	2942.05	735.72	4.	5.	0.001	96.12	1.408
PM-146	2987.81	747.16	30.	-13.	-0.002	90.56	1.417
ZR-95	3026.09	756.73	48.	-15.	-0.002	99.57	1.426s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-110M	3054.96	763.94	37.	-6.	-0.001	149.07	1.432s
NB-95	3062.34	765.79	43.	0.	0.000	1000.00	1.433s
PA-234M	3064.83	766.41	42.	1.	0.000	921.95	1.434s
EU-152	3114.87	778.92	22.	-2.	0.000	575.33	1.444s
BI-212	3140.88	785.42	13.	8.	0.001	95.21	1.450s
CS-134	3182.68	795.87	33.	10.	0.001	85.63	1.459
TL-210	3197.61	799.60	43.	10.	0.001	96.26	1.462
CS-134	3207.01	801.95	37.	7.	0.001	125.66	1.464s
CO-58	3242.31	810.77	66.	-2.	0.000	773.16	1.471s
La-140	3262.30	815.77	50.	6.	0.001	187.63	1.475s
Cs-136	3273.22	818.50	73.	-8.	-0.001	158.16	1.478s
MN-54	3338.63	834.85	44.	-9.	-0.001	95.62	1.492s
Co-56	3386.32	846.77	33.	5.	0.001	231.42	1.501s
TL-208	3441.51	860.56	37.	-8.	-0.001	159.35	1.513s
NB-94	3483.65	871.10	40.	-11.	-0.001	88.94	1.522s
EU-154	3492.19	873.23	35.	11.	0.001	84.39	1.523s
PA-234	3521.39	880.53	41.	11.	0.001	90.17	1.529s
PA-234	3532.24	883.24	51.	2.	0.000	601.33	1.531s
AG-110M	3538.01	884.68	53.	0.	0.000	1000.00	1.533s
Sc-46	3556.40	889.28	65.	-10.	-0.001	84.41	1.536s
Y-88	3591.45	898.04	23.	2.	0.000	619.68	1.543s
AC-228	3643.58	911.07	9.	19.	0.003	41.73	1.554s
AG-110M	3749.30	937.49	33.	-6.	-0.001	218.04	1.576s
PA-234	3783.42	946.02	33.	-6.	-0.001	218.04	1.582s
EU-152	3855.80	964.11	24.	10.	0.001	78.23	1.597s
AC-228	3875.25	968.97	33.	10.	0.001	90.35	1.601s
EU-154	3984.71	996.33	41.	1.	0.000	681.91	1.622s
PA-234M	4003.39	1001.00	44.	-2.	0.000	383.77	1.626s
EU-154	4018.51	1004.77	33.	9.	0.001	94.37	1.629s
Co-56	4150.81	1037.84	15.	6.	0.001	147.67	1.655
Cs-136	4191.74	1048.07	25.	2.	0.000	360.56	1.663s
RH-106	4200.91	1050.36	28.	5.	0.001	156.21	1.665s
BI-207	4254.12	1063.66	30.	-5.	-0.001	244.95	1.675s
Ga-68	4309.10	1077.40	30.	-8.	-0.001	154.62	1.685s
FE-59	4396.54	1099.25	25.	-4.	-0.001	279.32	1.702s
EU-152	4447.85	1112.07	43.	12.	0.002	82.82	1.712s
BI-214	4480.72	1120.29	53.	2.	0.000	504.89	1.718s
Sc-46	4481.77	1120.55	38.	-6.	-0.001	147.29	1.718s
Ta-182	4484.77	1121.30	52.	-14.	-0.002	74.76	1.719s
CO-60	4692.60	1173.24	25.	-8.	-0.001	141.88	1.757
Ta-182	4755.88	1189.05	11.	8.	0.001	101.17	1.769s
Ta-182	4885.38	1221.41	22.	8.	0.001	138.85	1.792s
Co-56	4952.89	1238.28	6.	13.	0.002	50.37	1.805s
NA-22	5097.96	1274.53	11.	1.	0.000	357.07	1.831
EU-154	5098.00	1274.54	12.	0.	0.000	1000.00	1.831
TL-210	5251.92	1313.00	5.	6.	0.001	90.26	1.858s
CO-60	5329.96	1332.50	13.	1.	0.000	595.27	1.871s
AG-110M	5537.26	1384.30	5.	3.	0.000	206.16	1.907s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	5632.13	1408.00	16.	-4.	-0.001	232.74	1.923s
K-40	5843.58	1460.83	22.	-9.	-0.001	85.22	1.958s
La-140	6385.44	1596.21	17.	-7.	-0.001	143.21	2.044s
SB-124	6764.81	1690.98	17.	-8.	-0.001	125.93	2.102s
BI-214	7059.07	1764.49	19.	-3.	0.000	196.24	2.145s
Co-56	7086.53	1771.35	29.	-2.	0.000	429.17	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	8.7786E-01				5.31E+01	
			477.60	8.779E-01	&(P	3.038E+00 1.03E+02 1.05E+01	G
NA-22	C	2.1849E-02				9.50E+02	
			1274.53	2.185E-02	?(	2.938E-01 3.57E+02 9.99E+01	G
K-40	N	-1.5660E+00				4.66E+11	
			1460.83	-1.566E+00	?(P	4.221E+00 8.52E+01 1.07E+01	G
Sc-46	F	-1.2279E-01				8.38E+01	
			889.28	-1.228E-01	?(P	4.830E-01 8.44E+01 1.00E+02	G
			1120.55	-9.012E-02	&	4.603E-01 1.47E+02 1.00E+02	G
CR-51	F	-4.3738E-02				2.77E+01	
			320.08	-4.374E-02	&(P	2.721E+00 3.07E+03 9.94E+00	G
MN-54	C	-1.0053E-01				3.12E+02	
			834.85	-1.005E-01	?(P	3.809E-01 9.56E+01 1.00E+02	G
FE-59	F	-1.0172E-01				4.45E+01	
			1099.25	-1.017E-01	?(	6.615E-01 2.79E+02 5.65E+01	G
			1291.60	1.279E-02	%	6.878E-01 2.23E+03 4.32E+01	G
Co-56	C	1.9544E-01				7.73E+01	
			846.77	6.126E-02	?(	3.371E-01 2.31E+02 9.99E+01	G
			1238.28	3.161E-01	?(P	3.393E-01 5.04E+01 6.61E+01	G
			1037.84	5.803E-01	?(	2.008E+00 1.48E+02 1.41E+01	G
			1771.35	-2.566E-01	+	3.960E+00 4.29E+02 1.55E+01	A
CO-57	C	-5.6863E-03				2.72E+02	
			122.06	-5.686E-03	%(	2.573E-01 1.33E+03 8.56E+01	G
			136.47	0.000E+00	+	2.311E+00 1.00E+03 1.07E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-58	C	-1.6691E-02					7.09E+01	
			810.78	-1.669E-02	*(	4.530E-01	7.73E+02	9.95E+01 G
CO-60	F	2.2442E-02					1.93E+03	
			1332.50	2.244E-02	?(P	3.291E-01	5.95E+02	1.00E+02 G
			1173.24	-1.218E-01	&	3.962E-01	1.42E+02	9.99E+01 G
ZN-65	F	1.2288E-02					2.44E+02	
			1115.55	1.229E-02	&(	1.068E+00	2.45E+03	5.06E+01 G
NB-94	I	-6.3564E-02					7.41E+06	
			702.63	-6.356E-02	?(	3.782E-01	2.45E+02	9.79E+01 G
			871.10	-1.256E-01	+	3.774E-01	8.89E+01	9.99E+01 G
ZR-95	I	-2.8135E-01					6.40E+01	
			756.73	-2.814E-01	?(	6.692E-01	9.96E+01	5.45E+01 G
			724.20	0.000E+00	+	1.162E+00	1.00E+03	4.42E+01 G
RU-103	I	2.6207E-01					3.93E+01	
			497.05	2.621E-01	?(	9.852E-02	2.15E+01	9.09E+01 G
			610.30	9.404E-01	+	8.809E+00	2.74E+02	5.75E+00 GA
RH-106	I	1.5965E+00					3.74E+02	
			621.92	1.152E+00	(	4.860E+00	1.25E+02	9.93E+00 G
			1050.36	4.426E+00	?(	2.423E+01	1.56E+02	1.56E+00 G
			511.86	3.865E+00	? P	1.775E+00	1.73E+01	2.00E+01 GA
AG-108M	C	2.2223E-02					1.53E+05	
			433.94	2.222E-02	?(	2.761E-01	4.66E+02	9.05E+01 G
			722.94	-9.299E-02	+	5.424E-01	1.71E+02	9.08E+01 G
			614.28	-6.861E-02	+	4.741E-01	2.02E+02	8.98E+01 G
AG-110M	F	4.8507E-02					2.50E+02	
			884.68	0.000E+00	?(	6.005E-01	1.00E+03	7.27E+01 G
			657.76	-1.072E-01	+ P	3.873E-01	1.66E+02	9.46E+01 G
			937.49	-2.064E-01	+	1.069E+00	2.18E+02	3.44E+01 G
			1384.30	1.936E-01	?(	9.783E-01	2.06E+02	2.43E+01 G
			763.94	-2.836E-01	+	1.468E+00	1.49E+02	2.23E+01 G
SN-113	F	1.2774E-01					1.15E+02	
			391.69	1.277E-01	?(	5.351E-01	1.24E+02	6.40E+01 G
SB-124	F	1.4280E-01					6.02E+01	
			602.73	1.428E-01	&(	6.796E-01	1.42E+02	9.83E+01 G
			1690.98	-3.546E-01	+	9.718E-01	1.26E+02	4.78E+01 G
			722.79	-1.498E+00	+	4.190E+00	8.36E+01	1.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	I	1.4670E-01					1.01E+03	
			427.88	-3.480E-01	&(P	8.372E-01	1.06E+02	2.96E+01 G
			600.50	-8.676E-01	+	3.996E+00	1.37E+02	1.79E+01 G
			635.89	1.441E+00	?(	1.562E+00	3.69E+01	1.13E+01 G
			463.37	-1.025E+00	+ P	2.979E+00	1.11E+02	1.05E+01 G
I-131	I	8.1744E-02					8.02E+00	
			364.48	8.174E-02	&(P	2.466E-01	1.15E+02	8.17E+01 G
			284.30	-4.274E-01	+	3.646E+00	3.25E+02	6.14E+00 G
			636.97	-1.844E+00	+	5.222E+00	8.45E+01	7.17E+00 G
Gd-153	F	2.0281E-02					2.42E+02	
			97.50	-5.029E-02	?(	6.253E-01	3.65E+02	3.00E+01 G
			103.20	1.174E-01	?(	9.731E-01	2.45E+02	2.18E+01 G
Ga-68	C	-6.0044E+00					4.71E-02	
			1077.40	-6.004E+00	?(	2.119E+01	1.55E+02	3.30E+00 G
Tc-99m	I	7.7210E-02					2.51E-01	
			140.51	7.721E-02	?(	2.635E-01	1.02E+02	8.93E+01 G
BA-133	F	8.9258E-02					3.85E+03	
			356.00	8.926E-02	?(	4.640E-01	1.53E+02	6.20E+01 G
			302.85	-1.068E-07	&	2.383E+00	6.56E+08	1.83E+01 G
			383.84	9.358E-01	? P	3.765E+00	1.20E+02	8.94E+00 GA
			80.99	-8.767E-02	+ P	5.208E-01	2.21E+02	3.41E+01 GA
CS-134	I	2.7784E-01					7.54E+02	
			795.87	1.292E-01	?(	3.738E-01	8.56E+01	8.55E+01 G
			604.71	5.123E-03	%	6.645E-01	3.80E+03	9.76E+01 G
			569.32	5.782E-01	&(	1.475E+00	7.61E+01	1.54E+01 G
			801.95	9.084E-01	?(	3.934E+00	1.26E+02	8.69E+00 G
			563.24	5.903E-01	?(	2.693E+00	1.77E+02	8.35E+00 G
CS-137	I	-1.4219E-02					1.10E+04	
			661.66	-1.422E-02	%(P	4.677E-01	1.41E+03	8.52E+01 G
CE-139	F	6.5591E-02					1.38E+02	
			165.85	6.559E-02	?(	2.555E-01	1.16E+02	7.99E+01 G
Ba-140	I	4.5960E-01					1.28E+01	
			537.26	3.057E-01	(P	8.449E-01	1.09E+02	2.44E+01 G
			162.66	-3.775E-01	+	3.683E+00	2.87E+02	6.22E+00 G
			304.85	1.335E+00	?(	5.608E+00	1.24E+02	4.29E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
La-140	I	-1.5433E-02					1.28E+01	
			1596.21	-1.474E-01	?(	4.616E-01	1.43E+02	9.54E+01 G
			487.02	-1.449E-01	+	5.414E-01	1.48E+02	4.55E+01 G
			328.76	2.855E-01	?(P	1.091E+00	1.47E+02	2.03E+01 G
			815.77	2.628E-01	?(	1.712E+00	1.88E+02	2.33E+01 G
CE-141	I	9.6774E-02					3.25E+01	
			145.44	9.677E-02	?(	4.512E-01	1.38E+02	4.82E+01 G
PM-144	C	8.2162E-02					3.63E+02	
			696.54	1.018E-01	(	2.971E-01	1.20E+02	9.90E+01 G
			618.06	6.252E-02	(	5.149E-01	2.41E+02	9.91E+01 G
EU-152	F	4.0420E-01					4.94E+03	
			121.78	-2.027E-01	?(	7.388E-01	1.09E+02	2.86E+01 G
			344.29	0.000E+00	+	1.295E+00	1.00E+03	2.65E+01 G
			1112.07	1.267E+00	?(	3.527E+00	8.28E+01	1.36E+01 G
			778.92	-1.378E-01	-	2.018E+00	5.75E+02	1.29E+01 G
			964.11	8.444E-01	?(	2.221E+00	7.82E+01	1.46E+01 G
			244.69	2.920E-01	?(	4.718E+00	4.76E+02	7.58E+00 G
			1408.00	-3.411E-01	-	1.821E+00	2.33E+02	2.10E+01 GA
EU-154	I	3.6810E-01					3.14E+03	
			123.10	8.931E-02	?(	5.159E-01	1.71E+02	4.08E+01 G
			1274.54	0.000E+00	-	8.774E-01	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	2.534E+00	1.00E+03	2.02E+01 G
			873.23	1.017E+00	&(	2.895E+00	8.44E+01	1.23E+01 G
			1004.77	6.763E-01	?(	2.170E+00	9.44E+01	1.80E+01 G
			996.33	1.659E-01	&(	4.035E+00	6.82E+02	1.06E+01 G
EU-155	I	-2.7011E-01					1.81E+03	
			105.31	-2.701E-01	(	9.962E-01	1.10E+02	2.12E+01 G
			86.54	0.000E+00	+	9.559E-01	1.00E+03	3.07E+01 G
HF-181	F	7.6226E-02					4.24E+01	
			482.00	7.623E-02	?(	4.249E-01	1.63E+02	8.05E+01 G
			133.02	-5.201E-02	+	5.569E-01	3.16E+02	4.33E+01 G
			345.83	-5.563E-01	+	2.386E+00	1.27E+02	1.51E+01 G
			136.30	0.000E+00	-	4.218E+00	1.00E+03	5.85E+00 G
Ta-182	F	-6.0745E-01					1.14E+02	
			1121.30	-6.074E-01	&(	1.515E+00	7.48E+01	3.49E+01 G
			1221.41	4.620E-01	& P	1.437E+00	1.39E+02	2.70E+01 G
			1189.05	7.227E-01	& P	1.733E+00	1.01E+02	1.62E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Hg-203	F -1.0765E-01					4.66E+01	
		279.20	-1.077E-01	?(	3.517E-01	9.75E+01	8.15E+01 G
TL-208	N 9.9943E-03					6.98E+02	
		583.02	9.994E-03	&(	2.905E-01	1.11E+03	8.45E+01 G
		277.28	-5.518E-01	+ P	3.940E+00	3.29E+02	6.31E+00 G
		860.56	-7.808E-01	+	2.922E+00	1.59E+02	1.24E+01 G
PM-146	C -3.0654E-02					2.02E+03	
		453.88	-1.197E-01	*(P	4.337E-01	1.50E+02	6.50E+01 G
		747.16	-3.964E-01	+	8.627E-01	9.06E+01	3.40E+01 G
		735.72	2.266E-01	?(	5.629E-01	9.61E+01	2.25E+01 G
Y-88	F 6.2950E-03					1.07E+02	
		1836.06	-8.031E-03	%(P	3.332E-01	1.80E+03	9.92E+01 G
		898.04	2.146E-02	?(	3.248E-01	6.20E+02	9.37E+01 G
Cd-113m	-1.1488E+03					5.33E+03	
		263.70	-1.149E+03	?(	4.144E+03	1.07E+02	6.00E-03 K
Cf-251	T -1.9411E-01					3.28E+05	
		176.60	-1.941E-01	&(	1.042E+00	1.97E+02	1.70E+01 G
		227.00	2.879E-01	&	3.063E+00	3.85E+02	6.30E+00 GA
Cf-249	T 6.0794E-02					1.28E+05	
		387.95	6.397E-02	?(	5.399E-01	2.47E+02	6.60E+01 G
		333.44	4.730E-02	&(	1.237E+00	9.73E+02	1.55E+01 G
Sn-126	-1.2980E-01					3.65E+07	
		87.57	0.000E+00	+	7.821E-01	1.00E+03	3.75E+01 GA
		64.28	-1.298E-01	?(	2.199E+00	4.97E+02	9.70E+00 G
		86.94	0.000E+00	+	3.245E+00	1.00E+03	9.04E+00 GA
PB-210	N -3.5905E+00					8.14E+03	
		46.54	-3.591E+00	(P	5.802E+00	5.28E+01	4.25E+00 G
PB-212	N 4.7438E-02					6.98E+02	
		238.63	4.744E-02	(P	4.180E-01	2.66E+02	4.33E+01 G
		300.03	4.744E-02	} P	1.301E+01	1.03E+03	3.28E+00 GA
PB-214	N -2.2726E-01					5.84E+05	
		351.93	-2.273E-01	?(P	7.543E-01	9.69E+01	3.76E+01 G
		295.09	-1.296E-01	+ P	2.097E+00	4.82E+02	1.93E+01 G
		242.00	2.722E-01	P	4.655E+00	5.08E+02	7.43E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-207	C	-9.3697E-02					1.18E+04	
			1063.66	-9.370E-02	?(	5.291E-01	2.45E+02	7.45E+01 G
			569.70	1.245E-02	+	2.926E-01	6.62E+02	9.77E+01 G
BI-212	N	1.0933E+00					6.98E+02	
			727.17	1.093E+00	(	6.534E+00	1.75E+02	7.55E+00 G
			785.42	7.119E+00	? P	1.658E+01	9.52E+01	1.28E+00 GA
U-235	N	4.8340E-01					2.57E+11	
			143.79	2.760E-01	?(P	2.052E+00	2.21E+02	1.10E+01 G
			205.33	5.462E-01	&(	3.848E+00	2.57E+02	5.01E+00 G
			163.38	8.688E-01	&(P	3.956E+00	1.36E+02	5.08E+00 G
			185.72	1.327E-01		3.826E-01	1.07E+02	5.40E+01 GA
BI-214	N	-3.6443E-01					5.84E+05	
			609.31	-3.644E-01	(P	1.167E+00	9.31E+01	4.61E+01 G
			1120.29	2.038E-01	+ P	3.541E+00	5.05E+02	1.51E+01 G
			1764.49	-4.466E-01	+ P	3.301E+00	1.96E+02	1.54E+01 G
BI-210M	T	-1.3313E-02					1.10E+09	
			265.83	-1.353E-01	?(P	5.354E-01	1.63E+02	5.00E+01 G
			304.90	2.045E-01	?(	9.082E-01	1.31E+02	2.80E+01 G
AC-228	N	7.3588E-01					2.10E+03	
			911.07	7.863E-01	?(	7.138E-01	4.17E+01	2.90E+01 G
			968.97	7.111E-01	?(	2.178E+00	9.03E+01	1.75E+01 G
			338.32	6.502E-01	&(	2.609E+00	1.19E+02	1.20E+01 G
			93.35	-2.210E-01	-	5.115E+00	6.85E+02	5.56E+00 XA
TH-227	N	-1.3416E+00					7.95E+03	
			256.24	-1.342E+00	&(	3.588E+00	9.96E+01	7.00E+00 G
			235.97	-5.736E-01	+	2.164E+00	1.12E+02	1.23E+01 G
			50.14	-6.992E-01	+	2.277E+00	1.14E+02	8.00E+00 G
TH-229	N	-1.5790E+00					2.68E+06	
			193.51	-1.579E+00	?(	4.529E+00	1.06E+02	4.40E+00 G
			210.85	1.065E+00	+	5.909E+00	2.02E+02	2.99E+00 G
TH-234	N	1.1344E+00					1.63E+12	
			92.59	1.134E+00	*(P	3.151E+00	9.71E+01	5.58E+00 G
			63.29	-8.564E-01	- P	6.092E+00	2.14E+02	3.81E+00 G
PA-231	N	1.1869E-01					1.20E+07	
			302.65	1.187E-01	%(	1.514E+01	3.75E+03	2.88E+00 G
			300.07	1.187E-01	}	1.692E+01	1.03E+03	2.46E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-233	C	-1.2675E-02					7.82E+08	
			312.01	-1.267E-02	&(	9.238E-01	2.12E+03	3.60E+01 G
			300.18	0.000E+00	&	7.000E+00	1.00E+03	6.20E+00 G
PA-234	N	1.3221E-01					1.63E+12	
			131.29	-3.005E-01	?(	1.290E+00	1.28E+02	1.80E+01 G
			946.02	-5.335E-01	+	2.763E+00	2.18E+02	1.34E+01 G
			569.47	9.905E-01	*(	2.920E+00	8.71E+01	8.20E+00 G
			883.24	2.105E-01	?(	4.472E+00	6.01E+02	9.60E+00 G
			880.53	2.103E+00	?	6.413E+00	9.02E+01	6.00E+00 GA
PA-234M	N	-1.8413E+00					1.63E+12	
			1001.00	-3.750E+00	?(P	5.340E+01	3.84E+02	8.37E-01 G
			766.41	3.591E+00	?(	1.182E+02	9.22E+02	2.94E-01 G
AM-241	T	-5.2152E-02					1.58E+05	
			59.54	-5.215E-02	&(	4.782E-01	3.18E+02	3.59E+01 G
Np-237	F	-3.3474E-01					2.14E+06	
			86.49	-3.347E-01	(	2.276E+00	2.03E+02	1.31E+01 G
Ir-192	F	1.2978E-01					7.40E+01	
			316.49	7.910E-02	?(	2.653E-01	9.94E+01	8.70E+01 G
			468.06	1.575E-01	?(	5.767E-01	1.08E+02	5.18E+01 G
			308.44	2.235E-01	?(	9.799E-01	1.30E+02	3.18E+01 G
Cs-136	F	-2.3515E-02					1.30E+01	
			818.50	-8.739E-02	?(	4.739E-01	1.58E+02	1.00E+02 G
			1048.07	3.446E-02	+	4.481E-01	3.61E+02	8.00E+01 G
			340.57	1.127E-01	(	7.044E-01	1.84E+02	4.69E+01 G
Np-239	T	-1.2626E-01					2.36E+00	
			103.70	-4.801E-02	&	8.056E-01	4.91E+02	2.40E+01 X
			106.13	-1.263E-01	?(	9.914E-01	2.32E+02	2.27E+01 G
			99.50	0.000E+00	&	1.285E+00	1.00E+03	1.50E+01 X
Nd-147		6.2940E-01					1.11E+01	
			531.00	6.294E-01	&(	1.540E+00	9.70E+01	1.30E+01 G
			91.10	1.698E-01	-	9.582E-01	1.68E+02	2.83E+01 G
TL-210	N	1.0321E-01					5.84E+05	
			799.60	1.124E-01	(	3.670E-01	9.63E+01	9.90E+01 G
			296.00	9.170E-02	?(	5.090E-01	1.65E+02	7.90E+01 G
			1313.00	5.175E-01	?	1.079E+00	9.03E+01	2.10E+01 GA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Kr-85	I 2.4790E+01					3.92E+03	
		513.98	2.479E+01	?(	1.190E+02	1.42E+02	4.30E-01 G

(- This peak used in the nuclide activity average.

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

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

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	198.	-42.	-0.006	52.79	-3.591E+00	P
TH-227	50.14	117.	-16.	-0.002	114.36	-6.992E-01	
AM-241	59.54	126.	-6.	-0.001	317.54	-5.215E-02	
Sn-126	64.28	212.	-4.	-0.001	496.81	-1.298E-01	
BA-133	80.99	163.	-10.	-0.001	220.64	-8.767E-02	P
Np-237	86.49	486.	-16.	-0.002	202.64	-3.347E-01	
Nd-147	91.10	401.	17.	0.002	168.16	1.698E-01	
Gd-153	97.50	186.	-5.	-0.001	364.54	-5.029E-02	
Gd-153	103.20	238.	9.	0.001	244.70	1.174E-01	
Np-239	103.70	191.	-4.	-0.001	491.17	-4.801E-02	
EU-155	105.31	234.	-20.	-0.003	110.12	-2.701E-01	
Np-239	106.13	260.	-10.	-0.001	232.18	-1.263E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	121.78	219.	-20.	-0.003	108.78	-2.027E-01	
EU-154	123.10	216.	12.	0.002	171.04	8.931E-02	
PA-234	131.29	253.	-18.	-0.002	127.86	-3.005E-01	
HF-181	133.02	271.	-7.	-0.001	316.00	-5.201E-02	
Tc-99m	140.51	194.	20.	0.003	101.91	7.721E-02	
U-235	143.79	219.	10.	0.001	221.05	2.760E-01	P
CE-141	145.44	202.	15.	0.002	138.39	9.677E-02	
Ba-140	162.66	198.	-7.	-0.001	286.78	-3.775E-01	
U-235	163.38	150.	13.	0.002	135.95	8.688E-01	P
CE-139	165.85	152.	15.	0.002	115.72	6.559E-02	
Cf-251	176.60	103.	-9.	-0.001	196.56	-1.941E-01	
U-235	185.72	133.	20.	0.003	107.25	1.327E-01	
TH-229	193.51	117.	-18.	-0.003	106.50	-1.579E+00	
U-235	205.33	100.	7.	0.001	257.01	5.462E-01	
TH-229	210.85	80.	8.	0.001	202.07	1.065E+00	
Cf-251	227.00	87.	4.	0.001	385.31	2.879E-01	
TH-227	235.97	161.	-16.	-0.002	112.24	-5.736E-01	
EU-152	244.69	283.	5.	0.001	475.96	2.920E-01	
TH-227	256.24	127.	-21.	-0.003	99.58	-1.342E+00	
Cd-113m	263.70	119.	-15.	-0.002	107.13	-1.149E+03	
BI-210M	265.83	137.	-14.	-0.002	163.48	-1.353E-01	P
TL-208	277.28	110.	-7.	-0.001	329.48	-5.518E-01	P
Hg-203	279.20	147.	-18.	-0.003	97.49	-1.077E-01	
I-131	284.30	84.	-5.	-0.001	325.03	-4.274E-01	
TL-210	296.00	273.	14.	0.002	164.84	9.170E-02	
Ba-140	304.85	89.	11.	0.002	123.79	1.335E+00	
BI-210M	304.90	100.	11.	0.002	130.86	2.045E-01	
Ir-192	308.44	150.	14.	0.002	129.88	2.235E-01	
Ir-192	316.49	77.	13.	0.002	99.41	7.910E-02	
La-140	328.76	66.	11.	0.001	147.11	2.855E-01	P
Cf-249	333.44	48.	1.	0.000	972.59	4.730E-02	
Cs-136	340.57	147.	9.	0.001	183.94	1.127E-01	
HF-181	345.83	171.	-15.	-0.002	127.29	-5.563E-01	
BA-133	356.00	102.	10.	0.001	152.65	8.926E-02	
I-131	364.48	46.	11.	0.002	115.42	8.174E-02	P
BA-133	383.84	126.	14.	0.002	119.69	9.358E-01	P
Cf-249	387.95	140.	7.	0.001	247.12	6.397E-02	
SN-113	391.69	127.	13.	0.002	123.99	1.277E-01	
SB-125	427.88	55.	-16.	-0.002	106.42	-3.480E-01	P
AG-108M	433.94	55.	3.	0.000	466.07	2.222E-02	
PM-146	453.88	66.	-11.	-0.002	149.74	-1.197E-01	P
SB-125	463.37	79.	-15.	-0.002	110.98	-1.025E+00	P
Ir-192	468.06	71.	11.	0.002	108.05	1.575E-01	
BE-7	477.60	80.	13.	0.002	102.99	8.779E-01	P
HF-181	482.00	91.	8.	0.001	163.08	7.623E-02	
La-140	487.02	44.	-9.	-0.001	148.10	-1.449E-01	
RH-106	511.86	89.	101.	0.014	17.27	3.865E+00	P
Kr-85	513.98	190.	14.	0.002	142.37	2.479E+01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Nd-147	531.00	24.	10.	0.001	96.99	6.294E-01	
Ba-140	537.26	25.	9.	0.001	108.79	3.057E-01	P
CS-134	563.24	28.	6.	0.001	177.43	5.903E-01	
CS-134	569.32	28.	11.	0.001	76.11	5.782E-01	
PA-234	569.47	32.	10.	0.001	87.15	9.905E-01	
BI-207	569.70	47.	1.	0.000	662.31	1.245E-02	
SB-125	600.50	293.	-18.	-0.002	137.22	-8.676E-01	
SB-124	602.73	254.	16.	0.002	141.55	1.428E-01	
BI-214	609.31	159.	-19.	-0.003	93.13	-3.644E-01	P
AG-108M	614.28	96.	-7.	-0.001	201.52	-6.861E-02	
RH-106	621.92	122.	13.	0.002	124.78	1.152E+00	
SB-125	635.89	13.	18.	0.002	36.85	1.441E+00	
I-131	636.97	68.	-15.	-0.002	84.46	-1.844E+00	
AG-110M	657.76	62.	-11.	-0.002	165.85	-1.072E-01	P
NB-94	702.63	56.	-6.	-0.001	245.15	-6.356E-02	
SB-124	722.79	82.	-16.	-0.002	83.58	-1.498E+00	
AG-108M	722.94	99.	-8.	-0.001	170.74	-9.299E-02	
BI-212	727.17	98.	8.	0.001	174.82	1.093E+00	
PM-146	735.72	4.	5.	0.001	96.12	2.266E-01	
PM-146	747.16	30.	-13.	-0.002	90.56	-3.964E-01	
ZR-95	756.73	48.	-15.	-0.002	99.57	-2.814E-01	
AG-110M	763.94	37.	-6.	-0.001	149.07	-2.836E-01	
PA-234M	766.41	42.	1.	0.000	921.95	3.591E+00	
EU-152	778.92	22.	-2.	0.000	575.33	-1.378E-01	
BI-212	785.42	13.	8.	0.001	95.21	7.119E+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	37.	7.	0.001	125.66	9.084E-01	
CO-58	810.77	66.	-2.	0.000	773.16	-1.669E-02	
La-140	815.77	50.	6.	0.001	187.63	2.628E-01	
Cs-136	818.50	73.	-8.	-0.001	158.16	-8.739E-02	
MN-54	834.85	44.	-9.	-0.001	95.62	-1.005E-01	P
Co-56	846.77	33.	5.	0.001	231.42	6.126E-02	
TL-208	860.56	37.	-8.	-0.001	159.35	-7.808E-01	
NB-94	871.10	40.	-11.	-0.001	88.94	-1.256E-01	
EU-154	873.23	35.	11.	0.001	84.39	1.017E+00	
PA-234	880.53	41.	11.	0.001	90.17	2.103E+00	
PA-234	883.24	51.	2.	0.000	601.33	2.105E-01	
Sc-46	889.28	65.	-10.	-0.001	84.41	-1.228E-01	P
Y-88	898.04	23.	2.	0.000	619.68	2.146E-02	
AG-110M	937.49	33.	-6.	-0.001	218.04	-2.064E-01	
PA-234	946.02	33.	-6.	-0.001	218.04	-5.335E-01	
EU-152	964.11	24.	10.	0.001	78.23	8.444E-01	
EU-154	996.33	41.	1.	0.000	681.91	1.659E-01	
PA-234M	1001.00	44.	-2.	0.000	383.77	-3.750E+00	P
EU-154	1004.77	33.	9.	0.001	94.37	6.763E-01	
Co-56	1037.84	15.	6.	0.001	147.67	5.803E-01	
Cs-136	1048.07	25.	2.	0.000	360.56	3.446E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
RH-106	1050.36	28.	5.	0.001	156.21	4.426E+00		
BI-207	1063.66	30.	-5.	-0.001	244.95	-9.370E-02		
Ga-68	1077.40	30.	-8.	-0.001	154.62	-6.004E+00		
FE-59	1099.25	25.	-4.	-0.001	279.32	-1.017E-01		
EU-152	1112.07	43.	12.	0.002	82.82	1.267E+00		
BI-214	1120.29	53.	2.	0.000	504.89	2.038E-01		P
Sc-46	1120.55	38.	-6.	-0.001	147.29	-9.012E-02		
Ta-182	1121.30	52.	-14.	-0.002	74.76	-6.074E-01		
CO-60	1173.24	25.	-8.	-0.001	141.88	-1.218E-01		
Ta-182	1189.05	11.	8.	0.001	101.17	7.227E-01		P
Ta-182	1221.41	22.	8.	0.001	138.85	4.620E-01		P
Co-56	1238.28	6.	13.	0.002	50.37	3.161E-01		P
NA-22	1274.53	11.	1.	0.000	357.07	2.185E-02		
TL-210	1313.00	5.	6.	0.001	90.26	5.175E-01		
CO-60	1332.50	13.	1.	0.000	595.27	2.244E-02		P
AG-110M	1384.30	5.	3.	0.000	206.16	1.936E-01		
EU-152	1408.00	16.	-4.	-0.001	232.74	-3.411E-01		
K-40	1460.83	22.	-9.	-0.001	85.22	-1.566E+00		P
La-140	1596.21	17.	-7.	-0.001	143.21	-1.474E-01		
SB-124	1690.98	17.	-8.	-0.001	125.93	-3.546E-01		
BI-214	1764.49	19.	-3.	0.000	196.24	-4.466E-01		P
Co-56	1771.35	29.	-2.	0.000	429.17	-2.566E-01		

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	8.7786E-01	8.7786E-01	1.030E+02%	3.04E+00
NA-22	#A	2.1849E-02	2.1849E-02	3.571E+02%	2.94E-01
K-40	#A	-1.5660E+00	-1.5660E+00	8.522E+01%	4.22E+00
Sc-46	#A	-1.2279E-01	-1.2279E-01	8.441E+01%	4.83E-01
CR-51	#A	-4.3737E-02	-4.3738E-02	3.071E+03%	2.72E+00
MN-54	#A	-1.0053E-01	-1.0053E-01	9.562E+01%	3.81E-01
FE-59	#A	-1.0172E-01	-1.0172E-01	2.793E+02%	6.61E-01
Co-56	#A	1.9543E-01	1.9544E-01	5.037E+01%	3.37E-01
CO-57	#A	-5.6863E-03	-5.6863E-03	1.326E+03%	2.57E-01
CO-58	#A	-1.6690E-02	-1.6691E-02	7.732E+02%	4.53E-01
CO-60	#A	2.2442E-02	2.2442E-02	5.953E+02%	3.29E-01
ZN-65	#A	1.2288E-02	1.2288E-02	2.450E+03%	1.07E+00
NB-94	#A	-6.3564E-02	-6.3564E-02	2.451E+02%	3.78E-01
ZR-95	#A	-2.8135E-01	-2.8135E-01	9.957E+01%	6.69E-01
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.52E-01
RU-103	#	2.6207E-01	2.6207E-01	2.150E+01%	9.85E-02
RH-106	#A	1.5965E+00	1.5965E+00	9.996E+01%	4.86E+00
AG-108M	#A	2.2223E-02	2.2223E-02	4.661E+02%	2.76E-01

AG-110M#A	4.8507E-02	4.8507E-02	2.062E+02%	6.01E-01
SN-113 #A	1.2774E-01	1.2774E-01	1.240E+02%	5.35E-01
SB-124 #A	1.4280E-01	1.4280E-01	1.415E+02%	6.80E-01
SB-125 #A	1.4670E-01	1.4670E-01	3.685E+01%	8.37E-01
I-131 #A	8.1739E-02	8.1744E-02	1.154E+02%	2.47E-01
Gd-153 #A	2.0281E-02	2.0281E-02	2.195E+02%	6.25E-01
Ga-68 #A	-5.9423E+00	-6.0044E+00	1.546E+02%	2.12E+01
Tc-99m #A	7.7060E-02	7.7210E-02	1.019E+02%	2.63E-01
BA-133 #A	8.9258E-02	8.9258E-02	1.527E+02%	4.64E-01
CS-134 #A	2.7784E-01	2.7784E-01	6.144E+01%	3.74E-01
CS-137 #A	-1.4219E-02	-1.4219E-02	1.409E+03%	4.68E-01
CE-139 #A	6.5591E-02	6.5591E-02	1.157E+02%	2.55E-01
Ba-140 #A	4.5959E-01	4.5960E-01	8.240E+01%	8.45E-01
La-140 #A	-1.5432E-02	-1.5433E-02	9.271E+01%	4.62E-01
CE-141 #A	9.6772E-02	9.6774E-02	1.384E+02%	4.51E-01
CE-144 #A	0.0000E+00	0.0000E+00	1.000E+03%	2.21E+00
PM-144 A	8.2162E-02	8.2162E-02	1.204E+02%	2.97E-01
EU-152 #A	4.0420E-01	4.0420E-01	7.823E+01%	7.39E-01
EU-154 #A	3.6810E-01	3.6810E-01	8.439E+01%	5.16E-01
EU-155 #A	-2.7011E-01	-2.7011E-01	1.101E+02%	9.96E-01
HF-181 #A	7.6225E-02	7.6226E-02	1.631E+02%	4.25E-01
Ta-182 #A	-6.0745E-01	-6.0745E-01	7.476E+01%	1.51E+00
Hg-203 #A	-1.0765E-01	-1.0765E-01	9.749E+01%	3.52E-01
TL-208 #A	9.9943E-03	9.9943E-03	1.112E+03%	2.91E-01
PM-146 #A	-3.0654E-02	-3.0654E-02	8.897E+01%	4.34E-01
Y-88 #A	6.2950E-03	6.2950E-03	6.197E+02%	3.33E-01
Cd-113m#A	-1.1488E+03	-1.1488E+03	1.071E+02%	4.14E+03
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	7.74E+00
Cf-251 #A	-1.9411E-01	-1.9411E-01	1.966E+02%	1.04E+00
Cf-249 #A	6.0794E-02	6.0794E-02	2.471E+02%	5.40E-01
Sn-126 #A	-1.2980E-01	-1.2980E-01	4.968E+02%	2.20E+00
PB-210 #A	-3.5905E+00	-3.5905E+00	5.279E+01%	5.80E+00
PB-212 A	4.7438E-02	4.7438E-02	2.659E+02%	4.18E-01
PB-214 A	-2.2726E-01	-2.2726E-01	9.691E+01%	7.54E-01
BI-207 #A	-9.3697E-02	-9.3697E-02	2.449E+02%	5.29E-01
BI-212 #A	1.0933E+00	1.0933E+00	1.748E+02%	6.53E+00
U-235 #A	4.8340E-01	4.8340E-01	1.217E+02%	2.05E+00
BI-214 #A	-3.6443E-01	-3.6443E-01	9.313E+01%	1.17E+00
BI-210M#A	-1.3313E-02	-1.3313E-02	1.047E+02%	5.35E-01
AC-228 #	7.3588E-01	7.3588E-01	4.173E+01%	7.14E-01
TH-227 #A	-1.3416E+00	-1.3416E+00	9.958E+01%	3.59E+00
TH-229 #A	-1.5790E+00	-1.5790E+00	1.065E+02%	4.53E+00
TH-234 #A	1.1344E+00	1.1344E+00	9.712E+01%	3.15E+00
PA-231 #A	1.1869E-01	1.1869E-01	3.751E+03%	1.51E+01
PA-233 #A	-1.2675E-02	-1.2675E-02	2.120E+03%	9.24E-01
PA-234 #A	1.3221E-01	1.3221E-01	8.715E+01%	1.29E+00
PA-234M#A	-1.8413E+00	-1.8413E+00	3.838E+02%	5.34E+01
AM-241 #A	-5.2152E-02	-5.2152E-02	3.175E+02%	4.78E-01
Np-237 #A	-3.3474E-01	-3.3474E-01	2.026E+02%	2.28E+00

Ir-192	#A	1.2978E-01	1.2978E-01	6.534E+01%	2.65E-01
Cs-136	#A	-2.3514E-02	-2.3515E-02	1.213E+02%	4.74E-01
Np-239	#A	-1.2623E-01	-1.2626E-01	2.322E+02%	9.91E-01
Nd-147	#A	6.2937E-01	6.2940E-01	9.699E+01%	1.54E+00
TL-210	#A	1.0321E-01	1.0321E-01	9.544E+01%	3.67E-01
Kr-85	#A	2.4790E+01	2.4790E+01	1.424E+02%	1.19E+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

441833_Gamma_MB 160-441833~1-A. 14_Gamma_20192010.spc.

Test America St. Louis Spectrum ID: 16_Gamma_20191664

Sample Description: 441833_Gamma_LCS 160-441833~2-A
Detector: Detector #16
Batch ID: 441833
Work Order Number: Gamma
Lot Number: LCS 160-441833~2-A

Decay to Time: 9/26/2019 05:14 Live Time: 7200 sec
Acquisition Time: 9/26/2019 05:14:45 Real Time: 7358 sec
Analysis Time: 9/26/2019 07:17 Dead Time: 2.15 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 16_Liquid_Marinelli 1L.Clb
Efficiency Cal Desc: 16_1Lmarn_90062_032712
Efficiency Cal Date: 4/2/2012 18:09
Energy Cal Date: 2/28/2012 09:35
Library: Client_Long_Rev15.lib
Bkgd Correction File: 16_2019-09-07_1328.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	-1.230E+01	100.2	1.232E+01	1.233E+01	4.064E+01
NA-22	3.596E-02	1686.9	6.065E-01	6.065E-01	2.029E+00
K-40	3.805E+00	155.1	5.902E+00	5.905E+00	1.190E+01
Sc-46	1.716E+00	80.8	1.386E+00	1.389E+00	4.573E+00
CR-51	9.276E+00	86.4	8.011E+00	8.026E+00	2.643E+01
MN-54	5.901E+00	23.0	1.356E+00	1.387E+00	2.642E+00
FE-59	-3.446E+00	92.2	3.178E+00	3.183E+00	6.544E+00
Co-56	-7.390E-01	81.2	6.004E-01	6.015E-01	2.985E+00
CO-57	0.000E+00	1.#INF	7.704E+00	7.705E+00	2.543E+01
CO-58	-1.544E+00	78.6	1.214E+00	1.216E+00	4.004E+00
CO-60	1.015E+03	0.3	2.605E+00	5.016E+01	1.765E+00
ZN-65	1.166E+00	264.9	3.089E+00	3.090E+00	1.022E+01
NB-94	-2.519E-01	404.5	1.019E+00	1.019E+00	3.374E+00
ZR-95	-1.031E+00	100.7	1.038E+00	1.040E+00	4.427E+00
NB-95	0.000E+00	1.#INF	6.848E-01	6.848E-01	2.847E+00
RU-103	7.486E-01	154.7	1.158E+00	1.158E+00	2.655E+00
RH-106	-1.170E+01	122.7	1.436E+01	1.438E+01	4.742E+01
AG-108M	9.145E-02	84.8	7.759E-02	7.773E-02	2.954E+00
AG-110M	2.148E+00	81.2	1.744E+00	1.747E+00	6.376E+00
SN-113	9.615E-01	171.4	1.648E+00	1.649E+00	5.444E+00
SB-124	1.125E+00	122.5	1.379E+00	1.380E+00	4.553E+00
SB-125	4.492E+00	86.9	3.905E+00	3.912E+00	8.859E+00
I-131	6.720E-01	166.7	1.120E+00	1.120E+00	2.676E+00
Gd-153	-1.708E+00	148.0	2.528E+00	2.530E+00	8.342E+00
Ga-68	3.071E+01	294.9	9.056E+01	9.058E+01	1.869E+02
Tc-99m	2.070E-01	212.5	4.399E-01	4.400E-01	1.456E+00
BA-133	1.248E-01	1056.4	1.318E+00	1.318E+00	4.362E+00
CS-134	1.313E+00	51.6	6.771E-01	6.802E-01	4.443E+00
CS-137	1.549E+03	0.2	3.728E+00	7.754E+01	4.159E+00
CE-139	-8.003E-01	92.5	7.407E-01	7.442E-01	2.444E+00
Ba-140	-6.964E-01	105.4	7.342E-01	7.351E-01	9.461E+00
La-140	-3.477E-01	199.7	6.944E-01	6.946E-01	1.336E+00
CE-141	-1.239E+00	141.1	1.748E+00	1.749E+00	5.768E+00

CE-144	5.095E+00	144.1	7.340E+00	7.345E+00	2.422E+01
PM-144	-1.169E+00	86.9	1.017E+00	1.018E+00	3.356E+00
EU-152	9.322E+00	25.9	2.418E+00	2.466E+00	6.508E+00
EU-154	8.968E+00	14.5	1.298E+00	1.388E+00	3.785E+00
EU-155	-2.502E+00	99.9	2.499E+00	2.503E+00	1.390E+01
HF-181	-1.622E+00	100.2	1.624E+00	1.626E+00	5.360E+00
Ta-182	5.950E+00	72.3	4.299E+00	4.309E+00	1.418E+01
Hg-203	3.494E-01	249.1	8.705E-01	8.707E-01	2.878E+00
TL-208	2.687E+00	64.2	1.726E+00	1.731E+00	2.573E+00
PM-146	1.702E+00	99.7	1.698E+00	1.700E+00	4.356E+00
Y-88	6.985E-01	114.8	8.016E-01	8.026E-01	1.270E+00
Cd-113m	6.710E+03	181.7	1.219E+04	1.220E+04	4.029E+04
Cd-109	5.496E+02	2.4	1.308E+01	3.405E+01	3.893E+01
Cf-251	-1.164E-01	3170.3	3.691E+00	3.691E+00	9.238E+00
Cf-249	1.618E+00	100.2	1.622E+00	1.624E+00	5.351E+00
Sn-126	-1.443E+01	229.6	3.313E+01	3.314E+01	1.092E+02
PB-210	6.573E+02	8.6	5.674E+01	8.211E+01	1.859E+02
PB-212	9.303E-01	231.3	2.152E+00	2.153E+00	7.104E+00
PB-214	2.349E+00	67.5	1.586E+00	1.591E+00	4.164E+00
BI-207	-2.133E+00	31.3	6.683E-01	6.763E-01	4.740E+00
BI-212	-1.622E+01	90.3	1.464E+01	1.467E+01	4.834E+01
U-235	-5.603E+00	82.3	4.612E+00	4.621E+00	2.528E+01
BI-214	3.740E+00	42.7	1.595E+00	1.606E+00	4.054E+00
BI-210M	-2.082E-01	956.3	1.991E+00	1.991E+00	4.732E+00
AC-228	6.516E+00	58.4	3.808E+00	3.822E+00	9.121E+00
TH-227	-9.291E+00	129.5	1.203E+01	1.204E+01	2.872E+01
TH-229	8.168E+00	184.1	1.504E+01	1.505E+01	4.145E+01
TH-234	-1.501E+01	62.3	9.352E+00	9.392E+00	4.498E+01
PA-231	-3.144E+01	155.7	4.896E+01	4.899E+01	1.615E+02
PA-233	-2.933E-02	13702.3	4.018E+00	4.018E+00	1.327E+01
PA-234	8.284E+00	81.2	6.726E+00	6.741E+00	1.478E+01
PA-234M	-4.608E+01	435.7	2.008E+02	2.008E+02	5.310E+02
AM-241	4.745E+03	0.2	7.479E+00	2.740E+02	1.056E+01
Np-237	3.786E+00	112.4	4.257E+00	4.262E+00	1.405E+01
Ir-192	-7.140E-01	125.8	8.985E-01	8.995E-01	2.967E+00
Cs-136	1.307E+00	81.4	1.064E+00	1.067E+00	4.062E+00
Np-239	-2.337E+00	173.6	4.056E+00	4.059E+00	1.338E+01
Nd-147	5.444E+00	66.5	3.621E+00	3.634E+00	1.194E+01
TL-210	-1.462E+00	78.8	1.153E+00	1.156E+00	3.804E+00
Kr-85	2.729E+02	78.7	2.148E+02	2.154E+02	7.086E+02
Total	1.564E+04				

Analyst: kody Saulters

Sample description
441833_Gamma_LCS 160-441833~2-A

Spectrum Filename: C:\User\SPC\Det16\16_Gamma_20191664.An1

Acquisition information
Start time: 9/26/2019 5:14:45 AM
Live time: 7200
Real time: 7358
Dead time: 2.15 %
Detector ID: 16

Detector system
Ge16 SN/11012217

Calibration
Filename: 16_Liquid_Marinelli 1L.Clb
16_1Lmarn_90062_032712

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

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

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

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.06keV)
Stop channel: 8000 (1999.64keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

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

Corrections	Status	Comments
Decay correct to date:	YES	9/26/2019 5:14:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	16_2019-09-07_1328.PBC 9/7/2019 1:28:10 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 54 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.2534

***** 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
26.20	5967.	5.06	0.73	3.001E-02				
32.04	22015.	1.85	1.10	3.737E-02				
36.41	4603.	7.03	1.03	4.208E-02				
43.30	470.	69.17	0.96	4.814E-02				
46.54	10168.	8.63	0.96	5.055E-02	46.54	4.250	6.573E+02	PB210
49.53	34930.	2.27	2.09	5.247E-02	50.14	8.000	1.148E+03	TH227
59.48	702421.	0.16	1.01	5.725E-02	59.54	35.900	4.745E+03	AM241
80.99	66.	352.21	0.99	6.158E-02	80.99	34.060	PBC<MDA	BA133
86.49	221.	112.43	1.00	6.180E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.616E+00	EU155
					86.94	9.040	5.486E+00	Sn126
86.95	225.	104.68	1.00	6.181E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.644E+00	EU155
					86.94	9.040	5.582E+00	Sn126
87.97	9745.	2.90	0.99	6.181E-02	87.57	37.500	5.839E+01	Sn126
					88.04	3.790	5.777E+02	Cd109
98.66	674.	26.00	0.63	6.145E-02	97.50	30.000	5.074E+00	Gd153
					99.50	15.000	1.030E+01	Np239
103.08	551.	28.09	0.71	6.110E-02	103.20	21.800	5.746E+00	Gd153
					103.70	24.000	5.290E+00	Np239
122.43	1942.	11.38	1.78	5.868E-02	121.78	28.580	1.606E+01	EU152
					122.06	85.600	5.365E+00	CO57

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					123.10	40.790	1.128E+01	EU154
131.29	231.	143.91	1.04	5.726E-02	131.29	18.000	PBC<MDA	PA234
133.16	231.	143.84	1.04	5.696E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	5.093E+00	CE144
133.54	231.	144.07	1.04	5.687E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	5.095E+00	CE144
136.44	88.	153.71	1.04	5.639E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.023E+00	CO57
136.59	162.	205.97	1.04	5.636E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	3.741E+00	CO57
139.10	167.	61.44	0.49	5.590E-02				
140.65	66.	212.50	1.05	5.565E-02	140.51	89.300	PBC<MDA	Tc99m
162.66	198.	114.04	1.07	5.153E-02	162.66	6.220	PBC<MDA	Ba140
182.92	138.	81.60	0.46	4.817E-02				
185.72	190.	110.56	1.09	4.776E-02	185.72	54.000	PBC<MDA	U235
193.31	120.	204.36	1.09	4.666E-02	193.51	4.400	PBC<MDA	TH229
210.50	79.	306.27	1.11	4.441E-02	210.85	2.990	PBC<MDA	TH229
238.54	120.	231.32	1.14	4.126E-02	238.63	43.300	PBC<MDA	PB212
242.39	70.	111.51	0.33	4.087E-02	242.00	7.430	3.214E+00	PB214
263.70	112.	181.73	1.16	3.881E-02	263.70	0.006	PBC<MDA	Cd113m
279.20	77.	249.14	1.17	3.745E-02	279.20	81.460	PBC<MDA	Hg203
307.40	102.	123.80	1.20	3.524E-02	308.44	31.750	1.273E+00	Ir192
310.39	254.	49.75	1.20	3.502E-02				
320.77	228.	86.36	1.21	3.431E-02	320.08	9.940	PBC<MDA	CR51
338.41	166.	175.47	1.23	3.309E-02	338.32	12.010	PBC<MDA	AC228
344.39	480.	25.94	1.23	3.271E-02	344.29	26.500	7.684E+00	EU152
351.94	205.	67.52	0.80	3.223E-02	351.93	37.600	PBC<MDA	PB214
364.48	124.	166.65	1.25	3.149E-02	364.48	81.700	PBC<MDA	I131
383.84	231.	100.06	1.27	3.040E-02	383.84	8.940	PBC<MDA	BA133
387.95	232.	100.20	1.27	3.018E-02	387.95	66.000	PBC<MDA	Cf249
391.69	133.	171.42	1.27	2.999E-02	391.69	64.000	PBC<MDA	SN113
427.65	27.	849.43	1.31	2.821E-02	427.88	29.600	PBC<MDA	SB125
453.88	64.	374.02	1.33	2.706E-02	453.88	65.000	PBC<MDA	PM146
462.50	262.	86.94	1.34	2.667E-02	463.37	10.470	PBC<MDA	SB125
486.53	77.	97.33	0.43	2.575E-02	487.02	45.500	9.153E-01	La140
497.05	124.	154.65	1.37	2.536E-02	497.05	90.900	PBC<MDA	RU103
511.86	198.	85.34	2.63	2.482E-02	511.86	20.000	PBC<MDA	RH106
513.98	209.	78.71	1.38	2.475E-02	513.98	0.430	PBC<MDA	Kr85
529.46	117.	70.31	1.40	2.422E-02				
530.91	123.	66.51	1.40	2.417E-02	531.00	13.000	5.444E+00	Nd147
563.24	183.	86.36	1.43	2.314E-02	563.24	8.350	PBC<MDA	CS134
569.32	77.	148.47	1.43	2.295E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	5.683E+00	PA234
					569.70	97.740	4.769E-01	BI207
583.02	161.	95.83	1.44	2.255E-02	583.02	84.500	PBC<MDA	TL208
591.44	330.	48.36	0.43	2.231E-02				
600.50	175.	122.24	1.46	2.206E-02	600.50	17.860	PBC<MDA	SB125
602.73	175.	122.54	1.46	2.199E-02	602.73	98.260	PBC<MDA	SB124

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
604.71	159.	53.09	1.46	2.194E-02	604.71	97.620	PBC<MDA	CS134
609.31	120.	74.44	1.47	2.181E-02	609.31	46.090	PBC<MDA	BI214
610.30	175.	121.94	1.47	2.179E-02	610.30	5.750	PBC<MDA	RU103
614.28	176.	122.12	1.47	2.168E-02	614.28	89.850	PBC<MDA	AG108M
617.59	176.	122.14	1.47	2.158E-02	618.06	99.100	PBC<MDA	PM144
658.09	321.	199.23	1.51	2.058E-02	657.76	94.640	PBC<MDA	AG110M
661.97	203759.	0.24	1.64	2.048E-02	661.66	85.210	1.621E+03	CS137
704.89	167.	61.81	0.34	1.951E-02				
716.69	344.	36.29	0.47	1.925E-02				
723.31	131.	60.15	1.57	1.912E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.051E+00	AG108M
					723.36	20.220	4.722E+00	EU154
735.72	92.	149.83	1.58	1.886E-02	735.72	22.500	PBC<MDA	PM146
747.16	142.	99.72	1.59	1.863E-02	747.16	34.000	PBC<MDA	PM146
778.92	335.	42.21	1.62	1.803E-02	778.92	12.940	1.994E+01	EU152
785.42	177.	81.66	1.62	1.791E-02	785.42	1.280	PBC<MDA	BI212
792.11	160.	57.44	0.77	1.779E-02				
801.80	181.	81.69	1.64	1.762E-02	801.95	8.690	PBC<MDA	CS134
818.50	51.	300.13	1.65	1.733E-02	818.50	100.000	PBC<MDA	Cs136
834.83	725.	22.98	2.40	1.706E-02	834.85	99.980	5.901E+00	MN54
860.56	194.	85.57	1.69	1.664E-02	860.56	12.420	PBC<MDA	TL208
873.23	205.	62.35	1.70	1.645E-02	873.23	12.270	PBC<MDA	EU154
880.53	202.	80.69	1.70	1.633E-02	880.53	6.000	PBC<MDA	PA234
883.83	349.	43.97	0.64	1.628E-02	883.24	9.600	3.099E+01	PA234
					884.68	72.680	4.099E+00	AG110M
889.28	200.	80.79	1.71	1.620E-02	889.28	99.984	PBC<MDA	Sc46
898.04	90.	196.44	1.72	1.607E-02	898.04	93.700	PBC<MDA	Y88
911.79	226.	58.44	2.69	1.588E-02	911.07	29.000	PBC<MDA	AC228
936.11	49.	388.56	1.75	1.551E-02	937.49	34.360	PBC<MDA	AG110M
964.11	196.	94.05	1.77	1.516E-02	964.11	14.605	PBC<MDA	EU152
996.33	211.	59.42	1.80	1.475E-02	996.33	10.600	PBC<MDA	EU154
1004.77	210.	75.46	1.81	1.465E-02	1004.77	18.010	PBC<MDA	EU154
1037.84	87.	191.96	1.84	1.425E-02	1037.84	14.130	PBC<MDA	Co56
1042.81	153.	54.94	0.30	1.420E-02				
1048.07	198.	81.41	1.84	1.414E-02	1048.07	80.000	PBC<MDA	Cs136
1077.40	57.	294.85	1.87	1.381E-02	1077.40	3.300	PBC<MDA	Ga68
1115.55	57.	264.87	1.90	1.341E-02	1115.55	50.600	PBC<MDA	ZN65
1120.29	106.	143.05	1.91	1.336E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.30	200.	72.25	1.91	1.335E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	5.950E+00	Ta182
1173.83	93160.	0.36	2.23	1.283E-02	1173.24	99.900	1.009E+03	CO60
1200.89	66.	64.97	0.57	1.258E-02				
1238.28	68.	119.04	2.00	1.225E-02	1238.28	66.070	PBC<MDA	Co56
1275.19	271.	14.57	2.89	1.195E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	9.272E+00	EU154
1313.00	28.	238.01	2.07	1.164E-02	1313.00	21.000	PBC<MDA	TL210
1333.18	84454.	0.36	2.39	1.148E-02	1332.50	99.980	1.021E+03	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1354.14	52.	63.26	0.30	1.133E-02				
1407.84	152.	24.01	3.77	1.094E-02	1408.00	21.005	9.186E+00	EU152
1460.83	31.	155.09	2.19	1.059E-02	1460.83	10.670	PBC<MDA	K40
1765.13	64.	42.66	1.99	8.909E-03	1764.49	15.400	6.497E+00	BI214
1836.06	35.	118.67	2.48	8.585E-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	
104.56	26.20	30037.	5967.	1.988E+05	5.06	0.731	-	s
127.90	32.04	33140.	22015.	5.892E+05	1.85	1.098	-	s
145.36	36.41	30028.	4603.	1.094E+05	7.03	1.033	-	
172.93	43.23	42084.	470.	9.763E+03	69.17	0.958	-	c
197.83	49.53	155114.	34930.	6.657E+05	2.27	2.093	-	s
395.36	98.66	7250.	568.	9.238E+03	21.62	1.008	-	sD
411.64	103.08	7950.	403.	6.595E+03	31.68	1.012	-	sD
556.47	139.10	8965.	145.	2.590E+03	92.85	1.045	-	sc
731.14	182.92	5376.	138.	2.865E+03	81.60	0.462	-	sc
1228.89	307.21	7969.	102.	2.903E+03	123.80	1.198	-	sc
1240.84	310.20	7880.	254.	7.264E+03	49.75	1.201	-	sD
1945.85	486.53	4590.	42.	1.642E+03	227.09	1.359	-	sc
2116.93	529.45	3304.	117.	4.816E+03	70.31	1.397	-	sc
2364.81	591.44	5028.	330.	1.479E+04	48.36	0.429	-	sM
2819.10	704.89	2987.	139.	7.142E+03	56.13	1.551	-	sD
2865.80	716.69	3162.	344.	1.789E+04	36.29	0.468	-	s
3166.89	792.11	2210.	170.	9.528E+03	39.96	1.627	-	sD
4170.42	1042.81	2193.	153.	1.080E+04	54.94	0.302	-	s
4802.97	1200.89	629.	66.	5.259E+03	64.97	0.567	-	s
5416.20	1354.14	224.	52.	4.620E+03	63.26	0.300	-	s

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

This section based on library: Client_Long_Rev15.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.86	46.54	380080.	10168.	1.412	8.63	0.959
TH-227	200.26	50.14	382955.	-687.	-0.095	127.49	0.963s
AM-241	237.58	59.48	112160.	702421.	97.558	0.16	1.012
TH-234	252.82	63.29	906427.	-692.	-0.096	160.05	0.975
Sn-126	256.79	64.28	925972.	-593.	-0.082	229.61	0.976
BA-133	323.60	80.99	15246.	66.	0.009	352.21	0.991s
Np-237	345.59	86.49	30674.	221.	0.031	112.43	0.996
EU-155	345.80	86.54	28124.	-225.	-0.031	105.85	0.996
Sn-126	347.39	86.94	27518.	225.	0.031	104.68	0.997s
Sn-126	349.91	87.57	28572.	-162.	-0.022	148.23	0.997
Cd-109	351.79	88.04	19695.	9270.	1.288	2.38	0.998A
Nd-147	364.02	91.10	78554.	-225.	-0.031	176.36	1.001
TH-234	369.98	92.59	57144.	-373.	-0.052	62.29	1.002
AC-228	373.02	93.35	56631.	-226.	-0.031	149.01	1.003
Gd-153	389.61	97.50	56312.	-227.	-0.032	148.01	1.007s
Np-239	397.61	99.50	77892.	-227.	-0.031	174.25	1.008
Gd-153	412.40	103.20	77666.	-227.	-0.032	173.44	1.012
Np-239	414.40	103.70	77438.	-228.	-0.032	173.11	1.012
EU-155	420.85	105.31	76486.	-233.	-0.032	99.88	1.014s
Np-239	424.11	106.13	79106.	-229.	-0.032	173.57	1.014s
EU-152	486.69	121.78	19287.	796.	0.111	18.36	1.029D
CO-57	487.81	122.06	20071.	0.	0.000	153.97	1.029A
EU-154	491.96	123.10	19362.	1384.	0.192	14.47	1.030s
PA-234	524.73	131.29	55092.	231.	0.032	143.91	1.038s
HF-181	531.64	133.02	55209.	231.	0.032	143.84	1.039s
CE-144	533.70	133.54	55441.	231.	0.032	144.07	1.040s
HF-181	544.74	136.30	55800.	88.	0.012	153.71	1.042D
CO-57	545.43	136.47	55672.	162.	0.023	205.97	1.042A
Tc-99m	561.57	140.51	9771.	66.	0.009	212.50	1.046D
U-235	574.67	143.79	55283.	-243.	-0.034	82.32	1.049s
CE-141	581.29	145.44	55040.	-235.	-0.033	141.08	1.050s
Ba-140	650.14	162.66	25266.	198.	0.027	114.04	1.066s
CE-139	662.90	165.85	23350.	-234.	-0.033	92.54	1.069
U-235	742.34	185.72	21968.	190.	0.026	110.56	1.087s
TH-229	773.49	193.51	17136.	120.	0.017	204.36	1.094s
U-235	820.76	205.33	16639.	-259.	-0.036	93.46	1.105s
TH-229	842.82	210.85	16629.	79.	0.011	306.27	1.110s
TH-227	943.27	235.97	38556.	-212.	-0.029	131.31	1.133s
PB-212	953.91	238.63	38224.	120.	0.017	231.32	1.136
PB-214	967.37	242.00	38172.	172.	0.024	160.44	1.139s
EU-152	978.14	244.69	40152.	-255.	-0.035	111.23	1.141s
TH-227	1024.32	256.24	14916.	-185.	-0.026	129.46	1.152s
Cd-113m	1054.15	263.70	20842.	112.	0.016	181.73	1.158
BI-210M	1062.67	265.83	19766.	-29.	-0.004	956.30	1.160

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1108.46	277.28	19977.	-242.	-0.034	114.53	1.171s
Hg-203	1116.13	279.20	18243.	77.	0.011	249.14	1.173
I-131	1136.52	284.30	13300.	-240.	-0.033	115.33	1.177s
PB-214	1179.67	295.09	65442.	-262.	-0.036	105.65	1.187
TL-210	1183.31	296.00	65010.	-231.	-0.032	156.40	1.188
PB-212	1199.42	300.03	64748.	-231.	-0.032	155.61	1.191s
PA-231	1199.58	300.07	64650.	-232.	-0.032	155.47	1.192s
PA-233	1200.02	300.18	64882.	-232.	-0.032	155.74	1.192s
PA-231	1209.90	302.65	65114.	-232.	-0.032	155.72	1.194s
BA-133	1210.70	302.85	65345.	-232.	-0.032	155.97	1.194s
Ba-140	1218.69	304.85	65577.	-232.	-0.032	156.01	1.196s
BI-210M	1218.88	304.90	65810.	-213.	-0.030	170.55	1.196s
Ir-192	1265.24	316.49	18864.	-155.	-0.021	125.84	1.206s
CR-51	1279.62	320.08	19239.	228.	0.032	86.36	1.210s
La-140	1314.31	328.76	42553.	-226.	-0.031	129.26	1.217
Cf-249	1333.02	333.44	42327.	-76.	-0.010	385.28	1.222s
AC-228	1352.54	338.32	42086.	166.	0.023	175.47	1.226s
EU-152	1376.40	344.29	7494.	480.	0.067	25.94	1.231D
HF-181	1382.56	345.83	14750.	-229.	-0.032	75.32	1.233s
PB-214	1406.99	351.94	5991.	205.	0.028	67.52	0.801s
I-131	1457.16	364.48	11108.	124.	0.017	166.65	1.250
BA-133	1534.57	383.84	26699.	231.	0.032	100.06	1.267s
Cf-249	1551.01	387.95	26931.	232.	0.032	100.20	1.271
SN-113	1565.96	391.69	25865.	133.	0.018	171.42	1.274s
SB-125	1710.67	427.88	12931.	27.	0.004	849.43	1.307s
AG-108M	1734.91	433.94	13168.	-193.	-0.027	117.81	1.312s
PM-146	1814.67	453.88	13880.	64.	0.009	374.02	1.330s
SB-125	1852.61	463.37	25874.	262.	0.036	86.94	1.338s
Ir-192	1871.38	468.06	24267.	-208.	-0.029	106.38	1.342s
BE-7	1909.51	477.60	29523.	-243.	-0.034	100.18	1.351s
HF-181	1927.12	482.00	29670.	-244.	-0.034	100.15	1.355s
La-140	1947.21	487.02	28364.	-244.	-0.034	97.98	1.359s
RU-103	1987.33	497.05	8831.	124.	0.017	154.65	1.368s
RH-106	2046.57	511.86	14227.	198.	0.028	85.34	2.631s
Kr-85	2055.03	513.98	13442.	209.	0.029	78.71	1.383s
Nd-147	2123.10	531.00	3293.	123.	0.017	66.51	1.398D
Ba-140	2148.14	537.26	7198.	-129.	-0.018	177.36	1.404s
CS-134	2252.03	563.24	5924.	183.	0.025	86.36	1.427
CS-134	2276.36	569.32	6496.	77.	0.011	148.47	1.432
PA-234	2276.96	569.47	6395.	-187.	-0.026	61.06	1.432s
BI-207	2277.89	569.70	6680.	-61.	-0.008	189.57	1.432
TL-208	2331.16	583.02	5649.	161.	0.022	95.83	1.444s
SB-125	2401.07	600.50	22763.	175.	0.024	122.24	1.460
SB-124	2409.99	602.73	22938.	175.	0.024	122.54	1.462s
CS-134	2417.91	604.71	3491.	159.	0.022	53.09	1.463D
BI-214	2436.31	609.31	3893.	120.	0.017	74.44	1.467D
RU-103	2440.26	610.30	22784.	175.	0.024	121.94	1.468s
AG-108M	2456.19	614.28	22959.	176.	0.024	122.12	1.472s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-144	2471.31	618.06	23070.	176.	0.024	122.14	1.475
RH-106	2486.73	621.92	24234.	-180.	-0.025	122.71	1.479s
SB-125	2542.62	635.89	6760.	-95.	-0.013	50.44	1.491s
I-131	2546.96	636.97	6661.	-5.	-0.001	881.32	1.492s
AG-110M	2630.10	657.76	203765.	321.	0.045	199.23	1.510s
CS-137	2645.69	661.66	12449.	194671.	27.038	0.24	1.513D
PM-144	2785.22	696.54	10095.	-164.	-0.023	86.94	1.544
NB-94	2809.57	702.63	9842.	-35.	-0.005	404.48	1.549s
SB-124	2890.19	722.79	11618.	-166.	-0.023	92.11	1.567s
AG-108M	2890.80	722.94	11452.	-166.	-0.023	91.44	1.567s
EU-154	2892.49	723.36	3058.	131.	0.018	60.15	1.567D
ZR-95	2895.84	724.20	11149.	-87.	-0.012	172.53	1.568
BI-212	2907.73	727.17	11397.	-168.	-0.023	90.28	1.570
PM-146	2941.93	735.72	4233.	92.	0.013	149.83	1.578s
PM-146	2987.69	747.16	4424.	142.	0.020	99.72	1.588s
ZR-95	3025.97	756.73	4644.	-75.	-0.010	100.69	1.596s
AG-110M	3054.82	763.94	6341.	-4.	-0.001	939.67	1.602s
NB-95	3062.21	765.79	6342.	0.	0.000	1000.00	1.604s
EU-152	3114.73	778.92	4368.	335.	0.047	42.21	1.615
BI-212	3140.74	785.42	4583.	177.	0.025	81.66	1.621s
CS-134	3182.54	795.87	10710.	-184.	-0.026	80.04	1.630s
TL-210	3197.46	799.60	10428.	-184.	-0.026	78.84	1.633s
CS-134	3206.86	801.95	10814.	181.	0.025	81.69	1.635s
CO-58	3242.16	810.78	11420.	-193.	-0.027	78.63	1.643s
La-140	3262.14	815.77	11613.	-194.	-0.027	79.08	1.647
Cs-136	3273.06	818.50	11702.	51.	0.007	300.13	1.649s
MN-54	3338.39	834.83	4765.	725.	0.101	22.98	2.396s
Co-56	3386.15	846.77	5949.	-205.	-0.028	81.25	1.674s
TL-208	3441.33	860.56	5638.	194.	0.027	85.57	1.685s
NB-94	3483.47	871.10	6540.	-213.	-0.030	83.72	1.695
EU-154	3492.00	873.23	8026.	205.	0.028	62.35	1.696
PA-234	3521.21	880.53	13214.	202.	0.028	80.69	1.703s
PA-234	3532.05	883.24	13417.	203.	0.028	81.19	1.705s
AG-110M	3537.82	884.68	13436.	203.	0.028	81.19	1.706s
Sc-46	3556.21	889.28	12969.	200.	0.028	80.79	1.710s
Y-88	3591.26	898.04	6509.	90.	0.013	196.44	1.718s
AC-228	3646.25	911.79	4139.	226.	0.031	58.44	2.687s
AG-110M	3749.09	937.49	7490.	49.	0.007	388.56	1.751s
EU-152	3855.58	964.11	6990.	196.	0.027	94.05	1.774
AC-228	3875.02	968.97	11580.	-231.	-0.032	66.25	1.778
EU-154	3984.48	996.33	7735.	211.	0.029	59.42	1.801
PA-234M	4003.15	1001.00	10061.	-41.	-0.006	435.67	1.805s
EU-154	4018.27	1004.77	12462.	210.	0.029	75.46	1.808
Co-56	4150.56	1037.84	13836.	87.	0.012	191.96	1.836s
Cs-136	4191.49	1048.07	12872.	198.	0.027	81.41	1.845s
RH-106	4200.65	1050.36	14873.	-209.	-0.029	82.92	1.847s
BI-207	4253.86	1063.66	5715.	-160.	-0.022	31.33	1.858s
Ga-68	4308.84	1077.40	5456.	57.	0.008	294.85	1.870s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
FE-59	4396.27	1099.25	5925.	-190.	-0.026	92.21	1.888s
EU-152	4447.58	1112.07	11596.	-205.	-0.029	74.53	1.899
ZN-65	4461.46	1115.55	11354.	57.	0.008	264.87	1.901s
BI-214	4480.43	1120.29	11434.	106.	0.015	143.05	1.906s
Sc-46	4481.49	1120.55	11297.	0.	0.000	1000.00	1.906s
Ta-182	4484.49	1121.30	10295.	200.	0.028	72.25	1.906s
CO-60	4694.68	1173.83	3065.	93160.	12.939	0.36	2.228
Ta-182	4755.57	1189.05	2488.	-112.	-0.016	105.18	1.963s
Ta-182	4885.06	1221.41	1643.	-118.	-0.016	81.20	1.990
Co-56	4952.57	1238.28	1177.	68.	0.009	119.04	2.004s
EU-154	5097.66	1274.54	773.	271.	0.038	14.57	2.887A
TL-210	5251.57	1313.00	822.	28.	0.004	238.01	2.066
CO-60	5332.33	1333.18	945.	84451.	11.729	0.36	2.386
AG-110M	5536.89	1384.30	480.	-20.	-0.003	265.52	2.124s
EU-152	5631.10	1407.84	236.	152.	0.021	24.01	3.767s
K-40	5843.19	1460.83	407.	31.	0.004	155.09	2.186s
La-140	6385.02	1596.21	348.	-23.	-0.003	199.71	2.294s
SB-124	6764.37	1690.98	317.	-10.	-0.001	458.27	2.369s
BI-214	7061.18	1765.13	137.	64.	0.009	42.66	1.991
Co-56	7086.08	1771.35	505.	-56.	-0.008	58.16	2.433s
Y-88	7345.12	1836.06	260.	35.	0.005	118.67	2.483s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.2295E+01				5.31E+01	
			477.60	-1.230E+01	?(	4.064E+01 1.00E+02 1.05E+01	G
NA-22	C	3.5957E-02				9.50E+02	
						Derived Ave Activity	
			1274.53	3.596E-02	}(	2.029E+00 1.69E+03 9.99E+01	G
K-40	N	3.8051E+00				4.66E+11	
			1460.83	3.805E+00	?(P	1.190E+01 1.55E+02 1.07E+01	G
Sc-46	F	1.7157E+00				8.38E+01	
			889.28	1.716E+00	*(P	4.573E+00 8.08E+01 1.00E+02	G
			1120.55	0.000E+00	-	5.180E+00 1.00E+03 1.00E+02	G
CR-51	F	9.2762E+00				2.77E+01	
			320.08	9.276E+00	&(	2.643E+01 8.64E+01 9.94E+00	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C	5.9015E+00					3.12E+02	
			834.85	5.901E+00	@(P	2.642E+00	2.30E+01	1.00E+02 G
FE-59	F	-3.4465E+00					4.45E+01	
			1099.25	-3.446E+00	&(	6.544E+00	9.22E+01	5.65E+01 G
			1291.60	-5.987E-02	% P	3.910E+00	3.68E+03	4.32E+01 G
Co-56	C	-7.3896E-01					7.73E+01	
			846.77	-1.690E+00	?(P	2.985E+00	8.12E+01	9.99E+01 G
			1238.28	1.165E+00	& P	2.790E+00	1.19E+02	6.61E+01 G
			1037.84	5.986E+00	(P	3.799E+01	1.92E+02	1.41E+01 G
			1771.35	-5.674E+00	+	1.086E+01	5.82E+01	1.55E+01 A
CO-58	C	-1.5435E+00					7.09E+01	
			810.78	-1.544E+00	&(	4.004E+00	7.86E+01	9.95E+01 G
CO-60	F	1.0150E+03					1.93E+03	
			1332.50	1.021E+03	(P	1.765E+00	3.62E-01	1.00E+02 G
			1173.24	1.009E+03	(P	2.823E+00	3.64E-01	9.99E+01 G
ZN-65	F	1.1663E+00					2.44E+02	
			1115.55	1.166E+00	?(	1.022E+01	2.65E+02	5.06E+01 G
NB-94	I	-2.5188E-01					7.41E+06	
			702.63	-2.519E-01	?(	3.374E+00	4.04E+02	9.79E+01 G
			871.10	-1.798E+00	+	3.203E+00	8.37E+01	9.99E+01 G
ZR-95	I	-1.0313E+00					6.40E+01	
			756.73	-1.031E+00	&(P	4.427E+00	1.01E+02	5.45E+01 G
			724.20	-1.428E+00	+	8.150E+00	1.73E+02	4.42E+01 G
RU-103	I	7.4862E-01					3.93E+01	
			497.05	7.486E-01	&(	2.655E+00	1.55E+02	9.09E+01 G
			610.30	1.944E+01		7.828E+01	1.22E+02	5.75E+00 GA
RH-106	I	-1.1705E+01					3.74E+02	
			621.92	-1.170E+01	(	4.742E+01	1.23E+02	9.93E+00 G
			1050.36	-1.317E+02	+	3.603E+02	8.29E+01	1.56E+00 G
			511.86	5.548E+00	+	1.562E+01	8.53E+01	2.00E+01 GA
AG-108M	C	9.1454E-02					1.53E+05	
			433.94	-1.063E+00	(P	2.954E+00	1.18E+02	9.05E+01 G
			722.94	-1.328E+00	+	4.009E+00	9.14E+01	9.08E+01 G
			614.28	1.254E+00	(	5.054E+00	1.22E+02	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	2.1480E+00					2.50E+02	
			884.68	2.380E+00	?(	6.376E+00	8.12E+01	7.27E+01 G
			657.76	2.286E+00	?(P	1.502E+01	1.99E+02	9.46E+01 G
			937.49	1.277E+00	&(	1.058E+01	3.89E+02	3.44E+01 G
			1384.30	-1.030E+00	-	5.395E+00	2.66E+02	2.43E+01 G
			763.94	-1.375E-01	- P	1.273E+01	9.40E+02	2.23E+01 G
SN-113	F	9.6154E-01					1.15E+02	
			391.69	9.615E-01	&(P	5.444E+00	1.71E+02	6.40E+01 G
SB-124	F	1.1254E+00					6.02E+01	
			602.73	1.125E+00	?(	4.553E+00	1.23E+02	9.83E+01 G
			1690.98	-3.032E-01	-	2.686E+00	4.58E+02	4.78E+01 G
			722.79	-1.116E+01	+	3.392E+01	9.21E+01	1.08E+01 G
SB-125	I	4.4919E+00					1.01E+03	
			427.88	4.546E-01	?(	8.859E+00	8.49E+02	2.96E+01 G
			600.50	6.166E+00	(	2.488E+01	1.22E+02	1.79E+01 G
			635.89	-5.530E+00	+ P	2.244E+01	5.04E+01	1.13E+01 G
			463.37	1.305E+01	&(P	3.742E+01	8.69E+01	1.05E+01 G
I-131	I	6.7198E-01					8.02E+00	
			364.48	6.720E-01	&(	2.676E+00	1.67E+02	8.17E+01 G
			284.30	-1.472E+01	+ P	3.312E+01	1.15E+02	6.14E+00 G
			636.97	-5.028E-01	+ P	3.531E+01	8.81E+02	7.17E+00 G
Gd-153	F	-1.7079E+00					2.42E+02	
			97.50	-1.708E+00	&(	8.342E+00	1.48E+02	3.00E+01 G
			103.20	-2.372E+00	+	1.357E+01	1.73E+02	2.18E+01 G
Ga-68	C	3.0715E+01					4.71E-02	
			1077.40	3.071E+01	?(	1.869E+02	2.95E+02	3.30E+00 G
Tc-99m	I	2.0700E-01					2.51E-01	
			140.51	2.070E-01	(	1.456E+00	2.12E+02	8.93E+01 G
BA-133	F	1.2479E-01					3.85E+03	
			356.00	1.248E-01	%(	4.362E+00	1.06E+03	6.20E+01 G
			302.85	-4.942E+00	+	2.544E+01	1.56E+02	1.83E+01 G
			383.84	1.183E+01	&	3.905E+01	1.00E+02	8.94E+00 GA
			80.99	4.346E-01	& P	3.828E+00	3.52E+02	3.41E+01 GA
CS-134	I	1.3125E+00					7.54E+02	
			795.87	-1.683E+00	&(	4.443E+00	8.00E+01	8.55E+01 G
			604.71	1.032E+00	+	1.803E+00	5.31E+01	9.76E+01 G
			569.32	3.029E+00	(	1.488E+01	1.48E+02	1.54E+01 G
			801.95	1.640E+01	&(	4.421E+01	8.17E+01	8.69E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	1.313E+01	(P	2.598E+01	8.64E+01	8.35E+00 G
CS-137	I	1.5489E+03					1.10E+04	
			661.66	1.549E+03	(	4.159E+00	2.41E-01	8.52E+01 G
CE-139	F	-8.0033E-01					1.38E+02	
			165.85	-8.003E-01	?(	2.444E+00	9.25E+01	7.99E+01 G
Ba-140	I	-6.9642E-01					1.28E+01	
			537.26	-3.057E+00	?(P	9.461E+00	1.77E+02	2.44E+01 G
			162.66	8.558E+00	&(	3.221E+01	1.14E+02	6.22E+00 G
			304.85	-2.124E+01	+	1.093E+02	1.56E+02	4.29E+00 G
La-140	I	-3.4771E-01					1.28E+01	
			1596.21	-3.477E-01	(	1.336E+00	2.00E+02	9.54E+01 G
			487.02	-2.890E+00	+	9.341E+00	9.80E+01	4.55E+01 G
			328.76	-4.585E+00	+	1.956E+01	1.29E+02	2.03E+01 G
			815.77	-6.645E+00	&	1.734E+01	7.91E+01	2.33E+01 G
CE-141	I	-1.2390E+00					3.25E+01	
			145.44	-1.239E+00	&(	5.768E+00	1.41E+02	4.82E+01 G
CE-144	I	5.0948E+00					2.85E+02	
			133.54	5.095E+00	(	2.422E+01	1.44E+02	1.11E+01 G
PM-144	C	-1.1694E+00					3.63E+02	
			696.54	-1.169E+00	?(	3.356E+00	8.69E+01	9.90E+01 G
			618.06	1.144E+00	+	4.614E+00	1.22E+02	9.91E+01 G
EU-152	F	9.3223E+00					4.94E+03	
			121.78	6.583E+00	}	5.372E+00	1.84E+01	2.86E+01 G
			344.29	7.684E+00	(	6.508E+00	2.59E+01	2.65E+01 G
			1112.07	-1.554E+01	-	3.821E+01	7.45E+01	1.36E+01 G
			778.92	1.994E+01	+	1.850E+01	4.22E+01	1.29E+01 G
			964.11	1.230E+01	(	2.461E+01	9.41E+01	1.46E+01 G
			244.69	-1.151E+01	-	4.223E+01	1.11E+02	7.58E+00 G
			1408.00	9.186E+00		4.490E+00	2.40E+01	2.10E+01 GA
EU-154	I	8.9677E+00					3.14E+03	
			123.10	8.043E+00	?(P	3.785E+00	1.45E+01	4.08E+01 G
			1274.54	8.968E+00	}	4.371E+00	1.46E+01	3.52E+01 G
			723.36	4.722E+00	-	9.358E+00	6.01E+01	2.02E+01 G
			873.23	1.408E+01	+	2.892E+01	6.23E+01	1.23E+01 G
			1004.77	1.106E+01	(	2.753E+01	7.55E+01	1.80E+01 G
			996.33	1.872E+01	+	3.665E+01	5.94E+01	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	-2.5015E+00					1.81E+03	
			105.31	-2.502E+00	?(P	1.390E+01	9.99E+01	2.12E+01 G
			86.54	-1.644E+00	+	5.741E+00	1.06E+02	3.07E+01 G
HF-181	F	-1.6219E+00					4.24E+01	
			482.00	-1.622E+00	?(	5.360E+00	1.00E+02	8.05E+01 G
			133.02	1.302E+00	&	6.181E+00	1.44E+02	4.33E+01 G
			345.83	-6.469E+00	+	1.607E+01	7.53E+01	1.51E+01 G
			136.30	3.691E+00	}	4.646E+01	1.54E+02	5.85E+00 G
Ta-182	F	5.9498E+00					1.14E+02	
			1121.30	5.950E+00	?(	1.418E+01	7.23E+01	3.49E+01 G
			1221.41	-4.889E+00	-	7.950E+00	8.12E+01	2.70E+01 G
			1189.05	-7.544E+00	-	1.588E+01	1.05E+02	1.62E+01 G
Hg-203	F	3.4940E-01					4.66E+01	
			279.20	3.494E-01	?(	2.878E+00	2.49E+02	8.15E+01 G
TL-208	N	2.6870E+00					6.98E+02	
			583.02	1.170E+00	?(P	2.573E+00	9.58E+01	8.45E+01 G
			277.28	-1.415E+01	& P	3.870E+01	1.15E+02	6.31E+00 G
			860.56	1.301E+01	&(P	2.369E+01	8.56E+01	1.24E+01 G
PM-146	C	1.7024E+00					2.02E+03	
			453.88	5.080E-01	&(	4.356E+00	3.74E+02	6.50E+01 G
			747.16	3.113E+00	*(	6.854E+00	9.97E+01	3.40E+01 G
			735.72	3.022E+00	&(	1.001E+01	1.50E+02	2.25E+01 G
Y-88	F	6.9853E-01					1.07E+02	
			1836.06	5.708E-01	&(	1.270E+00	1.19E+02	9.92E+01 G
			898.04	8.337E-01	?(P	3.492E+00	1.96E+02	9.37E+01 G
Cd-113m		6.7096E+03					5.33E+03	
			263.70	6.710E+03	?(	4.029E+04	1.82E+02	6.00E-03 K
Cd-109	F	5.4958E+02					4.53E+02	
							Derived Ave Activity	
			88.04	5.496E+02	}(	3.893E+01	2.38E+00	3.79E+00 G
Cf-251	T	-1.1643E-01					3.28E+05	
			176.60	-1.164E-01	&(	9.238E+00	3.17E+03	1.70E+01 G
			227.00	3.975E-01	%	3.103E+01	3.12E+03	6.30E+00 GA
Cf-249	T	1.6182E+00					1.28E+05	
			387.95	1.618E+00	&(	5.351E+00	1.00E+02	6.60E+01 G
			333.44	-2.025E+00	+	2.577E+01	3.85E+02	1.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sn-126		-1.4429E+01					3.65E+07	
			87.57	-9.677E-01	}	4.736E+00	1.48E+02	3.75E+01 GA
			64.28	-1.443E+01	&(	1.092E+02	2.30E+02	9.70E+00 G
			86.94	5.582E+00	?	1.928E+01	1.05E+02	9.04E+00 GA
PB-210	N	6.5733E+02					8.14E+03	
			46.54	6.573E+02	?(P	1.859E+02	8.63E+00	4.25E+00 G
PB-212	N	9.3032E-01					6.98E+02	
			238.63	9.303E-01	?(P	7.104E+00	2.31E+02	4.33E+01 G
			300.03	-2.739E+01	+	1.407E+02	1.56E+02	3.28E+00 GA
PB-214	N	2.3493E+00					5.84E+05	
			351.93	2.349E+00	(P	4.164E+00	6.75E+01	3.76E+01 G
			295.09	-5.220E+00	- P	2.378E+01	1.06E+02	1.93E+01 G
			242.00	7.878E+00	?	4.172E+01	1.60E+02	7.43E+00 GA
BI-207	C	-2.1329E+00					1.18E+04	
			1063.66	-2.133E+00	?(P	4.740E+00	3.13E+01	7.45E+01 G
			569.70	-3.785E-01	+	2.376E+00	1.90E+02	9.77E+01 G
BI-212	N	-1.6219E+01					6.98E+02	
			727.17	-1.622E+01	?(	4.834E+01	9.03E+01	7.55E+00 G
			785.42	1.070E+02	*	1.928E+02	8.17E+01	1.28E+00 GA
U-235	N	-5.6027E+00					2.57E+11	
			143.79	-5.603E+00	?(P	2.528E+01	8.23E+01	1.10E+01 G
			205.33	-1.591E+01	+	3.712E+01	9.35E+01	5.01E+00 G
			163.38	-3.898E-01	% P	3.971E+01	2.74E+03	5.08E+00 G
			185.72	1.023E+00	+	3.734E+00	1.11E+02	5.40E+01 GA
BI-214	N	3.7402E+00					5.84E+05	
			609.31	1.654E+00	(P	4.054E+00	7.44E+01	4.61E+01 G
			1120.29	7.297E+00	?(P	3.450E+01	1.43E+02	1.51E+01 G
			1764.49	6.497E+00	(P	5.792E+00	4.27E+01	1.54E+01 G
BI-210M	T	-2.0822E-01					1.10E+09	
			265.83	-2.082E-01	&(P	4.732E+00	9.56E+02	5.00E+01 G
			304.90	-2.982E+00	+	1.678E+01	1.71E+02	2.80E+01 G
AC-228	N	6.5160E+00					2.10E+03	
			911.07	6.819E+00	(	9.121E+00	5.84E+01	2.90E+01 G
			968.97	-1.216E+01	-	2.657E+01	6.63E+01	1.75E+01 G
			338.32	5.784E+00	?(	3.351E+01	1.75E+02	1.20E+01 G
			93.35	-9.148E+00	&	4.498E+01	1.49E+02	5.56E+00 XA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	N	-9.2912E+00					7.95E+03	
			256.24	-9.291E+00	(	2.872E+01	1.29E+02	7.00E+00 G
			235.97	-5.757E+00	+	2.495E+01	1.31E+02	1.23E+01 G
			50.14	-2.257E+01	+	9.486E+01	1.27E+02	8.00E+00 G
TH-229	N	8.1685E+00					2.68E+06	
			193.51	8.116E+00	?(P	4.145E+01	2.04E+02	4.40E+00 G
			210.85	8.246E+00	?(P	6.315E+01	3.06E+02	2.99E+00 G
TH-234	N	-1.5014E+01					1.63E+12	
			92.59	-1.501E+01	?(P	4.498E+01	6.23E+01	5.58E+00 G
			63.29	-4.309E+01	+ P	2.765E+02	1.60E+02	3.81E+00 G
PA-231	N	-3.1437E+01					1.20E+07	
			302.65	-3.144E+01	*(	1.615E+02	1.56E+02	2.88E+00 G
			300.07	-3.653E+01	+	1.874E+02	1.55E+02	2.46E+00 G
PA-233	C	-2.9327E-02					7.82E+08	
			312.01	-2.933E-02	&(P	1.327E+01	1.37E+04	3.60E+01 G
			300.18	-1.450E+01	+	7.451E+01	1.56E+02	6.20E+00 G
PA-234	N	8.2844E+00					1.63E+12	
			131.29	3.112E+00	?(	1.478E+01	1.44E+02	1.80E+01 G
			946.02	-5.385E-01	&	2.767E+01	2.41E+03	1.34E+01 G
			569.47	-1.377E+01	&	2.770E+01	6.11E+01	8.20E+00 G
			883.24	1.798E+01	(	4.817E+01	8.12E+01	9.60E+00 G
			880.53	2.866E+01	&	7.630E+01	8.07E+01	6.00E+00 GA
PA-234M	N	-4.6081E+01					1.63E+12	
			1001.00	-4.608E+01	?(P	5.310E+02	4.36E+02	8.37E-01 G
			766.41	-5.706E+00	& P	9.671E+02	1.73E+03	2.94E-01 G
AM-241	T	4.7449E+03					1.58E+05	
			59.54	4.745E+03	(P	1.056E+01	1.58E-01	3.59E+01 G
Np-237	F	3.7862E+00					2.14E+06	
			86.49	3.786E+00	?(	1.405E+01	1.12E+02	1.31E+01 G
Ir-192	F	-7.1398E-01					7.40E+01	
			316.49	-7.140E-01	*(	2.967E+00	1.26E+02	8.70E+01 G
			468.06	-2.104E+00	&	7.386E+00	1.06E+02	5.18E+01 G
			308.44	-1.519E-06	&	1.494E+01	2.98E+08	3.18E+01 G
Cs-136	F	1.3071E+00					1.30E+01	
			818.50	4.090E-01	&(	4.062E+00	3.00E+02	1.00E+02 G
			1048.07	2.430E+00	&(	6.527E+00	8.14E+01	8.00E+01 G
			340.57	-2.743E-07	%	8.635E+00	9.53E+08	4.69E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Np-239   T  -2.3369E+00                                      2.36E+00
                          103.70-2.184E+00 &   1.248E+01 1.73E+02 2.40E+01 X
                          106.13-2.337E+00 &(  1.338E+01 1.74E+02 2.27E+01 G
                           99.50-3.462E+00 +   1.991E+01 1.74E+02 1.50E+01 X

Nd-147       5.4439E+00                                      1.11E+01
                          531.00 5.444E+00 !(  1.194E+01 6.65E+01 1.30E+01 G
                           91.10-1.787E+00 +   1.040E+01 1.76E+02 2.83E+01 G

TL-210   N  -1.4624E+00                                      5.84E+05
                          799.60-1.462E+00 &(  3.804E+00 7.88E+01 9.90E+01 G
                          296.00-1.124E+00 &   5.801E+00 1.56E+02 7.90E+01 G
                         1313.00 1.610E+00 +   7.744E+00 2.38E+02 2.10E+01 GA

Kr-85    I   2.7292E+02                                      3.92E+03
                          513.98 2.729E+02 &(  7.086E+02 7.87E+01 4.30E-01 G
   ( - This peak used in the nuclide activity average.

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

   Nuclide Codes:                      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	382955.	-687.	-0.095	127.49	-2.257E+01	
TH-234	63.29	906427.	-692.	-0.096	160.05	-4.309E+01	P
BA-133	80.99	15246.	66.	0.009	352.21	4.346E-01	P
Np-237	86.49	30674.	221.	0.031	112.43	3.786E+00	
EU-155	86.54	28124.	-225.	-0.031	105.85	-1.644E+00	
TH-234	92.59	57144.	-373.	-0.052	62.29	-1.501E+01	P
Gd-153	97.50	56312.	-227.	-0.032	148.01	-1.708E+00	
Np-239	99.50	77892.	-227.	-0.031	174.25	-3.462E+00	
Gd-153	103.20	77666.	-227.	-0.032	173.44	-2.372E+00	
Np-239	103.70	77438.	-228.	-0.032	173.11	-2.184E+00	
EU-155	105.31	76486.	-233.	-0.032	99.88	-2.502E+00	P
Np-239	106.13	79106.	-229.	-0.032	173.57	-2.337E+00	
PA-234	131.29	55092.	231.	0.032	143.91	3.112E+00	
CE-144	133.54	55441.	231.	0.032	144.07	5.095E+00	
CO-57	136.47	55672.	162.	0.023	205.97	3.741E+00	
U-235	143.79	55283.	-243.	-0.034	82.32	-5.603E+00	P
CE-141	145.44	55040.	-235.	-0.033	141.08	-1.239E+00	
Ba-140	162.66	25266.	198.	0.027	114.04	8.558E+00	
CE-139	165.85	23350.	-234.	-0.033	92.54	-8.003E-01	
U-235	185.72	21968.	190.	0.026	110.56	1.023E+00	
U-235	205.33	16639.	-259.	-0.036	93.46	-1.591E+01	
TH-227	235.97	38556.	-212.	-0.029	131.31	-5.757E+00	
TH-227	256.24	14916.	-185.	-0.026	129.46	-9.291E+00	
Cd-113m	263.70	20842.	112.	0.016	181.73	6.710E+03	
BI-210M	265.83	19766.	-29.	-0.004	956.30	-2.082E-01	P
Hg-203	279.20	18243.	77.	0.011	249.14	3.494E-01	
I-131	284.30	13300.	-240.	-0.033	115.33	-1.472E+01	P
PA-231	300.07	64650.	-232.	-0.032	155.47	-3.653E+01	
PA-233	300.18	64882.	-232.	-0.032	155.74	-1.450E+01	
PA-231	302.65	65114.	-232.	-0.032	155.72	-3.144E+01	
BA-133	302.85	65345.	-232.	-0.032	155.97	-4.942E+00	
Ba-140	304.85	65577.	-232.	-0.032	156.01	-2.124E+01	
BI-210M	304.90	65810.	-213.	-0.030	170.55	-2.982E+00	
Ir-192	316.49	18864.	-155.	-0.021	125.84	-7.140E-01	
La-140	328.76	42553.	-226.	-0.031	129.26	-4.585E+00	
Cf-249	333.44	42327.	-76.	-0.010	385.28	-2.025E+00	
I-131	364.48	11108.	124.	0.017	166.65	6.720E-01	
BA-133	383.84	26699.	231.	0.032	100.06	1.183E+01	
Cf-249	387.95	26931.	232.	0.032	100.20	1.618E+00	
SN-113	391.69	25865.	133.	0.018	171.42	9.615E-01	P
AG-108M	433.94	13168.	-193.	-0.027	117.81	-1.063E+00	P
PM-146	453.88	13880.	64.	0.009	374.02	5.080E-01	
Ir-192	468.06	24267.	-208.	-0.029	106.38	-2.104E+00	
BE-7	477.60	29523.	-243.	-0.034	100.18	-1.230E+01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
La-140	487.02	28364.	-244.	-0.034	97.98	-2.890E+00		
RU-103	497.05	8831.	124.	0.017	154.65	7.486E-01		
RH-106	511.86	14227.	198.	0.028	85.34	5.548E+00		
Kr-85	513.98	13442.	209.	0.029	78.71	2.729E+02		
Ba-140	537.26	7198.	-129.	-0.018	177.36	-3.057E+00		P
PA-234	569.47	6395.	-187.	-0.026	61.06	-1.377E+01		
BI-207	569.70	6680.	-61.	-0.008	189.57	-3.785E-01		
SB-124	602.73	22938.	175.	0.024	122.54	1.125E+00		
RU-103	610.30	22784.	175.	0.024	121.94	1.944E+01		
AG-108M	614.28	22959.	176.	0.024	122.12	1.254E+00		
RH-106	621.92	24234.	-180.	-0.025	122.71	-1.170E+01		
I-131	636.97	6661.	-5.	-0.001	881.32	-5.028E-01		P
NB-94	702.63	9842.	-35.	-0.005	404.48	-2.519E-01		
SB-124	722.79	11618.	-166.	-0.023	92.11	-1.116E+01		
AG-108M	722.94	11452.	-166.	-0.023	91.44	-1.328E+00		
ZR-95	724.20	11149.	-87.	-0.012	172.53	-1.428E+00		
BI-212	727.17	11397.	-168.	-0.023	90.28	-1.622E+01		
PM-146	735.72	4233.	92.	0.013	149.83	3.022E+00		
PM-146	747.16	4424.	142.	0.020	99.72	3.113E+00		
ZR-95	756.73	4644.	-75.	-0.010	100.69	-1.031E+00		P
BI-212	785.42	4583.	177.	0.025	81.66	1.070E+02		
CO-58	810.78	11420.	-193.	-0.027	78.63	-1.544E+00		
La-140	815.77	11613.	-194.	-0.027	79.08	-6.645E+00		
Cs-136	818.50	11702.	51.	0.007	300.13	4.090E-01		
Co-56	846.77	5949.	-205.	-0.028	81.25	-1.690E+00		P
NB-94	871.10	6540.	-213.	-0.030	83.72	-1.798E+00		
PA-234	880.53	13214.	202.	0.028	80.69	2.866E+01		
PA-234	883.24	13417.	203.	0.028	81.19	1.798E+01		
Sc-46	889.28	12969.	200.	0.028	80.79	1.716E+00		P
Y-88	898.04	6509.	90.	0.013	196.44	8.337E-01		P
PA-234M	1001.00	10061.	-41.	-0.006	435.67	-4.608E+01		P
Co-56	1037.84	13836.	87.	0.012	191.96	5.986E+00		P
Cs-136	1048.07	12872.	198.	0.027	81.41	2.430E+00		
RH-106	1050.36	14873.	-209.	-0.029	82.92	-1.317E+02		
BI-207	1063.66	5715.	-160.	-0.022	31.33	-2.133E+00		P
Ga-68	1077.40	5456.	57.	0.008	294.85	3.071E+01		
FE-59	1099.25	5925.	-190.	-0.026	92.21	-3.446E+00		
Ta-182	1121.30	10295.	200.	0.028	72.25	5.950E+00		
Ta-182	1189.05	2488.	-112.	-0.016	105.18	-7.544E+00		
Ta-182	1221.41	1643.	-118.	-0.016	81.20	-4.889E+00		
Co-56	1238.28	1177.	68.	0.009	119.04	1.165E+00		P
K-40	1460.83	407.	31.	0.004	155.09	3.805E+00		P
La-140	1596.21	348.	-23.	-0.003	199.71	-3.477E-01		
SB-124	1690.98	317.	-10.	-0.001	458.27	-3.032E-01		
Co-56	1771.35	505.	-56.	-0.008	58.16	-5.674E+00		
Y-88	1836.06	260.	35.	0.005	118.67	5.708E-01		

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-1.2295E+01	-1.2295E+01	1.002E+02%	4.06E+01
NA-22	#A	3.5957E-02	3.5957E-02	1.687E+03%	2.03E+00
K-40	#A	3.8051E+00	3.8051E+00	1.551E+02%	1.19E+01
Sc-46	#A	1.7157E+00	1.7157E+00	8.079E+01%	4.57E+00
CR-51	A	9.2761E+00	9.2762E+00	8.636E+01%	2.64E+01
MN-54	#	5.9015E+00	5.9015E+00	2.298E+01%	2.64E+00
FE-59	#A	-3.4464E+00	-3.4465E+00	9.221E+01%	6.54E+00
Co-56	#A	-7.3895E-01	-7.3896E-01	8.125E+01%	2.99E+00
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.54E+01
CO-58	#A	-1.5435E+00	-1.5435E+00	7.863E+01%	4.00E+00
CO-60		1.0150E+03	1.0150E+03	2.566E-01%	1.77E+00
ZN-65	#A	1.1663E+00	1.1663E+00	2.649E+02%	1.02E+01
NB-94	#A	-2.5188E-01	-2.5188E-01	4.045E+02%	3.37E+00
ZR-95	#A	-1.0313E+00	-1.0313E+00	1.007E+02%	4.43E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.85E+00
RU-103	#A	7.4861E-01	7.4862E-01	1.547E+02%	2.65E+00
RH-106	#A	-1.1705E+01	-1.1705E+01	1.227E+02%	4.74E+01
AG-108M	#A	9.1454E-02	9.1454E-02	8.484E+01%	2.95E+00
AG-110M	#A	2.1480E+00	2.1480E+00	8.119E+01%	6.38E+00
SN-113	#A	9.6154E-01	9.6154E-01	1.714E+02%	5.44E+00
SB-124	#A	1.1254E+00	1.1254E+00	1.225E+02%	4.55E+00
SB-125	A	4.4919E+00	4.4919E+00	8.694E+01%	8.86E+00
I-131	#A	6.7195E-01	6.7198E-01	1.667E+02%	2.68E+00
Gd-153	#A	-1.7079E+00	-1.7079E+00	1.480E+02%	8.34E+00
Ga-68	#A	3.0480E+01	3.0715E+01	2.949E+02%	1.87E+02
Tc-99m	A	2.0670E-01	2.0700E-01	2.125E+02%	1.46E+00
BA-133	#A	1.2479E-01	1.2479E-01	1.056E+03%	4.36E+00
CS-134	A	1.3125E+00	1.3125E+00	5.159E+01%	4.44E+00
CS-137		1.5489E+03	1.5489E+03	2.407E-01%	4.16E+00
CE-139	#A	-8.0033E-01	-8.0033E-01	9.254E+01%	2.44E+00
Ba-140	#A	-6.9640E-01	-6.9642E-01	1.054E+02%	9.46E+00
La-140	#A	-3.4770E-01	-3.4771E-01	1.997E+02%	1.34E+00
CE-141	#A	-1.2390E+00	-1.2390E+00	1.411E+02%	5.77E+00
CE-144	#A	5.0948E+00	5.0948E+00	1.441E+02%	2.42E+01
PM-144	#A	-1.1694E+00	-1.1694E+00	8.694E+01%	3.36E+00
EU-152		9.3223E+00	9.3223E+00	2.594E+01%	6.51E+00
EU-154		8.9677E+00	8.9677E+00	1.447E+01%	3.78E+00
EU-155	#A	-2.5015E+00	-2.5015E+00	9.988E+01%	1.39E+01
HF-181	A	-1.6219E+00	-1.6219E+00	1.002E+02%	5.36E+00
Ta-182	#A	5.9498E+00	5.9498E+00	7.225E+01%	1.42E+01
Hg-203	#A	3.4940E-01	3.4940E-01	2.491E+02%	2.88E+00
TL-208	#C	2.6870E+00	2.6870E+00	6.424E+01%	2.57E+00
PM-146	#A	1.7024E+00	1.7024E+00	9.972E+01%	4.36E+00

Y-88	#A	6.9852E-01	6.9853E-01	1.148E+02%	1.27E+00
Cd-113m	#A	6.7096E+03	6.7096E+03	1.817E+02%	4.03E+04
Cd-109	#	5.4958E+02	5.4958E+02	2.380E+00%	3.89E+01
Cf-251	#A	-1.1643E-01	-1.1643E-01	3.170E+03%	9.24E+00
Cf-249	#A	1.6182E+00	1.6182E+00	1.002E+02%	5.35E+00
Sn-126	#A	-1.4429E+01	-1.4429E+01	2.296E+02%	1.09E+02
PB-210	#	6.5733E+02	6.5733E+02	8.632E+00%	1.86E+02
PB-212	#A	9.3032E-01	9.3032E-01	2.313E+02%	7.10E+00
PB-214	A	2.3493E+00	2.3493E+00	6.752E+01%	4.16E+00
BI-207	#A	-2.1329E+00	-2.1329E+00	3.133E+01%	4.74E+00
BI-212	#A	-1.6219E+01	-1.6219E+01	9.028E+01%	4.83E+01
U-235	#A	-5.6027E+00	-5.6027E+00	8.232E+01%	2.53E+01
BI-214	A	3.7402E+00	3.7402E+00	4.266E+01%	4.05E+00
BI-210M	#A	-2.0822E-01	-2.0822E-01	9.563E+02%	4.73E+00
AC-228	A	6.5160E+00	6.5160E+00	5.844E+01%	9.12E+00
TH-227	#A	-9.2912E+00	-9.2912E+00	1.295E+02%	2.87E+01
TH-229	#A	8.1685E+00	8.1685E+00	1.841E+02%	4.15E+01
TH-234	#A	-1.5014E+01	-1.5014E+01	6.229E+01%	4.50E+01
PA-231	#A	-3.1437E+01	-3.1437E+01	1.557E+02%	1.62E+02
PA-233	#A	-2.9327E-02	-2.9327E-02	1.370E+04%	1.33E+01
PA-234	#A	8.2844E+00	8.2844E+00	8.119E+01%	1.48E+01
PA-234M	#A	-4.6081E+01	-4.6081E+01	4.357E+02%	5.31E+02
AM-241		4.7449E+03	4.7449E+03	1.576E-01%	1.06E+01
Np-237	#A	3.7862E+00	3.7862E+00	1.124E+02%	1.40E+01
Ir-192	#A	-7.1398E-01	-7.1398E-01	1.258E+02%	2.97E+00
Cs-136	#A	1.3071E+00	1.3071E+00	8.141E+01%	4.06E+00
Np-239	#A	-2.3365E+00	-2.3369E+00	1.736E+02%	1.34E+01
Nd-147	#A	5.4437E+00	5.4439E+00	6.651E+01%	1.19E+01
TL-210	A	-1.4624E+00	-1.4624E+00	7.884E+01%	3.80E+00
Kr-85	#A	2.7292E+02	2.7292E+02	7.871E+01%	7.09E+02

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

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

Total Activity (25.1 to 1999.6 keV) 7.891E+03 Bq/Sample
Total Decayed Activity (25.1 to 1999.6 keV) 7.8914160E+03 Bq/Sample

441833_Gamma_LCS 160-441833~2-A. 16_Gamma_20191664.spc.

Test America St. Louis Spectrum ID: 14_Gamma_20192012

Sample Description: 441833_Gamma_180-94764-A-3-A
Detector: Detector #14
Batch ID: 441833
Work Order Number: Gamma
Lot Number: 180-94764-A-3-A

Decay to Time: 9/26/2019 08:59 Live Time: 7200 sec
Acquisition Time: 9/26/2019 09:00:05 Real Time: 7204 sec
Analysis Time: 9/26/2019 11:00 Dead Time: 0.06 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 14_Liquid_Marinelli 1L.Clb
Efficiency Cal Desc: 14_1LMarinelli_90062_030612
Efficiency Cal Date: 3/14/2012 16:58
Energy Cal Date: 2/28/2012 10:48
Library: Client_Long_Rev15.lib
Bkgd Correction File: 14_2019-09-07_1325.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	-7.381E-01	108.2	7.987E-01	7.996E-01	3.163E+00
NA-22	-1.529E-01	77.3	1.182E-01	1.184E-01	3.971E-01
K-40	-3.732E+00	52.8	1.971E+00	1.980E+00	5.489E+00
Sc-46	-1.196E-01	124.4	1.487E-01	1.488E-01	5.462E-01
CR-51	-1.246E-01	1009.5	1.258E+00	1.258E+00	3.239E+00
MN-54	-5.137E-02	271.6	1.395E-01	1.395E-01	3.414E-01
FE-59	1.210E-01	90.9	1.100E-01	1.101E-01	5.279E-01
Co-56	9.920E-02	123.0	1.220E-01	1.221E-01	2.897E-01
CO-57	6.439E-03	1044.8	6.728E-02	6.728E-02	2.305E-01
CO-58	-1.610E-01	89.2	1.436E-01	1.438E-01	4.822E-01
CO-60	5.223E-02	93.8	4.900E-02	4.907E-02	3.834E-01
ZN-65	2.425E-01	97.8	2.371E-01	2.374E-01	8.091E-01
NB-94	1.004E-01	108.8	1.092E-01	1.093E-01	2.657E-01
ZR-95	1.647E-01	92.3	1.520E-01	1.522E-01	3.743E-01
NB-95	-3.524E-03	2903.5	1.023E-01	1.023E-01	3.652E-01
RU-103	-4.095E-02	275.0	1.126E-01	1.126E-01	2.866E-01
RH-106	-1.351E+00	153.1	2.068E+00	2.069E+00	6.961E+00
AG-108M	-2.222E-02	466.1	1.036E-01	1.036E-01	2.761E-01
AG-110M	2.382E-01	40.8	9.723E-02	9.794E-02	5.745E-01
SN-113	-8.236E-02	214.4	1.766E-01	1.766E-01	6.007E-01
SB-124	9.274E-02	165.7	1.537E-01	1.538E-01	6.292E-01
SB-125	6.992E-01	28.4	1.982E-01	2.013E-01	4.121E-01
I-131	-6.971E-02	80.4	5.603E-02	5.615E-02	3.443E-01
Gd-153	1.430E-01	147.6	2.110E-01	2.112E-01	7.103E-01
Ga-68	2.253E+00	238.8	5.381E+00	5.383E+00	1.310E+01
Tc-99m	-7.775E-02	137.6	1.069E-01	1.070E-01	3.583E-01
BA-133	-4.653E-02	356.1	1.657E-01	1.657E-01	5.668E-01
CS-134	1.756E-01	74.1	1.302E-01	1.305E-01	3.773E-01
CS-137	7.850E-02	165.7	1.301E-01	1.301E-01	4.445E-01
CE-139	0.000E+00	1.#INF	6.066E-02	6.066E-02	3.136E-01
Ba-140	-3.450E-02	1849.1	6.379E-01	6.379E-01	9.574E-01
La-140	1.260E-01	84.8	1.069E-01	1.071E-01	2.906E-01
CE-141	1.209E-01	126.1	1.524E-01	1.525E-01	5.113E-01

CE-144	0.000E+00	1.#INF	3.489E-01	3.489E-01	2.309E+00
PM-144	-6.569E-02	184.4	1.211E-01	1.212E-01	2.971E-01
EU-152	4.112E-01	69.1	2.842E-01	2.851E-01	6.587E-01
EU-154	2.083E-01	92.7	1.932E-01	1.936E-01	4.719E-01
EU-155	2.537E-01	119.5	3.031E-01	3.034E-01	1.016E+00
HF-181	2.160E-02	278.8	6.021E-02	6.022E-02	4.324E-01
Ta-182	-1.100E-01	85.2	9.374E-02	9.389E-02	1.677E+00
Hg-203	9.098E-02	98.4	8.956E-02	8.971E-02	3.011E-01
TL-208	1.381E-01	119.8	1.655E-01	1.657E-01	2.735E-01
PM-146	-1.517E-01	62.7	9.512E-02	9.542E-02	3.814E-01
Y-88	-2.617E-01	57.2	1.498E-01	1.505E-01	5.227E-01
Cd-113m	1.225E+03	98.6	1.208E+03	1.210E+03	4.058E+03
Cd-109	-1.679E+00	154.5	2.593E+00	2.595E+00	8.667E+00
Cf-251	-4.159E-02	1092.0	4.542E-01	4.542E-01	1.243E+00
Cf-249	0.000E+00	1.#INF	9.960E-02	9.960E-02	5.583E-01
Sn-126	-7.374E-01	124.1	9.149E-01	9.158E-01	3.058E+00
PB-210	1.136E+00	157.1	1.785E+00	1.788E+00	5.086E+00
PB-212	-5.042E-01	48.7	2.453E-01	2.474E-01	9.422E-01
PB-214	-2.791E-01	102.7	2.867E-01	2.870E-01	9.808E-01
BI-207	1.544E-01	91.3	1.409E-01	1.411E-01	3.269E-01
BI-212	-9.818E-01	229.0	2.248E+00	2.249E+00	7.674E+00
U-235	4.742E-01	135.6	6.429E-01	6.434E-01	2.593E+00
BI-214	-3.783E-01	108.4	4.100E-01	4.104E-01	1.401E+00
BI-210M	4.872E-02	300.7	1.465E-01	1.465E-01	5.001E-01
AC-228	3.311E-01	118.5	3.923E-01	3.926E-01	9.622E-01
TH-227	-1.324E+00	99.6	1.319E+00	1.321E+00	3.543E+00
TH-229	8.712E-01	141.7	1.234E+00	1.236E+00	3.790E+00
TH-234	2.038E+00	60.2	1.227E+00	1.232E+00	3.539E+00
PA-231	1.002E+00	217.5	2.179E+00	2.180E+00	1.401E+01
PA-233	2.245E-01	144.1	3.235E-01	3.238E-01	1.089E+00
PA-234	2.884E-01	132.5	3.821E-01	3.825E-01	1.284E+00
PA-234M	1.545E+01	86.8	1.342E+01	1.344E+01	6.092E+01
AM-241	1.130E-01	154.6	1.747E-01	1.748E-01	4.994E-01
Np-237	3.599E-02	2002.9	7.209E-01	7.209E-01	2.432E+00
Ir-192	-4.842E-03	71.9	3.483E-03	3.495E-03	3.331E-01
Cs-136	-1.171E-01	144.9	1.697E-01	1.699E-01	5.767E-01
Np-239	1.422E-02	2114.0	3.006E-01	3.006E-01	1.024E+00
Nd-147	-6.032E-02	1112.1	6.707E-01	6.708E-01	1.753E+00
TL-210	9.419E-02	114.7	1.080E-01	1.081E-01	3.696E-01
Kr-85	0.000E+00	1.#INF	7.948E+00	7.948E+00	1.271E+02
Total	1.253E+03				

Analyst: Kellene Robbs

Sample description
441833_Gamma_180-94764-A-3-A

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20192012.An1

Acquisition information
Start time: 9/26/2019 9:00:05 AM
Live time: 7200
Real time: 7204
Dead time: 0.06 %
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	9/26/2019 8:59:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2019-09-07_1325.PBC 9/7/2019 1:25:07 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 8 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.5239

***** 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
46.88	95.	18.72	0.86	3.869E-02	46.54	4.250	PBC<MDA	PB210
50.14	13.	142.77	0.75	4.049E-02	50.14	8.000	PBC<MDA	TH227
59.54	13.	154.61	0.76	4.451E-02	59.54	35.900	PBC<MDA	AM241
63.42	38.	70.21	2.09	4.569E-02	63.29	3.810	PBC<MDA	TH234
					64.28	9.700	PBC<MDA	Sn126
80.99	10.	224.91	0.78	4.877E-02	80.99	34.060	PBC<MDA	BA133
92.54	27.	97.80	1.09	4.919E-02	92.59	5.584	PBC<MDA	TH234
97.50	15.	147.56	0.80	4.910E-02	97.50	30.000	PBC<MDA	Gd153
105.31	19.	119.45	0.81	4.871E-02	105.31	21.200	PBC<MDA	EU155
121.78	17.	109.08	0.83	4.718E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	6.010E-02	CO57
131.29	17.	132.50	0.84	4.599E-02	131.29	18.000	PBC<MDA	PA234
133.02	9.	278.80	0.84	4.576E-02	133.02	43.300	PBC<MDA	HF181
143.31	13.	214.84	0.85	4.425E-02	143.79	10.960	PBC<MDA	U235
145.44	18.	126.10	0.85	4.401E-02	145.44	48.200	PBC<MDA	CE141
163.33	10.	230.74	0.87	4.129E-02	163.38	5.080	PBC<MDA	U235
185.36	67.	25.75	0.78	3.800E-02	185.72	54.000	4.558E-01	U235
193.51	11.	141.68	0.90	3.697E-02	193.51	4.400	PBC<MDA	TH229
205.44	7.	257.01	0.91	3.553E-02	205.33	5.010	PBC<MDA	U235
210.85	5.	330.90	0.92	3.489E-02	210.85	2.990	PBC<MDA	TH229
238.14	44.	35.79	0.76	3.210E-02	238.63	43.300	PBC<MDA	PB212
263.70	16.	98.61	0.97	2.989E-02	263.70	0.006	PBC<MDA	Cd113m

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
265.83	5.	300.72	0.97	2.972E-02	265.83	50.000	PBC<MDA	BI210M
277.28	6.	255.84	0.98	2.884E-02	277.28	6.310	PBC<MDA	TL208
279.20	15.	98.44	0.99	2.870E-02	279.20	81.460	PBC<MDA	Hg203
284.30	12.	129.95	0.99	2.833E-02	284.30	6.140	PBC<MDA	I131
300.03	3.	713.16	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
300.07	10.	217.49	1.01	2.726E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	2.175E+00	PA231
					300.18	6.200	8.632E-01	PA233
312.01	15.	144.13	1.02	2.650E-02	312.01	36.000	PBC<MDA	PA233
351.93	-18.	102.69	1.06	2.426E-02	351.93	37.600	PBC<MDA	PB214
428.22	30.	28.35	1.13	2.095E-02	427.88	29.600	6.646E-01	SB125
463.37	11.	100.89	1.16	1.970E-02	463.37	10.470	PBC<MDA	SB125
468.06	11.	105.43	1.17	1.955E-02	468.06	51.750	PBC<MDA	Ir192
487.02	12.	99.24	1.18	1.896E-02	487.02	45.500	PBC<MDA	La140
511.86	83.	23.64	2.46	1.823E-02	511.86	20.000	3.146E+00	RH106
563.24	4.	263.79	1.25	1.691E-02	563.24	8.350	PBC<MDA	CS134
569.32	12.	74.13	1.26	1.676E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.253E+00	PA234
					569.70	97.740	1.051E-01	BI207
569.70	1.	737.39	1.26	1.675E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.348E-01	PA234
					569.70	97.740	1.131E-02	BI207
583.02	9.	119.84	1.27	1.645E-02	583.02	84.500	PBC<MDA	TL208
600.72	15.	137.64	1.29	1.606E-02	600.50	17.860	PBC<MDA	SB125
602.73	7.	280.77	1.29	1.601E-02	602.73	98.260	PBC<MDA	SB124
604.71	13.	145.59	1.29	1.597E-02	604.71	97.620	PBC<MDA	CS134
609.31	-20.	108.37	1.30	1.587E-02	609.31	46.090	PBC<MDA	BI214
610.30	6.	337.02	1.30	1.585E-02	610.30	5.750	PBC<MDA	RU103
661.66	7.	165.68	1.34	1.485E-02	661.66	85.210	PBC<MDA	CS137
702.63	10.	108.78	1.38	1.414E-02	702.63	97.900	PBC<MDA	NB94
756.73	9.	92.27	1.43	1.329E-02	756.73	54.460	PBC<MDA	ZR95
766.41	10.	86.84	1.43	1.315E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	3.581E+01	PA234M
795.87	10.	86.39	1.46	1.275E-02	795.87	85.530	PBC<MDA	CS134
799.60	9.	114.67	1.46	1.270E-02	799.60	98.960	PBC<MDA	TL210
846.77	9.	123.02	1.50	1.210E-02	846.77	99.935	PBC<MDA	Co56
860.56	3.	280.36	1.51	1.193E-02	860.56	12.420	PBC<MDA	TL208
884.68	9.	111.30	1.53	1.166E-02	884.68	72.680	PBC<MDA	AG110M
898.04	8.	105.33	1.54	1.151E-02	898.04	93.700	PBC<MDA	Y88
911.07	4.	216.89	1.55	1.137E-02	911.07	29.000	PBC<MDA	AC228
937.49	8.	91.03	1.58	1.110E-02	937.49	34.360	PBC<MDA	AG110M
968.97	8.	118.50	1.60	1.079E-02	968.97	17.460	PBC<MDA	AC228
1001.00	5.	212.84	1.63	1.049E-02	1001.00	0.837	PBC<MDA	PA234M
1004.77	10.	92.74	1.63	1.045E-02	1004.77	18.010	PBC<MDA	EU154
1037.84	1.	857.32	1.65	1.016E-02	1037.84	14.130	PBC<MDA	Co56
1063.66	8.	91.31	1.67	9.948E-03	1063.66	74.500	PBC<MDA	BI207

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1077.40	3.	238.82	1.69	9.838E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	1.	857.32	1.70	9.666E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	8.	84.90	1.71	9.569E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	8.	97.75	1.71	9.543E-03	1115.55	50.600	PBC<MDA	ZN65
1120.29	-1.	739.74	1.72	9.507E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	5.	185.07	1.72	9.505E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	7.842E-02	Sc46
					1121.30	34.900	2.248E-01	Ta182
1173.24	8.	93.82	1.76	9.128E-03	1173.24	99.900	PBC<MDA	CO60
1189.05	5.	112.71	1.77	9.021E-03	1189.05	16.200	PBC<MDA	Ta182
1291.60	6.	90.93	1.84	8.380E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	-1.	915.36	1.87	8.149E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	6.	40.82	1.91	7.874E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	1.	563.47	1.92	7.754E-03	1408.00	21.005	PBC<MDA	EU152
1596.21	4.	137.50	2.04	6.915E-03	1596.21	95.400	PBC<MDA	La140
1690.98	3.	176.21	2.10	6.556E-03	1690.98	47.790	PBC<MDA	SB124
1764.49	-3.	203.10	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 Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
951.79	238.14	51.	44.	1.371E+03	35.79	0.756	- sM

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

This section based on library: Client_Long_Rev15.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.95	46.88	151.	13.	0.002	157.08	0.864s
TH-227	199.98	50.14	117.	13.	0.002	142.77	0.751s
AM-241	237.55	59.54	138.	13.	0.002	154.61	0.761s
TH-234	253.09	63.42	213.	38.	0.005	70.21	2.090s
Sn-126	256.52	64.28	420.	-24.	-0.003	124.07	0.766s
BA-133	323.33	80.99	157.	10.	0.001	224.91	0.784
EU-155	345.54	86.54	558.	0.	0.000	1000.00	0.790s
Sn-126	347.13	86.94	638.	-22.	-0.003	160.40	0.790s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Sn-126	349.65	87.57	616.	-22.	-0.003	157.44	0.791s
Cd-109	351.53	88.04	593.	-23.	-0.003	154.49	0.791s
Nd-147	363.77	91.10	571.	-23.	-0.003	151.00	0.794s
TH-234	369.54	92.54	208.	27.	0.004	97.80	1.088s
AC-228	372.76	93.35	522.	-9.	-0.001	356.81	0.797s
Gd-153	389.36	97.50	243.	15.	0.002	147.56	0.801s
Np-239	397.36	99.50	266.	-21.	-0.003	110.78	0.803s
Gd-153	412.15	103.20	317.	-21.	-0.003	122.02	0.807
Np-239	414.15	103.70	338.	-21.	-0.003	125.79	0.807
EU-155	420.60	105.31	244.	19.	0.003	119.45	0.809s
EU-152	486.45	121.78	173.	17.	0.002	109.08	0.826
EU-154	491.73	123.10	180.	-3.	0.000	713.48	0.828s
PA-234	524.50	131.29	251.	17.	0.002	132.50	0.836s
HF-181	531.42	133.02	297.	9.	0.001	278.80	0.838s
CE-144	533.47	133.54	306.	0.	0.000	1000.00	0.838
HF-181	544.52	136.30	306.	0.	0.000	1000.00	0.841s
CO-57	545.21	136.47	306.	0.	0.000	1000.00	0.841s
Tc-99m	561.35	140.51	366.	-20.	-0.003	137.55	0.845s
U-235	574.45	143.79	355.	13.	0.002	214.84	0.849
CE-141	581.07	145.44	262.	18.	0.003	126.10	0.850s
Ba-140	649.93	162.66	244.	-15.	-0.002	152.76	0.868s
U-235	652.81	163.38	249.	10.	0.001	230.74	0.869s
CE-139	662.70	165.85	233.	0.	0.000	1000.00	0.871s
U-235	740.72	185.36	74.	67.	0.009	25.75	0.781s
TH-229	773.30	193.51	80.	11.	0.002	141.68	0.899s
U-235	820.58	205.33	100.	7.	0.001	257.01	0.912s
TH-229	842.65	210.85	97.	5.	0.001	330.90	0.917s
TH-227	943.11	235.97	374.	-20.	-0.003	141.00	0.942s
PB-212	953.75	238.63	385.	-50.	-0.007	48.66	0.945
PB-214	967.21	242.00	346.	-32.	-0.004	80.25	0.948s
EU-152	977.99	244.69	345.	-20.	-0.003	134.36	0.951s
TH-227	1024.17	256.24	123.	-20.	-0.003	99.62	0.962s
Cd-113m	1054.01	263.70	114.	16.	0.002	98.61	0.970
BI-210M	1062.53	265.83	119.	5.	0.001	300.72	0.972
TL-208	1108.33	277.28	104.	6.	0.001	255.84	0.983s
Hg-203	1115.99	279.20	106.	15.	0.002	98.44	0.985s
I-131	1136.39	284.30	62.	12.	0.002	129.95	0.990s
PB-214	1179.54	295.09	390.	-32.	-0.004	53.96	1.001s
PB-212	1199.30	300.03	268.	3.	0.000	713.16	1.006
PA-231	1199.46	300.07	256.	10.	0.001	217.49	1.006s
PA-233	1199.90	300.18	266.	0.	0.000	1000.00	1.006s
PA-231	1209.78	302.65	266.	0.	0.000	1000.00	1.008s
BA-133	1210.59	302.85	266.	0.	0.000	1000.00	1.009s
Ba-140	1218.57	304.85	266.	0.	0.000	1000.00	1.011s
BI-210M	1218.76	304.90	266.	0.	0.000	1000.00	1.011s
Ir-192	1232.94	308.44	266.	0.	0.000	1000.00	1.014s
PA-233	1247.22	312.01	239.	15.	0.002	144.13	1.018s
Ir-192	1265.13	316.49	125.	-17.	-0.002	97.89	1.022s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	1314.21	328.76	99.	-19.	-0.003	123.76	1.034s
Cf-249	1332.92	333.44	88.	-13.	-0.002	137.82	1.039s
AC-228	1352.44	338.32	168.	-7.	-0.001	270.83	1.043
Cs-136	1361.44	340.57	175.	0.	0.000	1000.00	1.045s
EU-152	1376.30	344.29	175.	0.	0.000	1000.00	1.049s
HF-181	1382.47	345.83	180.	-9.	-0.001	202.43	1.050s
PB-214	1406.88	351.93	175.	-18.	-0.003	102.69	1.056s
BA-133	1423.15	356.00	156.	-5.	-0.001	356.09	1.060s
I-131	1457.08	364.48	93.	-20.	-0.003	94.64	1.069s
BA-133	1534.50	383.84	139.	-12.	-0.002	158.33	1.087s
Cf-249	1550.94	387.95	150.	0.	0.000	1000.00	1.091s
SN-113	1565.90	391.69	162.	-8.	-0.001	214.42	1.095s
SB-125	1710.63	427.88	11.	30.	0.004	28.35	1.129s
AG-108M	1734.87	433.94	55.	-3.	0.000	466.07	1.135s
PM-146	1814.64	453.88	50.	-14.	-0.002	62.70	1.154s
SB-125	1852.59	463.37	59.	11.	0.002	100.89	1.163
Ir-192	1871.36	468.06	67.	11.	0.002	105.43	1.167s
BE-7	1909.50	477.60	87.	-11.	-0.001	108.21	1.176s
HF-181	1927.10	482.00	94.	0.	0.000	1000.00	1.180s
La-140	1947.19	487.02	36.	12.	0.002	99.24	1.185s
RU-103	1987.33	497.05	48.	-5.	-0.001	274.95	1.194s
RH-106	2046.57	511.86	135.	83.	0.011	23.64	2.458s
Kr-85	2055.03	513.98	218.	0.	0.000	1000.00	1.210s
CS-134	2252.06	563.24	28.	4.	0.001	263.79	1.255s
CS-134	2276.40	569.32	36.	12.	0.002	74.13	1.260s
BI-207	2277.92	569.70	48.	1.	0.000	737.39	1.261s
TL-208	2331.20	583.02	28.	9.	0.001	119.84	1.273
SB-125	2401.12	600.50	202.	15.	0.002	137.64	1.289s
SB-124	2410.04	602.73	217.	7.	0.001	280.77	1.291
CS-134	2417.96	604.71	186.	13.	0.002	145.59	1.292
BI-214	2436.36	609.31	233.	-20.	-0.003	108.37	1.296s
RU-103	2440.31	610.30	213.	6.	0.001	337.02	1.297s
AG-108M	2456.25	614.28	219.	0.	0.000	1000.00	1.301s
PM-144	2471.37	618.06	219.	0.	0.000	1000.00	1.304s
RH-106	2486.79	621.92	259.	-15.	-0.002	153.11	1.308
SB-125	2542.69	635.89	35.	-3.	0.000	318.20	1.320
I-131	2547.03	636.97	58.	-11.	-0.002	99.31	1.321s
AG-110M	2630.18	657.76	62.	-17.	-0.002	125.45	1.339s
CS-137	2645.77	661.66	66.	7.	0.001	165.68	1.343s
PM-144	2785.32	696.54	35.	-7.	-0.001	184.39	1.374s
NB-94	2809.67	702.63	26.	10.	0.001	108.78	1.379s
SB-124	2890.31	722.79	84.	-17.	-0.002	80.83	1.396s
AG-108M	2890.91	722.94	101.	-17.	-0.002	87.87	1.397s
EU-154	2892.60	723.36	118.	-8.	-0.001	186.68	1.397s
ZR-95	2895.96	724.20	126.	0.	0.000	1000.00	1.398s
BI-212	2907.84	727.17	137.	-7.	-0.001	228.99	1.400
PM-146	2942.05	735.72	39.	-10.	-0.001	131.34	1.408s
PM-146	2987.81	747.16	35.	-11.	-0.001	116.76	1.417s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZR-95	3026.09	756.73	13.	9.	0.001	92.27	1.426s
AG-110M	3054.96	763.94	36.	-8.	-0.001	109.86	1.432s
PA-234M	3064.83	766.41	32.	10.	0.001	86.84	1.434s
EU-152	3114.87	778.92	26.	-2.	0.000	525.20	1.444s
BI-212	3140.88	785.42	35.	-5.	-0.001	242.96	1.450s
CS-134	3182.68	795.87	33.	10.	0.001	86.39	1.459s
TL-210	3197.61	799.60	43.	9.	0.001	114.67	1.462s
CS-134	3207.01	801.95	61.	-8.	-0.001	139.88	1.464s
CO-58	3242.31	810.77	76.	-14.	-0.002	89.17	1.471s
La-140	3262.30	815.77	90.	-8.	-0.001	182.32	1.475s
Cs-136	3273.22	818.50	110.	-10.	-0.001	144.91	1.478s
MN-54	3338.63	834.85	35.	-5.	-0.001	271.57	1.492s
Co-56	3386.32	846.77	23.	9.	0.001	123.02	1.501s
TL-208	3441.51	860.56	19.	3.	0.000	280.36	1.513s
NB-94	3483.65	871.10	57.	-17.	-0.002	68.16	1.522s
EU-154	3492.19	873.23	77.	-4.	-0.001	294.24	1.523s
PA-234	3521.39	880.53	71.	-14.	-0.002	88.89	1.529s
PA-234	3532.24	883.24	85.	-6.	-0.001	217.91	1.531
AG-110M	3538.01	884.68	48.	9.	0.001	111.30	1.533s
Sc-46	3556.40	889.28	85.	-10.	-0.001	124.37	1.536s
Y-88	3591.45	898.04	14.	8.	0.001	105.33	1.543s
AC-228	3643.58	911.07	19.	4.	0.001	216.89	1.554s
AG-110M	3749.30	937.49	9.	8.	0.001	91.03	1.576s
PA-234	3783.42	946.02	28.	-7.	-0.001	164.75	1.582s
EU-152	3855.80	964.11	50.	0.	0.000	1000.00	1.597s
AC-228	3875.25	968.97	39.	8.	0.001	118.50	1.601
EU-154	3984.71	996.33	56.	-13.	-0.002	88.36	1.622s
PA-234M	4003.39	1001.00	59.	5.	0.001	212.84	1.626s
EU-154	4018.51	1004.77	36.	10.	0.001	92.74	1.629s
Co-56	4150.81	1037.84	15.	1.	0.000	857.32	1.655s
Cs-136	4191.74	1048.07	35.	-3.	0.000	284.80	1.663s
RH-106	4200.91	1050.36	55.	-8.	-0.001	135.78	1.665s
BI-207	4254.12	1063.66	10.	8.	0.001	91.31	1.675s
Ga-68	4309.10	1077.40	10.	3.	0.000	238.82	1.685s
FE-59	4396.54	1099.25	15.	1.	0.000	857.32	1.702s
EU-152	4447.85	1112.07	21.	8.	0.001	84.90	1.712s
ZN-65	4461.74	1115.55	30.	8.	0.001	97.75	1.714
BI-214	4480.72	1120.29	48.	-1.	0.000	739.74	1.718s
Sc-46	4481.77	1120.55	47.	5.	0.001	185.07	1.718s
Ta-182	4484.77	1121.30	64.	-9.	-0.001	127.92	1.719s
CO-60	4692.60	1173.24	10.	8.	0.001	93.82	1.757
Ta-182	4755.88	1189.05	6.	5.	0.001	112.71	1.769s
Co-56	4952.89	1238.28	38.	-15.	-0.002	52.64	1.805s
NA-22	5097.96	1274.53	21.	-9.	-0.001	77.26	1.831s
EU-154	5098.00	1274.54	31.	0.	0.000	1000.00	1.831s
FE-59	5166.25	1291.60	5.	6.	0.001	90.93	1.843s
TL-210	5251.92	1313.00	21.	-10.	-0.001	106.26	1.858s
CO-60	5329.96	1332.50	18.	-1.	0.000	915.36	1.871s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-110M	5537.26	1384.30	0.	6.	0.001	40.82	1.907s
EU-152	5632.13	1408.00	11.	1.	0.000	563.47	1.923s
K-40	5843.58	1460.83	38.	-22.	-0.003	52.81	1.958s
La-140	6385.44	1596.21	6.	4.	0.001	137.50	2.044s
SB-124	6764.81	1690.98	6.	3.	0.000	176.21	2.102s
BI-214	7059.07	1764.49	20.	-3.	0.000	203.10	2.145
Co-56	7086.53	1771.35	29.	-10.	-0.001	83.80	2.149s
Y-88	7345.59	1836.06	18.	-11.	-0.002	57.24	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	-7.3813E-01				5.31E+01	
			477.60	-7.381E-01	&(P	3.163E+00 1.08E+02 1.05E+01	G
NA-22	C	-1.5295E-01				9.50E+02	
			1274.53	-1.529E-01	?(	3.971E-01 7.73E+01 9.99E+01	G
K-40	N	-3.7319E+00				4.66E+11	
			1460.83	-3.732E+00	?(P	5.489E+00 5.28E+01 1.07E+01	G
Sc-46	F	-1.1957E-01				8.38E+01	
			889.28	-1.196E-01	?(P	5.462E-01 1.24E+02 1.00E+02	G
			1120.55	7.842E-02	&	5.047E-01 1.85E+02 1.00E+02	G
CR-51	F	-1.2460E-01				2.77E+01	
			320.08	-1.246E-01	%(P	3.239E+00 1.01E+03 9.94E+00	G
MN-54	C	-5.1369E-02				3.12E+02	
			834.85	-5.137E-02	?(P	3.414E-01 2.72E+02 1.00E+02	G
FE-59	F	1.2096E-01				4.45E+01	
			1099.25	2.543E-02	?(	5.279E-01 8.57E+02 5.65E+01	G
			1291.60	2.459E-01	?(	5.168E-01 9.09E+01 4.32E+01	G
Co-56	C	9.9200E-02				7.73E+01	
			846.77	9.955E-02	?(	2.897E-01 1.23E+02 9.99E+01	G
			1238.28	-3.604E-01	+ P	7.587E-01 5.26E+01 6.61E+01	G
			1037.84	9.671E-02	?(	2.008E+00 8.57E+02 1.41E+01	G
			1771.35	-1.400E+00	+	3.960E+00 8.38E+01 1.55E+01	A

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	C 6.4395E-03					2.72E+02	
		122.06	6.439E-03	%(	2.305E-01	1.04E+03	8.56E+01 G
		136.47	0.000E+00	-	2.418E+00	1.00E+03	1.07E+01 G
CO-58	C -1.6101E-01					7.09E+01	
		810.78	-1.610E-01	&(	4.822E-01	8.92E+01	9.95E+01 G
CO-60	F 5.2228E-02					1.93E+03	
		1332.50	-1.733E-02	&(P	3.834E-01	9.15E+02	1.00E+02 G
		1173.24	1.218E-01	?(	2.657E-01	9.38E+01	9.99E+01 G
ZN-65	F 2.4254E-01					2.44E+02	
		1115.55	2.425E-01	?(	8.091E-01	9.78E+01	5.06E+01 G
NB-94	I 1.0036E-01					7.41E+06	
		702.63	1.004E-01	?(	2.657E-01	1.09E+02	9.79E+01 G
		871.10	-1.969E-01	+	4.448E-01	6.82E+01	9.99E+01 G
ZR-95	I 1.6469E-01					6.40E+01	
		756.73	1.647E-01	?(	3.743E-01	9.23E+01	5.45E+01 G
		724.20	0.000E+00	&	1.255E+00	1.00E+03	4.42E+01 G
NB-95	I -3.5245E-03					6.40E+01	
		765.79	-3.524E-03	%(	3.652E-01	2.90E+03	9.98E+01 G
RU-103	I -4.0949E-02					3.93E+01	
		497.05	-4.095E-02	?(	2.866E-01	2.75E+02	9.09E+01 G
		610.30	9.395E-01	&	1.077E+01	3.37E+02	5.75E+00 GA
RH-106	I -1.3509E+00					3.74E+02	
		621.92	-1.351E+00	?(	6.961E+00	1.53E+02	9.93E+00 G
		1050.36	-7.081E+00	+	3.299E+01	1.36E+02	1.56E+00 G
		511.86	3.146E+00	? P	2.168E+00	2.36E+01	2.00E+01 GA
AG-108M	C -2.2223E-02					1.53E+05	
		433.94	-2.222E-02	?(	2.761E-01	4.66E+02	9.05E+01 G
		722.94	-1.863E-01	+	5.481E-01	8.79E+01	9.08E+01 G
		614.28	0.000E+00	&	7.025E-01	1.00E+03	8.98E+01 G
AG-110M	F 2.3817E-01					2.50E+02	
		884.68	1.513E-01	?(	5.745E-01	1.11E+02	7.27E+01 G
		657.76	-1.707E-01	+ P	3.887E-01	1.25E+02	9.46E+01 G
		937.49	2.823E-01	?(	6.174E-01	9.10E+01	3.44E+01 G
		1384.30	4.357E-01	?(	5.352E-01	4.08E+01	2.43E+01 G
		763.94	-3.860E-01	+	1.453E+00	1.10E+02	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	-8.2360E-02					1.15E+02	
			391.69	-8.236E-02	?(	6.007E-01	2.14E+02	6.40E+01 G
SB-124	F	9.2744E-02					6.02E+01	
			602.73	6.599E-02	?(	6.292E-01	2.81E+02	9.83E+01 G
			1690.98	1.478E-01	?(	6.119E-01	1.76E+02	4.78E+01 G
			722.79	-1.565E+00	+	4.226E+00	8.08E+01	1.08E+01 G
SB-125	I	6.9925E-01					1.01E+03	
			427.88	6.646E-01	?(P	4.121E-01	2.84E+01	2.96E+01 G
			600.50	7.194E-01	?(	3.335E+00	1.38E+02	1.79E+01 G
			635.89	-2.135E-01	-	2.414E+00	3.18E+02	1.13E+01 G
			463.37	7.627E-01	(P	2.588E+00	1.01E+02	1.05E+01 G
I-131	I	-6.9710E-02					8.02E+00	
			364.48	-1.452E-01	&(P	3.443E-01	9.46E+01	8.17E+01 G
			284.30	9.348E-01	?(	3.165E+00	1.30E+02	6.14E+00 G
			636.97	-1.439E+00	+	4.837E+00	9.93E+01	7.17E+00 G
Gd-153	F	1.4301E-01					2.42E+02	
			97.50	1.430E-01	&(	7.103E-01	1.48E+02	3.00E+01 G
			103.20	-2.737E-01	+	1.118E+00	1.22E+02	2.18E+01 G
Ga-68	C	2.2533E+00					4.71E-02	
			1077.40	2.253E+00	?(	1.310E+01	2.39E+02	3.30E+00 G
Tc-99m	I	-7.7751E-02					2.51E-01	
			140.51	-7.775E-02	&(	3.583E-01	1.38E+02	8.93E+01 G
BA-133	F	-4.6527E-02					3.85E+03	
			356.00	-4.653E-02	*(	5.668E-01	3.56E+02	6.20E+01 G
			302.85	0.000E+00	+	2.203E+00	1.00E+03	1.83E+01 G
			383.84	-8.274E-01	+ P	3.940E+00	1.58E+02	8.94E+00 GA
			80.99	7.955E-02	? P	5.116E-01	2.25E+02	3.41E+01 GA
CS-134	I	1.7562E-01					7.54E+02	
			795.87	1.292E-01	?(	3.773E-01	8.64E+01	8.55E+01 G
			604.71	1.201E-01	?(	5.901E-01	1.46E+02	9.76E+01 G
			569.32	6.677E-01	&(	1.652E+00	7.41E+01	1.54E+01 G
			801.95	-1.031E+00	+	4.941E+00	1.40E+02	8.69E+00 G
			563.24	3.936E-01	&(	2.693E+00	2.64E+02	8.35E+00 G
CS-137	I	7.8503E-02					1.10E+04	
			661.66	7.850E-02	?(P	4.445E-01	1.66E+02	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ba-140	I	-3.4500E-02					1.28E+01	
			537.26	-3.450E-02	%(P	9.574E-01	1.85E+03	2.44E+01 G
			162.66	-7.910E-01	+	4.069E+00	1.53E+02	6.22E+00 G
			304.85	0.000E+00	+	9.457E+00	1.00E+03	4.29E+00 G
La-140	I	1.2603E-01					1.28E+01	
			1596.21	9.124E-02	?(	2.906E-01	1.37E+02	9.54E+01 G
			487.02	1.990E-01	?(	4.939E-01	9.92E+01	4.55E+01 G
			328.76	-5.104E-01	+ P	1.319E+00	1.24E+02	2.03E+01 G
			815.77	-3.598E-01	+	2.248E+00	1.82E+02	2.33E+01 G
CE-141	I	1.2087E-01					3.25E+01	
			145.44	1.209E-01	&(	5.113E-01	1.26E+02	4.82E+01 G
PM-144	C	-6.5695E-02					3.63E+02	
			696.54	-6.569E-02	?(	2.971E-01	1.84E+02	9.90E+01 G
			618.06	0.000E+00	+	6.401E-01	1.00E+03	9.91E+01 G
EU-152	F	4.1117E-01					4.94E+03	
			121.78	1.799E-01	?(	6.587E-01	1.09E+02	2.86E+01 G
			344.29	0.000E+00	-	1.367E+00	1.00E+03	2.65E+01 G
			1112.07	8.956E-01	?(	2.578E+00	8.49E+01	1.36E+01 G
			778.92	-1.654E-01	-	2.189E+00	5.25E+02	1.29E+01 G
			964.11	0.000E+00	-	3.131E+00	1.00E+03	1.46E+01 G
			244.69	-1.154E+00	+	5.194E+00	1.34E+02	7.58E+00 G
			1408.00	1.137E-01	-	1.529E+00	5.63E+02	2.10E+01 GA
EU-154	I	2.0835E-01					3.14E+03	
			123.10	-1.931E-02	&(	4.719E-01	7.13E+02	4.08E+01 G
			1274.54	0.000E+00	+	1.327E+00	1.00E+03	3.52E+01 G
			723.36	-4.162E-01	&	2.651E+00	1.87E+02	2.02E+01 G
			873.23	-4.099E-01	+	4.180E+00	2.94E+02	1.23E+01 G
			1004.77	7.240E-01	&(	2.277E+00	9.27E+01	1.80E+01 G
			996.33	-1.570E+00	+	4.670E+00	8.84E+01	1.06E+01 G
EU-155	I	2.5372E-01					1.81E+03	
			105.31	2.537E-01	(	1.016E+00	1.19E+02	2.12E+01 G
			86.54	0.000E+00	&	1.039E+00	1.00E+03	3.07E+01 G
HF-181	F	2.1596E-02					4.24E+01	
			482.00	0.000E+00	(	4.324E-01	1.00E+03	8.05E+01 G
			133.02	6.175E-02	?(	5.821E-01	2.79E+02	4.33E+01 G
			345.83	-3.563E-01	+	2.447E+00	2.02E+02	1.51E+01 G
			136.30	0.000E+00	-	4.413E+00	1.00E+03	5.85E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ta-182	F -1.0996E-01					1.14E+02	
		1121.30	-3.840E-01	&(	1.677E+00	1.28E+02	3.49E+01 G
		1221.41	-2.465E-02	% P	1.078E+00	1.79E+03	2.70E+01 G
		1189.05	4.805E-01	?(P	1.351E+00	1.13E+02	1.62E+01 G
Hg-203	F 9.0983E-02					4.66E+01	
		279.20	9.098E-02	?(	3.011E-01	9.84E+01	8.15E+01 G
TL-208	N 1.3812E-01					6.98E+02	
		583.02	8.995E-02	?(	2.735E-01	1.20E+02	8.45E+01 G
		277.28	4.402E-01	&(P	3.837E+00	2.56E+02	6.31E+00 G
		860.56	3.123E-01	?(	2.140E+00	2.80E+02	1.24E+01 G
PM-146	C -1.5171E-01					2.02E+03	
		453.88	-1.517E-01	?(P	3.814E-01	6.27E+01	6.50E+01 G
		747.16	-3.243E-01	+	9.166E-01	1.17E+02	3.40E+01 G
		735.72	-4.536E-01	+	1.443E+00	1.31E+02	2.25E+01 G
Y-88	F -2.6166E-01					1.07E+02	
		1836.06	-2.617E-01	?(P	5.227E-01	5.72E+01	9.92E+01 G
		898.04	1.030E-01	+	2.594E-01	1.05E+02	9.37E+01 G
Cd-113m	1.2247E+03					5.33E+03	
		263.70	1.225E+03	(	4.058E+03	9.86E+01	6.00E-03 K
Cd-109	F -1.6785E+00					4.53E+02	
		88.04	-1.679E+00	&(	8.667E+00	1.54E+02	3.79E+00 G
Cf-251	T -4.1595E-02					3.28E+05	
		176.60	-4.159E-02	%(	1.243E+00	1.09E+03	1.70E+01 G
		227.00	-2.215E-02	%	3.172E+00	5.16E+03	6.30E+00 GA
Sn-126	-7.3745E-01					3.65E+07	
		87.57	-1.696E-01	+	8.923E-01	1.57E+02	3.75E+01 GA
		64.28	-7.374E-01	?(	3.058E+00	1.24E+02	9.70E+00 G
		86.94	-7.030E-01	+	3.768E+00	1.60E+02	9.04E+00 GA
PB-210	N 1.1364E+00					8.14E+03	
		46.54	1.136E+00	*(P	5.086E+00	1.57E+02	4.25E+00 G
PB-212	N -5.0415E-01					6.98E+02	
		238.63	-5.042E-01	(P	9.422E-01	4.87E+01	4.33E+01 G
		300.03	5.071E-01	+ P	1.227E+01	7.13E+02	3.28E+00 GA
PB-214	N -2.7915E-01					5.84E+05	
		351.93	-2.791E-01	(P	9.808E-01	1.03E+02	3.76E+01 G
		295.09	-8.387E-01	& P	2.472E+00	5.40E+01	1.93E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			242.00	-1.863E+00	+ P	5.268E+00	8.02E+01	7.43E+00 GA
BI-207	C	1.5435E-01					1.18E+04	
			1063.66	1.544E-01	?(	3.269E-01	9.13E+01	7.45E+01 G
			569.70	1.131E-02	-	2.959E-01	7.37E+02	9.77E+01 G
BI-212	N	-9.8177E-01					6.98E+02	
			727.17	-9.818E-01	?(	7.674E+00	2.29E+02	7.55E+00 G
			785.42	-4.161E+00	+ P	2.547E+01	2.43E+02	1.28E+00 GA
U-235	N	4.7420E-01					2.57E+11	
			143.79	3.600E-01	?(P	2.593E+00	2.15E+02	1.10E+01 G
			205.33	5.462E-01	?(	3.848E+00	2.57E+02	5.01E+00 G
			163.38	6.494E-01	?(P	5.043E+00	2.31E+02	5.08E+00 G
			185.72	4.558E-01		2.891E-01	2.57E+01	5.40E+01 GA
BI-214	N	-3.7832E-01					5.84E+05	
			609.31	-3.783E-01	*(P	1.401E+00	1.08E+02	4.61E+01 G
			1120.29	-1.307E-01	& P	3.385E+00	7.40E+02	1.51E+01 G
			1764.49	-4.466E-01	+ P	3.401E+00	2.03E+02	1.54E+01 G
BI-210M	T	4.8718E-02					1.10E+09	
			265.83	4.872E-02	?(P	5.001E-01	3.01E+02	5.00E+01 G
			304.90	0.000E+00	-	1.449E+00	1.00E+03	2.80E+01 G
AC-228	N	3.3105E-01					2.10E+03	
			911.07	1.825E-01	?(	9.622E-01	2.17E+02	2.90E+01 G
			968.97	5.777E-01	?(	2.351E+00	1.19E+02	1.75E+01 G
			338.32	-3.164E-01	&	2.921E+00	2.71E+02	1.20E+01 G
			93.35	-4.619E-01	+	5.545E+00	3.57E+02	5.56E+00 XA
TH-227	N	-1.3239E+00					7.95E+03	
			256.24	-1.324E+00	?(	3.543E+00	9.96E+01	7.00E+00 G
			235.97	-6.869E-01	&	3.245E+00	1.41E+02	1.23E+01 G
			50.14	5.574E-01	+	2.277E+00	1.43E+02	8.00E+00 G
TH-229	N	8.7115E-01					2.68E+06	
			193.51	9.807E-01	?(	3.790E+00	1.42E+02	4.40E+00 G
			210.85	7.100E-01	?(	6.460E+00	3.31E+02	2.99E+00 G
TH-234	N	2.0378E+00					1.63E+12	
			92.59	1.345E+00	*(P	3.539E+00	9.78E+01	5.58E+00 G
			63.29	3.053E+00	*(P	5.639E+00	7.02E+01	3.81E+00 G
PA-231	N	1.0019E+00					1.20E+07	
			302.65	0.000E+00	?(	1.401E+01	1.00E+03	2.88E+00 G
			300.07	2.175E+00	&(	1.599E+01	2.17E+02	2.46E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-233	C	2.2447E-01					7.82E+08	
			312.01	2.245E-01	?(	1.089E+00	1.44E+02	3.60E+01 G
			300.18	0.000E+00	-	6.471E+00	1.00E+03	6.20E+00 G
PA-234	N	2.8840E-01					1.63E+12	
			131.29	2.884E-01	&(	1.284E+00	1.33E+02	1.80E+01 G
			946.02	-6.590E-01	+	2.577E+00	1.65E+02	1.34E+01 G
			569.47	6.135E-02	%	3.550E+00	1.63E+03	8.20E+00 G
			883.24	-7.557E-01	+	5.667E+00	2.18E+02	9.60E+00 G
			880.53	-2.782E+00	+	8.310E+00	8.89E+01	6.00E+00 GA
PA-234M	N	1.5452E+01					1.63E+12	
			1001.00	8.302E+00	&(P	6.092E+01	2.13E+02	8.37E-01 G
			766.41	3.581E+01	?(	1.051E+02	8.68E+01	2.94E-01 G
AM-241	T	1.1300E-01					1.58E+05	
			59.54	1.130E-01	(	4.994E-01	1.55E+02	3.59E+01 G
Np-237	F	3.5994E-02					2.14E+06	
			86.49	3.599E-02	%(	2.432E+00	2.00E+03	1.31E+01 G
Ir-192	F	-4.8423E-03					7.40E+01	
			316.49	-1.014E-01	?(	3.331E-01	9.79E+01	8.70E+01 G
			468.06	1.575E-01	?(	5.626E-01	1.05E+02	5.18E+01 G
			308.44	0.000E+00	+	1.289E+00	1.00E+03	3.18E+01 G
Cs-136	F	-1.1714E-01					1.30E+01	
			818.50	-1.171E-01	?(	5.767E-01	1.45E+02	1.00E+02 G
			1048.07	-5.169E-02	&	5.217E-01	2.85E+02	8.00E+01 G
			340.57	0.000E+00	+	7.661E-01	1.00E+03	4.69E+01 G
Np-239	T	1.4219E-02					2.36E+00	
			103.70	-2.521E-01	&	1.061E+00	1.26E+02	2.40E+01 X
			106.13	1.422E-02	%(	1.024E+00	2.11E+03	2.27E+01 G
			99.50	-4.064E-01	+	1.507E+00	1.11E+02	1.50E+01 X
Nd-147		-6.0316E-02					1.11E+01	
			531.00	-6.032E-02	%(	1.753E+00	1.11E+03	1.30E+01 G
			91.10	-2.255E-01	+	1.138E+00	1.51E+02	2.83E+01 G
TL-210	N	9.4192E-02					5.84E+05	
			799.60	9.419E-02	?(	3.696E-01	1.15E+02	9.90E+01 G
			296.00	6.091E-09	%	6.003E-01	2.90E+09	7.90E+01 G
			1313.00	-8.276E-01	+	1.941E+00	1.06E+02	2.10E+01 GA

(- This peak used in the nuclide activity average.

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

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

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	117.	13.	0.002	142.77	5.574E-01	
AM-241	59.54	138.	13.	0.002	154.61	1.130E-01	
Sn-126	64.28	420.	-24.	-0.003	124.07	-7.374E-01	
BA-133	80.99	157.	10.	0.001	224.91	7.955E-02	P
Sn-126	86.94	638.	-22.	-0.003	160.40	-7.030E-01	
Sn-126	87.57	616.	-22.	-0.003	157.44	-1.696E-01	
Cd-109	88.04	593.	-23.	-0.003	154.49	-1.679E+00	
Nd-147	91.10	571.	-23.	-0.003	151.00	-2.255E-01	
AC-228	93.35	522.	-9.	-0.001	356.81	-4.619E-01	
Gd-153	97.50	243.	15.	0.002	147.56	1.430E-01	
Np-239	99.50	266.	-21.	-0.003	110.78	-4.064E-01	
Gd-153	103.20	317.	-21.	-0.003	122.02	-2.737E-01	
Np-239	103.70	338.	-21.	-0.003	125.79	-2.521E-01	
EU-155	105.31	244.	19.	0.003	119.45	2.537E-01	
EU-152	121.78	173.	17.	0.002	109.08	1.799E-01	
EU-154	123.10	180.	-3.	0.000	713.48	-1.931E-02	
PA-234	131.29	251.	17.	0.002	132.50	2.884E-01	
HF-181	133.02	297.	9.	0.001	278.80	6.175E-02	
Tc-99m	140.51	366.	-20.	-0.003	137.55	-7.775E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CE-141	145.44	262.	18.	0.003	126.10	1.209E-01	
Ba-140	162.66	244.	-15.	-0.002	152.76	-7.910E-01	
TH-229	193.51	80.	11.	0.002	141.68	9.807E-01	
TH-229	210.85	97.	5.	0.001	330.90	7.100E-01	
TH-227	235.97	374.	-20.	-0.003	141.00	-6.869E-01	
PB-214	242.00	346.	-32.	-0.004	80.25	-1.863E+00	P
EU-152	244.69	345.	-20.	-0.003	134.36	-1.154E+00	
TH-227	256.24	123.	-20.	-0.003	99.62	-1.324E+00	
Cd-113m	263.70	114.	16.	0.002	98.61	1.225E+03	
BI-210M	265.83	119.	5.	0.001	300.72	4.872E-02	P
TL-208	277.28	104.	6.	0.001	255.84	4.402E-01	P
Hg-203	279.20	106.	15.	0.002	98.44	9.098E-02	
I-131	284.30	62.	12.	0.002	129.95	9.348E-01	
PB-214	295.09	390.	-32.	-0.004	53.96	-8.387E-01	P
PA-231	300.07	256.	10.	0.001	217.49	2.175E+00	
PA-233	312.01	239.	15.	0.002	144.13	2.245E-01	
Ir-192	316.49	125.	-17.	-0.002	97.89	-1.014E-01	
La-140	328.76	99.	-19.	-0.003	123.76	-5.104E-01	P
Cf-249	333.44	88.	-13.	-0.002	137.82	-4.611E-01	
AC-228	338.32	168.	-7.	-0.001	270.83	-3.164E-01	
HF-181	345.83	180.	-9.	-0.001	202.43	-3.563E-01	
PB-214	351.93	175.	-18.	-0.003	102.69	-2.791E-01	P
BA-133	356.00	156.	-5.	-0.001	356.09	-4.653E-02	
I-131	364.48	93.	-20.	-0.003	94.64	-1.452E-01	P
BA-133	383.84	139.	-12.	-0.002	158.33	-8.274E-01	P
SN-113	391.69	162.	-8.	-0.001	214.42	-8.236E-02	
AG-108M	433.94	55.	-3.	0.000	466.07	-2.222E-02	
PM-146	453.88	50.	-14.	-0.002	62.70	-1.517E-01	P
Ir-192	468.06	67.	11.	0.002	105.43	1.575E-01	
BE-7	477.60	87.	-11.	-0.001	108.21	-7.381E-01	P
La-140	487.02	36.	12.	0.002	99.24	1.990E-01	
RU-103	497.05	48.	-5.	-0.001	274.95	-4.095E-02	
RH-106	511.86	135.	83.	0.011	23.64	3.146E+00	P
CS-134	563.24	28.	4.	0.001	263.79	3.936E-01	
CS-134	569.32	36.	12.	0.002	74.13	6.677E-01	
BI-207	569.70	48.	1.	0.000	737.39	1.131E-02	
TL-208	583.02	28.	9.	0.001	119.84	8.995E-02	
SB-124	602.73	217.	7.	0.001	280.77	6.599E-02	
CS-134	604.71	186.	13.	0.002	145.59	1.201E-01	
BI-214	609.31	233.	-20.	-0.003	108.37	-3.783E-01	P
RU-103	610.30	213.	6.	0.001	337.02	9.395E-01	
RH-106	621.92	259.	-15.	-0.002	153.11	-1.351E+00	
I-131	636.97	58.	-11.	-0.002	99.31	-1.439E+00	
AG-110M	657.76	62.	-17.	-0.002	125.45	-1.707E-01	P
CS-137	661.66	66.	7.	0.001	165.68	7.850E-02	P
PM-144	696.54	35.	-7.	-0.001	184.39	-6.569E-02	
NB-94	702.63	26.	10.	0.001	108.78	1.004E-01	
SB-124	722.79	84.	-17.	-0.002	80.83	-1.565E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-108M	722.94	101.	-17.	-0.002	87.87	-1.863E-01	
EU-154	723.36	118.	-8.	-0.001	186.68	-4.162E-01	
BI-212	727.17	137.	-7.	-0.001	228.99	-9.818E-01	
PM-146	735.72	39.	-10.	-0.001	131.34	-4.536E-01	
PM-146	747.16	35.	-11.	-0.001	116.76	-3.243E-01	
ZR-95	756.73	13.	9.	0.001	92.27	1.647E-01	
AG-110M	763.94	36.	-8.	-0.001	109.86	-3.860E-01	
PA-234M	766.41	32.	10.	0.001	86.84	3.581E+01	
EU-152	778.92	26.	-2.	0.000	525.20	-1.654E-01	
BI-212	785.42	35.	-5.	-0.001	242.96	-4.161E+00	P
CS-134	795.87	33.	10.	0.001	86.39	1.292E-01	
TL-210	799.60	43.	9.	0.001	114.67	9.419E-02	
CS-134	801.95	61.	-8.	-0.001	139.88	-1.031E+00	
CO-58	810.77	76.	-14.	-0.002	89.17	-1.610E-01	
La-140	815.77	90.	-8.	-0.001	182.32	-3.598E-01	
Cs-136	818.50	110.	-10.	-0.001	144.91	-1.171E-01	
MN-54	834.85	35.	-5.	-0.001	271.57	-5.137E-02	P
Co-56	846.77	23.	9.	0.001	123.02	9.955E-02	
TL-208	860.56	19.	3.	0.000	280.36	3.123E-01	
NB-94	871.10	57.	-17.	-0.002	68.16	-1.969E-01	
EU-154	873.23	77.	-4.	-0.001	294.24	-4.099E-01	
PA-234	880.53	71.	-14.	-0.002	88.89	-2.782E+00	
PA-234	883.24	85.	-6.	-0.001	217.91	-7.557E-01	
AG-110M	884.68	48.	9.	0.001	111.30	1.513E-01	
Sc-46	889.28	85.	-10.	-0.001	124.37	-1.196E-01	P
Y-88	898.04	14.	8.	0.001	105.33	1.030E-01	
AC-228	911.07	19.	4.	0.001	216.89	1.825E-01	
AG-110M	937.49	9.	8.	0.001	91.03	2.823E-01	
PA-234	946.02	28.	-7.	-0.001	164.75	-6.590E-01	
AC-228	968.97	39.	8.	0.001	118.50	5.777E-01	
EU-154	996.33	56.	-13.	-0.002	88.36	-1.570E+00	
PA-234M	1001.00	59.	5.	0.001	212.84	8.302E+00	P
EU-154	1004.77	36.	10.	0.001	92.74	7.240E-01	
Co-56	1037.84	15.	1.	0.000	857.32	9.671E-02	
Cs-136	1048.07	35.	-3.	0.000	284.80	-5.169E-02	
RH-106	1050.36	55.	-8.	-0.001	135.78	-7.081E+00	
BI-207	1063.66	10.	8.	0.001	91.31	1.544E-01	
Ga-68	1077.40	10.	3.	0.000	238.82	2.253E+00	
FE-59	1099.25	15.	1.	0.000	857.32	2.543E-02	
EU-152	1112.07	21.	8.	0.001	84.90	8.956E-01	
ZN-65	1115.55	30.	8.	0.001	97.75	2.425E-01	
BI-214	1120.29	48.	-1.	0.000	739.74	-1.307E-01	P
Sc-46	1120.55	47.	5.	0.001	185.07	7.842E-02	
Ta-182	1121.30	64.	-9.	-0.001	127.92	-3.840E-01	
CO-60	1173.24	10.	8.	0.001	93.82	1.218E-01	
Ta-182	1189.05	6.	5.	0.001	112.71	4.805E-01	P
Co-56	1238.28	38.	-15.	-0.002	52.64	-3.604E-01	P
NA-22	1274.53	21.	-9.	-0.001	77.26	-1.529E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
FE-59	1291.60	5.	6.	0.001	90.93	2.459E-01		
TL-210	1313.00	21.	-10.	-0.001	106.26	-8.276E-01		
CO-60	1332.50	18.	-1.	0.000	915.36	-1.733E-02		P
AG-110M	1384.30	0.	6.	0.001	40.82	4.357E-01		
EU-152	1408.00	11.	1.	0.000	563.47	1.137E-01		
K-40	1460.83	38.	-22.	-0.003	52.81	-3.732E+00		P
La-140	1596.21	6.	4.	0.001	137.50	9.124E-02		
SB-124	1690.98	6.	3.	0.000	176.21	1.478E-01		
BI-214	1764.49	20.	-3.	0.000	203.10	-4.466E-01		P
Co-56	1771.35	29.	-10.	-0.001	83.80	-1.400E+00		
Y-88	1836.06	18.	-11.	-0.002	57.24	-2.617E-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	-7.3812E-01	-7.3813E-01	1.082E+02%	3.16E+00
NA-22	#A	-1.5295E-01	-1.5295E-01	7.726E+01%	3.97E-01
K-40	#A	-3.7319E+00	-3.7319E+00	5.281E+01%	5.49E+00
Sc-46	#A	-1.1957E-01	-1.1957E-01	1.244E+02%	5.46E-01
CR-51	#A	-1.2460E-01	-1.2460E-01	1.009E+03%	3.24E+00
MN-54	#A	-5.1369E-02	-5.1369E-02	2.716E+02%	3.41E-01
FE-59	#A	1.2096E-01	1.2096E-01	9.093E+01%	5.28E-01
Co-56	#A	9.9199E-02	9.9200E-02	1.230E+02%	2.90E-01
CO-57	#A	6.4395E-03	6.4395E-03	1.045E+03%	2.30E-01
CO-58	#A	-1.6101E-01	-1.6101E-01	8.917E+01%	4.82E-01
CO-60	#A	5.2228E-02	5.2228E-02	9.382E+01%	3.83E-01
ZN-65	#A	2.4254E-01	2.4254E-01	9.775E+01%	8.09E-01
NB-94	#A	1.0036E-01	1.0036E-01	1.088E+02%	2.66E-01
ZR-95	#A	1.6469E-01	1.6469E-01	9.227E+01%	3.74E-01
NB-95	#A	-3.5244E-03	-3.5245E-03	2.903E+03%	3.65E-01
RU-103	#A	-4.0948E-02	-4.0949E-02	2.750E+02%	2.87E-01
RH-106	#A	-1.3509E+00	-1.3509E+00	1.531E+02%	6.96E+00
AG-108M	#A	-2.2223E-02	-2.2223E-02	4.661E+02%	2.76E-01
AG-110M	#A	2.3817E-01	2.3817E-01	4.082E+01%	5.75E-01
SN-113	#A	-8.2359E-02	-8.2360E-02	2.144E+02%	6.01E-01
SB-124	#A	9.2743E-02	9.2744E-02	1.657E+02%	6.29E-01
SB-125		6.9925E-01	6.9925E-01	2.835E+01%	4.12E-01
I-131	#A	-6.9705E-02	-6.9710E-02	8.038E+01%	3.44E-01
Gd-153	#A	1.4301E-01	1.4301E-01	1.476E+02%	7.10E-01
Ga-68	#A	2.2285E+00	2.2533E+00	2.388E+02%	1.31E+01
Tc-99m	#A	-7.7590E-02	-7.7751E-02	1.376E+02%	3.58E-01
BA-133	#A	-4.6527E-02	-4.6527E-02	3.561E+02%	5.67E-01
CS-134	#A	1.7562E-01	1.7562E-01	7.413E+01%	3.77E-01
CS-137	#A	7.8503E-02	7.8503E-02	1.657E+02%	4.45E-01

CE-139 #A	0.0000E+00	0.0000E+00	1.000E+03%		3.14E-01
Ba-140 #A	-3.4499E-02	-3.4500E-02	1.849E+03%		9.57E-01
La-140 #A	1.2602E-01	1.2603E-01	8.479E+01%		2.91E-01
CE-141 #A	1.2087E-01	1.2087E-01	1.261E+02%		5.11E-01
CE-144 #A	0.0000E+00	0.0000E+00	1.000E+03%		2.31E+00
PM-144 #A	-6.5694E-02	-6.5695E-02	1.844E+02%		2.97E-01
EU-152 #A	4.1117E-01	4.1117E-01	6.911E+01%		6.59E-01
EU-154 #A	2.0835E-01	2.0835E-01	9.274E+01%		4.72E-01
EU-155 #A	2.5372E-01	2.5372E-01	1.195E+02%		1.02E+00
HF-181 #A	2.1596E-02	2.1596E-02	2.788E+02%		4.32E-01
Ta-182 #A	-1.0996E-01	-1.0996E-01	8.525E+01%		1.68E+00
Hg-203 #A	9.0982E-02	9.0983E-02	9.844E+01%		3.01E-01
TL-208 #A	1.3812E-01	1.3812E-01	1.198E+02%		2.74E-01
PM-146 #A	-1.5171E-01	-1.5171E-01	6.270E+01%		3.81E-01
Y-88 #A	-2.6166E-01	-2.6166E-01	5.724E+01%		5.23E-01
Cd-113m#A	1.2247E+03	1.2247E+03	9.861E+01%		4.06E+03
Cd-109 #A	-1.6785E+00	-1.6785E+00	1.545E+02%		8.67E+00
Cf-251 #A	-4.1595E-02	-4.1595E-02	1.092E+03%		1.24E+00
Cf-249 #A	0.0000E+00	0.0000E+00	1.000E+03%		5.58E-01
Sn-126 #A	-7.3745E-01	-7.3745E-01	1.241E+02%		3.06E+00
PB-210 #A	1.1364E+00	1.1364E+00	1.571E+02%		5.09E+00
PB-212 A	-5.0415E-01	-5.0415E-01	4.866E+01%		9.42E-01
PB-214 #A	-2.7915E-01	-2.7915E-01	1.027E+02%		9.81E-01
BI-207 #A	1.5435E-01	1.5435E-01	9.131E+01%		3.27E-01
BI-212 #A	-9.8177E-01	-9.8177E-01	2.290E+02%		7.67E+00
U-235 #A	4.7420E-01	4.7420E-01	1.356E+02%		2.59E+00
BI-214 #A	-3.7832E-01	-3.7832E-01	1.084E+02%		1.40E+00
BI-210M#A	4.8718E-02	4.8718E-02	3.007E+02%		5.00E-01
AC-228 #A	3.3105E-01	3.3105E-01	1.185E+02%		9.62E-01
TH-227 #A	-1.3239E+00	-1.3239E+00	9.962E+01%		3.54E+00
TH-229 #A	8.7115E-01	8.7115E-01	1.417E+02%		3.79E+00
TH-234 #A	2.0378E+00	2.0378E+00	6.020E+01%		3.54E+00
PA-231 #A	1.0019E+00	1.0019E+00	2.175E+02%		1.40E+01
PA-233 #A	2.2447E-01	2.2447E-01	1.441E+02%		1.09E+00
PA-234 #A	2.8840E-01	2.8840E-01	1.325E+02%		1.28E+00
PA-234M#A	1.5452E+01	1.5452E+01	8.684E+01%		6.09E+01
AM-241 #A	1.1300E-01	1.1300E-01	1.546E+02%		4.99E-01
Np-237 #A	3.5994E-02	3.5994E-02	2.003E+03%		2.43E+00
Ir-192 #A	-4.8423E-03	-4.8423E-03	7.193E+01%		3.33E-01
Cs-136 #A	-1.1713E-01	-1.1714E-01	1.449E+02%		5.77E-01
Np-239 #A	1.4216E-02	1.4219E-02	2.114E+03%		1.02E+00
Nd-147 #A	-6.0313E-02	-6.0316E-02	1.112E+03%		1.75E+00
TL-210 #A	9.4192E-02	9.4192E-02	1.147E+02%		3.70E-01
Kr-85 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.27E+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) 6.992E-01 Bq/Sample
Total Decayed Activity (25.1 to 1999.5 keV) 6.9924963E-01 Bq/Sample

441833_Gamma_180-94764-A-3-A. 14_Gamma_20192012.spc.

Test America St. Louis Spectrum ID: 16_Gamma_20191669

Sample Description: 441833_Gamma_180-94764-A-3-B DU
Detector: Detector #16
Batch ID: 441833
Work Order Number: Gamma
Lot Number: 180-94764-A-3-B DU

Decay to Time: 9/26/2019 14:13 Live Time: 7200 sec
Acquisition Time: 9/26/2019 14:13:48 Real Time: 7216 sec
Analysis Time: 9/26/2019 16:14 Dead Time: 0.22 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 16_Liquid_Marinelli 1L.Clb
Efficiency Cal Desc: 16_1Lmarn_90062_032712
Efficiency Cal Date: 4/2/2012 18:09
Energy Cal Date: 2/28/2012 09:35
Library: Client_Long_Rev15.lib
Bkgd Correction File: 16_2019-09-07_1328.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	8.888E-01	102.0	9.062E-01	9.073E-01	3.040E+00
NA-22	1.241E-01	76.9	9.545E-02	9.564E-02	3.201E-01
K-40	-1.745E+00	98.0	1.710E+00	1.712E+00	4.521E+00
Sc-46	-1.593E-01	78.3	1.247E-01	1.250E-01	4.376E-01
CR-51	2.850E-01	253.0	7.212E-01	7.213E-01	1.808E+00
MN-54	2.217E-01	48.8	1.082E-01	1.087E-01	2.327E-01
FE-59	2.658E-01	84.1	2.236E-01	2.240E-01	4.848E-01
Co-56	-1.744E-02	318.7	5.558E-02	5.559E-02	3.055E-01
CO-57	0.000E+00	1.#INF	2.067E-02	2.067E-02	2.455E-01
CO-58	8.797E-02	118.9	1.046E-01	1.047E-01	3.550E-01
CO-60	-9.717E-02	190.1	1.847E-01	1.847E-01	3.517E-01
ZN-65	0.000E+00	1.#INF	1.262E-01	1.262E-01	9.177E-01
NB-94	-1.060E-01	133.3	1.413E-01	1.414E-01	4.763E-01
ZR-95	1.497E-01	91.4	1.368E-01	1.370E-01	3.178E-01
NB-95	0.000E+00	1.#INF	2.154E-02	2.154E-02	3.239E-01
RU-103	-7.632E-02	152.6	1.165E-01	1.166E-01	2.777E-01
RH-106	-7.631E-01	80.7	6.161E-01	6.173E-01	3.489E+00
AG-108M	2.661E-02	89.5	2.382E-02	2.385E-02	2.583E-01
AG-110M	2.576E-02	336.4	8.666E-02	8.667E-02	5.334E-01
SN-113	-4.564E-02	353.1	1.611E-01	1.611E-01	5.234E-01
SB-124	1.934E-02	47.6	9.205E-03	9.256E-03	5.832E-01
SB-125	2.068E-01	73.2	1.514E-01	1.518E-01	7.484E-01
I-131	-1.347E-02	92.4	1.244E-02	1.246E-02	3.048E-01
Gd-153	0.000E+00	1.#INF	8.904E-02	8.904E-02	1.338E+00
Ga-68	-1.246E+00	598.8	7.460E+00	7.461E+00	1.665E+01
Tc-99m	8.451E-02	146.4	1.238E-01	1.239E-01	4.127E-01
BA-133	2.178E-01	87.6	1.909E-01	1.913E-01	4.589E-01
CS-134	1.834E-01	86.9	1.593E-01	1.596E-01	3.838E-01
CS-137	7.957E-03	1374.8	1.094E-01	1.094E-01	3.810E-01
CE-139	8.893E-02	95.1	8.453E-02	8.491E-02	2.818E-01
Ba-140	2.940E-01	170.9	5.025E-01	5.027E-01	1.042E+00
La-140	1.156E-01	85.9	9.937E-02	9.956E-02	2.151E-01
CE-141	-1.513E-01	148.2	2.241E-01	2.243E-01	7.469E-01

CE-144	1.122E-01	779.0	8.744E-01	8.745E-01	2.936E+00
PM-144	-1.667E-01	81.0	1.350E-01	1.353E-01	4.495E-01
EU-152	4.597E-01	65.0	2.986E-01	2.997E-01	7.115E-01
EU-154	2.797E-01	58.2	1.629E-01	1.637E-01	4.791E-01
EU-155	-7.910E-02	482.0	3.813E-01	3.813E-01	8.224E-01
HF-181	1.473E-01	84.4	1.244E-01	1.246E-01	4.214E-01
Ta-182	7.109E-09	5360401467.8	3.810E-01	3.810E-01	1.336E+00
Hg-203	9.088E-02	88.3	8.024E-02	8.040E-02	2.681E-01
TL-208	-2.289E-01	63.3	1.449E-01	1.453E-01	3.782E-01
PM-146	-3.421E-02	395.2	1.352E-01	1.352E-01	3.278E-01
Y-88	-1.413E-01	155.7	2.200E-01	2.202E-01	4.366E-01
Cd-113m	-1.646E+03	86.9	1.431E+03	1.435E+03	4.764E+03
Cd-109	-4.523E-07	696287255.2	3.149E+00	3.149E+00	1.054E+01
Cf-251	1.386E-01	311.9	4.323E-01	4.325E-01	1.115E+00
Cf-249	-1.508E-01	103.4	1.559E-01	1.561E-01	5.214E-01
Sn-126	5.355E-01	160.1	8.571E-01	8.576E-01	2.865E+00
PB-210	1.351E+00	152.0	2.054E+00	2.058E+00	6.573E+00
PB-212	-2.288E-01	97.2	2.223E-01	2.228E-01	7.416E-01
PB-214	-5.747E-01	43.9	2.521E-01	2.538E-01	8.655E-01
BI-207	-1.164E-01	144.0	1.676E-01	1.677E-01	4.794E-01
BI-212	6.603E-01	193.7	1.279E+00	1.279E+00	4.393E+00
U-235	5.437E-01	138.2	7.512E-01	7.517E-01	3.098E+00
BI-214	3.673E-02	71.9	2.639E-02	2.646E-02	1.360E+00
BI-210M	6.413E-03	112.1	7.191E-03	7.201E-03	5.718E-01
AC-228	-3.317E-01	144.5	4.793E-01	4.795E-01	1.075E+00
TH-227	5.562E-01	130.5	7.259E-01	7.267E-01	2.742E+00
TH-229	1.532E+00	104.4	1.599E+00	1.604E+00	4.071E+00
TH-234	1.219E+00	88.6	1.080E+00	1.083E+00	3.537E+00
PA-231	2.898E+00	114.8	3.327E+00	3.331E+00	1.492E+01
PA-233	1.577E-01	162.5	2.563E-01	2.564E-01	1.324E+00
PA-234	4.531E-01	86.1	3.899E-01	3.907E-01	1.733E+00
PA-234M	-5.774E-01	92.2	5.326E-01	5.333E-01	4.016E+01
AM-241	-2.512E-01	89.1	2.239E-01	2.244E-01	8.584E-01
Np-237	-5.178E-01	184.1	9.534E-01	9.538E-01	3.173E+00
Ir-192	5.882E-02	199.0	1.171E-01	1.171E-01	5.516E-01
Cs-136	1.271E-01	55.4	7.039E-02	7.074E-02	3.158E-01
Np-239	2.547E-02	951.8	2.424E-01	2.424E-01	8.246E-01
Nd-147	5.452E-01	101.5	5.535E-01	5.544E-01	1.333E+00
TL-210	4.281E-02	161.2	6.902E-02	6.906E-02	3.610E-01
Kr-85	1.882E+01	163.1	3.069E+01	3.071E+01	1.033E+02
Total	3.410E+01				

Analyst: Shiloh Smith

Sample description
441833_Gamma_180-94764-A-3-B DU

Spectrum Filename: C:\User\SPC\Det16\16_Gamma_20191669.An1

Acquisition information
Start time: 9/26/2019 2:13:48 PM
Live time: 7200
Real time: 7216
Dead time: 0.22 %
Detector ID: 16

Detector system
Ge16 SN/11012217

Calibration
Filename: 16_Liquid_Marinelli 1L.Clb
16_1Lmarn_90062_032712

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

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

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

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.06keV)
Stop channel: 8000 (1999.64keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

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

Corrections	Status	Comments
Decay correct to date:	YES	9/26/2019 2:13:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	16_2019-09-07_1328.PBC 9/7/2019 1:28:10 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 10 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1681

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.35	21.	152.03	0.96	5.055E-02	46.54	4.250	PBC<MDA	PB210
50.14	9.	355.38	0.96	5.283E-02	50.14	8.000	PBC<MDA	TH227
63.29	11.	249.40	1.02	5.853E-02	63.29	3.810	PBC<MDA	TH234
64.28	22.	160.06	0.98	5.882E-02	64.28	9.700	PBC<MDA	Sn126
92.58	40.	88.64	1.37	6.175E-02	92.59	5.584	PBC<MDA	TH234
99.60	51.	50.59	0.31	6.138E-02	99.50	15.000	7.737E-01	Np239
106.13	3.	951.77	1.01	6.081E-02	106.13	22.700	PBC<MDA	Np239
121.78	22.	116.95	1.03	5.878E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	6.077E-02	CO57
123.10	3.	733.70	1.03	5.858E-02	123.10	40.790	PBC<MDA	EU154
131.29	28.	138.11	1.04	5.726E-02	131.29	18.000	PBC<MDA	PA234
133.02	28.	140.46	1.04	5.696E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	6.160E-01	CE144
133.54	5.	779.02	1.04	5.687E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	1.122E-01	CE144
140.51	27.	146.44	1.05	5.565E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	19.	215.45	1.05	5.505E-02	143.79	10.960	PBC<MDA	U235
163.38	15.	172.99	1.07	5.140E-02	163.38	5.080	PBC<MDA	U235
166.74	26.	95.06	1.07	5.085E-02	165.85	79.900	PBC<MDA	CE139
176.60	8.	311.92	1.08	4.912E-02	176.60	17.000	PBC<MDA	Cf251
185.72	94.	29.11	1.09	4.776E-02	185.72	54.000	5.063E-01	U235
193.51	23.	104.38	1.09	4.666E-02	193.51	4.400	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
227.00	16.	142.04	1.13	4.251E-02	227.00	6.300	PBC<MDA	Cf251
238.63	-29.	97.16	1.14	4.126E-02	238.63	43.300	PBC<MDA	PB212
242.00	23.	120.86	1.14	4.091E-02	242.00	7.430	PBC<MDA	PB214
244.69	21.	123.64	1.14	4.064E-02	244.69	7.580	PBC<MDA	EU152
256.24	17.	130.52	1.15	3.951E-02	256.24	7.000	PBC<MDA	TH227
277.28	14.	146.19	1.17	3.761E-02	277.28	6.310	PBC<MDA	TL208
279.20	20.	88.28	1.17	3.745E-02	279.20	81.460	PBC<MDA	Hg203
284.30	8.	272.19	1.18	3.703E-02	284.30	6.140	PBC<MDA	I131
296.00	20.	161.22	1.19	3.609E-02	296.00	79.000	PBC<MDA	TL210
300.03	20.	157.58	1.19	3.578E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	3.134E+00	PA231
					300.18	6.200	1.244E+00	PA233
300.07	20.	159.36	1.19	3.578E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	3.134E+00	PA231
					300.18	6.200	1.244E+00	PA233
300.18	20.	162.49	1.19	3.577E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	3.134E+00	PA231
					300.18	6.200	1.244E+00	PA233
302.65	20.	165.25	1.19	3.558E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	4.239E-01	BA133
302.85	20.	168.23	1.19	3.557E-02	302.65	2.880	2.698E+00	PA231
					302.85	18.330	4.240E-01	BA133
304.85	20.	170.93	1.20	3.542E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	2.792E-01	BI210M
304.90	20.	173.84	1.20	3.541E-02	304.85	4.290	1.822E+00	Ba140
					304.90	28.000	2.792E-01	BI210M
308.44	18.	199.02	1.20	3.515E-02	308.44	31.750	PBC<MDA	Ir192
320.08	7.	253.01	1.21	3.431E-02	320.08	9.940	PBC<MDA	CR51
345.83	22.	84.39	1.23	3.261E-02	345.83	15.070	PBC<MDA	HF181
351.93	-50.	43.87	1.24	3.223E-02	351.93	37.600	PBC<MDA	PB214
356.00	22.	87.65	1.24	3.199E-02	356.00	62.050	PBC<MDA	BA133
383.84	19.	102.42	1.27	3.040E-02	383.84	8.940	PBC<MDA	BA133
477.60	18.	101.96	1.35	2.610E-02	477.60	10.520	PBC<MDA	BE7
482.00	8.	239.68	1.35	2.593E-02	482.00	80.500	PBC<MDA	HF181
487.02	9.	199.02	1.36	2.573E-02	487.02	45.500	PBC<MDA	La140
511.86	206.	9.83	2.63	2.482E-02	511.86	20.000	5.772E+00	RH106
513.98	14.	163.05	1.38	2.475E-02	513.98	0.430	PBC<MDA	Kr85
531.00	12.	101.52	1.40	2.417E-02	531.00	13.000	PBC<MDA	Nd147
569.47	3.	551.14	1.43	2.295E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.968E-01	PA234
					569.70	97.740	1.652E-02	BI207
569.70	9.	165.34	1.43	2.294E-02	569.32	15.380	3.410E-01	CS134
					569.47	8.200	6.396E-01	PA234
					569.70	97.740	5.368E-02	BI207
609.48	-24.	122.69	1.47	2.181E-02	609.31	46.090	PBC<MDA	BI214
610.30	18.	147.64	1.47	2.179E-02	610.30	5.750	PBC<MDA	RU103
618.06	9.	131.29	1.47	2.158E-02	618.06	99.100	PBC<MDA	PM144
635.60	13.	73.24	1.49	2.112E-02	635.89	11.310	PBC<MDA	SB125

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
636.97	10.	105.60	1.49	2.109E-02	636.97	7.170	PBC<MDA	I131
657.76	4.	336.39	1.51	2.058E-02	657.76	94.640	PBC<MDA	AG110M
722.79	21.	47.61	1.57	1.913E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.689E-01	AG108M
					723.36	20.220	7.590E-01	EU154
722.94	14.	89.49	1.57	1.912E-02	722.79	10.810	9.680E-01	SB124
					722.94	90.840	1.152E-01	AG108M
					723.36	20.220	5.179E-01	EU154
723.36	3.	514.21	1.57	1.912E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.105E-02	AG108M
					723.36	20.220	9.463E-02	EU154
727.17	7.	193.68	1.57	1.904E-02	727.17	7.550	PBC<MDA	BI212
756.73	11.	91.40	1.60	1.845E-02	756.73	54.460	PBC<MDA	ZR95
763.94	2.	744.37	1.60	1.831E-02	763.94	22.280	PBC<MDA	AG110M
766.41	7.	102.90	1.60	1.826E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
785.42	3.	489.90	1.62	1.791E-02	785.42	1.280	PBC<MDA	BI212
795.87	13.	93.27	1.63	1.772E-02	795.87	85.530	PBC<MDA	CS134
801.95	9.	146.56	1.64	1.762E-02	801.95	8.690	PBC<MDA	CS134
810.78	11.	118.88	1.64	1.746E-02	810.78	99.460	PBC<MDA	CO58
818.50	13.	91.23	1.65	1.733E-02	818.50	100.000	PBC<MDA	Cs136
834.85	27.	48.81	1.66	1.706E-02	834.85	99.980	PBC<MDA	MN54
871.10	7.	120.37	1.69	1.648E-02	871.10	99.890	PBC<MDA	NB94
880.53	9.	134.96	1.70	1.633E-02	880.53	6.000	PBC<MDA	PA234
898.04	2.	560.72	1.72	1.607E-02	898.04	93.700	PBC<MDA	Y88
937.49	2.	606.22	1.75	1.551E-02	937.49	34.360	PBC<MDA	AG110M
946.02	11.	86.07	1.76	1.540E-02	946.02	13.400	PBC<MDA	PA234
964.11	12.	94.92	1.77	1.516E-02	964.11	14.605	PBC<MDA	EU152
996.33	13.	58.24	1.80	1.475E-02	996.33	10.600	PBC<MDA	EU154
1001.00	-7.	153.09	1.81	1.469E-02	1001.00	0.837	PBC<MDA	PA234M
1004.77	11.	100.66	1.81	1.465E-02	1004.77	18.010	PBC<MDA	EU154
1037.84	2.	744.55	1.84	1.425E-02	1037.84	14.130	PBC<MDA	Co56
1048.07	13.	62.75	1.84	1.414E-02	1048.07	80.000	PBC<MDA	Cs136
1050.36	4.	222.24	1.85	1.411E-02	1050.36	1.560	PBC<MDA	RH106
1099.25	15.	84.10	1.89	1.358E-02	1099.25	56.500	PBC<MDA	FE59
1120.18	-14.	96.35	1.91	1.336E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1274.53	11.	76.93	2.03	1.195E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	3.524E-01	EU154
1291.60	-2.	972.51	2.05	1.181E-02	1291.60	43.200	PBC<MDA	FE59
1460.83	-14.	97.96	2.19	1.059E-02	1460.83	10.670	PBC<MDA	K40
1596.21	8.	85.93	2.29	9.770E-03	1596.21	95.400	PBC<MDA	La140
1764.37	11.	74.87	2.43	8.909E-03	1764.49	15.400	PBC<MDA	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
398.00	99.60	165.	51.	8.254E+02	50.59	0.307	- 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	185.86	46.54	451.	21.	0.003	152.03	0.959
TH-227	200.26	50.14	507.	9.	0.001	355.38	0.963s
AM-241	237.83	59.54	712.	-37.	-0.005	89.15	0.971
TH-234	252.83	63.29	251.	11.	0.001	249.40	1.019s
Sn-126	256.79	64.28	609.	22.	0.003	160.06	0.976s
BA-133	323.60	80.99	257.	-21.	-0.003	129.51	0.991s
Np-237	345.59	86.49	1529.	-30.	-0.004	184.11	0.996s
EU-155	345.80	86.54	1499.	-30.	-0.004	182.30	0.996s
Sn-126	347.39	86.94	1469.	-30.	-0.004	180.43	0.997s
Sn-126	349.91	87.57	1438.	-27.	-0.004	196.38	0.997s
Nd-147	364.02	91.10	1411.	0.	0.000	1000.00	1.001s
TH-234	369.94	92.58	333.	40.	0.005	88.64	1.368s
AC-228	373.02	93.35	1411.	0.	0.000	1000.00	1.003s
Gd-153	389.61	97.50	1411.	0.	0.000	1000.00	1.007
Np-239	397.61	99.50	1411.	0.	0.000	1000.00	1.008s
EU-155	420.85	105.31	250.	-7.	-0.001	482.03	1.014s
Np-239	424.11	106.13	282.	3.	0.000	951.77	1.014s
EU-152	486.69	121.78	320.	22.	0.003	116.95	1.029s
CO-57	487.81	122.06	342.	0.	0.000	1000.00	1.029s
EU-154	491.96	123.10	293.	3.	0.000	733.70	1.030s
PA-234	524.73	131.29	730.	28.	0.004	138.11	1.038s
HF-181	531.64	133.02	758.	28.	0.004	140.46	1.039s
CE-144	533.70	133.54	786.	5.	0.001	779.02	1.040s
HF-181	544.74	136.30	791.	0.	0.000	1000.00	1.042s
CO-57	545.43	136.47	495.	-29.	-0.004	111.91	1.042s
Tc-99m	561.57	140.51	766.	27.	0.004	146.44	1.046
U-235	574.67	143.79	801.	19.	0.003	215.45	1.049s
CE-141	581.29	145.44	892.	-29.	-0.004	148.16	1.050s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ba-140	650.14	162.66	448.	-29.	-0.004	105.03	1.066
U-235	653.01	163.38	315.	15.	0.002	172.99	1.067s
CE-139	662.90	165.85	293.	26.	0.004	95.06	1.069s
Cf-251	705.88	176.60	191.	8.	0.001	311.92	1.079
U-235	742.34	185.72	187.	94.	0.013	29.11	1.087s
TH-229	773.49	193.51	152.	23.	0.003	104.38	1.094s
U-235	820.76	205.33	169.	-6.	-0.001	430.82	1.105s
Cf-251	907.40	227.00	143.	16.	0.002	142.04	1.125s
PB-212	953.91	238.63	396.	-29.	-0.004	97.16	1.136
PB-214	967.37	242.00	366.	23.	0.003	120.86	1.139
EU-152	978.14	244.69	338.	21.	0.003	123.64	1.141s
TH-227	1024.32	256.24	124.	17.	0.002	130.52	1.152s
Cd-113m	1054.15	263.70	274.	-28.	-0.004	86.95	1.158
BI-210M	1062.67	265.83	272.	-20.	-0.003	141.68	1.160
TL-208	1108.46	277.28	190.	14.	0.002	146.19	1.171s
Hg-203	1116.13	279.20	145.	20.	0.003	88.28	1.173s
I-131	1136.52	284.30	116.	8.	0.001	272.19	1.177
PB-214	1179.67	295.09	751.	-56.	-0.008	43.30	1.187s
TL-210	1183.31	296.00	499.	20.	0.003	161.22	1.188s
PB-212	1199.42	300.03	480.	20.	0.003	157.58	1.191s
PA-231	1199.58	300.07	491.	20.	0.003	159.36	1.192s
PA-233	1200.02	300.18	511.	20.	0.003	162.49	1.192s
PA-231	1209.90	302.65	531.	20.	0.003	165.25	1.194s
BA-133	1210.70	302.85	551.	20.	0.003	168.23	1.194s
Ba-140	1218.69	304.85	570.	20.	0.003	170.93	1.196s
BI-210M	1218.88	304.90	590.	20.	0.003	173.84	1.196s
Ir-192	1233.05	308.44	610.	18.	0.002	199.02	1.199s
PA-233	1247.34	312.01	631.	-3.	0.000	920.79	1.202s
CR-51	1279.62	320.08	80.	7.	0.001	253.01	1.210s
La-140	1314.31	328.76	522.	-24.	-0.003	134.54	1.217s
Cf-249	1333.02	333.44	547.	-24.	-0.003	137.09	1.222s
AC-228	1352.54	338.32	571.	-24.	-0.003	139.54	1.226s
EU-152	1376.40	344.29	524.	-25.	-0.003	133.20	1.231s
HF-181	1382.56	345.83	165.	22.	0.003	84.39	1.233s
PB-214	1406.97	351.93	244.	-50.	-0.007	43.87	1.238s
BA-133	1423.24	356.00	182.	22.	0.003	87.65	1.242s
I-131	1457.16	364.48	132.	-25.	-0.003	92.36	1.250
BA-133	1534.57	383.84	184.	19.	0.003	102.42	1.267s
Cf-249	1551.01	387.95	239.	-22.	-0.003	103.35	1.271s
SN-113	1565.96	391.69	223.	-6.	-0.001	353.08	1.274s
AG-108M	1734.91	433.94	90.	-11.	-0.002	199.49	1.312s
PM-146	1814.67	453.88	69.	-4.	-0.001	395.16	1.330s
SB-125	1852.61	463.37	171.	-12.	-0.002	193.37	1.338
Ir-192	1871.38	468.06	200.	-24.	-0.003	86.60	1.342s
BE-7	1909.51	477.60	152.	18.	0.002	101.96	1.351
HF-181	1927.12	482.00	169.	8.	0.001	239.68	1.355s
La-140	1947.21	487.02	162.	9.	0.001	199.02	1.359s
RU-103	1987.33	497.05	87.	-13.	-0.002	152.63	1.368

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RH-106	2046.57	511.86	103.	206.	0.029	9.83	2.631
Kr-85	2055.03	513.98	269.	14.	0.002	163.05	1.383s
Nd-147	2123.10	531.00	35.	12.	0.002	101.52	1.398s
CS-134	2252.03	563.24	96.	-24.	-0.003	75.46	1.427s
CS-134	2276.36	569.32	100.	-8.	-0.001	187.66	1.432s
PA-234	2276.96	569.47	107.	3.	0.000	551.14	1.432s
BI-207	2277.89	569.70	98.	9.	0.001	165.34	1.432s
TL-208	2331.16	583.02	111.	-31.	-0.004	63.29	1.444s
SB-125	2401.07	600.50	378.	-21.	-0.003	133.21	1.460s
SB-124	2409.99	602.73	357.	-21.	-0.003	129.40	1.462s
CS-134	2417.91	604.71	336.	-21.	-0.003	125.50	1.463s
BI-214	2436.31	609.31	422.	-24.	-0.003	122.69	1.467
RU-103	2440.26	610.30	356.	18.	0.003	147.64	1.468s
PM-144	2471.31	618.06	68.	9.	0.001	131.29	1.475s
RH-106	2486.73	621.92	119.	-20.	-0.003	80.73	1.479s
SB-125	2542.62	635.89	38.	13.	0.002	73.24	1.491s
I-131	2546.96	636.97	53.	10.	0.001	105.60	1.492s
AG-110M	2630.10	657.76	90.	4.	0.001	336.39	1.510
PM-144	2785.22	696.54	168.	-23.	-0.003	81.00	1.544s
NB-94	2809.57	702.63	182.	-15.	-0.002	133.34	1.549s
SB-124	2890.19	722.79	40.	21.	0.003	47.61	1.567s
AG-108M	2890.80	722.94	76.	14.	0.002	89.49	1.567s
EU-154	2892.49	723.36	90.	3.	0.000	514.21	1.567s
ZR-95	2895.84	724.20	93.	0.	0.000	1000.00	1.568s
BI-212	2907.73	727.17	84.	7.	0.001	193.68	1.570s
PM-146	2941.93	735.72	51.	-2.	0.000	654.65	1.578s
ZR-95	3025.97	756.73	19.	11.	0.002	91.40	1.596s
AG-110M	3054.82	763.94	71.	2.	0.000	744.37	1.602s
NB-95	3062.21	765.79	73.	0.	0.000	1000.00	1.604s
PA-234M	3064.70	766.41	24.	7.	0.001	102.90	1.605s
EU-152	3114.73	778.92	61.	-20.	-0.003	84.57	1.615s
BI-212	3140.74	785.42	37.	3.	0.000	489.90	1.621s
CS-134	3182.54	795.87	71.	13.	0.002	93.27	1.630s
TL-210	3197.46	799.60	84.	0.	0.000	1000.00	1.633s
CS-134	3206.86	801.95	76.	9.	0.001	146.56	1.635s
CO-58	3242.16	810.78	80.	11.	0.002	118.88	1.643s
La-140	3262.14	815.77	136.	-22.	-0.003	77.33	1.647s
Cs-136	3273.06	818.50	62.	13.	0.002	91.23	1.649s
MN-54	3338.46	834.85	31.	27.	0.004	48.81	1.663s
Co-56	3386.15	846.77	54.	-4.	-0.001	318.72	1.674s
TL-208	3441.33	860.56	58.	-20.	-0.003	70.84	1.685s
NB-94	3483.47	871.10	32.	7.	0.001	120.37	1.695s
EU-154	3492.00	873.23	85.	-20.	-0.003	67.54	1.696s
PA-234	3521.21	880.53	75.	9.	0.001	134.96	1.703s
PA-234	3532.05	883.24	84.	0.	0.000	1000.00	1.705s
AG-110M	3537.82	884.68	84.	0.	0.000	1000.00	1.706s
Sc-46	3556.21	889.28	108.	-19.	-0.003	78.31	1.710
Y-88	3591.26	898.04	39.	2.	0.000	560.72	1.718s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	3643.38	911.07	50.	-11.	-0.002	144.50	1.729s
AG-110M	3749.09	937.49	30.	2.	0.000	606.22	1.751s
PA-234	3783.21	946.02	15.	11.	0.001	86.07	1.759s
EU-152	3855.58	964.11	57.	12.	0.002	94.92	1.774s
AC-228	3875.02	968.97	77.	-7.	-0.001	177.32	1.778
EU-154	3984.48	996.33	21.	13.	0.002	58.24	1.801s
PA-234M	4003.15	1001.00	50.	-7.	-0.001	153.09	1.805s
EU-154	4018.27	1004.77	55.	11.	0.002	100.66	1.808s
Co-56	4150.56	1037.84	29.	2.	0.000	744.55	1.836s
Cs-136	4191.49	1048.07	26.	13.	0.002	62.75	1.845s
RH-106	4200.65	1050.36	41.	4.	0.001	222.24	1.847
BI-207	4253.86	1063.66	51.	-9.	-0.001	143.98	1.858s
Ga-68	4308.84	1077.40	37.	-2.	0.000	598.81	1.870s
FE-59	4396.27	1099.25	27.	15.	0.002	84.10	1.888
EU-152	4447.58	1112.07	80.	-3.	0.000	384.19	1.899s
ZN-65	4461.46	1115.55	82.	0.	0.000	1000.00	1.901s
BI-214	4480.43	1120.29	98.	-14.	-0.002	96.35	1.906s
CO-60	4692.30	1173.24	46.	-10.	-0.001	145.05	1.950s
Ta-182	4755.57	1189.05	28.	-7.	-0.001	174.19	1.963s
Ta-182	4885.06	1221.41	40.	-4.	-0.001	406.20	1.990s
Co-56	4952.57	1238.28	44.	-11.	-0.001	133.68	2.004s
NA-22	5097.62	1274.53	28.	11.	0.001	76.93	2.034s
EU-154	5097.66	1274.54	39.	0.	0.000	1000.00	2.034s
FE-59	5165.91	1291.60	42.	-2.	0.000	972.51	2.048
TL-210	5251.57	1313.00	23.	-2.	0.000	674.39	2.066s
CO-60	5329.61	1332.50	32.	-8.	-0.001	190.06	2.081s
AG-110M	5536.89	1384.30	36.	-10.	-0.001	148.32	2.124s
EU-152	5631.75	1408.00	30.	-9.	-0.001	150.72	2.143s
K-40	5843.19	1460.83	53.	-14.	-0.002	97.96	2.186s
La-140	6385.02	1596.21	6.	8.	0.001	85.93	2.294s
SB-124	6764.37	1690.98	19.	-2.	0.000	545.82	2.369s
BI-214	7058.61	1764.49	26.	11.	0.002	74.87	2.427s
Y-88	7345.12	1836.06	27.	-9.	-0.001	155.66	2.483s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	8.8881E-01				5.31E+01	
			477.60	8.888E-01	&(	3.040E+00 1.02E+02 1.05E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NA-22	C	1.2408E-01					9.50E+02	
			1274.53	1.241E-01	?(	3.201E-01	7.69E+01	9.99E+01 G
K-40	N	-1.7454E+00					4.66E+11	
			1460.83	-1.745E+00	?(P	4.521E+00	9.80E+01	1.07E+01 G
Sc-46	F	-1.5928E-01					8.38E+01	
			889.28	-1.593E-01	&(P	4.376E-01	7.83E+01	1.00E+02 G
			1120.55	2.480E-09	%	4.662E-01	5.36E+09	1.00E+02 G
CR-51	F	2.8504E-01					2.77E+01	
			320.08	2.850E-01	&(	1.808E+00	2.53E+02	9.94E+00 G
MN-54	C	2.2166E-01					3.12E+02	
			834.85	2.217E-01	&(P	2.327E-01	4.88E+01	1.00E+02 G
FE-59	F	2.6584E-01					4.45E+01	
			1099.25	2.658E-01	(	4.848E-01	8.41E+01	5.65E+01 G
			1291.60	-4.172E-02	- P	8.914E-01	9.73E+02	4.32E+01 G
Co-56	C	-1.7439E-02					7.73E+01	
			846.77	-3.580E-02	&(P	3.055E-01	3.19E+02	9.99E+01 G
			1238.28	-1.850E-01	+ P	5.755E-01	1.34E+02	6.61E+01 G
			1037.84	1.124E-01	?(P	1.929E+00	7.45E+02	1.41E+01 G
			1771.35	-5.054E-02	%	3.158E+00	1.74E+03	1.55E+01 A
CO-58	C	8.7968E-02					7.09E+01	
			810.78	8.797E-02	?(	3.550E-01	1.19E+02	9.95E+01 G
CO-60	F	-9.7166E-02					1.93E+03	
			1332.50	-9.717E-02	?(P	3.517E-01	1.90E+02	1.00E+02 G
			1173.24	-1.043E-01	+ P	3.702E-01	1.45E+02	9.99E+01 G
NB-94	I	-1.0598E-01					7.41E+06	
			702.63	-1.060E-01	?(	4.763E-01	1.33E+02	9.79E+01 G
			871.10	5.907E-02	+	2.453E-01	1.20E+02	9.99E+01 G
ZR-95	I	1.4969E-01					6.40E+01	
			756.73	1.497E-01	&(P	3.178E-01	9.14E+01	5.45E+01 G
			724.20	0.000E+00	-	7.849E-01	1.00E+03	4.42E+01 G
RU-103	I	-7.6320E-02					3.93E+01	
			497.05	-7.632E-02	?(	2.777E-01	1.53E+02	9.09E+01 G
			610.30	2.030E+00	?	1.005E+01	1.48E+02	5.75E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RH-106	I	-7.6313E-01					3.74E+02	
			621.92	-1.296E+00	?(	3.489E+00	8.07E+01	9.93E+00 G
			1050.36	2.630E+00	(	2.050E+01	2.22E+02	1.56E+00 G
			511.86	5.772E+00		1.397E+00	9.83E+00	2.00E+01 GA
AG-108M	C	2.6614E-02					1.53E+05	
			433.94	-6.234E-02	?(P	2.583E-01	1.99E+02	9.05E+01 G
			722.94	1.152E-01	&(	3.464E-01	8.95E+01	9.08E+01 G
			614.28	1.360E-08	%	6.302E-01	1.36E+09	8.98E+01 G
AG-110M	F	2.5763E-02					2.50E+02	
			884.68	0.000E+00	?(	5.334E-01	1.00E+03	7.27E+01 G
			657.76	2.900E-02	&(P	3.345E-01	3.36E+02	9.46E+01 G
			937.49	5.211E-02	?(	7.356E-01	6.06E+02	3.44E+01 G
			1384.30	-5.148E-01	+	1.579E+00	1.48E+02	2.43E+01 G
			763.94	5.541E-02	&(P	1.433E+00	7.44E+02	2.23E+01 G
SN-113	F	-4.5636E-02					1.15E+02	
			391.69	-4.564E-02	&(P	5.234E-01	3.53E+02	6.40E+01 G
SB-124	F	1.9335E-02					6.02E+01	
			602.73	-1.346E-01	@(	5.832E-01	1.29E+02	9.83E+01 G
			1690.98	-6.272E-02	+	7.220E-01	5.46E+02	4.78E+01 G
			722.79	1.419E+00	&(	2.162E+00	4.76E+01	1.08E+01 G
SB-125	I	2.0676E-01					1.01E+03	
			427.88	-5.544E-03	%(	7.484E-01	5.56E+03	2.96E+01 G
			600.50	-7.376E-01	+	3.289E+00	1.33E+02	1.79E+01 G
			635.89	7.624E-01	?(P	1.827E+00	7.32E+01	1.13E+01 G
			463.37	-5.896E-01	+ P	3.165E+00	1.93E+02	1.05E+01 G
I-131	I	-1.3471E-02					8.02E+00	
			364.48	-1.352E-01	?(	3.048E-01	9.24E+01	8.17E+01 G
			284.30	4.780E-01	&(P	3.246E+00	2.72E+02	6.14E+00 G
			636.97	9.526E-01	&(P	3.367E+00	1.06E+02	7.17E+00 G
Ga-68	C	-1.2459E+00					4.71E-02	
			1077.40	-1.246E+00	?(	1.665E+01	5.99E+02	3.30E+00 G
Tc-99m	I	8.4511E-02					2.51E-01	
			140.51	8.451E-02	(	4.127E-01	1.46E+02	8.93E+01 G
BA-133	F	2.1785E-01					3.85E+03	
			356.00	1.569E-01	&(	4.589E-01	8.76E+01	6.20E+01 G
			302.85	4.240E-01	*(	2.387E+00	1.68E+02	1.83E+01 G
			383.84	9.809E-01	&	3.366E+00	1.02E+02	8.94E+00 GA
			80.99	-1.393E-01	- P	5.126E-01	1.30E+02	3.41E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	I	1.8342E-01				7.54E+02		
			795.87	1.222E-01	?(	3.838E-01	9.33E+01	8.55E+01 G
			604.71	-1.360E-01	-	5.715E-01	1.26E+02	9.76E+01 G
			569.32	-3.016E-01	+	1.937E+00	1.88E+02	1.54E+01 G
			801.95	7.863E-01	?(	3.940E+00	1.47E+02	8.69E+00 G
			563.24	-1.727E+00	+ P	3.479E+00	7.55E+01	8.35E+00 G
CS-137	I	7.9567E-03				1.10E+04		
			661.66	7.957E-03	%(	3.810E-01	1.37E+03	8.52E+01 G
CE-139	F	8.8926E-02				1.38E+02		
			165.85	8.893E-02	&(	2.818E-01	9.51E+01	7.99E+01 G
Ba-140	I	2.9398E-01				1.28E+01		
			537.26	2.518E-02	&(P	1.042E+00	1.69E+03	2.44E+01 G
			162.66	-1.254E+00	+	4.389E+00	1.05E+02	6.22E+00 G
			304.85	1.822E+00	?(	1.042E+01	1.71E+02	4.29E+00 G
La-140	I	1.1564E-01				1.28E+01		
			1596.21	1.189E-01	?(	2.151E-01	8.59E+01	9.54E+01 G
			487.02	1.087E-01	?(	7.353E-01	1.99E+02	4.55E+01 G
			328.76	-4.932E-01	+	2.216E+00	1.35E+02	2.03E+01 G
			815.77	-7.615E-01	+	1.959E+00	7.73E+01	2.33E+01 G
CE-141	I	-1.5127E-01				3.25E+01		
			145.44	-1.513E-01	?(	7.469E-01	1.48E+02	4.82E+01 G
CE-144	I	1.1225E-01				2.85E+02		
			133.54	1.122E-01	?(	2.936E+00	7.79E+02	1.11E+01 G
PM-144	C	-1.6669E-01				3.63E+02		
			696.54	-1.667E-01	?(	4.495E-01	8.10E+01	9.90E+01 G
			618.06	5.953E-02	+	2.669E-01	1.31E+02	9.91E+01 G
EU-152	F	4.5969E-01				4.94E+03		
			121.78	1.819E-01	?(	7.115E-01	1.17E+02	2.86E+01 G
			344.29	-3.939E-01	+	1.752E+00	1.33E+02	2.65E+01 G
			1112.07	-2.524E-01	+	3.368E+00	3.84E+02	1.36E+01 G
			778.92	-1.205E+00	+	2.322E+00	8.46E+01	1.29E+01 G
			964.11	7.423E-01	&(	2.380E+00	9.49E+01	1.46E+01 G
			244.69	9.626E-01	?(	3.983E+00	1.24E+02	7.58E+00 G
			1408.00	-5.439E-01	+	1.706E+00	1.51E+02	2.10E+01 GA
EU-154	I	2.7975E-01				3.14E+03		
			123.10	1.936E-02	?(P	4.791E-01	7.34E+02	4.08E+01 G
			1274.54	0.000E+00	-	1.051E+00	1.00E+03	3.52E+01 G
			723.36	9.463E-02	&(	1.689E+00	5.14E+02	2.02E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			873.23	-1.406E+00	+	3.144E+00	6.75E+01	1.23E+01 G
			1004.77	5.735E-01	?(	1.957E+00	1.01E+02	1.80E+01 G
			996.33	1.136E+00	?(	2.153E+00	5.82E+01	1.06E+01 G
EU-155	I	-7.9103E-02					1.81E+03	
			105.31	-7.910E-02	(P	8.224E-01	4.82E+02	2.12E+01 G
			86.54	-2.210E-01	+	1.341E+00	1.82E+02	3.07E+01 G
HF-181	F	1.4735E-01					4.24E+01	
			482.00	5.166E-02	(	4.214E-01	2.40E+02	8.05E+01 G
			133.02	1.575E-01	?(	7.377E-01	1.40E+02	4.33E+01 G
			345.83	6.292E-01	?(	1.770E+00	8.44E+01	1.51E+01 G
			136.30	0.000E+00	-	5.632E+00	1.00E+03	5.85E+00 G
Ta-182	F	7.1085E-09					1.14E+02	
			1121.30	7.109E-09	%(	1.336E+00	5.36E+09	3.49E+01 G
			1221.41	-1.521E-01	+	1.330E+00	4.06E+02	2.70E+01 G
			1189.05	-4.954E-01	+	1.859E+00	1.74E+02	1.62E+01 G
Hg-203	F	9.0884E-02					4.66E+01	
			279.20	9.088E-02	&(	2.681E-01	8.83E+01	8.15E+01 G
TL-208	N	-2.2887E-01					6.98E+02	
			583.02	-2.289E-01	?(P	3.782E-01	6.33E+01	8.45E+01 G
			277.28	7.999E-01	& P	3.921E+00	1.46E+02	6.31E+00 G
			860.56	-1.355E+00	+ P	2.570E+00	7.08E+01	1.24E+01 G
PM-146	C	-3.4214E-02					2.02E+03	
			453.88	-3.421E-02	?(	3.278E-01	3.95E+02	6.50E+01 G
			747.16	1.461E-02	%	6.836E-01	1.95E+03	3.40E+01 G
			735.72	-7.636E-02	+	1.181E+00	6.55E+02	2.25E+01 G
Y-88	F	-1.4134E-01					1.07E+02	
			1836.06	-1.413E-01	?(	4.366E-01	1.56E+02	9.92E+01 G
			898.04	2.221E-02	+ P	2.920E-01	5.61E+02	9.37E+01 G
Cd-113m		-1.6462E+03					5.33E+03	
			263.70	-1.646E+03	?(	4.764E+03	8.69E+01	6.00E-03 K
Cd-109	F	-4.5231E-07					4.53E+02	
			88.04	-4.523E-07	%(	1.054E+01	6.96E+08	3.79E+00 G
Cf-251	T	1.3860E-01					3.28E+05	
			176.60	1.386E-01	&(	1.115E+00	3.12E+02	1.70E+01 G
			227.00	8.297E-01	?	3.030E+00	1.42E+02	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	-1.5085E-01					1.28E+05	
			387.95	-1.508E-01	?(	5.214E-01	1.03E+02	6.60E+01 G
			333.44	-6.538E-01	+	2.993E+00	1.37E+02	1.55E+01 G
Sn-126		5.3550E-01					3.65E+07	
			87.57	-1.644E-01	-	1.075E+00	1.96E+02	3.75E+01 GA
			64.28	5.355E-01	?(	2.865E+00	1.60E+02	9.70E+00 G
			86.94	-7.505E-01	+	4.507E+00	1.80E+02	9.04E+00 GA
PB-210	N	1.3511E+00					8.14E+03	
			46.54	1.351E+00	(P	6.573E+00	1.52E+02	4.25E+00 G
PB-212	N	-2.2877E-01					6.98E+02	
			238.63	-2.288E-01	(P	7.416E-01	9.72E+01	4.33E+01 G
			300.03	2.350E+00	?	1.240E+01	1.58E+02	3.28E+00 GA
PB-214	N	-5.7468E-01					5.84E+05	
			351.93	-5.747E-01	(P	8.655E-01	4.39E+01	3.76E+01 G
			295.09	-1.110E+00	+ P	2.596E+00	4.33E+01	1.93E+01 G
			242.00	1.039E+00	&	4.198E+00	1.21E+02	7.43E+00 GA
BI-207	C	-1.1643E-01					1.18E+04	
			1063.66	-1.164E-01	&(P	4.794E-01	1.44E+02	7.45E+01 G
			569.70	5.368E-02	+	3.030E-01	1.65E+02	9.77E+01 G
BI-212	N	6.6034E-01					6.98E+02	
			727.17	6.603E-01	(	4.393E+00	1.94E+02	7.55E+00 G
			785.42	1.615E+00	?	1.889E+01	4.90E+02	1.28E+00 GA
U-235	N	5.4372E-01					2.57E+11	
			143.79	4.313E-01	(P	3.098E+00	2.15E+02	1.10E+01 G
			205.33	-3.484E-01	+	3.887E+00	4.31E+02	5.01E+00 G
			163.38	7.862E-01	*(P	4.545E+00	1.73E+02	5.08E+00 G
			185.72	5.063E-01	*	3.578E-01	2.91E+01	5.40E+01 GA
BI-214	N	3.6727E-02					5.84E+05	
			609.31	-3.293E-01	?(P	1.360E+00	1.23E+02	4.61E+01 G
			1120.29	-9.847E-01	+ P	3.363E+00	9.63E+01	1.51E+01 G
			1764.49	1.132E+00	?(P	2.671E+00	7.49E+01	1.54E+01 G
BI-210M	T	6.4133E-03					1.10E+09	
			265.83	-1.464E-01	?(P	5.718E-01	1.42E+02	5.00E+01 G
			304.90	2.792E-01	?(	1.624E+00	1.74E+02	2.80E+01 G
AC-228	N	-3.3166E-01					2.10E+03	
			911.07	-3.317E-01	&(	1.075E+00	1.45E+02	2.90E+01 G
			968.97	-3.776E-01	+	2.300E+00	1.77E+02	1.75E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			338.32	-8.556E-01	&	3.987E+00	1.40E+02	1.20E+01 G
			93.35	0.000E+00	+	7.193E+00	1.00E+03	5.56E+00 XA
TH-227	N	5.5618E-01					7.95E+03	
			256.24	8.538E-01	?(	2.742E+00	1.31E+02	7.00E+00 G
			235.97	6.556E-02	%	2.413E+00	1.08E+03	1.23E+01 G
			50.14	2.958E-01	?(	3.537E+00	3.55E+02	8.00E+00 G
TH-229	N	1.5323E+00					2.68E+06	
			193.51	1.532E+00	?(P	4.071E+00	1.04E+02	4.40E+00 G
			210.85	-5.282E-02	% P	6.630E+00	4.84E+03	2.99E+00 G
TH-234	N	1.2189E+00					1.63E+12	
			92.59	1.592E+00	@(P	3.537E+00	8.86E+01	5.58E+00 G
			63.29	6.714E-01	(P	4.769E+00	2.49E+02	3.81E+00 G
PA-231	N	2.8984E+00					1.20E+07	
			302.65	2.697E+00	*(	1.492E+01	1.65E+02	2.88E+00 G
			300.07	3.134E+00	?(	1.672E+01	1.59E+02	2.46E+00 G
PA-233	C	1.5773E-01					7.82E+08	
			312.01	-2.933E-02	?(P	1.324E+00	9.21E+02	3.60E+01 G
			300.18	1.244E+00	?(	6.766E+00	1.62E+02	6.20E+00 G
PA-234	N	4.5307E-01					1.63E+12	
			131.29	3.764E-01	(	1.733E+00	1.38E+02	1.80E+01 G
			946.02	7.129E-01	?(	1.397E+00	8.61E+01	1.34E+01 G
			569.47	1.968E-01	?(	3.752E+00	5.51E+02	8.20E+00 G
			883.24	0.000E+00	-	4.033E+00	1.00E+03	9.60E+00 G
			880.53	1.323E+00	?	6.091E+00	1.35E+02	6.00E+00 GA
PA-234M	N	-5.7744E-01					1.63E+12	
			1001.00	-7.555E+00	?(P	4.016E+01	1.53E+02	8.37E-01 G
			766.41	1.929E+01	&(P	6.631E+01	1.03E+02	2.94E-01 G
AM-241	T	-2.5115E-01					1.58E+05	
			59.54	-2.512E-01	(P	8.584E-01	8.91E+01	3.59E+01 G
Np-237	F	-5.1782E-01					2.14E+06	
			86.49	-5.178E-01	?(	3.173E+00	1.84E+02	1.31E+01 G
Ir-192	F	5.8817E-02					7.40E+01	
			316.49	-7.044E-08	&(	5.516E-01	2.32E+08	8.70E+01 G
			468.06	-2.411E-01	+	6.960E-01	8.66E+01	5.18E+01 G
			308.44	2.201E-01	?(	1.467E+00	1.99E+02	3.18E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cs-136	F	1.2714E-01					1.30E+01	
			818.50	1.028E-01	?(	3.158E-01	9.12E+01	1.00E+02 G
			1048.07	1.576E-01	?(	3.251E-01	6.28E+01	8.00E+01 G
			340.57	-1.191E-02	%	1.047E+00	2.61E+03	4.69E+01 G
Np-239	T	2.5469E-02					2.36E+00	
			103.70	-2.197E-07	%	1.706E+00	2.32E+08	2.40E+01 X
			106.13	2.547E-02	&(	8.246E-01	9.52E+02	2.27E+01 G
			99.50	0.000E+00	-	2.715E+00	1.00E+03	1.50E+01 X
Nd-147		5.4523E-01					1.11E+01	
			531.00	5.452E-01	?(	1.333E+00	1.02E+02	1.30E+01 G
			91.10	0.000E+00	-	1.412E+00	1.00E+03	2.83E+01 G
TL-210	N	4.2810E-02					5.84E+05	
			799.60	0.000E+00	?(	3.610E-01	1.00E+03	9.90E+01 G
			296.00	9.644E-02	?(	5.205E-01	1.61E+02	7.90E+01 G
			1313.00	-9.470E-02	+	1.415E+00	6.74E+02	2.10E+01 GA
Kr-85	I	1.8823E+01					3.92E+03	
			513.98	1.882E+01	&(	1.033E+02	1.63E+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

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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	507.	9.	0.001	355.38	2.958E-01	
AM-241	59.54	712.	-37.	-0.005	89.15	-2.512E-01	P
Sn-126	64.28	609.	22.	0.003	160.06	5.355E-01	
BA-133	80.99	257.	-21.	-0.003	129.51	-1.393E-01	P
Np-237	86.49	1529.	-30.	-0.004	184.11	-5.178E-01	
EU-155	86.54	1499.	-30.	-0.004	182.30	-2.210E-01	
Sn-126	86.94	1469.	-30.	-0.004	180.43	-7.505E-01	
Sn-126	87.57	1438.	-27.	-0.004	196.38	-1.644E-01	
EU-155	105.31	250.	-7.	-0.001	482.03	-7.910E-02	P
Np-239	106.13	282.	3.	0.000	951.77	2.547E-02	
EU-152	121.78	320.	22.	0.003	116.95	1.819E-01	
EU-154	123.10	293.	3.	0.000	733.70	1.936E-02	P
PA-234	131.29	730.	28.	0.004	138.11	3.764E-01	
HF-181	133.02	758.	28.	0.004	140.46	1.575E-01	
CE-144	133.54	786.	5.	0.001	779.02	1.122E-01	
CO-57	136.47	495.	-29.	-0.004	111.91	-6.580E-01	
U-235	143.79	801.	19.	0.003	215.45	4.313E-01	P
CE-141	145.44	892.	-29.	-0.004	148.16	-1.513E-01	
Ba-140	162.66	448.	-29.	-0.004	105.03	-1.254E+00	
U-235	163.38	315.	15.	0.002	172.99	7.862E-01	P
Cf-251	176.60	191.	8.	0.001	311.92	1.386E-01	
U-235	185.72	187.	94.	0.013	29.11	5.063E-01	
TH-229	193.51	152.	23.	0.003	104.38	1.532E+00	P
U-235	205.33	169.	-6.	-0.001	430.82	-3.484E-01	
Cf-251	227.00	143.	16.	0.002	142.04	8.297E-01	
PB-212	238.63	396.	-29.	-0.004	97.16	-2.288E-01	P
PB-214	242.00	366.	23.	0.003	120.86	1.039E+00	
EU-152	244.69	338.	21.	0.003	123.64	9.626E-01	
TH-227	256.24	124.	17.	0.002	130.52	8.538E-01	
Cd-113m	263.70	274.	-28.	-0.004	86.95	-1.646E+03	
BI-210M	265.83	272.	-20.	-0.003	141.68	-1.464E-01	P
TL-208	277.28	190.	14.	0.002	146.19	7.999E-01	P
Hg-203	279.20	145.	20.	0.003	88.28	9.088E-02	
I-131	284.30	116.	8.	0.001	272.19	4.780E-01	P
PB-214	295.09	751.	-56.	-0.008	43.30	-1.110E+00	P
TL-210	296.00	499.	20.	0.003	161.22	9.644E-02	
PB-212	300.03	480.	20.	0.003	157.58	2.350E+00	
PA-231	300.07	491.	20.	0.003	159.36	3.134E+00	
PA-233	300.18	511.	20.	0.003	162.49	1.244E+00	
PA-231	302.65	531.	20.	0.003	165.25	2.697E+00	
BA-133	302.85	551.	20.	0.003	168.23	4.240E-01	
Ba-140	304.85	570.	20.	0.003	170.93	1.822E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	304.90	590.	20.	0.003	173.84	2.792E-01	
Ir-192	308.44	610.	18.	0.002	199.02	2.201E-01	
PA-233	312.01	631.	-3.	0.000	920.79	-2.933E-02	P
CR-51	320.08	80.	7.	0.001	253.01	2.850E-01	
La-140	328.76	522.	-24.	-0.003	134.54	-4.932E-01	
Cf-249	333.44	547.	-24.	-0.003	137.09	-6.538E-01	
AC-228	338.32	571.	-24.	-0.003	139.54	-8.556E-01	
EU-152	344.29	524.	-25.	-0.003	133.20	-3.939E-01	
HF-181	345.83	165.	22.	0.003	84.39	6.292E-01	
PB-214	351.93	244.	-50.	-0.007	43.87	-5.747E-01	P
BA-133	356.00	182.	22.	0.003	87.65	1.569E-01	
I-131	364.48	132.	-25.	-0.003	92.36	-1.352E-01	
BA-133	383.84	184.	19.	0.003	102.42	9.809E-01	
Cf-249	387.95	239.	-22.	-0.003	103.35	-1.508E-01	
SN-113	391.69	223.	-6.	-0.001	353.08	-4.564E-02	P
AG-108M	433.94	90.	-11.	-0.002	199.49	-6.234E-02	P
PM-146	453.88	69.	-4.	-0.001	395.16	-3.421E-02	
Ir-192	468.06	200.	-24.	-0.003	86.60	-2.411E-01	
BE-7	477.60	152.	18.	0.002	101.96	8.888E-01	
HF-181	482.00	169.	8.	0.001	239.68	5.166E-02	
La-140	487.02	162.	9.	0.001	199.02	1.087E-01	
RU-103	497.05	87.	-13.	-0.002	152.63	-7.632E-02	
RH-106	511.86	103.	206.	0.029	9.83	5.772E+00	
Kr-85	513.98	269.	14.	0.002	163.05	1.882E+01	
Nd-147	531.00	35.	12.	0.002	101.52	5.452E-01	
CS-134	563.24	96.	-24.	-0.003	75.46	-1.727E+00	P
CS-134	569.32	100.	-8.	-0.001	187.66	-3.016E-01	
PA-234	569.47	107.	3.	0.000	551.14	1.968E-01	
BI-207	569.70	98.	9.	0.001	165.34	5.368E-02	
TL-208	583.02	111.	-31.	-0.004	63.29	-2.289E-01	P
SB-124	602.73	357.	-21.	-0.003	129.40	-1.346E-01	
CS-134	604.71	336.	-21.	-0.003	125.50	-1.360E-01	
RU-103	610.30	356.	18.	0.003	147.64	2.030E+00	
PM-144	618.06	68.	9.	0.001	131.29	5.953E-02	
RH-106	621.92	119.	-20.	-0.003	80.73	-1.296E+00	
I-131	636.97	53.	10.	0.001	105.60	9.526E-01	P
AG-110M	657.76	90.	4.	0.001	336.39	2.900E-02	P
PM-144	696.54	168.	-23.	-0.003	81.00	-1.667E-01	
NB-94	702.63	182.	-15.	-0.002	133.34	-1.060E-01	
SB-124	722.79	40.	21.	0.003	47.61	1.419E+00	
AG-108M	722.94	76.	14.	0.002	89.49	1.152E-01	
EU-154	723.36	90.	3.	0.000	514.21	9.463E-02	
BI-212	727.17	84.	7.	0.001	193.68	6.603E-01	
PM-146	735.72	51.	-2.	0.000	654.65	-7.636E-02	
ZR-95	756.73	19.	11.	0.002	91.40	1.497E-01	P
AG-110M	763.94	71.	2.	0.000	744.37	5.541E-02	P
PA-234M	766.41	24.	7.	0.001	102.90	1.929E+01	P
EU-152	778.92	61.	-20.	-0.003	84.57	-1.205E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
BI-212	785.42	37.	3.	0.000	489.90	1.615E+00		
CS-134	795.87	71.	13.	0.002	93.27	1.222E-01		
CS-134	801.95	76.	9.	0.001	146.56	7.863E-01		
CO-58	810.78	80.	11.	0.002	118.88	8.797E-02		
La-140	815.77	136.	-22.	-0.003	77.33	-7.615E-01		
Cs-136	818.50	62.	13.	0.002	91.23	1.028E-01		
MN-54	834.85	31.	27.	0.004	48.81	2.217E-01		P
Co-56	846.77	54.	-4.	-0.001	318.72	-3.580E-02		P
TL-208	860.56	58.	-20.	-0.003	70.84	-1.355E+00		P
NB-94	871.10	32.	7.	0.001	120.37	5.907E-02		
EU-154	873.23	85.	-20.	-0.003	67.54	-1.406E+00		
PA-234	880.53	75.	9.	0.001	134.96	1.323E+00		
Sc-46	889.28	108.	-19.	-0.003	78.31	-1.593E-01		P
Y-88	898.04	39.	2.	0.000	560.72	2.221E-02		P
AC-228	911.07	50.	-11.	-0.002	144.50	-3.317E-01		
AG-110M	937.49	30.	2.	0.000	606.22	5.211E-02		
PA-234	946.02	15.	11.	0.001	86.07	7.129E-01		
EU-152	964.11	57.	12.	0.002	94.92	7.423E-01		
AC-228	968.97	77.	-7.	-0.001	177.32	-3.776E-01		
EU-154	996.33	21.	13.	0.002	58.24	1.136E+00		
PA-234M	1001.00	50.	-7.	-0.001	153.09	-7.555E+00		P
EU-154	1004.77	55.	11.	0.002	100.66	5.735E-01		
Co-56	1037.84	29.	2.	0.000	744.55	1.124E-01		P
Cs-136	1048.07	26.	13.	0.002	62.75	1.576E-01		
RH-106	1050.36	41.	4.	0.001	222.24	2.630E+00		
BI-207	1063.66	51.	-9.	-0.001	143.98	-1.164E-01		P
Ga-68	1077.40	37.	-2.	0.000	598.81	-1.246E+00		
EU-152	1112.07	80.	-3.	0.000	384.19	-2.524E-01		
CO-60	1173.24	46.	-10.	-0.001	145.05	-1.043E-01		P
Ta-182	1189.05	28.	-7.	-0.001	174.19	-4.954E-01		
Ta-182	1221.41	40.	-4.	-0.001	406.20	-1.521E-01		
Co-56	1238.28	44.	-11.	-0.001	133.68	-1.850E-01		P
NA-22	1274.53	28.	11.	0.001	76.93	1.241E-01		
TL-210	1313.00	23.	-2.	0.000	674.39	-9.470E-02		
CO-60	1332.50	32.	-8.	-0.001	190.06	-9.717E-02		P
AG-110M	1384.30	36.	-10.	-0.001	148.32	-5.148E-01		
EU-152	1408.00	30.	-9.	-0.001	150.72	-5.439E-01		
K-40	1460.83	53.	-14.	-0.002	97.96	-1.745E+00		P
La-140	1596.21	6.	8.	0.001	85.93	1.189E-01		
SB-124	1690.98	19.	-2.	0.000	545.82	-6.272E-02		
Y-88	1836.06	27.	-9.	-0.001	155.66	-1.413E-01		

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	8.8880E-01	8.8881E-01	1.020E+02%	3.04E+00
NA-22	#A	1.2408E-01	1.2408E-01	7.693E+01%	3.20E-01
K-40	#A	-1.7454E+00	-1.7454E+00	9.796E+01%	4.52E+00
Sc-46	#A	-1.5928E-01	-1.5928E-01	7.831E+01%	4.38E-01
CR-51	#A	2.8504E-01	2.8504E-01	2.530E+02%	1.81E+00
MN-54	#A	2.2166E-01	2.2166E-01	4.881E+01%	2.33E-01
FE-59	A	2.6584E-01	2.6584E-01	8.410E+01%	4.85E-01
Co-56	#A	-1.7439E-02	-1.7439E-02	3.187E+02%	3.05E-01
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.46E-01
CO-58	#A	8.7968E-02	8.7968E-02	1.189E+02%	3.55E-01
CO-60	#A	-9.7166E-02	-9.7166E-02	1.901E+02%	3.52E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	9.18E-01
NB-94	#A	-1.0598E-01	-1.0598E-01	1.333E+02%	4.76E-01
ZR-95	#A	1.4969E-01	1.4969E-01	9.140E+01%	3.18E-01
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.24E-01
RU-103	#A	-7.6319E-02	-7.6320E-02	1.526E+02%	2.78E-01
RH-106	#A	-7.6313E-01	-7.6313E-01	8.073E+01%	3.49E+00
AG-108M	#A	2.6614E-02	2.6614E-02	8.949E+01%	2.58E-01
AG-110M	#A	2.5763E-02	2.5763E-02	3.364E+02%	5.33E-01
SN-113	#A	-4.5636E-02	-4.5636E-02	3.531E+02%	5.23E-01
SB-124	#A	1.9335E-02	1.9335E-02	4.761E+01%	5.83E-01
SB-125	#A	2.0676E-01	2.0676E-01	7.324E+01%	7.48E-01
I-131	#A	-1.3470E-02	-1.3471E-02	9.236E+01%	3.05E-01
Gd-153	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.34E+00
Ga-68	#A	-1.2357E+00	-1.2459E+00	5.988E+02%	1.67E+01
Tc-99m	A	8.4381E-02	8.4511E-02	1.464E+02%	4.13E-01
BA-133	#A	2.1785E-01	2.1785E-01	8.765E+01%	4.59E-01
CS-134	#A	1.8342E-01	1.8342E-01	8.686E+01%	3.84E-01
CS-137	#A	7.9567E-03	7.9567E-03	1.375E+03%	3.81E-01
CE-139	#A	8.8925E-02	8.8926E-02	9.506E+01%	2.82E-01
Ba-140	#A	2.9397E-01	2.9398E-01	1.709E+02%	1.04E+00
La-140	#A	1.1564E-01	1.1564E-01	8.593E+01%	2.15E-01
CE-141	#A	-1.5127E-01	-1.5127E-01	1.482E+02%	7.47E-01
CE-144	#A	1.1225E-01	1.1225E-01	7.790E+02%	2.94E+00
PM-144	#A	-1.6669E-01	-1.6669E-01	8.100E+01%	4.50E-01
EU-152	#A	4.5969E-01	4.5969E-01	6.496E+01%	7.12E-01
EU-154	#A	2.7975E-01	2.7975E-01	5.824E+01%	4.79E-01
EU-155	#A	-7.9103E-02	-7.9103E-02	4.820E+02%	8.22E-01
HF-181	#A	1.4735E-01	1.4735E-01	8.439E+01%	4.21E-01
Ta-182	#A	7.1085E-09	7.1085E-09	5.360E+09%	1.34E+00
Hg-203	#A	9.0883E-02	9.0884E-02	8.828E+01%	2.68E-01
TL-208	#A	-2.2887E-01	-2.2887E-01	6.329E+01%	3.78E-01
PM-146	#A	-3.4214E-02	-3.4214E-02	3.952E+02%	3.28E-01

Y-88	#A	-1.4134E-01	-1.4134E-01	1.557E+02%	4.37E-01
Cd-113m	#A	-1.6462E+03	-1.6462E+03	8.695E+01%	4.76E+03
Cd-109	#A	-4.5231E-07	-4.5231E-07	6.963E+08%	1.05E+01
Cf-251	#A	1.3860E-01	1.3860E-01	3.119E+02%	1.12E+00
Cf-249	#A	-1.5085E-01	-1.5085E-01	1.034E+02%	5.21E-01
Sn-126	#A	5.3550E-01	5.3550E-01	1.601E+02%	2.87E+00
PB-210	A	1.3511E+00	1.3511E+00	1.520E+02%	6.57E+00
PB-212	#A	-2.2877E-01	-2.2877E-01	9.716E+01%	7.42E-01
PB-214	#A	-5.7468E-01	-5.7468E-01	4.387E+01%	8.65E-01
BI-207	#A	-1.1643E-01	-1.1643E-01	1.440E+02%	4.79E-01
BI-212	#A	6.6034E-01	6.6034E-01	1.937E+02%	4.39E+00
U-235	#A	5.4372E-01	5.4372E-01	1.382E+02%	3.10E+00
BI-214	#A	3.6727E-02	3.6727E-02	7.186E+01%	1.36E+00
BI-210M	#A	6.4133E-03	6.4133E-03	1.121E+02%	5.72E-01
AC-228	#A	-3.3166E-01	-3.3166E-01	1.445E+02%	1.08E+00
TH-227	#A	5.5618E-01	5.5618E-01	1.305E+02%	2.74E+00
TH-229	#A	1.5323E+00	1.5323E+00	1.044E+02%	4.07E+00
TH-234	#A	1.2189E+00	1.2189E+00	8.864E+01%	3.54E+00
PA-231	#A	2.8984E+00	2.8984E+00	1.148E+02%	1.49E+01
PA-233	#A	1.5773E-01	1.5773E-01	1.625E+02%	1.32E+00
PA-234	#A	4.5307E-01	4.5307E-01	8.607E+01%	1.73E+00
PA-234M	#A	-5.7744E-01	-5.7744E-01	9.223E+01%	4.02E+01
AM-241	#A	-2.5115E-01	-2.5115E-01	8.915E+01%	8.58E-01
Np-237	#A	-5.1782E-01	-5.1782E-01	1.841E+02%	3.17E+00
Ir-192	#A	5.8817E-02	5.8817E-02	1.990E+02%	5.52E-01
Cs-136	#A	1.2714E-01	1.2714E-01	5.536E+01%	3.16E-01
Np-239	#A	2.5465E-02	2.5469E-02	9.518E+02%	8.25E-01
Nd-147	#A	5.4521E-01	5.4523E-01	1.015E+02%	1.33E+00
TL-210	#A	4.2810E-02	4.2810E-02	1.612E+02%	3.61E-01
Kr-85	#A	1.8823E+01	1.8823E+01	1.631E+02%	1.03E+02

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

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

Total Activity (25.1 to 1999.6 keV) 2.658E-01 Bq/Sample
Total Decayed Activity (25.1 to 1999.6 keV) 2.6584071E-01 Bq/Sample

441833_Gamma_180-94764-A-3-B DU. 16_Gamma_20191669.spc.

Daily Checks

Test America
St. Louis
Quality Control Check

Spectrum: 5_20190926002_QCAsLeft
Description: Quality control Check (QC Source 'A') Post Stabilization
Acquired: 9/26/2019 4:09:52 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	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.58	59.79	60.04	PASS
FWHM	0.74	0.00	0.00	0.84	1.84	1.94	PASS
ActivityDiff	636.60	-5.00	-4.00	-0.48	4.00	5.00	PASS
QA-662							
FWHM	1.36	0.00	0.00	1.41	3.06	3.16	PASS
ActivityDiff	596.80	-5.00	-4.00	-1.12	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.90	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.79	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.93	4.10	4.20	PASS
ActivityDiff	1164.20	-5.00	-4.00	-1.28	4.00	5.00	PASS

Analyst: Justin Banner Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 5_20190926003_BG
Description: Background Contamination Check
Acquired: 9/26/2019 4:43:32 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	1.42	1.55	1.60	PASS

Analyst: Justin Banner Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 8_20190926001_BG
Description: Background Contamination Check
Acquired: 9/26/2019 12:49:30 AM
Detector: Detector # 8
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.56	1.39	1.45	1.60	1.68	1.74	PASS

Analyst: Justin Banner Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 8_20190926002_QCAsLeft
Description: Quality control Check (QC Source 'D') Post Stabilization
Acquired: 9/26/2019 1:46:40 AM
Detector: Detector # 8
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.56	59.79	60.04	PASS
FWHM	1.10	0.00	0.00	0.97	2.20	2.30	PASS
ActivityDiff	650.60	-5.00	-4.00	3.56	4.00	5.00	PASS
QA-662							
FWHM	1.53	0.00	0.00	1.42	3.23	3.33	PASS
ActivityDiff	609.90	-5.00	-4.00	3.51	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.90	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.73	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.98	4.10	4.20	PASS
ActivityDiff	1189.70	-5.00	-4.00	1.15	4.00	5.00	PASS

Analyst: Justin Banner Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 9_20190926001_QCAsLeft
Description: Quality control Check (QC Source 'E') Post Stabilization
Acquired: 9/26/2019 12:27:57 AM
Detector: Detector # 9
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.59	59.79	60.04	PASS
FWHM	1.08	0.00	0.00	0.94	2.18	2.28	PASS
ActivityDiff	649.44	-5.00	-4.00	0.94	4.00	5.00	PASS
QA-662							
FWHM	1.62	0.00	0.00	1.53	3.32	3.42	PASS
ActivityDiff	607.56	-5.00	-4.00	1.40	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.20	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.23	1333.01	1333.26	PASS
FWHM	2.12	0.00	0.00	2.06	4.32	4.42	PASS
ActivityDiff	1191.31	-5.00	-4.00	2.46	4.00	5.00	PASS

Analyst: Justin Banner Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 9_20190926002_BG
Description: Background Contamination Check
Acquired: 9/26/2019 1:18:52 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	1.78	2.14	2.26	PASS

Analyst: Justin Banner Reviewer: kody Saulters

Test America
St. Louis
Quality Control Check

Spectrum: 12_20190926001_QCAsLeft
Description: Quality control Check (QC Source 'H') Post Stabilization
Acquired: 9/26/2019 1:06:23 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	0.86	2.00	2.10	PASS
ActivityDiff	691.00	-5.00	-4.00	1.44	4.00	5.00	PASS
QA-662							
FWHM	1.48	0.00	0.00	1.37	3.18	3.28	PASS
ActivityDiff	659.00	-5.00	-4.00	-0.42	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.60	1333.01	1333.26	PASS
FWHM	2.00	0.00	0.00	2.20	4.20	4.30	PASS
ActivityDiff	1274.00	-5.00	-4.00	-0.60	4.00	5.00	PASS

Analyst: Justin Banner Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 12_20190926002_BG
Description: Background Contamination Check
Acquired: 9/26/2019 2:25:58 AM
Detector: Detector #12
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.00	1.89	1.93	2.04	2.07	2.10	PASS

Analyst: Justin Banner Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 14_20190926001_BG
Description: Background Contamination Check
Acquired: 9/26/2019 12:38:30 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	1.77	1.90	1.94	PASS

Analyst: Justin Banner Reviewer: Justin Banner

Test America
St. Louis
Quality Control Check

Spectrum: 14_20190926002_QCAsLeft
Description: Quality control Check (QC Source 'E') Post Stabilization
Acquired: 9/26/2019 1:39:20 AM
Detector: Detector #14
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.65	59.79	60.04	PASS
FWHM	0.76	0.00	0.00	0.89	1.86	1.96	PASS
ActivityDiff	671.90	-5.00	-4.00	-0.60	4.00	5.00	PASS
QA-662							
FWHM	1.35	0.00	0.00	1.45	3.05	3.15	PASS
ActivityDiff	628.85	-5.00	-4.00	-0.76	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.65	1333.01	1333.26	PASS
FWHM	1.91	0.00	0.00	1.93	4.11	4.21	PASS
ActivityDiff	1224.59	-5.00	-4.00	-1.15	4.00	5.00	PASS

Analyst: Justin Banner Reviewer: Justin Banner

Test America
St. Louis
Background Check

Spectrum: 16_20190926001_BG
Description: Background Contamination Check
Acquired: 9/26/2019 12:08:09 AM
Detector: Detector #16
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.68	2.51	2.56	2.69	2.80	2.86	PASS

Analyst: Justin Banner Reviewer: Justin Banner

Test America
St. Louis
Quality Control Check

Spectrum: 16_20190926002_QCAsLeft
Description: Quality control Check (QC Source 'G') Post Stabilization
Acquired: 9/26/2019 1:38:03 AM
Detector: Detector #16
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.57	59.79	60.04	PASS
FWHM	0.96	0.00	0.00	1.00	2.06	2.16	PASS
ActivityDiff	602.10	-5.00	-4.00	3.45	4.00	5.00	PASS
QA-662							
FWHM	1.53	0.00	0.00	1.77	3.23	3.33	PASS
ActivityDiff	571.13	-5.00	-4.00	0.38	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5332.20	5332.00	5333.00	High OOT
Energy	1332.51	1331.76	1332.01	1333.15	1333.01	1333.26	High OOT
FWHM	2.09	0.00	0.00	2.73	4.29	4.39	PASS
ActivityDiff	1139.05	-5.00	-4.00	3.36	4.00	5.00	PASS

Analyst: Justin Banner Reviewer: Justin Banner

Initial Calibrations

Gamma Verification per Geometry

Detector: Ge5

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard Rad12-0007

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

Reviewed By: Jody Watson

Date: 3/27/2012

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

Calibration Description:
5_Soil_TunaCan_90099_032612

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

Energy/FWHM Table

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

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

Efficiency Table

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

Calibration Certificate Table

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

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

Sample description
     5_TunaCan_90099_032612


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

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

Detector system
     Ge 5 SN/157


Calibration
       Filename:                   5_Soil_TunaCan.Clb
     5_Soil_TunaCan_90099_032612


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

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

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

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

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

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

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

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

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

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

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

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

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

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

This section based on library: DET_EnergyStandardMix & Pb.Lib

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

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

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

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

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

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

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

(- This peak used in the nuclide activity average.

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

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

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

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

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

- -

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

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

P - Peakbackground subtraction

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

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

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

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

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

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector:	Ge8
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14960	100.2
Am-241	2037	418	0.3590	1163	1240.5	106.6
Cd-109	2881	591	0.0361	16363	16066	98.2
Co-57	1511	310	0.8560	362	345.12	95.4
Ce-139	2139	439	0.7990	549	536.34	97.7
Hg-203	4651	954	0.8146	1171	1218.2	104.1
Sn-113	3015	618	0.6400	966	967.15	100.1
Cs-137	1938	397	0.8510	467	465.86	99.8
Y-88	7264	1489	0.9370	1589	1552.1	97.6
Co-60	3580	734	0.9997	734	724.48	98.7
Co-60	3581	734	0.9999	734	729.98	99.4
Y-88	7690	1577	0.9920	1589	1627.2	102.4

Reviewed By: Jody Watson

Date: 3/28/2012

Calibration Data from file: 8_Soil_TunaCan.Clb
Energy Calibration Date: 3/28/2012 Time: 10:35:07 AM
Efficiency Calibration Date: 3/28/2012 Time: 10:35:20 AM

Calibration Description:
8_Soil_TunaCan_90099_032712

Energy Calibration Fit
Energy = 0.0505 +0.250025*Channel +8.06699e-010*Channel**2
FWHM (ch) = 3.6351 +0.000832*Channel -2.49195e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.74	46.54	46.49	0.11%	0.94	0.95	-0.61%
237.86	59.54	59.52	0.03%	0.95	0.96	-1.36%
351.89	88.03	88.03	-0.00%	0.97	0.98	-1.63%
488.04	122.06	122.07	-0.01%	1.01	1.01	0.12%
663.26	165.85	165.88	-0.02%	1.07	1.04	2.17%
1116.59	279.17	279.23	-0.02%	1.15	1.13	1.73%
1566.40	391.69	391.69	-0.00%	1.22	1.22	0.24%
2645.92	661.66	661.60	0.01%	1.39	1.42	-1.95%
3591.62	898.02	898.05	-0.00%	1.61	1.58	2.16%
4692.17	1173.24	1173.23	0.00%	1.74	1.75	-0.61%
5329.14	1332.50	1332.49	0.00%	1.82	1.84	-1.05%
7342.97	1836.01	1836.02	-0.00%	2.11	2.10	0.42%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.3942 %
Ln(Eff) = -0.1099 -0.495854*Ln(Eng) -0.0257227*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.7131 %
Ln(Eff) = -25.2530 +9.398253*Ln(Eng) -1.00003*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.9170E-002	2.0055E-002	-4.62%
59.54	3.0526E-002	2.8813E-002	5.61%
88.03	3.9175E-002	3.9918E-002	-1.90%
122.06	3.9509E-002	4.1457E-002	-4.93%
165.85	========== Knee ==========		
165.85	3.5429E-002	3.6291E-002	-2.43%
279.17	2.5270E-002	2.4275E-002	3.94%
391.69	1.8582E-002	1.8550E-002	0.17%
661.66	1.2089E-002	1.2090E-002	-0.01%
898.02	9.1435E-003	9.3604E-003	-2.37%
1173.24	7.3487E-003	7.4527E-003	-1.42%
1332.50	6.6398E-003	6.6776E-003	-0.57%
1836.01	5.1654E-003	5.0457E-003	2.32%

Calibration Certificate Table

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

```
     ORTEC g v - i (1087) Env32  G53W4.25  3/28/2012 10:36:01 AM
TestAmerica                      Spectrum name: 8_TunaCan_20120676.An1

Sample description
     8_TunaCan_90099_032712


Spectrum Filename: C:\User\SPC\Det8\8_TunaCan_20120676.An1

Acquisition information
       Start time:                 3/27/2012 10:58:29 AM
       Live time:               3600
       Real time:               3655
       Dead time:                  1.49 %
       Detector ID:                   8

Detector system
     Ge 8 SN/174


Calibration
       Filename:                   8_Soil_TunaCan.Clb
     8_Soil_TunaCan_90099_032712


       Energy Calibration
            Created:               3/28/2012 10:35:07 AM
            Zero offset:           0.050 keV
            Gain:                  0.250 keV/channel
            Quadratic:             8.067E-10 keV/channel^2

       Efficiency Calibration
            Created:               3/28/2012 10:35:20 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.39 %
            Log(Eff):             -1.098764E-01 + (-4.958544E-01*Log(E) ) +
                                   ( -2.572270E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.71 %
            Log(Eff):             -2.525301E+01 + ( 9.398253E+00*Log(E) ) +
                                   ( -1.000034E+00*Log(E)^2 )

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

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.55keV )
       Stop channel:            8000 (  2000.30keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

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

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

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0205

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.54	43426.	0.60	0.95	2.002E-02	46.54	4.250	1.426E+04	Pb210
59.52	45918.	0.77	0.95	2.880E-02	59.54	35.700	1.240E+03	AM241
72.86	2434.	6.68	0.97	3.542E-02				
88.03	73269.	0.53	0.97	3.992E-02	88.03	3.610	1.607E+04	CD109
122.07	35407.	0.77	1.01	4.146E-02	122.06	85.600	3.451E+02	CO57
136.51	4312.	4.44	1.06	3.999E-02				
165.88	36308.	0.76	1.07	3.629E-02	165.85	79.900	5.363E+02	Ce139
279.23	24162.	0.88	1.15	2.427E-02	279.17	81.500	1.218E+03	Hg203
391.69	24625.	0.77	1.22	1.855E-02	391.69	64.000	9.671E+02	SN113
661.60	17184.	1.10	1.39	1.209E-02	661.66	85.210	4.659E+02	CS137
898.05	28015.	0.71	1.61	9.360E-03	898.02	93.700	1.552E+03	Y898
1173.23	18826.	0.79	1.74	7.453E-03	1173.24	99.900	7.245E+02	Co1173
1332.49	17010.	0.84	1.82	6.678E-03	1332.50	99.982	7.300E+02	Co1332
1836.02	16762.	0.79	2.11	5.046E-03	1836.01	99.200	1.627E+03	Y1836

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

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
291.19	72.85	12003.	2434.	6.872E+04	6.68	0.969	-	D
545.78	136.51	8432.	4312.	1.078E+05	4.44	1.059	-	

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

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

This section based on library: DET_EnergyStandardMix & Pb.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.74	46.49	17505.	45568.	12.658	0.76	0.942
AM-241	237.86	59.52	18397.	45918.	12.755	0.77	0.945
CD-109	351.89	88.03	17370.	73269.	20.353	0.53	0.966
CO-57	488.04	122.07	9639.	35407.	9.835	0.77	1.010
Ce-139	663.26	165.88	8356.	36308.	10.085	0.76	1.067
Hg-203	1116.59	279.23	4382.	24162.	6.712	0.88	1.153
SN-113	1566.40	391.69	2677.	24625.	6.840	0.77	1.223
CS-137	2645.92	661.60	3145.	17184.	4.773	1.10	1.389
Y-898	3591.62	898.05	1881.	28015.	7.782	0.71	1.611
Co-1173	4692.17	1173.23	650.	18826.	5.229	0.79	1.738
Co-1332	5329.14	1332.49	576.	17010.	4.725	0.84	1.822
Y-1836	7342.97	1836.02	111.	16762.	4.656	0.79	2.110

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

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

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Peak Code	MDA Value Bq	COMMENTS
Pb-210	N	1.4960E+04				8.15E+03	
			46.54	1.496E+04	(	2.033E+02 7.55E-01 4.25E+00	G
AM-241		1.2405E+03				1.58E+05	
			59.54	1.240E+03	(	1.715E+01 7.72E-01 3.57E+01	G
CD-109		1.6066E+04				4.63E+02	
			88.03	1.607E+04	(	1.353E+02 5.26E-01 3.61E+00	G
CO-57		3.4512E+02				2.72E+02	
			122.06	3.451E+02	(	4.486E+00 7.68E-01 8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3634E+02					1.38E+02	
		165.85	5.363E+02	(	6.333E+00	7.56E-01	7.99E+01 G
Hg-203	1.2182E+03					4.66E+01	
		279.17	1.218E+03	(	1.569E+01	8.81E-01	8.15E+01 G
SN-113	9.6715E+02					1.15E+02	
		391.69	9.671E+02	(	9.575E+00	7.73E-01	6.40E+01 G
CS-137	4.6586E+02					1.10E+04	
		661.66	4.659E+02	(	7.158E+00	1.10E+00	8.52E+01 G
Y-898	1.5521E+03					1.07E+02	
		898.02	1.552E+03	(	1.135E+01	7.10E-01	9.37E+01 G
Co-1173	7.2448E+02					1.93E+03	
		1173.24	7.245E+02	(	4.676E+00	7.93E-01	9.99E+01 G
Co-1332	7.2998E+02					1.93E+03	
		1332.50	7.300E+02	(	4.916E+00	8.45E-01	1.00E+02 G
Y-1836	1.6272E+03					1.07E+02	
		1836.01	1.627E+03	(	5.029E+00	7.91E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

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

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

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

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

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

- -

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

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

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4851E+04	1.4960E+04	7.555E-01%	2.03E+02
AM-241	1.2400E+03	1.2405E+03	7.719E-01%	1.71E+01
CD-109	1.4124E+04	1.6066E+04	5.260E-01%	1.35E+02
CO-57	2.7715E+02	3.4512E+02	7.681E-01%	4.49E+00
Ce-139	3.4782E+02	5.3634E+02	7.558E-01%	6.33E+00
Hg-203	3.3925E+02	1.2182E+03	8.812E-01%	1.57E+01
SN-113	5.7617E+02	9.6715E+02	7.729E-01%	9.58E+00
CS-137	4.6334E+02	4.6586E+02	1.105E+00%	7.16E+00
Y-898	8.8728E+02	1.5521E+03	7.104E-01%	1.13E+01
Co-1173	7.0239E+02	7.2448E+02	7.931E-01%	4.68E+00
Co-1332	7.0772E+02	7.2998E+02	8.450E-01%	4.92E+00
Y-1836	9.3024E+02	1.6272E+03	7.905E-01%	5.03E+00

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

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

Total Activity (82.3 to 2000.3 keV) 3.545E+04 Bq
Total Decayed Activity (82.3 to 2000.3 keV) 4.0432598E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector:	Ge9
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14240	95.4
Am-241	2037	418	0.3590	1163	1244.5	107.0
Cd-109	2881	591	0.0361	16363	15902	97.2
Co-57	1511	310	0.8560	362	347.48	96.0
Ce-139	2139	439	0.7990	549	535.87	97.6
Hg-203	4651	954	0.8146	1171	1216.7	103.9
Sn-113	3015	618	0.6400	966	970.65	100.5
Cs-137	1938	397	0.8510	467	466.58	99.9
Y-88	7264	1489	0.9370	1589	1552.5	97.7
Co-60	3580	734	0.9997	734	727.12	99.0
Co-60	3581	734	0.9999	734	719.75	98.0
Y-88	7690	1577	0.9920	1589	1638.8	103.1

Reviewed By: Jody Watson

Date: 6/14/2012

Calibration Data from file: 9_Soil_TunaCan.Clb
Energy Calibration Date: 6/14/2012 Time: 10:19:40 AM
Efficiency Calibration Date: 6/14/2012 Time: 10:19:51 AM

Calibration Description:
9_Soil_TunaCan_90099_050312

Energy Calibration Fit
Energy = 0.0875 +0.250109*Channel -2.0385e-008*Channel**2
FWHM (ch) = 4.1690 +0.000934*Channel -2.36522e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.85	46.54	46.57	-0.06%	1.07	1.09	-1.37%
237.85	59.54	59.58	-0.06%	1.08	1.10	-1.96%
351.79	88.03	88.07	-0.05%	1.12	1.12	-0.18%
487.79	122.06	122.08	-0.02%	1.14	1.16	-1.17%
662.64	165.85	165.81	0.02%	1.23	1.19	2.51%
1115.53	279.17	279.07	0.04%	1.30	1.30	0.44%
1565.74	391.69	391.64	0.01%	1.43	1.39	2.81%
2645.81	661.66	661.69	-0.00%	1.60	1.62	-0.83%
3591.21	898.02	898.02	0.00%	1.80	1.80	-0.02%
4692.44	1173.24	1173.26	-0.00%	2.01	2.01	0.18%
5329.80	1332.50	1332.54	-0.00%	2.09	2.12	-1.38%
7344.77	1836.01	1835.98	0.00%	2.45	2.44	0.55%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.3038 %
Ln(Eff) = -0.8080 -0.236727*Ln(Eng) -0.0395064*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.4241 %
Ln(Eff) = -23.8792 +8.875647*Ln(Eng) -0.94011*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.4596E-002	2.5767E-002	-4.76%
59.54	3.8891E-002	3.6589E-002	5.92%
88.03	4.9059E-002	5.0504E-002	-2.95%
122.06	5.0886E-002	5.3031E-002	-4.22%
165.85	========== Knee ==========		
165.85	4.6197E-002	4.7361E-002	-2.52%
279.17	3.4900E-002	3.3566E-002	3.82%
391.69	2.6668E-002	2.6526E-002	0.53%
661.66	1.8125E-002	1.8099E-002	0.14%
898.02	1.4012E-002	1.4341E-002	-2.34%
1173.24	1.1507E-002	1.1627E-002	-1.05%
1332.50	1.0296E-002	1.0501E-002	-2.00%
1836.01	8.3305E-003	8.0796E-003	3.01%

Calibration Certificate Table

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

```
     ORTEC g v - i (1087) Env32  G53W4.25  6/14/2012 10:20:07 AM
TestAmerica, Inc                Spectrum name: 9_TunaCan_20120147.An1

Sample description
     9_TunaCan_90099_050312


Spectrum Filename: C:\User\SPC\Det9\9_TunaCan_20120147.An1

Acquisition information
       Start time:                 5/3/2012 1:37:42 PM
       Live time:               3600
       Real time:               3661
       Dead time:                  1.65 %
       Detector ID:                    9

Detector system
     Ge 9 SN/100113


Calibration
       Filename:                   9_Soil_TunaCan.Clb
     9_Soil_TunaCan_90099_050312


       Energy Calibration
            Created:               6/14/2012 10:19:40 AM
            Zero offset:           0.088 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.039E-08 keV/channel^2

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

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

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.60keV )
       Stop channel:            8000 (  1999.66keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.An1

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

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

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0265

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.57	55553.	0.67	1.07	2.579E-02	46.54	4.250	1.424E+04	Pb210
59.56	58492.	0.66	1.08	3.660E-02	59.54	35.700	1.245E+03	AM241
88.07	86792.	0.48	1.12	5.052E-02	88.03	3.610	1.590E+04	CD109
122.08	41484.	0.73	1.14	5.303E-02	122.06	85.600	3.475E+02	CO57
136.48	5266.	4.55	1.22	5.150E-02				
165.81	39272.	0.74	1.23	4.626E-02	165.85	79.900	5.359E+02	Ce139
279.06	19221.	1.24	1.30	3.358E-02	279.17	81.500	1.217E+03	Hg203
391.64	28263.	0.86	1.43	2.653E-02	391.69	64.000	9.707E+02	SN113
661.69	25703.	0.90	1.61	1.810E-02	661.66	85.210	4.666E+02	CS137
898.02	33728.	0.69	1.80	1.434E-02	898.02	93.700	1.552E+03	Y898
1173.24	29087.	0.72	2.01	1.163E-02	1173.24	99.900	7.271E+02	Co1173
1332.54	26026.	0.70	2.09	1.050E-02	1332.50	99.982	7.198E+02	Co1332
1835.94	21237.	0.73	2.46	8.080E-03	1836.01	99.200	1.639E+03	Y1836

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
545.34	136.48	10776.	5266.	1.023E+05	4.55	1.225	-

ORTEC g v - i (1087) Env32 G53W4.25 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.An1

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

This section based on library: DET_EnergyStandardMix & Pb.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.85	46.57	18837.	55553.	15.431	0.67	1.071
AM-241	237.79	59.56	19448.	58492.	16.248	0.66	1.078
CD-109	351.79	88.07	19261.	86792.	24.109	0.48	1.122
CO-57	487.79	122.08	11232.	41484.	11.523	0.73	1.142
Ce-139	662.64	165.81	9084.	39272.	10.909	0.74	1.225
Hg-203	1115.51	279.06	6250.	19221.	5.339	1.24	1.302
SN-113	1565.73	391.64	4864.	28263.	7.851	0.86	1.434
CS-137	2645.81	661.69	4037.	25703.	7.140	0.90	1.605
Y-898	3591.21	898.02	2958.	33728.	9.369	0.69	1.803
Co-1173	4692.36	1173.24	1710.	29087.	8.080	0.72	2.014
Co-1332	5329.80	1332.54	1048.	26026.	7.229	0.70	2.088
Y-1836	7344.62	1835.94	304.	21237.	5.899	0.73	2.457

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

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

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq			COMMENTS
Pb-210	N	1.4240E+04					8.15E+03		
			46.54	1.424E+04	(	1.646E+02	6.67E-01	4.25E+00	G
AM-241		1.2445E+03					1.58E+05		
			59.54	1.245E+03	(	1.388E+01	6.60E-01	3.57E+01	G
CD-109		1.5902E+04					4.63E+02		
			88.03	1.590E+04	(	1.190E+02	4.84E-01	3.61E+00	G
CO-57		3.4748E+02					2.72E+02		
			122.06	3.475E+02	(	4.159E+00	7.31E-01	8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3587E+02					1.38E+02	
		165.85	5.359E+02	(	6.097E+00	7.41E-01	7.99E+01 G
Hg-203	1.2167E+03					4.66E+01	
		279.17	1.217E+03	(	2.349E+01	1.24E+00	8.15E+01 G
SN-113	9.7065E+02					1.15E+02	
		391.69	9.707E+02	(	1.125E+01	8.60E-01	6.40E+01 G
CS-137	4.6658E+02					1.10E+04	
		661.66	4.666E+02	(	5.424E+00	8.98E-01	8.52E+01 G
Y-898	1.5525E+03					1.07E+02	
		898.02	1.552E+03	(	1.179E+01	6.92E-01	9.37E+01 G
Co-1173	7.2712E+02					1.93E+03	
		1173.24	7.271E+02	(	4.884E+00	7.20E-01	9.99E+01 G
Co-1332	7.1975E+02					1.93E+03	
		1332.50	7.198E+02	(	4.248E+00	6.98E-01	1.00E+02 G
Y-1836	1.6388E+03					1.07E+02	
		1836.01	1.639E+03	(	6.479E+00	7.29E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

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

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

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

ORTEC g v - i (1087) Env32 G53W4.25 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.An1

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

- -

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

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

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4091E+04	1.4240E+04	6.667E-01%	1.65E+02
AM-241	1.2439E+03	1.2445E+03	6.605E-01%	1.39E+01
CD-109	1.3223E+04	1.5902E+04	4.843E-01%	1.19E+02
CO-57	2.5385E+02	3.4748E+02	7.313E-01%	4.16E+00
Ce-139	2.8828E+02	5.3587E+02	7.410E-01%	6.10E+00
Hg-203	1.9517E+02	1.2167E+03	1.239E+00%	2.35E+01
SN-113	4.6244E+02	9.7065E+02	8.599E-01%	1.13E+01
CS-137	4.6297E+02	4.6658E+02	8.981E-01%	5.42E+00
Y-898	6.9723E+02	1.5525E+03	6.917E-01%	1.18E+01
Co-1173	6.9559E+02	7.2712E+02	7.204E-01%	4.88E+00
Co-1332	6.8854E+02	7.1975E+02	6.982E-01%	4.25E+00
Y-1836	7.3602E+02	1.6388E+03	7.291E-01%	6.48E+00

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

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

Total Activity (37.6 to 1999.7 keV) 3.304E+04 Bq
Total Decayed Activity (37.6 to 1999.7 keV) 3.9561668E+04 Bq

Analyzed by: _____
admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc

Gamma Verification per Geometry

Detector: **Ge12**
Geometry: **Tuna Can**
Reference date: **1/1/2018**
Calibration Standard: **108513**
Standard volume g / vial: **1550**
Standard volume transferred in g / geometry: **342.2**
lab ID# of cal standard: **#1402359 / Tuna Can_2018_00001**

Isotope	Certified Activity - Bq	Geometry Activity - Bq	Count Results	%recovery
Pb-210	72410	15986	16000	100.1
Am-241	5770	1274	1261	99.0
Cd-109	79700	17596	18250	103.7
Co-57	1809	399	393.1	98.4
Ce-139	2723	601	585.9	97.5
Hg-203	5868	1296	1312	101.3
Sn-113	4658	1028	1059	103.0
Cs-137	2283	504	509.8	101.1
Y-88	7810	1724	1705	98.9
Co-60	3574	789	776.5	98.4
Co-60	3574	789	765.4	97.0
Y-88	7810	1724	1769	102.6

Reviewed By: Jody Watson

Date: 4/23/2018

Calibration Data from file: 12_Soil_TunaCan.Clb
Energy Calibration Date: 4/20/2018 Time: 11:53:01 AM
Efficiency Calibration Date: 4/20/2018 Time: 11:53:09 AM

Calibration Description:
12_TunaCan_108513

Energy Calibration Fit
Energy = 0.0591 +0.250183*Channel -3.73476e-008*Channel**2
FWHM (ch) = 3.2115 +0.001032*Channel -1.75096e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.95	46.54	46.58	-0.09%	0.84	0.85	-1.23%
237.82	59.54	59.56	-0.03%	0.86	0.86	-0.65%
351.66	88.03	88.03	-0.01%	0.89	0.89	-0.96%
487.75	122.06	122.08	-0.01%	0.92	0.93	-0.62%
662.97	165.85	165.91	-0.03%	0.97	0.97	0.22%
1115.42	279.17	279.07	0.04%	1.11	1.09	2.13%
1565.35	391.69	391.59	0.02%	1.20	1.20	0.60%
2645.53	661.66	661.66	-0.00%	1.49	1.45	2.30%
3591.22	898.02	898.04	-0.00%	1.66	1.67	-0.91%
4692.62	1173.24	1173.25	-0.00%	1.85	1.92	-3.60%
5330.40	1332.50	1332.57	-0.01%	2.09	2.05	1.92%
7346.34	1836.01	1835.97	0.00%	2.46	2.46	0.18%

Efficiency Calibration Fit
Polynomial Uncertainty = 1.0201 %
Coefficients:
-0.363508 -4.707999 0.462125 -0.051256 0.002384 -0.000043

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.8052E-002	1.7999E-002	0.29%
59.54	2.7878E-002	2.8172E-002	-1.06%
88.03	3.7143E-002	3.5814E-002	3.58%
122.06	3.6658E-002	3.7240E-002	-1.59%
165.85	3.3189E-002	3.4052E-002	-2.60%
279.17	2.4853E-002	2.4494E-002	1.45%
391.69	1.9499E-002	1.8934E-002	2.90%
661.66	1.2936E-002	1.2789E-002	1.13%
898.02	1.0139E-002	1.0253E-002	-1.13%
1173.24	8.2922E-003	8.4265E-003	-1.62%
1332.50	7.4182E-003	7.6470E-003	-3.08%
1836.01	6.0193E-003	5.8663E-003	2.54%

Calibration Certificate Table

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

Test America St. Louis Spectrum ID: 12_TunaCan_20180005

Sample Description: 12_TunaCan_108513
Detector: Detector #12
Batch ID: 12
Work Order Number: TunaCan
Lot Number: 108513

Decay to Time: 1/1/2018 11:00 Live Time: 3600 sec
Acquisition Time: 4/18/2018 13:54:19 Real Time: 3652 sec
Analysis Time: 4/20/2018 11:55 Dead Time: 1.41 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: DET_EnergyStandardMix & Pb.lib
Bkgd Correction File: 12_2017-05-07_0806.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
Pb-210	1.600E+04	0.6	9.485E+01	1.031E+03	1.853E+02
AM-241	1.261E+03	0.7	9.223E+00	8.039E+01	1.659E+01
CD-109	1.825E+04	0.4	7.598E+01	1.135E+03	1.134E+02
CO-57	3.931E+02	0.8	3.042E+00	2.279E+01	5.110E+00
Ce-139	5.859E+02	0.7	4.357E+00	3.335E+01	6.791E+00
Hg-203	1.312E+03	1.1	1.414E+01	7.659E+01	2.206E+01
SN-113	1.059E+03	0.9	9.013E+00	6.310E+01	1.205E+01
CS-137	5.098E+02	0.9	4.734E+00	2.665E+01	6.233E+00
Y-898	1.705E+03	0.8	1.331E+01	8.765E+01	1.505E+01
Co-1173	7.765E+02	0.9	6.740E+00	3.922E+01	6.891E+00
Co-1332	7.654E+02	0.8	6.419E+00	3.866E+01	6.071E+00
Y-1836	1.769E+03	0.8	1.413E+01	1.018E+02	8.211E+00
Total	4.438E+04				

Analyst: Jody Watson

Sample description
12_TunaCan_108513

Spectrum Filename: C:\User\SPC\Det12\12_TunaCan_20180005.An1

Acquisition information

Start time:	4/18/2018 1:54:19 PM
Live time:	3600
Real time:	3652
Dead time:	1.41 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCan_108513

Energy Calibration

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

Efficiency Calibration

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

Library Files

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

Analysis parameters

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

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

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2018 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2017-05-07_0806.PBC 5/7/2017 8:06:54 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0332

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
27.87	601.	9.86	0.70	3.939E-03				
33.44	3191.	3.58	0.84	8.062E-03				
36.78	534.	21.42	0.84	1.059E-02				
38.00	764.	15.14	0.84	1.151E-02				
46.62	43669.	0.59	0.85	1.805E-02	46.54	4.250	1.600E+04	Pb210
49.75	200.	71.91	0.85	2.153E-02				
59.56	45621.	0.73	0.86	2.818E-02	59.54	35.700	1.261E+03	AM241
70.78	903.	16.81	0.88	3.227E-02				
72.97	1715.	8.94	0.88	3.286E-02				
74.88	161.	95.77	0.88	3.334E-02				
77.23	29.	497.10	0.88	3.389E-02				
82.47	1429.	10.54	0.89	3.493E-02				
84.79	2014.	7.84	0.89	3.532E-02				
88.06	72330.	0.42	0.89	3.581E-02	88.03	3.610	1.825E+04	CD109
90.37	144.	87.05	0.90	3.612E-02				
122.08	34326.	0.77	0.92	3.724E-02	122.06	85.600	3.931E+02	CO57
136.51	4200.	4.35	0.96	3.651E-02				
165.91	33460.	0.74	0.97	3.405E-02	165.85	79.900	5.859E+02	Ce139
206.00	117.	63.94	0.45	3.024E-02				
238.46	443.	25.54	0.90	2.744E-02				
255.00	1168.	12.03	0.88	2.617E-02				
279.07	19187.	1.08	1.11	2.450E-02	279.17	81.500	1.312E+03	Hg203
286.67	107.	74.95	0.64	2.401E-02				
351.85	322.	30.50	1.33	2.056E-02				
391.59	24235.	0.85	1.20	1.894E-02	391.69	64.000	1.059E+03	SN113
500.18	113.	56.68	0.53	1.573E-02				
583.01	248.	32.33	0.89	1.403E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
601.08	176.	44.64	0.64	1.372E-02				
643.04	164.	48.09	0.69	1.306E-02				
661.66	19866.	0.93	1.49	1.279E-02	661.66	85.210	5.098E+02	CS137
695.58	154.	52.24	0.30	1.233E-02				
712.59	169.	39.74	0.69	1.212E-02				
814.18	641.	15.80	1.86	1.101E-02				
890.80	44.	76.23	0.45	1.031E-02				
898.03	29383.	0.78	1.66	1.025E-02	898.02	93.700	1.705E+03	Y898
924.59	170.	51.69	2.08	1.004E-02				
1059.91	148.	40.90	0.51	9.087E-03				
1173.24	22640.	0.87	1.85	8.426E-03	1173.24	99.900	7.765E+02	Co1173
1217.40	45.	61.22	0.33	8.195E-03				
1271.51	36.	60.60	1.04	7.928E-03				
1301.67	34.	60.56	0.43	7.787E-03				
1332.57	20270.	0.84	2.09	7.647E-03	1332.50	99.982	7.654E+02	Co1332
1491.52	180.	28.09	0.33	6.994E-03				
1835.92	18468.	0.80	2.47	5.867E-03	1836.01	99.200	1.769E+03	Y1836

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
111.16	27.87	1248.	601.	1.526E+05	9.86	0.703	-	s
133.41	33.32	4927.	3191.	3.959E+05	3.58	0.838	-	sD
146.77	36.66	6263.	534.	5.040E+04	21.42	0.841	-	sD
151.64	37.88	6317.	764.	6.642E+04	15.14	0.842	-	sD
198.79	49.71	10292.	213.	9.912E+03	67.59	0.855	-	sc
282.69	70.80	11078.	903.	2.799E+04	16.81	0.876	-	D
291.44	72.99	10900.	1715.	5.219E+04	8.94	0.878	-	D
299.07	74.90	11841.	161.	4.837E+03	95.77	0.880	-	c
308.48	77.26	10683.	29.	8.685E+02	497.10	0.883	-	c
329.43	82.44	10620.	1431.	4.097E+04	10.52	0.888	-	D
338.70	84.76	11438.	2016.	5.707E+04	7.83	0.890	-	sD
361.04	90.35	7839.	145.	4.014E+03	86.78	0.896	-	sc
545.45	136.51	7622.	4200.	1.150E+05	4.35	0.964	-	
823.26	206.00	2348.	117.	3.869E+03	63.94	0.454	-	s
953.03	238.46	3718.	443.	1.615E+04	25.54	0.897	-	s
1019.19	255.00	4459.	1168.	4.464E+04	12.03	0.878	-	
1145.82	286.67	2108.	107.	4.456E+03	74.95	0.636	-	s
1406.43	351.85	2440.	322.	1.569E+04	30.50	1.334	-	
1999.63	500.18	1252.	113.	7.164E+03	56.68	0.530	-	s
2330.90	583.01	1545.	248.	1.767E+04	32.33	0.894	-	s
2403.19	601.08	1564.	176.	1.283E+04	44.64	0.638	-	s
2571.03	643.04	1587.	164.	1.258E+04	48.09	0.694	-	s
2781.20	695.58	1652.	154.	1.250E+04	52.24	0.304	-	s
2849.27	712.59	1184.	169.	1.395E+04	39.74	0.695	-	s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
3255.67	814.18	1648.	641.	5.823E+04	15.80	1.859	-	s
3562.26	890.80	503.	44.	4.283E+03	76.23	0.452	-	sc
3697.47	924.59	1556.	170.	1.690E+04	51.69	2.082	-	s
4239.01	1059.91	879.	148.	1.629E+04	40.90	0.508	-	s
4869.35	1217.40	238.	45.	5.491E+03	61.22	0.330	-	s
5085.97	1271.51	165.	36.	4.541E+03	60.60	1.043	-	s
5206.71	1301.67	156.	34.	4.366E+03	60.56	0.434	-	s
5966.81	1491.52	462.	180.	2.581E+04	28.09	0.329	-	s

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

This section based on library: DET_EnergyStandardMix & Pb.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.79	46.54	11653.	43669.	12.130	0.59	0.851D
AM-241	237.82	59.56	16449.	45621.	12.672	0.73	0.859
CD-109	351.65	88.03	9195.	72330.	20.092	0.42	0.894D
CO-57	487.75	122.08	9060.	34326.	9.535	0.77	0.923
Ce-139	662.97	165.91	6830.	33460.	9.295	0.74	0.975
Hg-203	1115.42	279.07	4712.	19187.	5.330	1.08	1.109
SN-113	1565.35	391.59	3432.	24235.	6.732	0.85	1.204
CS-137	2645.53	661.66	2656.	19866.	5.518	0.93	1.489
Y-898	3591.19	898.03	3033.	29383.	8.162	0.78	1.658
Co-1173	4692.59	1173.24	1810.	22640.	6.289	0.87	1.852
Co-1332	5330.41	1332.57	1150.	20270.	5.631	0.84	2.092
Y-1836	7346.14	1835.92	317.	18468.	5.130	0.80	2.475

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	Peak MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.6003E+04				8.15E+03	
			46.54	1.600E+04	(P	1.853E+02 5.93E-01 4.25E+00 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	1.2606E+03					1.58E+05	
		59.54	1.261E+03	(	1.659E+01	7.32E-01	3.57E+01 G
CD-109	1.8246E+04					4.63E+02	
		88.03	1.825E+04	(	1.134E+02	4.16E-01	3.61E+00 G
CO-57	3.9307E+02					2.72E+02	
		122.06	3.931E+02	(	5.110E+00	7.74E-01	8.56E+01 G
Ce-139	5.8589E+02					1.38E+02	
		165.85	5.859E+02	(	6.791E+00	7.44E-01	7.99E+01 G
Hg-203	1.3123E+03					4.66E+01	
		279.17	1.312E+03	(	2.206E+01	1.08E+00	8.15E+01 G
SN-113	1.0590E+03					1.15E+02	
		391.69	1.059E+03	(	1.205E+01	8.51E-01	6.40E+01 G
CS-137	5.0981E+02					1.10E+04	
		661.66	5.098E+02	(	6.233E+00	9.29E-01	8.52E+01 G
Y-898	1.7049E+03					1.07E+02	
		898.02	1.705E+03	(	1.505E+01	7.81E-01	9.37E+01 G
Co-1173	7.7646E+02					1.93E+03	
		1173.24	7.765E+02	(	6.891E+00	8.68E-01	9.99E+01 G
Co-1332	7.6541E+02					1.93E+03	
		1332.50	7.654E+02	(	6.071E+00	8.39E-01	1.00E+02 G
Y-1836	1.7690E+03					1.07E+02	
		1836.01	1.769E+03	(	8.211E+00	7.99E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

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

library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
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

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

14_Marn1L_20120214

```
     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

ORTEC g v - i (1087) Env32 G53W4.25 3/14/2012 5:01:08 PM Page 3
TestAmerica, Inc. Spectrum name: 14_Marn1L_20120214.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
291.07	72.97	66878.	18325.	3.832E+05	2.42	0.793	-	D
329.18	82.50	76800.	5506.	1.126E+05	8.82	1.048	-	sD
339.19	84.98	66692.	10172.	4.523E+04	3.72	0.818	-	lD
544.79	136.40	50098.	24070.	5.313E+05	1.86	0.859	-	
795.47	199.08	36038.	5460.	1.505E+05	6.64	0.972	-	s
1019.50	255.08	28728.	6879.	2.248E+05	4.87	1.025	-	
2043.63	511.09	21035.	8266.	4.528E+05	3.88	2.156	-	s
3255.08	813.89	12208.	3401.	2.718E+05	7.58	1.641	-	s
5299.75	1324.84	4748.	3723.	4.544E+05	5.11	3.107	-	s

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

This section based on library: DET_EnergyStandardMix & Mn, Zn.L

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.80	59.65	116745.	291645.	81.013	0.29	0.765
CD-109	351.28	88.02	93268.	406468.	112.908	0.22	0.817
CO-57	487.13	121.99	67906.	195618.	54.338	0.35	0.840
Ce-139	662.38	165.80	56766.	201696.	56.027	0.34	0.928
Hg-203	1115.87	279.18	28497.	168439.	46.789	0.32	1.005
SN-113	1565.85	391.66	20811.	147525.	40.979	0.33	1.116
CS-137	2646.08	661.68	22769.	92186.	25.607	0.51	1.329
Mn-54	3338.98	834.86	14954.	122362.	33.989	0.37	1.458
Y-898	3591.89	898.06	20498.	168004.	46.668	0.33	1.527
Zn-65	4462.13	1115.54	10931.	93846.	26.068	0.44	1.683
Co-1173	4693.00	1173.23	6251.	100357.	27.877	0.37	1.725
Co-1332	5330.38	1332.49	5298.	90580.	25.161	0.40	1.866
Y-1836	7345.86	1836.01	1482.	100634.	27.954	0.33	2.198

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

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

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Activity Bq	Code	MDA Value Bq	COMMENTS
AM-241		5.0997E+03				1.58E+05	
			59.54	5.100E+03	(	2.789E+01 2.95E-01 3.57E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/14/2012 5:01:08 PM Page 4
TestAmerica, Inc. Spectrum name: 14_Marn1L_20120214.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments

```
CD-109       7.0211E+04                                        4.63E+02
                           88.03 7.021E+04  (  2.463E+02 2.15E-01 3.61E+00 G

CO-57        1.5913E+03                                        2.72E+02
                          122.06 1.591E+03  (  9.901E+00 3.54E-01 8.56E+01 G

Ce-139       2.3827E+03                                        1.38E+02
                          165.85 2.383E+03  (  1.315E+01 3.35E-01 7.99E+01 G

Hg-203       5.2957E+03                                        4.66E+01
                          279.17 5.296E+03  (  2.482E+01 3.18E-01 8.15E+01 G

SN-113       4.2415E+03                                        1.15E+02
                          391.69 4.242E+03  (  1.941E+01 3.33E-01 6.40E+01 G

CS-137       2.0323E+03                                        1.10E+04
                          661.66 2.032E+03  (  1.556E+01 5.10E-01 8.52E+01 G

Mn-54        3.2108E+03                                        3.12E+02
                          834.85 3.211E+03  (  1.502E+01 3.74E-01 1.00E+02 G

Y-898        6.6244E+03                                        1.07E+02
                          898.02 6.624E+03  (  2.641E+01 3.30E-01 9.37E+01 G

Zn-65    F   6.5015E+03                                        2.44E+02
                         1115.55 6.502E+03  (  3.394E+01 4.44E-01 5.06E+01 G

Co-1173      3.1300E+03                                        1.93E+03
                         1173.24 3.130E+03  (  1.158E+01 3.73E-01 9.99E+01 G

Co-1332      3.1618E+03                                        1.93E+03
                         1332.50 3.162E+03  (  1.193E+01 3.99E-01 1.00E+02 G

Y-1836       7.1049E+03                                        1.07E+02
                         1836.01 7.105E+03  (  1.286E+01 3.32E-01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
```



```
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
                                       Page 4
```

I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

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

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

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty Counting 1 Sigma	MDA
AM-241	5.0982E+03	5.0997E+03	2.948E-01%	2.79E+01
CD-109	6.3647E+04	7.0211E+04	2.150E-01%	2.46E+02
CO-57	1.3465E+03	1.5913E+03	3.536E-01%	9.90E+00
Ce-139	1.7132E+03	2.3827E+03	3.352E-01%	1.31E+01
Hg-203	2.0000E+03	5.2957E+03	3.181E-01%	2.48E+01
SN-113	2.8588E+03	4.2415E+03	3.329E-01%	1.94E+01
CS-137	2.0240E+03	2.0323E+03	5.102E-01%	1.56E+01
Mn-54	2.7764E+03	3.2108E+03	3.741E-01%	1.50E+01
Y-898	4.3268E+03	6.6244E+03	3.304E-01%	2.64E+01
Zn-65	5.3988E+03	6.5015E+03	4.445E-01%	3.39E+01
Co-1173	3.0570E+03	3.1300E+03	3.728E-01%	1.16E+01
Co-1332	3.0881E+03	3.1618E+03	3.985E-01%	1.19E+01
Y-1836	4.6406E+03	7.1049E+03	3.322E-01%	1.29E+01

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

ORTEC g v - i (1087) Env32 G53W4.25 3/14/2012 5:01:08 PM Page 6
TestAmerica, Inc. Spectrum name: 14_Marn1L_20120214.An1

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

Total Activity (37.7 to 1999.4 keV) 1.020E+05 Bq
Total Decayed Activity (37.7 to 1999.4 keV) 1.2058714E+05 Bq

Gamma Verification per Geometry

Detector: Ge16

Geometry: 1L Marn

Reference date 1/1/2012

Calibration Standard: 90062

Standard volume g / vial 1

Standard volume transferred in g / geometry 1

lab ID# of cal standard 6707

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	Abundance	Activity Bq/L	Count Results	%recovery
Am-241	1821	1821	0.359	**5072.4**	5015.2	98.9
Cd-109	2602	2602	0.0361	**72077.6**	69098	95.9
Co-57	1364	1364	0.856	**1593.5**	1601.3	100.5
Ce-139	1932	1932	0.799	**2418.0**	2391.1	98.9
Hg-203	4200	4200	0.8146	**5155.9**	5262.6	102.1
Sn-113	2722	2722	0.64	**4253.1**	4232.8	99.5
Cs-137	1750	1750	0.851	**2056.4**	2036.7	99.0
Mn-54	3114	3114	0.9998	**3114.6**	3232.6	103.8
Y-88	6559	6559	0.937	**7000.0**	6514.5	93.1
Zn-65	3134	3134	0.506	**6193.7**	6635.9	107.1
Co-60	3233	3233	0.99974	**3233.8**	3077.5	95.2
Co-60	3233	3233	0.99986	**3233.5**	3114.5	96.3
Y-88	6944	6944	0.992	**7000.0**	7137.4	102.0

Reviewed By: Rachael Schneider

Date: 4/3/2012

Calibration Data from file: 16_Liquid_Marinelli 1L.Clb
Energy Calibration Date: 4/2/2012 Time: 6:09:11 PM
Efficiency Calibration Date: 4/2/2012 Time: 6:09:24 PM

Calibration Description:
16_1Lmarn_90062_032712

Energy Calibration Fit
Energy = -0.0068 +0.250063*Channel -1.97784e-008*Channel**2
FWHM (ch) = 3.8412 +0.000871*Channel -1.25435e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
238.12	59.54	59.54	0.01%	1.01	1.01	-0.57%
352.22	88.03	88.07	-0.04%	1.03	1.04	-0.82%
488.32	122.06	122.10	-0.03%	1.08	1.07	1.06%
663.48	165.85	165.90	-0.03%	1.12	1.10	1.25%
1116.17	279.17	279.08	0.03%	1.19	1.20	-0.51%
1566.25	391.69	391.60	0.02%	1.29	1.29	-0.31%
2646.59	661.66	661.67	-0.00%	1.52	1.51	0.19%
3339.48	834.85	834.85	-0.00%	1.65	1.65	0.11%
3592.25	898.02	898.03	-0.00%	1.69	1.70	-0.64%
4462.73	1115.55	1115.56	-0.00%	1.86	1.87	-0.63%
4693.62	1173.24	1173.26	-0.00%	1.90	1.91	-0.62%
5331.05	1332.50	1332.53	-0.00%	2.07	2.03	1.76%
7346.38	1836.01	1835.98	0.00%	2.38	2.39	-0.34%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.4245 %
Ln(Eff) = -2.3147 +0.284801*Ln(Eng) -0.0811499*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.2610 %
Ln(Eff) = -12.6035 +4.382261*Ln(Eng) -0.488912*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
59.54	5.7326E-002	5.7274E-002	0.09%
88.03	6.1456E-002	6.1813E-002	-0.58%
122.06	5.9034E-002	5.8742E-002	0.49%
165.85	========== Knee ==========		
165.85	5.0286E-002	5.0846E-002	-1.11%
279.17	3.8262E-002	3.7455E-002	2.11%
391.69	2.9847E-002	2.9986E-002	-0.47%
661.66	2.0315E-002	2.0485E-002	-0.84%
834.85	1.7702E-002	1.7055E-002	3.66%
898.02	1.4961E-002	1.6073E-002	-7.43%
1115.55	1.4365E-002	1.3406E-002	6.67%
1173.24	1.2209E-002	1.2839E-002	-5.16%
1332.50	1.1066E-002	1.1489E-002	-3.82%
1836.01	8.7552E-003	8.5852E-003	1.94%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Am-241	59.54	35.70	1.58E+005	5100.80	1821.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	72078.00	2602.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	1593.50	1364.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	2418.00	1932.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	5153.40	4200.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	4253.10	2722.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	2053.70	1750.00	4.00%	1/1/2012 11:00:00 AM
Mn-54	834.85	99.98	3.12E+002	3114.60	3114.00	3.30%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	7000.00	6559.00	3.90%	1/1/2012 11:00:00 AM
Zn-65	1115.55	50.60	2.44E+002	6193.70	3134.00	3.50%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	3236.20	3233.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	3233.60	3233.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	7000.00	6944.00	4.00%	1/1/2012 11:00:00 AM

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     ORTEC g v - i (1087) Env32  G53W4.25  4/2/2012 6:09:53 PM     Page  1
TestAmerica, Inc.               Spectrum name: 16_Marn1L_20120257.An1

Sample description
     16_Marn1L_90062_032712


Spectrum Filename: C:\User\SPC\Det16\16_Marn1L_20120257.An1

Acquisition information
       Start time:                 3/27/2012 3:43:12 PM
       Live time:               3600
       Real time:               4253
       Dead time:                 15.35 %
       Detector ID:                   16

Detector system
     Ge16 SN/11012217


Calibration
       Filename:                   16_Liquid_Marinelli 1L.Clb
     16_1Lmarn_90062_032712


       Energy Calibration
            Created:               4/2/2012 6:09:11 PM
            Zero offset:          -0.007 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.978E-08 keV/channel^2

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

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

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.50keV )
       Stop channel:            8000 (  1999.23keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (1087) Env32  G53W4.25  4/2/2012 6:09:53 PM     Page  2
TestAmerica, Inc.               Spectrum name: 16_Marn1L_20120257.An1
                                      Page 1
```

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

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

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

total peaks alloc. 13 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0239

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
37.83	30994.	1.94	1.11	4.347E-02				
49.52	16296.	4.51	1.90	5.246E-02				
56.55	9875.	5.10	1.01	5.605E-02				
59.58	372591.	0.20	1.01	5.727E-02	59.54	35.700	5.064E+03	AM241
70.84	10335.	4.30	1.02	6.035E-02				
72.96	17658.	2.60	1.02	6.071E-02				
82.50	10170.	4.38	1.03	6.167E-02				
84.88	12549.	3.45	1.03	6.176E-02				
88.08	502632.	0.16	1.04	6.181E-02	88.03	3.610	7.120E+04	CD109
122.10	232662.	0.34	1.08	5.874E-02	122.06	85.600	1.601E+03	CO57
136.54	29103.	1.83	1.06	5.635E-02				
165.90	226558.	0.31	1.12	5.084E-02	165.85	79.900	2.391E+03	Ce139
199.13	7237.	5.62	1.32	4.590E-02				
255.07	7532.	5.00	1.12	3.962E-02				
279.08	160585.	0.38	1.19	3.746E-02	279.17	81.500	5.263E+03	Hg203
391.60	174011.	0.36	1.29	2.999E-02	391.69	64.000	4.233E+03	SN113
511.03	14656.	2.70	2.70	2.485E-02				
661.67	127292.	0.48	1.52	2.049E-02	661.66	85.210	2.037E+03	CS137
834.85	163887.	0.33	1.65	1.706E-02	834.85	99.980	3.233E+03	Mn54
898.03	201661.	0.29	1.69	1.607E-02	898.02	93.700	6.515E+03	Y898
1115.56	126897.	0.38	1.86	1.341E-02	1115.55	50.600	6.636E+03	Zn65
1173.26	137755.	0.35	1.90	1.284E-02	1173.24	99.900	3.077E+03	Co1173
1324.86	3898.	4.83	2.78	1.155E-02				
1332.53	124857.	0.33	2.07	1.149E-02	1332.50	99.982	3.114E+03	Co1332
1835.98	124938.	0.31	2.38	8.585E-03	1836.01	99.200	7.137E+03	Y1836

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

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
151.30	37.83	85759.	30994.	7.130E+05	1.94	1.111	- s
198.06	49.52	136436.	16296.	3.106E+05	4.51	1.898	- s

226.17	56.51	121941.	9875.-	9.845E+03	5.10	1.010	-	D

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
283.31	70.84	93409.	10335.	1.712E+05	4.30	1.022	-	D
291.81	72.96	96786.	17658.	2.908E+05	2.60	1.024	-	D
329.95	82.48	94240.	10170.	8.117E+04	4.38	1.032	-	lD
339.46	84.86	87407.	12549.	3.048E+04	3.45	1.034	-	lD
546.08	136.54	63267.	29103.	5.165E+05	1.83	1.064	-	
796.39	199.13	43208.	7237.	1.577E+05	5.62	1.316	-	
1020.15	255.07	35111.	7532.	1.901E+05	5.00	1.125	-	
2043.98	511.03	26576.	14656.	5.897E+05	2.70	2.704	-	s
5300.35	1324.86	5255.	3898.	3.376E+05	4.83	2.783	-	sM

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

This section based on library: DET_EnergyStandardMix & Mn, Zn.L

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	238.12	59.54	164069.	369020.	102.506	0.29	1.006
CD-109	352.22	88.07	125895.	487826.	135.507	0.21	1.028
CO-57	488.32	122.10	84352.	232662.	64.628	0.34	1.078
Ce-139	663.48	165.90	60532.	226558.	62.933	0.31	1.118
Hg-203	1116.16	279.08	41732.	160585.	44.607	0.38	1.194
SN-113	1566.24	391.60	35115.	174011.	48.336	0.36	1.290
CS-137	2646.59	661.67	34986.	127292.	35.359	0.48	1.518
Mn-54	3339.48	834.85	20555.	163887.	45.524	0.33	1.654
Y-898	3592.25	898.03	23155.	201661.	56.017	0.29	1.691
Zn-65	4462.73	1115.56	13927.	126897.	35.249	0.38	1.858
Co-1173	4693.62	1173.26	10843.	137755.	38.265	0.35	1.901
Co-1332	5331.05	1332.53	6246.	124857.	34.682	0.33	2.068
Y-1836	7346.37	1835.98	2517.	124938.	34.705	0.31	2.381

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

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

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Activity Bq	Code	MDA Value Bq	COMMENTS
AM-241		5.0152E+03					1.58E+05
			59.54	5.015E+03	(	2.569E+01	2.89E-01 3.57E+01 G

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CD-109       6.9098E+04                                        4.63E+02
                           88.03 6.910E+04  (  2.346E+02 2.10E-01 3.61E+00 G

CO-57        1.6013E+03                                        2.72E+02
                          122.06 1.601E+03  (  9.333E+00 3.40E-01 8.56E+01 G

Ce-139       2.3911E+03                                        1.38E+02
                          165.85 2.391E+03  (  1.213E+01 3.12E-01 7.99E+01 G

Hg-203       5.2626E+03                                        4.66E+01
                          279.17 5.263E+03  (  3.129E+01 3.78E-01 8.15E+01 G

SN-113       4.2328E+03                                        1.15E+02
                          391.69 4.233E+03  (  2.131E+01 3.56E-01 6.40E+01 G

CS-137       2.0367E+03                                        1.10E+04
                          661.66 2.037E+03  (  1.399E+01 4.79E-01 8.52E+01 G

Mn-54        3.2326E+03                                        3.12E+02
                          834.85 3.233E+03  (  1.323E+01 3.31E-01 1.00E+02 G

Y-898        6.5145E+03                                        1.07E+02
                          898.02 6.515E+03  (  2.299E+01 2.94E-01 9.37E+01 G

Zn-65    F   6.6359E+03                                        2.44E+02
                         1115.55 6.636E+03  (  2.890E+01 3.77E-01 5.06E+01 G

Co-1173      3.0775E+03                                        1.93E+03
                         1173.24 3.077E+03  (  1.090E+01 3.45E-01 9.99E+01 G

Co-1332      3.1145E+03                                        1.93E+03
                         1332.50 3.114E+03  (  9.254E+00 3.29E-01 1.00E+02 G

Y-1836       7.1374E+03                                        1.07E+02
                         1836.01 7.137E+03  (  1.351E+01 3.08E-01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
```



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

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
                                       Page 4
```

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

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


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

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

 ____________________________________________________________________________
 AM-241       5.0133E+03    5.0152E+03    2.887E-01%                 2.57E+01
 CD-109       6.0726E+04    6.9098E+04    2.105E-01%                 2.35E+02
 CO-57        1.2853E+03    1.6013E+03    3.401E-01%                 9.33E+00
 Ce-139       1.5491E+03    2.3911E+03    3.118E-01%                 1.21E+01
 Hg-203       1.4613E+03    5.2626E+03    3.784E-01%                 3.13E+01
 SN-113       2.5187E+03    4.2328E+03    3.564E-01%                 2.13E+01
 CS-137       2.0256E+03    2.0367E+03    4.793E-01%                 1.40E+01
 Mn-54        2.6697E+03    3.2326E+03    3.309E-01%                 1.32E+01
 Y-898        3.7194E+03    6.5145E+03    2.943E-01%                 2.30E+01
 Zn-65        5.1962E+03    6.6359E+03    3.771E-01%                 2.89E+01
 Co-1173      2.9835E+03    3.0775E+03    3.453E-01%                 1.09E+01
 Co-1332      3.0193E+03    3.1145E+03    3.288E-01%                 9.25E+00
```



```
 Y-1836       4.0750E+03    7.1374E+03    3.084E-01%                 1.35E+01
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   78.0 to  1999.2 keV)     9.624E+04  Bq
 Total Decayed Activity (   78.0 to  1999.2 keV) 1.1935008E+05  Bq
```

Initial Calibration Verifications

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.

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample			COMMENTS
Pb-210	N	1.4212E+04						8.15E+03	
			46.54	1.421E+04	(P	1.177E+02	4.91E-01	4.25E+00	G
AM-241		1.1609E+03						1.58E+05	
			59.54	1.161E+03	(	8.959E+00	4.87E-01	3.57E+01	G
CD-109		1.5419E+04						4.63E+02	
			88.03	1.542E+04	(	1.658E+02	6.81E-01	3.61E+00	G
CO-57		3.3478E+02						2.72E+02	
			122.06	3.348E+02	(	1.063E+01	1.66E+00	8.56E+01	G
Ce-139		5.3191E+02						1.38E+02	
			165.85	5.319E+02	(	7.689E+01	6.14E+00	7.99E+01	G
Hg-203		-6.5193E-03						4.66E+01	
			279.17	-6.519E-03	%(	1.788E+00	8.22E+03	8.15E+01	G
SN-113		9.5011E+02						1.15E+02	
			391.69	9.501E+02	(	3.682E+02	1.63E+01	6.40E+01	G
CS-137		4.4236E+02						1.10E+04	
			661.66	4.424E+02	(P	3.020E+00	7.12E-01	8.52E+01	G
Y-898		1.6655E+03						1.07E+02	
			898.02	1.665E+03	(	6.908E+02	1.92E+01	9.37E+01	G
Co-1173		7.0021E+02						1.93E+03	
			1173.24	7.002E+02	(	4.056E+00	7.32E-01	9.99E+01	G
Co-1332		7.0186E+02						1.93E+03	
			1332.50	7.019E+02	(	1.651E+00	7.07E-01	1.00E+02	G
Y-1836		1.6424E+03						1.07E+02	
			1836.01	1.642E+03	(	1.392E+02	7.47E+00	9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

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

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

- -

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

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

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
Pb-210	1.3259E+04	1.4212E+04	4.918E-01%	1.18E+02
AM-241	1.1568E+03	1.1609E+03	4.867E-01%	8.96E+00
CD-109	4.5403E+03	1.5419E+04	6.810E-01%	1.66E+02
CO-57	4.1787E+01	3.3478E+02	1.660E+00%	1.06E+01
Ce-139	8.7347E+00	5.3191E+02	6.138E+00%	7.69E+01
Hg-203 #A	-6.5193E-03	>12 Halflives	8.2197E+03%	1.7882E+00
SN-113	6.9747E+00	9.5011E+02	1.633E+01%	3.68E+02
CS-137	4.2015E+02	4.4236E+02	7.122E-01%	3.02E+00
Y-898	8.2662E+00	1.6655E+03	1.921E+01%	6.91E+02
Co-1173	5.2196E+02	7.0021E+02	7.316E-01%	4.06E+00
Co-1332	5.2320E+02	7.0186E+02	7.069E-01%	1.65E+00
Y-1836	8.1520E+00	1.6424E+03	7.471E+00%	1.39E+02

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

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (  279.0 to  2000.5 keV)     2.050E+04  Bq/Sample
Total Decayed Activity (  279.0 to  2000.5 keV) 3.7761527E+04  Bq/Sample
```

2nd Source Verification

Detector:	Ge8
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1175.4	101.0
Cs-137	1926	396	0.851	465	446.61	96.0
Co-60	3611	742	0.99974	742	697.22	93.9
Co-60	3612	742	0.999856	742	691.92	93.2

Reviewed By: Jody Watson

Date: 3/29/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  3/29/2012 7:45:38 AM    Page  1
TestAmerica                     Spectrum name: 8_TunaCan2nd_20120697.An1

Sample description
     8_TunaCan_81427-334_2ndsource_032912


Spectrum Filename: C:\User\SPC\Det8\8_TunaCan2nd_20120697.An1

Acquisition information
       Start time:                 3/29/2012 1:58:04 AM
       Live time:               3600
       Real time:               3622
       Dead time:                  0.61 %
       Detector ID:                    8

Detector system
     Ge 8 SN/174


Calibration
       Filename:                   8_Soil_TunaCan.Clb
     8_Soil_TunaCan_90099_032712


       Energy Calibration
            Created:               3/28/2012 10:35:07 AM
            Zero offset:           0.050 keV
            Gain:                  0.250 keV/channel
            Quadratic:             8.067E-10 keV/channel^2

       Efficiency Calibration
            Created:               3/28/2012 10:35:20 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.39 %
            Log(Eff):             -1.098764E-01 + (-4.958544E-01*Log(E) ) +
                                   ( -2.572270E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.71 %
            Log(Eff):             -2.525301E+01 + ( 9.398253E+00*Log(E) ) +
                                   ( -1.000034E+00*Log(E)^2 )

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

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.55keV )
       Stop channel:            8000 (  2000.30keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  3/29/2012 7:45:38 AM    Page  2
TestAmerica                     Spectrum name: 8_TunaCan2nd_20120697.An1
                                      Page 1
```

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

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

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2012-03-02_0402.PBC 3/2/2012 4:02:11 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 27.9595

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.61	594.	17.47	1.15	1.254E-02				
46.53	38495.	0.62	0.95	2.001E-02	46.54	4.250	1.345E+04	Pb210
49.81	542.	25.92	1.04	2.243E-02				
59.48	43371.	0.71	0.98	2.878E-02	59.54	35.700	1.175E+03	AM241
84.86	327.	26.82	0.98	3.922E-02				
88.03	22911.	0.76	0.98	3.992E-02	88.03	3.610	1.504E+04	CD109
122.06	5318.	2.55	1.03	4.146E-02	122.06	85.600	3.349E+02	CO57
136.54	691.	14.03	0.89	3.998E-02				
165.93	1033.	8.62	1.19	3.628E-02	165.85	79.900	6.077E+02	Ce139
177.05	71.	70.08	0.69	3.453E-02				
185.74	128.	40.98	0.85	3.329E-02				
227.93	52.	65.04	0.45	2.844E-02				
270.79	87.	50.41	0.41	2.486E-02				
278.94	44.	131.33	1.13	2.428E-02	279.17	81.500	HL>Cutoff	Hg203
302.52	63.	54.81	0.69	2.279E-02				
370.09	35.	84.23	0.41	1.941E-02				
391.61	316.	17.91	0.81	1.855E-02	391.69	64.000	1.016E+03	SN113
409.22	93.	50.95	0.41	1.791E-02				
428.24	88.	46.51	0.39	1.726E-02				
564.57	72.	45.26	0.57	1.378E-02				
591.73	73.	42.60	0.61	1.326E-02				
661.62	15734.	0.88	1.38	1.209E-02	661.66	85.210	4.466E+02	CS137
720.39	41.	72.89	0.46	1.126E-02				
831.73	36.	50.61	0.44	9.986E-03				
897.91	396.	17.93	1.52	9.360E-03	898.02	93.700	2.554E+03	Y898
1092.31	69.	44.41	0.50	7.924E-03				
1173.30	13922.	0.92	1.73	7.452E-03	1173.24	99.900	6.972E+02	Co1173
1332.56	12390.	0.92	1.75	6.677E-03	1332.50	99.982	6.919E+02	Co1332
1836.18	152.	9.00	1.63	5.046E-03	1836.01	99.200	1.724E+03	Y1836

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
146.23	36.61	3218.	594.	4.742E+04	17.47	1.147	- s
199.01	49.81	6400.	542.	2.416E+04	25.92	1.039	- sM
339.16	84.85	3491.	236.	6.026E+03	42.58	0.697	- sM

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:45:38 AM Page 3
TestAmerica Spectrum name: 8_TunaCan2nd_20120697.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
545.91	136.54	2178.	691.	1.728E+04	14.03	0.888	-
707.94	177.05	893.	71.	2.046E+03	70.08	0.693	- sM
742.68	185.74	978.	128.	3.835E+03	40.98	0.847	- sM
911.43	227.93	546.	52.	1.829E+03	65.04	0.445	- sc
1082.86	270.79	683.	87.	3.486E+03	50.41	0.413	- sM
1209.76	302.52	484.	63.	2.765E+03	54.81	0.692	- s
1480.00	370.09	385.	35.	1.803E+03	84.23	0.412	- sc
1636.49	409.22	685.	93.	5.212E+03	50.95	0.407	- s
1712.56	428.24	565.	88.	5.117E+03	46.51	0.393	- s
2257.86	564.57	330.	72.	5.224E+03	45.26	0.565	- s
2366.45	591.73	298.	73.	5.505E+03	42.60	0.613	- s
2881.06	720.39	284.	41.	3.640E+03	72.89	0.464	- s
3326.37	831.73	148.	36.	3.605E+03	50.61	0.439	- s
4368.55	1092.31	290.	69.	8.708E+03	44.41	0.495	- s

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

This section based on library: DET_EnergyStandardMix & Pb.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.71	46.48	12173.	40702.	11.306	0.74	0.992
AM-241	237.70	59.48	10649.	43371.	12.047	0.71	0.984
CD-109	351.85	88.02	4506.	23196.	6.443	0.88	1.056
CO-57	487.99	122.06	2908.	5318.	1.477	2.55	1.026
Ce-139	663.47	165.93	1722.	1033.	0.287	8.62	1.189s
Hg-203	1115.46	278.94	1642.	44.	0.012	131.33	1.133
SN-113	1566.07	391.61	822.	316.	0.088	17.91	0.806s
CS-137	2646.01	661.62	665.	15731.	4.370	0.88	1.379
Y-898	3591.03	897.91	871.	396.	0.110	17.93	1.524
Co-1173	4692.46	1173.30	374.	13922.	3.867	0.92	1.726
Co-1332	5329.42	1332.56	82.	12390.	3.442	0.92	1.753
Y-1836	7343.62	1836.18	6.	152.	0.042	9.00	1.626s

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

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:45:38 AM Page 4
TestAmerica Spectrum name: 8_TunaCan2nd_20120697.An1
Page 3

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

Pb-210   N   1.4221E+04                                      8.15E+03
                            46.54 1.422E+04  (  1.806E+02 7.43E-01 4.25E+00 G

AM-241       1.1754E+03                                      1.58E+05
                            59.54 1.175E+03  (  1.311E+01 7.10E-01 3.57E+01 G

CD-109       1.5223E+04                                      4.63E+02
                            88.03 1.522E+04  (  2.071E+02 8.83E-01 3.61E+00 G

CO-57        3.3494E+02                                      2.72E+02
                           122.06 3.349E+02  (  1.600E+01 2.55E+00 8.56E+01 G

Ce-139       6.0766E+02                                      1.38E+02
                           165.85 6.077E+02 *(  1.153E+02 8.62E+00 7.99E+01 G

Hg-203       6.1671E-01                                      4.66E+01
                           279.17 6.167E-01  (  2.689E+00 1.31E+02 8.15E+01 G

SN-113       1.0157E+03                                      1.15E+02
                           391.69 1.016E+03  (  4.390E+02 1.79E+01 6.40E+01 G

CS-137       4.4661E+02                                      1.10E+04
                           661.66 4.466E+02  (P 3.489E+00 8.85E-01 8.52E+01 G

Y-898        2.5543E+03                                      1.07E+02
                           898.02 2.554E+03  (  9.046E+02 1.79E+01 9.37E+01 G

Co-1173      6.9722E+02                                      1.93E+03
                          1173.24 6.972E+02  (  4.649E+00 9.19E-01 9.99E+01 G

Co-1332      6.9192E+02                                      1.93E+03
                          1332.50 6.919E+02  (  2.515E+00 9.18E-01 1.00E+02 G

Y-1836       1.7236E+03                                      1.07E+02
                          1836.01 1.724E+03  (  1.542E+02 9.00E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```



```
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
```

P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

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

- -

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

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

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.3265E+04	1.4221E+04	7.429E-01%		1.81E+02
AM-241	1.1712E+03	1.1754E+03	7.101E-01%		1.31E+01
CD-109	4.4713E+03	1.5223E+04	8.832E-01%		2.07E+02
CO-57	4.1631E+01	3.3494E+02	2.551E+00%		1.60E+01
Ce-139 #	9.8959E+00	6.0766E+02	8.616E+00%		1.15E+02
Hg-203 A	6.1671E-01	>12 Halflives	1.3133E+02%	2.6892E+00	
SN-113	7.3819E+00	1.0157E+03	1.791E+01%		4.39E+02
CS-137	4.2415E+02	4.4661E+02	8.848E-01%		3.49E+00
Y-898	1.2542E+01	2.5543E+03	1.793E+01%		9.05E+02
Co-1173	5.1942E+02	6.9722E+02	9.185E-01%		4.65E+00
Co-1332	5.1548E+02	6.9192E+02	9.176E-01%		2.52E+00
Y-1836	8.4633E+00	1.7236E+03	8.997E+00%		1.54E+02

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:45:38 AM Page 6
TestAmerica Spectrum name: 8_TunaCan2nd_20120697.An1

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

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

Total Activity (37.6 to 2000.3 keV) 2.045E+04 Bq/Sample
Total Decayed Activity (37.6 to 2000.3 keV) 3.8690848E+04 Bq/Sample

2nd Source Verification

Detector:	Ge9
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1169.4	100.4
Cs-137	1926	396	0.851	465	444.52	95.6
Co-60	3611	742	0.99974	742	687.72	92.7
Co-60	3612	742	0.999856	742	692.56	93.3

Reviewed By: Jody Watson

Date: 6/14/2012

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     ORTEC g v - i (3263) Env32  G53W4.25  6/14/2012 1:20:45 PM    Page  1
TestAmerica, Inc                Spectrum name: 9_TunaCan_20120371.An1

Sample description
     9_TunaCan_90099_061412


Spectrum Filename: C:\User\SPC\Det9\9_TunaCan_20120371.An1

Acquisition information
       Start time:                 6/14/2012 10:54:15 AM
       Live time:               3600
       Real time:               3629
       Dead time:                  0.81 %
       Detector ID:                    9

Detector system
     Ge 9 SN/100113


Calibration
       Filename:                   9_Soil_TunaCan.Clb
     9_Soil_TunaCan_90099_050312


       Energy Calibration
            Created:               6/14/2012 10:19:40 AM
            Zero offset:           0.088 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.039E-08 keV/channel^2

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

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

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.60keV )
       Stop channel:            8000 (  1999.66keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

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

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

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2012-05-27_0502.PBC 5/27/2012 5:02:59 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0390

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.54	860.	12.66	1.34	1.634E-02				
46.62	48876.	0.54	1.09	2.580E-02	46.54	4.250	1.338E+04	Pb210
50.03	116.	122.12	1.09	2.886E-02				
59.57	54776.	0.62	1.11	3.661E-02	59.54	35.700	1.169E+03	AM241
63.90	47.	193.18	0.35	3.962E-02				
88.09	26880.	0.87	1.14	5.052E-02	88.03	3.610	1.566E+04	CD109
122.10	5522.	2.86	1.15	5.303E-02	122.06	85.600	3.312E+02	CO57
136.38	729.	11.64	1.25	5.151E-02				
165.67	814.	10.74	1.30	4.629E-02	165.85	79.900	5.417E+02	Ce139
295.46	252.	33.13	0.56	3.229E-02				
316.16	66.	75.82	0.25	3.082E-02				
356.41	45.	97.50	1.36	2.835E-02				
358.68	42.	110.02	1.37	2.822E-02				
379.76	37.	75.05	0.46	2.711E-02				
391.75	310.	24.80	1.08	2.652E-02	391.69	64.000	1.113E+03	SN113
454.98	83.	53.05	0.37	2.383E-02				
568.66	103.	37.41	0.47	2.026E-02				
626.42	84.	49.00	0.45	1.885E-02				
661.66	23324.	0.76	1.61	1.810E-02	661.66	85.210	4.445E+02	CS137
821.54	239.	27.43	0.39	1.536E-02				
876.16	66.	52.19	0.61	1.462E-02				
898.25	346.	23.61	1.52	1.434E-02	898.02	93.700	2.406E+03	Y898
937.90	34.	79.64	0.44	1.387E-02				
1071.41	38.	61.01	0.57	1.249E-02				
1085.31	68.	35.74	1.00	1.237E-02				
1098.64	14.	140.33	0.47	1.225E-02				
1173.23	20836.	0.81	2.05	1.163E-02	1173.24	99.900	6.877E+02	Co1173
1332.49	18966.	0.75	2.11	1.050E-02	1332.50	99.982	6.926E+02	Co1332
1835.90	150.	10.23	1.72	8.080E-03	1836.01	99.200	1.745E+03	Y1836

9_TunaCan_20120371

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
145.76	36.54	3297.	860.	5.262E+04	12.66	1.336	- s
199.48	49.98	8660.	956.	3.313E+04	18.50	0.958	- sM
255.13	63.90	2893.	47.	1.186E+03	193.18	0.347	- sc
544.97	136.38	1941.	729.	1.415E+04	11.64	1.247	-

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

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

Pb-210   N   1.3971E+04                                      8.15E+03
                            46.54 1.397E+04  (  1.478E+02 6.46E-01 4.25E+00 G

AM-241       1.1694E+03                                      1.58E+05
                            59.54 1.169E+03  (  1.086E+01 6.16E-01 3.57E+01 G

CD-109       1.5657E+04                                      4.63E+02
                            88.03 1.566E+04  (  2.117E+02 8.71E-01 3.61E+00 G

CO-57        3.3118E+02                                      2.72E+02
                           122.06 3.312E+02  (  1.731E+01 2.86E+00 8.56E+01 G

Ce-139       5.4173E+02                                      1.38E+02
                           165.85 5.417E+02  (  1.357E+02 1.07E+01 7.99E+01 G

Hg-203      -5.2429E-01                                      4.66E+01
                           279.17-5.243E-01 ?(  2.327E+00 1.34E+02 8.15E+01 G

SN-113       9.5260E+02                                      1.15E+02
                           391.69 9.526E+02 ?(  7.503E+02 2.44E+01 6.40E+01 G

CS-137       4.4452E+02                                      1.10E+04
                           661.66 4.445E+02  (  3.202E+00 7.63E-01 8.52E+01 G

Y-898        2.4057E+03                                      1.07E+02
                           898.02 2.406E+03 @(  1.118E+03 2.36E+01 9.37E+01 G

Co-1173      6.8772E+02                                      1.93E+03
                          1173.24 6.877E+02  (  4.547E+00 8.09E-01 9.99E+01 G

Co-1332      6.9256E+02                                      1.93E+03
                          1332.50 6.926E+02  (  2.044E+00 7.49E-01 1.00E+02 G

Y-1836       1.7452E+03                                      1.07E+02
                          1836.01 1.745E+03  (  2.388E+02 1.02E+01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```



```
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
```

```
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

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

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


*************** D I S C A R D E D  I S O T O P E  P E A K S ***************
Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
          Energy   Counts     Counts     Cts/Sec  1 Sigma %
_____________________________________________________________________________
Hg-203     280.29      2362.       -52.    -0.014   133.84   0.000E+00
  P - Peakbackground subtraction

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

_____________________________________________________________________________
Pb-210       1.2947E+04    1.3971E+04    6.459E-01%                 1.48E+02
AM-241       1.1648E+03    1.1694E+03    6.156E-01%                 1.09E+01
CD-109       4.0954E+03    1.5657E+04    8.713E-01%                 2.12E+02
CO-57        3.3792E+01    3.3118E+02    2.862E+00%                 1.73E+01
Ce-139       5.9752E+00    5.4173E+02    1.074E+01%                 1.36E+02
Hg-203 #A   -5.2429E-01 >12 Halflives   1.3384E+02%   2.3272E+00
SN-113 #     4.3447E+00    9.5260E+02    2.438E+01%                 7.50E+02
CS-137       4.2011E+02    4.4452E+02    7.635E-01%                 3.20E+00
Y-898  #     7.1422E+00    2.4057E+03    2.361E+01%                 1.12E+03
Co-1173      4.9827E+02    6.8772E+02    8.087E-01%                 4.55E+00
Co-1332      5.0178E+02    6.9256E+02    7.487E-01%                 2.04E+00
Y-1836       5.1813E+00    1.7452E+03    1.023E+01%                 2.39E+02
```



```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ---------------------------
Total Activity (  379.7 to  1999.7 keV)     1.968E+04  Bq/Sample
Total Decayed Activity (  379.7 to  1999.7 keV) 3.8598309E+04  Bq/Sample
```

2nd Source Verification

Detector: **Ge12**
Geometry: **Tunacan**
Reference date: **10/1/2006**
Calibration Standard: **74139-334**
Standard volume g / vial: **1550**
Standard volume transferred in g / geometry: **341.9**
lab ID# of cal standard: **1282974**

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	449	0.359	1250	1288	103.1
Cs-137	1926	425	0.851	499	509.9	102.1
Co-60	3612	797	0.999856	797	833.8	104.6

Reviewed By: Jody Watson

Date: 4/24/2018

Test America St. Louis Spectrum ID: 12_TunaCan_20180012

Sample Description: 12_TunaCan_ICV
Detector: Detector #12
Batch ID: 12
Work Order Number: TunaCan
Lot Number: ICV

Decay to Time: 10/1/2006 11:00 Live Time: 5000 sec
Acquisition Time: 4/24/2018 09:26:18 Real Time: 5018 sec
Analysis Time: 4/24/2018 10:50 Dead Time: 0.36 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: DET_EnergyStandardMix & Pb.lib
Bkgd Correction File: 12_2017-05-07_0806.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
Pb-210	1.634E+04	0.6	9.464E+01	1.053E+03	1.764E+02
AM-241	1.288E+03	0.4	5.772E+00	8.177E+01	8.914E+00
CD-109	2.726E+04	25.0	6.823E+03	7.030E+03	1.764E+04
CO-57	1.000E+100	153.6	5.398E-01	5.402E-01	1.425E+00
Ce-139	1.000E+100	106.9	5.267E-01	5.274E-01	1.390E+00
Hg-203	1.000E+100	297.5	6.855E-01	6.856E-01	1.730E+00
SN-113	1.000E+100	692.4	1.143E+00	1.143E+00	2.762E+00
CS-137	5.099E+02	0.8	3.904E+00	2.652E+01	3.285E+00
Y-898	1.000E+100	140.9	1.086E+00	1.086E+00	2.342E+00
Co-1173	8.106E+02	1.3	1.069E+01	4.173E+01	9.187E+00
Co-1332	8.338E+02	1.3	1.078E+01	4.290E+01	6.803E+00
Y-1836	1.000E+100	127.2	4.662E-01	4.667E-01	9.202E-01
Total	6.000E+100				

Analyst: Jody Watson

(Page 1 of 7)

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	Nuclide Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	MDA Value Bq/Sample	COMMENTS
AM-241		5.1019E+03				1.58E+05	
			59.54	5.102E+03	(	1.996E+01 2.45E-01 3.57E+01	G
CD-109		7.0262E+04				4.63E+02	
			88.03	7.026E+04	(	2.875E+02 2.77E-01 3.61E+00	G
CO-57		1.5904E+03				2.72E+02	
			122.06	1.590E+03	(	1.481E+01 5.54E-01 8.56E+01	G
Ce-139		2.3767E+03				1.38E+02	
			165.85	2.377E+03	(	5.014E+01 1.10E+00 7.99E+01	G
Hg-203		7.6741E+03				4.66E+01	
			279.17	7.674E+03	*(	5.573E+03 2.99E+01 8.15E+01	G
SN-113		4.2555E+03				1.15E+02	

```
                                391.69 4.256E+03  (  1.576E+02 2.00E+00 6.40E+01 G

CS-137       1.9553E+03                                          1.10E+04
                                661.66 1.955E+03  (  8.331E+00 3.93E-01 8.52E+01 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Mn-54        3.0193E+03                                          3.12E+02
                                834.85 3.019E+03  (  2.309E+01 5.83E-01 1.00E+02 G

Y-898        6.6610E+03                                          1.07E+02
                                898.02 6.661E+03  (  2.174E+02 1.84E+00 9.37E+01 G

Zn-65    F   6.5273E+03                                          2.44E+02
                               1115.55 6.527E+03  (  8.011E+01 9.00E-01 5.06E+01 G

Co-1173      3.1829E+03                                          1.93E+03
                               1173.24 3.183E+03  (  1.055E+01 3.89E-01 9.99E+01 G

Co-1332      3.2153E+03                                          1.93E+03
                               1332.50 3.215E+03  (  5.975E+00 3.69E-01 1.00E+02 G

Y-1836       7.1063E+03                                          1.07E+02
                               1836.01 7.106E+03  (  6.328E+01 1.27E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

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

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

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

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

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
AM-241	5.0915E+03	5.1019E+03	2.450E-01%	2.00E+01
CD-109	3.4917E+04	7.0262E+04	2.771E-01%	2.88E+02
CO-57	4.8377E+02	1.5904E+03	5.543E-01%	1.48E+01
Ce-139	2.2663E+02	2.3767E+03	1.105E+00%	5.01E+01
Hg-203 #	7.4529E+00	7.6741E+03	2.993E+01%	5.57E+03
SN-113	2.5605E+02	4.2555E+03	1.996E+00%	1.58E+02
CS-137	1.8986E+03	1.9553E+03	3.925E-01%	8.33E+00
Mn-54	1.0717E+03	3.0193E+03	5.831E-01%	2.31E+01
Y-898	3.2040E+02	6.6610E+03	1.840E+00%	2.17E+02
Zn-65	1.7366E+03	6.5273E+03	8.998E-01%	8.01E+01
Co-1173	2.6906E+03	3.1829E+03	3.889E-01%	1.05E+01
Co-1332	2.7180E+03	3.2153E+03	3.687E-01%	5.98E+00
Y-1836	3.4182E+02	7.1063E+03	1.270E+00%	6.33E+01

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

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

Total Activity (59.5 to 1999.4 keV) 5.176E+04 Bq/Sample
Total Decayed Activity (59.5 to 1999.4 keV) 1.2292753E+05 Bq/Sample

Second Source Verification

Detector: Ge16

Geometry: 1L Marn

Reference date 1/1/2011

Calibration Standard: 83924-334

Standard volume g / vial 1

Standard volume transferred in g / geometry 1

lab ID# of cal standard 1L Marn_00002

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	Abundance	Activity Bq/L	Count Results	%recovery
Am-241	1830	1830	0.359	**5097.5**	5095.2	100.0
Cs-137	1705	1705	0.851	**2003.5**	2003.6	100.0
Co-60	3293	3293	0.99974	**3293.9**	3267.4	99.2
Co-60	3294	3294	0.99986	**3294.5**	3265.3	99.1

Reviewed By: Jody Watson

Date: _____

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     ORTEC g v - i (3263) Env32  G53W4.25  4/24/2012 10:47:24 AM   Page  1
TestAmerica, Inc.               Spectrum name: 16_1Lmarn2nd_20120385.An1

Sample description
     16_1Lmarn2nd_Rad11_042412


Spectrum Filename: C:\User\SPC\Det16\16_1Lmarn2nd_20120385.An1

Acquisition information
       Start time:                 4/24/2012 8:11:06 AM
       Live time:               3600
       Real time:               3890
       Dead time:                  7.46 %
       Detector ID:                   16

Detector system
     Ge16 SN/11012217


Calibration
       Filename:                   16_Liquid_Marinelli 1L.Clb
     16_1Lmarn_90062_032712


       Energy Calibration
            Created:               4/2/2012 6:09:11 PM
            Zero offset:          -0.007 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.978E-08 keV/channel^2

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

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

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.50keV )
       Stop channel:            8000 (  1999.23keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  4/24/2012 10:47:24 AM   Page  2
TestAmerica, Inc.               Spectrum name: 16_1Lmarn2nd_20120385.An1
                                      Page 1
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Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

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

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	16_2012-04-01_0336.PBC 4/1/2012 3:36:15 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0381

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.24	2633.	9.05	0.99	4.192E-02				
37.73	3600.	7.28	0.99	4.339E-02				
43.01	1744.	21.30	1.21	4.796E-02				
49.63	17367.	3.62	1.81	5.253E-02				
59.52	364868.	0.24	0.99	5.727E-02	59.54	35.700	4.967E+03	AM241
77.86	1704.	22.69	0.64	6.133E-02				
88.04	270447.	0.27	1.00	6.181E-02	88.03	3.610	6.899E+04	CD109
101.18	167.	75.80	0.36	6.126E-02				
122.08	84451.	0.56	1.05	5.874E-02	122.06	85.600	1.582E+03	CO57
136.49	10430.	2.77	1.05	5.636E-02				
165.86	30802.	1.11	1.08	5.084E-02	165.85	79.900	2.349E+03	Ce139
199.00	1287.	18.47	1.49	4.592E-02				
220.46	244.	83.67	0.48	4.326E-02				
244.11	344.	44.21	0.74	4.070E-02				
278.61	580.	31.95	0.72	3.750E-02				
279.17	24.	799.67	1.20	3.745E-02	279.17	81.500	PBC<MDA	Hg203
294.17	181.	85.14	0.40	3.623E-02				
391.55	16351.	1.89	1.29	2.999E-02	391.69	64.000	4.234E+03	SN113
511.07	3625.	7.09	2.38	2.485E-02				
525.22	222.	43.75	0.56	2.436E-02				
661.61	120063.	0.30	1.51	2.049E-02	661.66	85.210	1.969E+03	CS137
666.12	109.	104.95	1.52	2.038E-02				
701.63	181.	58.10	0.60	1.958E-02				
730.08	88.	91.86	0.38	1.898E-02				
789.34	114.	59.03	0.66	1.784E-02				
834.78	63972.	0.55	1.65	1.706E-02	834.85	99.980	3.017E+03	Mn54
897.97	15428.	1.54	1.68	1.607E-02	898.02	93.700	6.404E+03	Y898
924.86	512.	35.84	0.38	1.569E-02				
935.31	113.	59.08	0.52	1.554E-02				
949.83	207.	52.10	0.44	1.535E-02				
971.39	360.	55.06	0.41	1.506E-02				

1002.30	88.	72.53	0.57	1.468E-02				
1030.28	135.	51.42	0.52	1.434E-02				
1087.52	232.	68.18	0.32	1.370E-02				
1115.47	41218.	0.80	1.85	1.341E-02	1115.55	50.600	6.568E+03	Zn65
1129.46	314.	46.37	0.69	1.327E-02				
1173.16	120613.	0.34	1.91	1.284E-02	1173.24	99.900	3.104E+03	Co1173
1234.16	56.	63.47	0.30	1.229E-02				
1274.33	249.	24.48	1.10	1.195E-02				
1332.42	110205.	0.32	2.04	1.149E-02	1332.50	99.982	3.166E+03	Co1332
1429.54	129.	51.29	0.35	1.079E-02				
1767.54	116.	44.61	0.50	8.895E-03				
1835.87	9468.	1.18	2.26	8.586E-03	1836.01	99.200	6.951E+03	Y1836

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
144.94	36.24	27063.	2633.	6.282E+04	9.05	0.992	-	D
150.93	37.74	32518.	3600.	8.298E+04	7.28	0.993	-	D

ORTEC g v - i (3263) Env32 G53W4.25 4/24/2012 10:47:24 AM Page 3
TestAmerica, Inc. Spectrum name: 16_1Lmarn2nd_20120385.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
172.01	43.01	42984.	1744.	3.635E+04	21.30	1.213	-	s
198.51	49.63	98747.	17367.	3.306E+05	3.62	1.807	-	s
311.38	77.86	42218.	1704.	2.778E+04	22.69	0.645	-	s
404.67	101.18	7929.	167.	2.726E+03	75.80	0.363	-	sc
545.88	136.49	18327.	10430.	1.851E+05	2.77	1.054	-	
795.88	199.00	15056.	1287.	2.803E+04	18.47	1.487	-	s
881.71	220.46	13032.	244.	5.629E+03	83.67	0.481	-	sc
976.30	244.11	8528.	344.	8.445E+03	44.21	0.740	-	s
1176.53	294.17	7856.	181.	4.995E+03	85.14	0.404	-	sc
2044.14	511.07	12100.	3625.	1.459E+05	7.09	2.382	-	s
2100.73	525.22	3668.	222.	9.092E+03	43.75	0.563	-	s
2664.36	666.11	4888.	226.	1.106E+04	58.38	0.353	-	sM
2806.46	701.63	3626.	181.	9.246E+03	58.10	0.599	-	s
2920.30	730.08	2608.	88.	4.664E+03	91.86	0.378	-	sc
3157.38	789.34	2031.	114.	6.381E+03	59.03	0.661	-	s
3699.64	924.86	7354.	512.	3.260E+04	35.84	0.380	-	s
3741.42	935.31	2172.	113.	7.269E+03	59.08	0.524	-	s
3799.55	949.83	4039.	207.	1.350E+04	52.10	0.442	-	s
3885.79	971.39	7512.	360.	2.386E+04	55.06	0.413	-	s
4009.51	1002.30	1847.	88.	6.007E+03	72.53	0.566	-	sc
4121.46	1030.28	1997.	135.	9.390E+03	51.42	0.518	-	s
4350.52	1087.52	5328.	232.	1.696E+04	68.18	0.319	-	s
4518.33	1129.46	4033.	314.	2.365E+04	46.37	0.690	-	s
4937.37	1234.16	483.	56.	4.557E+03	63.47	0.298	-	s
5098.12	1274.33	833.	249.	2.085E+04	24.48	1.102	-	s
5719.34	1429.54	687.	129.	1.194E+04	51.29	0.347	-	s
7072.37	1767.54	366.	116.	1.304E+04	44.61	0.496	-	s

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

This section based on library: DET_EnergyStandardMix & Mn, Zn.L

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	238.06	59.52	90566.	364868.	101.352	0.24	0.985
CD-109	352.11	88.04	53425.	270447.	75.124	0.27	1.004
CO-57	488.24	122.08	28256.	84451.	23.459	0.56	1.045
Ce-139	663.35	165.86	18928.	30802.	8.556	1.11	1.077
Hg-203	1116.52	279.17	18155.	24.	0.007	799.67	1.200s
SN-113	1566.04	391.55	14418.	16351.	4.542	1.89	1.286
CS-137	2646.33	661.60	11242.	120008.	33.336	0.37	1.500

ORTEC g v - i (3263) Env32 G53W4.25 4/24/2012 10:47:24 AM Page 4
TestAmerica, Inc. Spectrum name: 16_1Lmarn2nd_20120385.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Mn-54	3339.17	834.78	9796.	63972.	17.770	0.55	1.647
Y-898	3592.03	897.97	8456.	15428.	4.285	1.54	1.683
Zn-65	4462.34	1115.47	8938.	41218.	11.450	0.80	1.851
Co-1173	4693.23	1173.16	5375.	120613.	33.504	0.34	1.908
Co-1332	5330.61	1332.42	1667.	110205.	30.613	0.32	2.035
Y-1836	7345.92	1835.87	410.	9468.	2.630	1.18	2.257

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

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

Nuclide Name	Nuclide Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	MDA Value Bq/Sample	COMMENTS
AM-241		4.9673E+03				1.58E+05	
			59.54	4.967E+03	(	1.913E+01 2.41E-01 3.57E+01	G
CD-109		6.8995E+04				4.63E+02	
			88.03	6.899E+04	(	2.755E+02 2.69E-01 3.61E+00	G
CO-57		1.5822E+03				2.72E+02	
			122.06	1.582E+03	(	1.473E+01 5.63E-01 8.56E+01	G
Ce-139		2.3487E+03				1.38E+02	
			165.85	2.349E+03	(	4.909E+01 1.11E+00 7.99E+01	G
Hg-203		2.6780E+02				4.66E+01	
			279.17	2.678E+02	?(	7.085E+03 8.00E+02 8.15E+01	G
SN-113		4.2336E+03				1.15E+02	
			391.69	4.234E+03	(	1.456E+02 1.89E+00 6.40E+01	G
CS-137		1.9683E+03				1.10E+04	
			661.66	1.968E+03	(	8.148E+00 3.66E-01 8.52E+01	G
Mn-54		3.0166E+03				3.12E+02	
			834.85	3.017E+03	(	2.188E+01 5.51E-01 1.00E+02	G
Y-898		6.4044E+03				1.07E+02	
			898.02	6.404E+03	(	1.790E+02 1.54E+00 9.37E+01	G

```
Zn-65    F   6.5677E+03                                        2.44E+02
                         1115.55 6.568E+03  (  7.063E+01 7.98E-01 5.06E+01 G
```



```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Co-1173      3.1037E+03                                        1.93E+03
                         1173.24 3.104E+03  (  8.862E+00 3.37E-01 9.99E+01 G

Co-1332      3.1665E+03                                        1.93E+03
                         1332.50 3.166E+03  (  5.544E+00 3.18E-01 1.00E+02 G

Y-1836       6.9509E+03                                        1.07E+02
                         1836.01 6.951E+03  (  7.122E+01 1.18E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

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

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

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


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



```
 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count  Time Corrected  Uncertainty  1 Sigma
```

16_1Lmarn2nd_20120385

Nuclide	Activity Bq/Sample	Activity Bq/Sample	Counting	MDA Bq/Sample
AM-241	4.9569E+03	4.9673E+03	2.409E-01%	1.91E+01
CD-109	3.3666E+04	6.8995E+04	2.688E-01%	2.75E+02
CO-57	4.6653E+02	1.5822E+03	5.626E-01%	1.47E+01
Ce-139	2.1061E+02	2.3487E+03	1.106E+00%	4.91E+01
Hg-203 #A	2.1691E-01	2.6780E+02	7.997E+02%	7.08E+03
SN-113	2.3667E+02	4.2336E+03	1.891E+00%	1.46E+02
CS-137	1.9097E+03	1.9683E+03	3.662E-01%	8.15E+00
Mn-54	1.0421E+03	3.0166E+03	5.513E-01%	2.19E+01
Y-898	2.8454E+02	6.4044E+03	1.538E+00%	1.79E+02
Zn-65	1.6878E+03	6.5677E+03	7.982E-01%	7.06E+01
Co-1173	2.6122E+03	3.1037E+03	3.372E-01%	8.86E+00
Co-1332	2.6650E+03	3.1665E+03	3.182E-01%	5.54E+00
Y-1836	3.0883E+02	6.9509E+03	1.183E+00%	7.12E+01

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

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

Total Activity (43.0 to 1999.2 keV) 5.005E+04 Bq/Sample
Total Decayed Activity (43.0 to 1999.2 keV) 1.1330478E+05 Bq/Sample

Monthly Backgrounds

Test America
St. Louis
Background Check

Spectrum: 5_20190906012_BGLong
Description: Background Long PBC Count
Acquired: 9/6/2019 5:55:02 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	1.42	1.55	1.60	PASS

Analyst: Shiloh Smith Reviewer: kody Saulters

(Page 1 of 7)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det5\5_20190906012_BGLong.An1

Acquisition information

Start time:	9/6/2019 5:55:02 PM
Live time:	72000
Real time:	72257
Dead time:	0.36 %
Detector ID:	5

Detector system
Ge 5 SN/157

Calibration

Filename:	5_QC.Clb

Ge5_QC

Energy Calibration

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

Efficiency Calibration

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

Library Files

Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.62keV)
Stop channel:	8000 (2000.81keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3

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

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0830

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.57	538.	9.74	0.74	5.680E-02	46.54	4.250	3.101E+00	PB210
59.65	147.	28.40	0.88	7.435E-02	59.54	35.900	7.665E-02	AM241
63.30	594.	9.13	0.64	7.924E-02	63.29	3.810	2.733E+00	TH234
92.57	871.	6.43	1.01	1.129E-01	92.59	5.584	1.919E+00	TH234
					93.35	5.561	1.926E+00	AC228
139.76	154.	25.16	1.01	1.099E-01				
185.87	369.	12.02	1.16	9.604E-02	185.72	54.000	9.870E-02	U235
					185.99	3.280	1.626E+00	Ra226
352.20	200.	17.55	0.84	5.567E-02	351.93	37.600	1.326E-01	PB214
511.27	1682.	4.83	2.39	3.834E-02	511.86	20.000	3.049E+00	RH106
609.23	151.	17.82	1.18	3.200E-02	609.31	46.090	1.425E-01	BI214
					610.30	5.750	1.145E+00	RU103
661.77	163.	23.78	1.27	2.860E-02	661.66	85.210	9.288E-02	CS137
1121.18	94.	20.42	4.63	1.646E-02	1120.29	15.100	5.280E-01	BI214
					1120.55	99.987	7.975E-02	Sc46
					1121.30	34.900	2.287E-01	Ta182
1460.85	135.	15.04	2.43	1.300E-02	1460.83	10.670	1.352E+00	K40
1764.14	115.	15.50	1.47	1.105E-02	1764.49	15.400	9.411E-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	
558.87	139.76	422.	154.	1.397E+03	25.16	1.011	-	M
2045.67	511.27	556.	1682.	4.386E+04	4.83	2.395	-	

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	185.81	46.57	632.	538.	0.007	9.74	0.736
AM-241	238.17	59.65	532.	147.	0.002	28.40	0.877
TH-234	252.78	63.30	670.	594.	0.008	9.13	0.636
TH-234	369.96	92.57	619.	871.	0.012	6.43	1.012s
Ra-226	743.45	185.87	478.	369.	0.005	12.02	1.158s
PB-214	1409.15	352.20	295.	200.	0.003	17.55	0.840
BI-214	2437.63	609.23	173.	151.	0.002	17.82	1.184
CS-137	2647.80	661.77	268.	163.	0.002	23.78	1.268
BI-214	4485.08	1121.18	58.	94.	0.001	20.42	4.632s
K-40	5842.81	1460.85	52.	135.	0.002	15.04	2.433s
BI-214	7054.68	1764.14	27.	115.	0.002	15.50	1.469s

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	1.3520E+00					4.66E+11	
			1460.83	1.352E+00	(	3.637E-01	1.50E+01 1.07E+01	G
CS-137	I	9.2884E-02					1.10E+04	
			661.66	9.288E-02	(	4.502E-02	2.38E+01 8.52E+01	G
PB-210	N	3.1007E+00					8.14E+03	
			46.54	3.101E+00	(	6.904E-01	9.74E+00 4.25E+00	G
PB-214	N	1.3255E-01					5.84E+05	
			351.93	1.326E-01	(	5.484E-02	1.76E+01 3.76E+01	G
			295.09	0.000E+00	%	6.188E-02	3.27E+01 1.93E+01	G
			242.00	0.000E+00	&	1.423E-01	4.57E+01 7.43E+00	GA

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

BI-214   N   1.4254E-01                                      5.84E+05
                          609.31 1.425E-01  (  6.023E-02 1.78E+01 4.61E+01 G
                         1120.29 5.280E-01 &   2.126E-01 2.04E+01 1.51E+01 G
                         1764.49 9.411E-01 +   2.185E-01 1.55E+01 1.54E+01 G

TH-234   N   2.7329E+00                                      1.63E+12
                           63.29 2.733E+00  (  5.674E-01 9.13E+00 3.81E+00 G
                           92.59 1.919E+00 -   2.613E-01 6.43E+00 5.58E+00 G

Ra-226       1.6260E+00                                      5.84E+05
                          185.99 1.626E+00 *(  4.615E-01 1.20E+01 3.28E+00 G

AM-241   T   7.6647E-02                                      1.58E+05
                           59.54 7.665E-02  (  5.746E-02 2.84E+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	<	2.3606E-01		
NA-22	<	5.1542E-02		
K-40		1.3520E+00	1.5041E+01%	3.637E-01
Sc-46	<	2.5405E-02		
CR-51	<	1.2295E-01		
MN-54	<	2.5199E-02		
FE-59	<	5.4631E-02		
Co-56	<	2.4621E-02		
CO-57	<	1.3973E-02		
CO-58	<	2.7489E-02		
CO-60	<	3.3080E-02		
ZN-65	<	7.9831E-02		
NB-94	<	2.0891E-02		
ZR-95	<	3.9284E-02		
NB-95	<	3.5815E-02		
RU-103	<	1.8653E-02		
RH-106	<	3.8202E-01		
AG-108M	<	1.6759E-02		
AG-110M	<	3.1210E-02		
SN-113	<	2.5063E-02		
SB-124	<	2.2491E-02		
SB-125	<	5.2477E-02		
I-131	<	1.6584E-02		
BA-133	<	3.8443E-02		
CS-134	<	4.1376E-02		
CS-137		9.2884E-02	2.3784E+01%	4.502E-02
CE-139	<	1.7946E-02		
Ba-140	<	7.6295E-02		
La-140	<	3.0651E-02		
CE-141	<	2.2270E-02		
CE-144	<	5.7408E-02		
PM-144	<	2.6900E-02		
EU-152	<	7.9390E-02		
EU-154	<	2.5063E-01		
EU-155	<	4.0429E-02		
HF-181	<	2.0842E-02		

Ta-182	<	9.2068E-02		
Hg-203	<	1.6319E-02		
TL-208	<	2.4354E-02		
pm-146	<	6.3758E-02		
y-88	<	2.6715E-02		
PB-210		3.1007E+00	9.7422E+00%	6.904E-01
PB-212	<	2.4171E-02		
PB-214		1.3255E-01	1.7553E+01%	5.484E-02
BI-207	<	3.3235E-02		
BI-212	<	3.1301E-01		
BI-214		1.4254E-01	1.7816E+01%	6.023E-02
BI-210M	<	2.1088E-02		
RA-224	<	2.7434E-01		
AC-228	<	9.3257E-02		
TH-227	<	8.7619E-02		
TH-229	<	2.2151E-01		
TH-234		2.7329E+00	9.1267E+00%	5.674E-01
PA-231	<	4.9694E-01		
PA-233	<	3.3724E-02		
PA-234	<	4.9017E-02		
PA-234M	<	3.0097E+00		
Ra-226	#	1.6260E+00	1.2018E+01%	4.615E-01
U-235	<	7.8343E-02		
AM-241		7.6647E-02	2.8401E+01%	5.746E-02
Np-237	<	6.3487E-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) 9.256E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 8_20190906001_BGLong
Description: Background Long PBC Count
Acquired: 9/6/2019 5:37:54 PM
Detector: Detector # 8
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.56	1.39	1.45	1.57	1.68	1.74	PASS

Analyst: Shiloh Smith Reviewer: Kellene Robbs

(Page 1 of 8)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det8\8_20190906001_BGLong.An1

Acquisition information

Start time:	9/6/2019 5:37:54 PM
Live time:	72000
Real time:	73781
Dead time:	2.41 %
Detector ID:	8

Detector system
Ge 8 SN/174

Calibration

Filename:	8_QC.Clb

Ge8_QC

Energy Calibration

Created:	2/28/2012 10:34:41 AM
Zero offset:	0.052 keV
Gain:	0.250 keV/channel
Quadratic:	5.282E-10 keV/channel^2

Efficiency Calibration

Created:	1/6/2011 8:07:20 AM	
Knee Energy:	0.00 keV	
Above the Knee:	Interpolative	Uncertainty = 0.00 %
Below the Knee:	Interpolative	Uncertainty = 0.00 %

Library Files

Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.55keV)
Stop channel:	8000 (1999.97keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3

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

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0796

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
59.56	452.	8.75	1.02	8.697E-02	59.54	35.900	2.014E-01	AM241
63.26	1057.	4.53	1.03	9.244E-02	63.29	3.810	4.166E+00	TH234
92.64	2036.	3.81	1.16	1.295E-01	92.59	5.584	3.910E+00	TH234
					93.35	5.561	3.923E+00	AC228
112.81	192.	26.59	0.64	1.321E-01				
143.82	249.	18.37	1.42	1.248E-01	143.79	10.960	2.529E-01	U235
185.74	1107.	7.00	1.16	1.108E-01	185.72	54.000	2.570E-01	U235
					185.99	3.280	4.234E+00	Ra226
238.71	324.	12.85	0.94	9.637E-02	238.63	43.300	1.078E-01	PB212
510.84	1483.	6.13	2.40	4.531E-02	511.86	20.000	2.277E+00	RH106
582.96	130.	23.20	1.47	3.959E-02	583.02	84.500	5.398E-02	TL208
609.40	132.	27.57	1.26	3.750E-02	609.31	46.090	1.064E-01	BI214
					610.30	5.750	8.543E-01	RU103
661.40	167.	19.25	1.55	3.334E-02	661.66	85.210	8.164E-02	CS137
1000.86	150.	17.80	2.20	2.158E-02	1001.00	0.837	1.151E+01	PA234M
1172.58	149.	18.37	2.30	1.834E-02	1173.24	99.900	1.130E-01	CO60
1332.19	90.	26.62	3.63	1.637E-02	1332.50	99.980	7.594E-02	CO60
1460.82	105.	16.27	0.74	1.543E-02	1460.83	10.670	8.832E-01	K40
1764.14	48.	29.95	1.00	1.319E-02	1764.49	15.400	3.283E-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
451.07	112.81	690.	192.	1.454E+03	26.59	0.645	- s

(Page 3 of 8)

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
2043.27	510.84	689.	1483.	3.273E+04	6.13	2.400	- 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
AM-241	237.95	59.54	557.	453.	0.006	8.74	1.022D
TH-234	252.96	63.29	616.	1057.	0.015	4.53	1.025D
TH-234	370.36	92.64	953.	2036.	0.028	3.81	1.161
U-235	575.12	143.82	553.	249.	0.003	18.37	1.420s
U-235	742.71	185.72	849.	1073.	0.015	4.40	1.119D
PB-212	954.68	238.71	444.	324.	0.004	12.85	0.939
TL-208	2331.75	582.96	195.	130.	0.002	23.20	1.471
BI-214	2437.54	609.40	277.	132.	0.002	27.57	1.255s
CS-137	2645.53	661.40	200.	167.	0.002	19.25	1.550
PA-234M	4003.46	1000.86	108.	150.	0.002	17.80	2.201s
CO-60	4690.35	1172.58	100.	149.	0.002	18.37	2.296s
CO-60	5328.82	1332.19	78.	90.	0.001	26.62	3.632s
K-40	5843.33	1460.82	38.	105.	0.001	16.27	0.740s
BI-214	7056.68	1764.14	28.	48.	0.001	29.95	0.999s

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	8.8316E-01					4.66E+11
			1460.83	8.832E-01	(	2.663E-01	1.63E+01 1.07E+01 G
CO-60	F	9.4445E-02					1.93E+03
			1332.50	7.594E-02	(	3.711E-02	2.66E+01 1.00E+02 G
			1173.24	1.130E-01	*(	3.739E-02	1.84E+01 9.99E+01 G
CS-137	I	8.1641E-02					1.10E+04
			661.66	8.164E-02	(	3.354E-02	1.93E+01 8.52E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N 5.3982E-02					6.98E+02	
		583.02	5.398E-02	(	2.815E-02	2.32E+01	8.45E+01 G
		277.28	0.000E+00	%	1.512E-01	4.16E+01	6.31E+00 G
		860.56	0.000E+00	%	1.593E-01	4.49E+01	1.24E+01 G
PB-212	N 1.0777E-01					6.98E+02	
		238.63	1.078E-01	(	3.358E-02	1.28E+01	4.33E+01 G
		300.03	0.000E+00	%	3.117E-01	5.20E+01	3.28E+00 GA
BI-214	N 1.0635E-01					5.84E+05	
		609.31	1.064E-01	*(	6.447E-02	2.76E+01	4.61E+01 G
		1120.29	0.000E+00	%	2.106E-01	1.00E+03	1.51E+01 G
		1764.49	3.283E-01	+	1.872E-01	2.99E+01	1.54E+01 G
TH-234	N 4.0141E+00					1.63E+12	
		63.29	4.166E+00	(	4.669E-01	4.53E+00	3.81E+00 G
		92.59	3.910E+00	(	2.815E-01	3.81E+00	5.58E+00 G
PA-234M	N 1.1510E+01					1.63E+12	
		1001.00	1.151E+01	(	3.938E+00	1.78E+01	8.37E-01 G
		766.41	0.000E+00	%	6.635E+00	4.99E+01	2.94E-01 G
U-235	N 2.5290E-01					2.57E+11	
		185.72	2.491E-01	}	3.215E-02	4.40E+00	5.40E+01 GA
		143.79	2.529E-01	@(	1.141E-01	1.84E+01	1.10E+01 G
		205.33	0.000E+00	%	1.723E-01	3.62E+01	5.01E+00 G
		163.38	0.000E+00	%	1.713E-01	3.45E+01	5.08E+00 G
AM-241	T 2.0159E-01					1.58E+05	
		59.54	2.016E-01	(	5.017E-02	8.74E+00	3.59E+01 G

(- This peak used in the nuclide activity average.

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

} - Peak is too close to another for the activity
to be found directly.

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

- -

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

Nuclide	Centroid 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	<	1.3956E-01		
NA-22	<	1.3574E-02		
K-40		8.8316E-01	1.6269E+01%	2.663E-01
Sc-46	<	3.5868E-02		
CR-51	<	1.0316E-01		
MN-54	<	2.3334E-02		
FE-59	<	4.6633E-02		
Co-56	<	2.1327E-02		
CO-57	<	1.3616E-02		
CO-58	<	1.8347E-02		
CO-60		9.4445E-02	1.6169E+01%	3.711E-02
ZN-65	<	5.0398E-02		
NB-94	<	1.8255E-02		
ZR-95	<	3.1325E-02		
NB-95	<	3.5056E-02		
RU-103	<	1.4857E-02		
RH-106	<	3.0001E-01		
AG-108M	<	1.6713E-02		
AG-110M	<	4.1655E-02		
SN-113	<	2.5007E-02		
SB-124	<	1.7444E-02		
SB-125	<	5.0828E-02		
I-131	<	1.7767E-02		
BA-133	<	3.2019E-02		
CS-134	<	2.8761E-02		

CS-137		8.1641E-02	1.9252E+01%	3.354E-02
CE-139	<	1.8601E-02		
Ba-140	<	5.9459E-02		
La-140	<	2.9125E-02		
CE-141	<	1.3058E-02		
CE-144	<	1.1495E-01		
PM-144	<	2.2198E-02		
EU-152	<	7.6781E-02		
EU-154	<	1.8840E-01		
EU-155	<	3.7553E-02		
HF-181	<	2.8633E-02		
Ta-182	<	1.1838E-01		
Hg-203	<	1.1588E-02		
TL-208		5.3982E-02	2.3205E+01%	2.815E-02
pm-146	<	5.4441E-02		
y-88	<	2.6490E-02		
PB-210	<	4.0297E-01		
PB-212		1.0777E-01	1.2845E+01%	3.358E-02
PB-214	<	3.4555E-02		
BI-207	<	3.2163E-02		
BI-212	<	2.8483E-01		
BI-214	#	1.0635E-01	2.7571E+01%	6.447E-02
BI-210M	<	1.9436E-02		
RA-224	<	2.8792E-01		
AC-228	<	1.0866E-01		
TH-227	<	1.2789E-01		
TH-229	<	2.1503E-01		
TH-234		4.0141E+00	2.9582E+00%	4.669E-01
PA-231	<	6.1069E-01		
PA-233	<	2.9199E-02		
PA-234	<	5.8120E-02		
PA-234M	#	1.1510E+01	1.7796E+01%	3.938E+00
U-235		2.5290E-01	1.8370E+01%	1.141E-01
AM-241		2.0159E-01	8.7413E+00%	5.017E-02
Np-237	<	9.5890E-02		

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

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

Total Activity (37.5 to 2000.0 keV) 1.731E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 9_20190906017_BGLong
Description: Background Long PBC Count
Acquired: 9/6/2019 6:01:45 PM
Detector: Detector # 9
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.89	1.53	1.65	1.79	2.14	2.26	PASS

Analyst: Shiloh Smith Reviewer:

(Page 1 of 7)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det9\9_20190906017_BGLong.An1

Acquisition information
Start time: 9/6/2019 6:01:45 PM
Live time: 72000
Real time: 72092
Dead time: 0.13 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_QC.Clb
9_QC-E_79670-334_060211

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

Efficiency Calibration
Created: 6/3/2011 12:03:10 PM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.59keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

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

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0969

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
238.50	213.	21.22	1.46	1.228E-01	238.63	43.300	5.570E-02	PB212
295.16	149.	24.60	1.18	1.047E-01	295.09	19.300	1.024E-01	PB214
351.66	312.	14.94	1.23	8.649E-02	351.93	37.600	1.334E-01	PB214
511.09	2333.	5.06	2.46	6.207E-02	511.86	20.000	2.613E+00	RH106
569.63	88.	26.62	1.11	5.641E-02	569.70	97.740	2.208E-02	BI207
					569.32	15.380	1.403E-01	CS134
					569.47	8.200	2.631E-01	PA234
583.48	149.	21.28	1.03	5.508E-02	583.02	84.500	4.448E-02	TL208
609.49	256.	16.39	1.36	5.256E-02	609.31	46.090	1.467E-01	BI214
					610.30	5.750	1.178E+00	RU103
803.01	137.	28.49	0.64	3.767E-02				
1120.86	139.	21.97	2.21	2.761E-02	1120.29	15.100	4.619E-01	BI214
					1120.55	99.987	6.977E-02	Sc46
					1121.30	34.900	2.000E-01	Ta182
1460.87	267.	9.21	1.81	2.339E-02	1460.83	10.670	1.486E+00	K40
1764.48	152.	18.02	2.52	2.159E-02	1764.49	15.400	6.348E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
2043.69	511.09	1008.	2333.	3.758E+04	5.06	2.460	-	s
3211.51	803.01	260.	137.	3.637E+03	28.49	0.641	-	s

(Page 3 of 7)

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-212	953.45	238.50	551.	213.	0.003	21.22	1.456s
PB-214	1180.06	295.16	398.	149.	0.002	24.60	1.178
PB-214	1406.02	351.66	465.	312.	0.004	14.94	1.227
BI-207	2277.86	569.63	161.	88.	0.001	26.62	1.112s
TL-208	2333.28	583.48	224.	149.	0.002	21.28	1.032s
BI-214	2437.31	609.49	361.	256.	0.004	16.39	1.364
BI-214	4483.37	1120.86	135.	139.	0.002	21.97	2.207
K-40	5844.20	1460.87	58.	267.	0.004	9.21	1.810s
BI-214	7059.60	1764.48	69.	152.	0.002	18.02	2.522

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	1.4857E+00					4.66E+11	
			1460.83	1.486E+00	@(	2.126E-01	9.21E+00	1.07E+01 G
TL-208	N	4.4480E-02					6.98E+02	
			583.02	4.448E-02	?(	2.160E-02	2.13E+01	8.45E+01 G
			277.28	0.000E+00	%	1.362E-01	2.63E+02	6.31E+00 G
			860.56	0.000E+00	&	1.765E-01	1.00E+03	1.24E+01 G
PB-212	N	5.5702E-02					6.98E+02	
			238.63	5.570E-02	(	2.926E-02	2.12E+01	4.33E+01 G
			300.03	0.000E+00	%	3.675E-01	0.00E+00	3.28E+00 GA
PB-214	N	1.3339E-01					5.84E+05	
			351.93	1.334E-01	(	4.412E-02	1.49E+01	3.76E+01 G
			295.09	1.024E-01	-	6.577E-02	2.46E+01	1.93E+01 G
			242.00	0.000E+00		1.837E-01	0.00E+00	7.43E+00 GA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-207	C 2.2085E-02					1.18E+04	
		569.70	2.208E-02	?(	1.559E-02	2.66E+01	9.77E+01 G
		1063.66	0.000E+00	%	2.896E-02	1.62E+02	7.45E+01 G
BI-214	N 1.4672E-01					5.84E+05	
		609.31	1.467E-01	?(	5.230E-02	1.64E+01	4.61E+01 G
		1120.29	4.619E-01	+	1.896E-01	2.20E+01	1.51E+01 G
		1764.49	6.348E-01	+	1.730E-01	1.80E+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

(Page 5 of 7)

***** 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	<	1.1412E-01		
NA-22	<	3.4422E-02		
K-40	#	1.4857E+00	9.2148E+00%	2.126E-01
Sc-46	<	2.8544E-02		
CR-51	<	1.0760E-01		
MN-54	<	1.8952E-02		
FE-59	<	3.6443E-02		
Co-56	<	2.0392E-02		
CO-57	<	1.1675E-02		
CO-58	<	1.6596E-02		
CO-60	<	2.1255E-02		
ZN-65	<	7.4999E-02		
NB-94	<	2.9292E-02		
ZR-95	<	2.8873E-02		
NB-95	<	8.8279E-03		
RU-103	<	1.4424E-02		
RH-106	<	1.5437E-01		
AG-108M	<	1.3933E-02		
AG-110M	<	3.3490E-02		
SN-113	<	1.9802E-02		
SB-124	<	1.6482E-02		
SB-125	<	3.6494E-02		
I-131	<	1.5434E-02		
BA-133	<	3.0938E-02		
CS-134	<	1.9524E-02		
CS-137	<	2.1084E-02		
CE-139	<	1.6335E-02		
Ba-140	<	5.2617E-02		
La-140	<	2.0819E-02		
CE-141	<	1.4382E-02		
CE-144	<	7.1508E-02		
PM-144	<	2.6206E-02		
EU-152	<	4.3372E-02		
EU-154	<	1.7660E-01		
EU-155	<	3.1970E-02		
HF-181	<	1.5504E-02		
Ta-182	<	7.3903E-02		
Hg-203	<	1.0865E-02		
TL-208	#	4.4480E-02	2.1276E+01%	2.160E-02
pm-146	<	4.5219E-02		
y-88	<	2.4889E-02		
PB-210	<	3.5753E-01		
PB-212		5.5702E-02	2.1218E+01%	2.926E-02

(Page 6 of 7)

PB-214		1.3339E-01	1.4937E+01%	4.412E-02
BI-207	#	2.2085E-02	2.6624E+01%	1.559E-02
BI-212	<	2.6795E-01		
BI-214		1.4672E-01	1.6388E+01%	5.230E-02
BI-210M	<	1.6332E-02		
RA-224	<	2.1600E-01		
AC-228	<	7.1690E-02		
TH-227	<	6.9325E-02		
TH-229	<	1.7583E-01		
TH-234	<	2.8449E-01		
PA-231	<	5.4616E-01		
PA-233	<	2.5245E-02		
PA-234	<	4.0219E-02		
PA-234M	<	2.4709E+00		
Ra-226	<	3.4935E-01		
U-235	<	6.2585E-02		
AM-241	<	3.0786E-02		
Np-237	<	4.2631E-02		

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

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

Total Activity (37.6 to 1999.3 keV) 1.888E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 12_20190906016_BGLong
Description: Background Long PBC Count
Acquired: 9/6/2019 6:00:11 PM
Detector: Detector #12
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.00	1.89	1.93	1.98	2.07	2.10	PASS

Analyst: Shiloh Smith Reviewer:

(Page 1 of 5)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det12\12_20190906016_BGLong.An1

Acquisition information
Start time: 9/6/2019 6:00:11 PM
Live time: 72000
Real time: 72041
Dead time: 0.06 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_QC.Clb
12_SourceCheck_H_2018

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

Efficiency Calibration
Created: 4/24/2018 2:08:25 PM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

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

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.59keV)
Stop channel: 8000 (1999.13keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

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

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.62	1254.	5.69	0.94	5.842E-02				
63.35	918.	8.60	0.82	7.862E-02				
74.91	353.	12.27	0.88	9.259E-02				
77.24	257.	16.96	0.88	9.540E-02				
87.26	168.	28.26	0.98	1.075E-01				
92.66	1366.	5.49	1.03	1.066E-01				
139.89	159.	22.16	0.95	9.294E-02				
143.66	166.	23.71	0.95	9.250E-02				
185.75	628.	9.10	1.04	8.763E-02				
198.50	234.	20.71	1.23	8.615E-02				
238.55	402.	14.48	1.13	8.151E-02				
295.15	182.	21.67	1.20	7.495E-02				
351.80	416.	12.80	1.10	6.838E-02				
510.89	2387.	4.71	2.39	4.993E-02				
583.07	229.	21.16	1.59	4.157E-02				
609.62	331.	13.37	1.37	3.850E-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	
186.13	46.62	1098.	1254.	2.146E+04	5.69	0.941	-	
252.98	63.35	1329.	918.	1.168E+04	8.60	0.817	-	
299.22	74.92	760.	353.	3.811E+03	12.27	0.880	-	sD
308.52	77.24	824.	257.	2.698E+03	16.96	0.883	-	sD
348.58	87.26	732.	168.	1.558E+03	28.26	0.984	-	s

TestAmerica Inc Spectrum name: 12_20190906016_BGLong.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
370.16	92.66	1111.	1366.	1.282E+04	5.49	1.034	-	s
558.98	139.96	544.	159.	1.714E+03	22.16	0.946	-	sD
574.05	143.73	688.	166.	1.790E+03	23.71	0.950	-	sD
742.29	185.75	752.	628.	7.161E+03	9.10	1.044	-	
793.27	198.50	632.	234.	2.712E+03	20.71	1.230	-	s
953.41	238.55	747.	402.	4.932E+03	14.48	1.130	-	
1179.73	295.15	458.	182.	2.428E+03	21.67	1.196	-	
1406.21	351.80	580.	416.	6.076E+03	12.80	1.103	-	
2042.44	510.96	930.	2387.	4.780E+04	4.71	2.392	-	
2331.16	583.07	399.	229.	5.516E+03	21.16	1.594	-	s
2437.36	609.62	377.	331.	8.607E+03	13.37	1.366	-	s

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

This section based on library: Null.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV

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

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

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	Peak MDA Value DPS	COMMENTS

(- This peak used in the nuclide activity average.

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

```
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

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

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


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

*****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count   Uncertainty  1 Sigma
Nuclide    Activity        Counting                  MDA
               DPS
_____________________________________________________________________________
DUMMY    No in-range peaks
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.6 to  1999.1 keV)     0.000E+00  DPS
```

Test America
St. Louis
Background Check

Spectrum: 14_20190906012_BGLong
Description: Background Long PBC Count
Acquired: 9/6/2019 5:23:35 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: Shiloh Smith Reviewer:

(Page 1 of 7)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det14\14_20190906012_BGLong.An1

Acquisition information
Start time: 9/6/2019 5:23:35 PM
Live time: 72000
Real time: 72028
Dead time: 0.04 %
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

(Page 2 of 7)

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

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2155

***** 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
46.53	813.	8.39	0.82	6.120E-02	46.54	4.250	4.340E+00	PB210
63.29	652.	9.30	0.61	8.537E-02	63.29	3.810	2.786E+00	TH234
74.90	294.	15.03	0.78	1.021E-01				
77.30	140.	29.52	0.78	1.056E-01				
92.68	964.	7.09	1.11	1.215E-01	92.59	5.584	1.974E+00	TH234
					93.35	5.561	1.981E+00	AC228
185.55	400.	14.52	1.10	1.072E-01	185.72	54.000	9.600E-02	U235
					185.99	3.280	1.581E+00	Ra226
238.32	306.	17.49	0.95	9.397E-02	238.63	43.300	1.047E-01	PB212
241.68	119.	26.55	0.95	9.305E-02	242.00	7.430	2.382E-01	PB214
295.00	193.	24.41	0.92	7.975E-02	295.09	19.300	1.744E-01	PB214
351.64	287.	16.41	1.23	6.554E-02	351.93	37.600	1.618E-01	PB214
609.09	334.	13.63	1.64	3.708E-02	609.31	46.090	2.718E-01	BI214
					610.30	5.750	2.184E+00	RU103
1120.42	98.	23.22	2.06	1.998E-02	1120.29	15.100	4.512E-01	BI214
					1120.55	99.987	6.816E-02	Sc46
					1121.30	34.900	1.954E-01	Ta182
1461.06	158.	14.54	1.72	1.557E-02	1460.83	10.670	1.323E+00	K40
1764.74	106.	14.84	2.51	1.327E-02	1764.49	15.400	7.193E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.97	74.90	828.	294.	2.878E+03	15.03	0.777	- sD

(Page 3 of 7)

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
308.58	77.30	787.	140.	1.328E+03	29.52	0.780	- sD

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

This section based on library: 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	185.56	46.53	1000.	813.	0.011	8.39	0.816s
TH-234	252.56	63.29	908.	652.	0.009	9.30	0.611
TH-234	370.07	92.68	1060.	964.	0.013	7.09	1.109s
Ra-226	741.45	185.55	850.	400.	0.006	14.52	1.103s
PB-212	953.75	238.63	527.	307.	0.004	12.02	0.945D
PB-214	967.21	242.00	436.	119.	0.002	26.55	0.948D
PB-214	1179.18	295.00	530.	193.	0.003	24.41	0.917s
PB-214	1405.71	351.64	462.	287.	0.004	16.41	1.232
BI-214	2435.50	609.09	338.	334.	0.005	13.63	1.643s
BI-214	4481.26	1120.42	84.	98.	0.001	23.22	2.064s
K-40	5844.48	1461.06	51.	158.	0.002	14.54	1.717s
BI-214	7060.08	1764.74	24.	106.	0.001	14.84	2.506

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

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

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	MDA Value DPS	COMMENTS
K-40	N	1.3233E+00				4.66E+11	
			1460.83	1.323E+00	*(	2.999E-01 1.45E+01 1.07E+01	G
PB-210	N	4.3396E+00				8.14E+03	
			46.54	4.340E+00	*(	8.013E-01 8.39E+00 4.25E+00	G
PB-212	N	1.0478E-01				6.98E+02	
			238.63	1.048E-01	(	3.746E-02 1.20E+01 4.33E+01	G
			300.03	0.000E+00	%	3.326E-01 4.87E+01 3.28E+00	GA

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PB-214   N   1.6603E-01                                      5.84E+05
                          351.93 1.618E-01  (  5.807E-02 1.64E+01 3.76E+01 G
                          295.09 1.744E-01 @(  9.927E-02 2.44E+01 1.93E+01 G
                          242.00 2.382E-01     2.009E-01 2.65E+01 7.43E+00 GA

BI-214   N   2.7183E-01                                      5.84E+05
                          609.31 2.718E-01 *(  7.177E-02 1.36E+01 4.61E+01 G
                         1120.29 4.512E-01 +   2.091E-01 2.32E+01 1.51E+01 G
                         1764.49 7.193E-01 +   1.741E-01 1.48E+01 1.54E+01 G

TH-234   N   2.7856E+00                                      1.63E+12
                           63.29 2.786E+00  (  6.111E-01 9.30E+00 3.81E+00 G
                           92.59 1.974E+00 -   3.162E-01 7.09E+00 5.58E+00 G

Ra-226       1.5815E+00                                      5.84E+05
                          185.99 1.581E+00  (  5.479E-01 1.45E+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

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

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

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	1.2845E-01		
NA-22	<	3.8028E-02		
K-40	#	1.3233E+00	1.4539E+01%	2.999E-01
Sc-46	<	1.9723E-02		
CR-51	<	1.1311E-01		
MN-54	<	2.0674E-02		
FE-59	<	5.1171E-02		
Co-56	<	2.2610E-02		
CO-57	<	8.5711E-03		
CO-58	<	3.4433E-02		
CO-60	<	2.3701E-02		
ZN-65	<	7.5996E-02		
NB-94	<	2.4304E-02		
ZR-95	<	3.7647E-02		
NB-95	<	3.5163E-02		
RU-103	<	1.4704E-02		
RH-106	<	2.0877E-01		
AG-108M	<	1.5197E-02		
AG-110M	<	2.7804E-02		
SN-113	<	2.1024E-02		
SB-124	<	2.1200E-02		
SB-125	<	4.4820E-02		
I-131	<	1.4905E-02		
BA-133	<	2.8025E-02		
CS-134	<	2.5863E-02		
CS-137	<	2.1452E-02		
CE-139	<	9.1172E-03		
Ba-140	<	5.7095E-02		
La-140	<	2.5560E-02		
CE-141	<	1.9950E-02		
CE-144	<	9.0424E-02		
PM-144	<	2.6198E-02		
EU-152	<	7.2484E-02		
EU-154	<	2.7441E-01		
EU-155	<	3.5992E-02		
HF-181	<	1.7988E-02		

Ta-182	<	1.1885E-01		
Hg-203	<	1.7845E-02		
TL-208	<	2.2076E-02		
pm-146	<	5.9714E-02		
y-88	<	2.5422E-02		
PB-210	#	4.3396E+00	8.3864E+00%	8.013E-01
PB-212		1.0478E-01	1.2024E+01%	3.746E-02
PB-214		1.6603E-01	1.4709E+01%	5.807E-02
BI-207	<	3.3378E-02		
BI-212	<	4.3111E-01		
BI-214		2.7183E-01	1.3629E+01%	7.177E-02
BI-210M	<	1.9022E-02		
RA-224	<	4.0173E-01		
AC-228	<	1.0648E-01		
TH-227	<	9.2618E-02		
TH-229	<	2.3500E-01		
TH-234		2.7856E+00	9.2967E+00%	6.111E-01
PA-231	<	3.4219E-01		
PA-233	<	3.1435E-02		
PA-234	<	5.4679E-02		
PA-234M	<	2.7494E+00		
Ra-226		1.5815E+00	1.4524E+01%	5.479E-01
U-235	<	9.1699E-02		
AM-241	<	6.2565E-02		
Np-237	<	6.4507E-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 1999.5 keV) 1.057E+01 DPS

(Page 7 of 7)

Test America
St. Louis
Background Check

Spectrum: 16_20190906013_BGLong
Description: Background Long PBC Count
Acquired: 9/6/2019 5:24:57 PM
Detector: Detector #16
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.68	2.51	2.56	2.65	2.80	2.86	PASS

Analyst: Shiloh Smith Reviewer:

(Page 1 of 8)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det16\16_20190906013_BGLong.An1

Acquisition information
Start time: 9/6/2019 5:24:57 PM
Live time: 72000
Real time: 72134
Dead time: 0.19 %
Detector ID: 16

Detector system
Ge16 SN/11012217

Calibration
Filename: 16_QC.Clb
16_QC-G_081311

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

Efficiency Calibration
Created: 8/14/2011 1:15:14 PM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.57keV)
Stop channel: 8000 (1999.64keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

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

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 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. DPS	Nuc
46.51	1461.	6.37	0.98	7.068E-02	46.54	4.250	6.751E+00	PB210
59.49	226.	20.76	0.97	8.957E-02	59.54	35.900	9.757E-02	AM241
63.32	996.	5.76	0.97	9.511E-02	63.29	3.810	3.821E+00	TH234
74.92	469.	11.80	0.99	1.118E-01				
77.23	343.	15.80	0.99	1.151E-01				
84.47	362.	22.41	1.03	1.256E-01				
92.73	1468.	6.32	1.17	1.312E-01	92.59	5.584	2.783E+00	TH234
					93.35	5.561	2.793E+00	AC228
185.64	861.	8.17	0.99	1.130E-01	185.72	54.000	1.960E-01	U235
					185.99	3.280	3.229E+00	Ra226
238.46	521.	14.35	1.24	9.906E-02	238.63	43.300	1.688E-01	PB212
294.96	317.	18.56	1.61	8.412E-02	295.09	19.300	2.713E-01	PB214
351.77	522.	12.98	1.37	6.910E-02	351.93	37.600	2.789E-01	PB214
510.91	2720.	3.76	2.58	4.934E-02	511.86	20.000	3.833E+00	RH106
583.28	204.	17.48	1.57	4.377E-02	583.02	84.500	7.660E-02	TL208
609.20	449.	13.12	1.56	4.175E-02	609.31	46.090	3.239E-01	BI214
					610.30	5.750	2.601E+00	RU103
1001.03	156.	22.43	2.08	2.469E-02	1001.00	0.837	1.046E+01	PA234M
1120.00	153.	18.72	1.77	2.235E-02	1120.29	15.100	6.298E-01	BI214
					1120.55	99.987	9.513E-02	Sc46
					1121.30	34.900	2.727E-01	Ta182
1320.84	67.	29.42	0.36	1.918E-02				
1460.85	294.	10.06	2.89	1.797E-02	1460.83	10.670	2.130E+00	K40
1763.97	155.	17.44	1.33	1.550E-02	1764.49	15.400	9.009E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
299.35	74.92	1295.	469.	4.190E+03	11.80	0.986	- D
308.56	77.22	1294.	343.	2.975E+03	15.80	0.988	- sD
337.51	84.47	1699.	362.	2.884E+03	22.41	1.035	- s
2042.74	510.91	908.	2720.	5.512E+04	3.76	2.585	- s
5282.96	1320.84	70.	67.	3.511E+03	29.42	0.357	- s

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

This section based on library: DET_Long Background PBC.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.74	46.51	1660.	1461.	0.020	6.37	0.979
AM-241	237.83	59.54	986.	225.	0.003	20.82	0.971D
TH-234	252.82	63.29	1145.	996.	0.014	5.76	0.975D
TH-234	370.54	92.73	1785.	1468.	0.020	6.32	1.169
Ra-226	742.00	185.64	1115.	861.	0.012	8.17	0.986s
PB-212	953.23	238.46	1216.	521.	0.007	14.35	1.238s
PB-214	1179.16	294.96	786.	317.	0.004	18.56	1.606s
PB-214	1406.33	351.77	840.	522.	0.007	12.98	1.373s
TL-208	2332.21	583.28	305.	204.	0.003	17.48	1.570
BI-214	2435.88	609.20	583.	449.	0.006	13.12	1.565s
PA-234M	4003.30	1001.03	199.	156.	0.002	22.43	2.083
BI-214	4479.28	1120.00	138.	153.	0.002	18.72	1.767
K-40	5843.27	1460.85	116.	294.	0.004	10.06	2.889s
BI-214	7056.54	1763.97	80.	155.	0.002	17.44	1.326s

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

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

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS		COMMENTS
K-40	N	2.1299E+00					4.66E+11	
			1460.83	2.130E+00	(	3.832E-01	1.01E+01	1.07E+01 G
TL-208	N	7.6601E-02					6.98E+02	
			583.02	7.660E-02	(	3.158E-02	1.75E+01	8.45E+01 G
			277.28	0.000E+00	%	1.894E-01	6.07E+01	6.31E+00 G
			860.56	0.000E+00	%	2.036E-01	5.55E+01	1.24E+01 G
PB-210	N	6.7511E+00					8.14E+03	
			46.54	6.751E+00	(	8.899E-01	6.37E+00	4.25E+00 G
PB-212	N	1.6877E-01					6.98E+02	
			238.63	1.688E-01	*(	5.352E-02	1.43E+01	4.33E+01 G
			300.03	0.000E+00	%	3.964E-01	1.00E+03	3.28E+00 GA
PB-214	N	2.7634E-01					5.84E+05	
			351.93	2.789E-01	*(	7.367E-02	1.30E+01	3.76E+01 G
			295.09	2.713E-01	(	1.141E-01	1.86E+01	1.93E+01 G
			242.00	0.000E+00	?	2.682E-01	0.00E+00	7.43E+00 GA
BI-214	N	3.2390E-01					5.84E+05	
			609.31	3.239E-01	*(	8.321E-02	1.31E+01	4.61E+01 G
			1120.29	6.298E-01	+	2.365E-01	1.87E+01	1.51E+01 G
			1764.49	9.009E-01	+	2.585E-01	1.74E+01	1.54E+01 G
TH-234	N	3.8212E+00					1.63E+12	
			63.29	3.821E+00	(	6.158E-01	5.76E+00	3.81E+00 G
			92.59	2.783E+00	-	3.784E-01	6.32E+00	5.58E+00 G
PA-234M	N	1.0462E+01					1.63E+12	
			1001.00	1.046E+01	?(	4.604E+00	2.24E+01	8.37E-01 G
			766.41	0.000E+00	%	7.986E+00	7.85E+01	2.94E-01 G
Ra-226		3.2294E+00					5.84E+05	
			185.99	3.229E+00	@(	5.935E-01	8.17E+00	3.28E+00 G
AM-241	T	9.7273E-02					1.58E+05	
			59.54	9.727E-02	(	6.440E-02	2.08E+01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.

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

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

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


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

*****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count   Uncertainty  1 Sigma
Nuclide    Activity        Counting                    MDA
              DPS
_____________________________________________________________________________
BE-7    <    2.2217E-01
NA-22   <    3.7794E-02
K-40         2.1299E+00   1.0056E+01%               3.832E-01
Sc-46   <    2.7372E-02
CR-51   <    1.3508E-01
MN-54   <    2.4970E-02
FE-59   <    5.5596E-02
Co-56   <    2.4904E-02
CO-57   <    2.0100E-02
CO-58   <    3.8826E-02
CO-60   <    2.8686E-02
ZN-65   <    9.0140E-02
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NB-94	<	3.8834E-02		
ZR-95	<	4.0839E-02		
NB-95	<	4.0771E-02		
RU-103	<	1.9998E-02		
RH-106	<	3.1305E-01		
AG-108M	<	1.8704E-02		
AG-110M	<	3.8465E-02		
SN-113	<	2.7389E-02		
SB-124	<	3.0445E-02		
SB-125	<	6.2486E-02		
I-131	<	1.7420E-02		
BA-133	<	3.5676E-02		
CS-134	<	3.0084E-02		
CS-137	<	2.6174E-02		
CE-139	<	1.9516E-02		
Ba-140	<	7.1811E-02		
La-140	<	3.3145E-02		
CE-141	<	2.3377E-02		
CE-144	<	1.1433E-01		
PM-144	<	4.3084E-02		
EU-152	<	5.4894E-02		
EU-154	<	2.2222E-01		
EU-155	<	5.1880E-02		
HF-181	<	3.6592E-02		
Ta-182	<	1.0241E-01		
Hg-203	<	2.3834E-02		
TL-208		7.6601E-02	1.7479E+01%	3.158E-02
pm-146	<	6.2391E-02		
y-88	<	3.0701E-02		
PB-210		6.7511E+00	6.3675E+00%	8.899E-01
PB-212	#	1.6877E-01	1.4348E+01%	5.352E-02
PB-214		2.7634E-01	1.1322E+01%	7.367E-02
BI-207	<	3.3943E-02		
BI-212	<	4.8373E-01		
BI-214		3.2390E-01	1.3115E+01%	8.321E-02
BI-210M	<	2.3220E-02		
RA-224	<	4.9462E-01		
AC-228	<	1.1511E-01		
TH-227	<	8.7823E-02		
TH-229	<	2.5751E-01		
TH-234		3.8212E+00	5.7586E+00%	6.158E-01
PA-231	<	6.0878E-01		
PA-233	<	3.3907E-02		
PA-234	<	1.0816E-01		
PA-234M	#	1.0462E+01	2.2427E+01%	4.604E+00
Ra-226	#	3.2294E+00	8.1670E+00%	5.935E-01
U-235	<	1.0242E-01		
AM-241		9.7273E-02	2.0823E+01%	6.440E-02
Np-237	<	1.3596E-01		

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   37.6 to  1999.6 keV)     2.734E+01  DPS
```

Run Logs

Gamma Spectroscopy Run Log

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
09/06/19 17:55		ICB 160-442970/1		442970			JLW
09/26/19 01:26		CCV 160-444208/1		444208			
09/26/19 01:48		CCV 160-444208/2		444208			
09/26/19 03:49		CCV 160-444208/3		444208			
09/26/19 04:09		CCV 160-444208/4		444208			KLS
09/26/19 04:43		CCB 160-444208/5		444208			KLS
09/26/19 05:18	30	ZZZZZ		444208			
09/26/19 06:06	30	ZZZZZ		444208			
09/26/19 06:46	30	180-94764-1	JOF-BS-BG09-1.5/3.5-20 90823	444208	441817	901.1	KLS
09/26/19 08:53	30	ZZZZZ		444208			
09/26/19 09:33	30	ZZZZZ		444208			
09/26/19 10:07	30	ZZZZZ		444208			
09/26/19 11:42		TCCLBC 160-444235/3-A		444208			
09/26/19 12:01		TCCLBA 160-444235/1-A		444208			
09/26/19 12:44		TCCLBB 160-444235/2-A		444208			
09/26/19 14:23	30	ZZZZZ		444208			
09/26/19 15:11	30	ZZZZZ		444208			
09/26/19 16:05		ZZZZZ		444208			
09/26/19 16:31		ZZZZZ		444208			
09/26/19 16:47		ZZZZZ		444208			
09/26/19 17:03		ZZZZZ		444208			
09/26/19 17:18		ZZZZZ		444208			
09/26/19 17:32		ZZZZZ		444208			
09/26/19 17:54	60	ZZZZZ		444208			
09/26/19 19:24	30	ZZZZZ		444208			
09/26/19 21:07	30	ZZZZZ		444208			
09/26/19 21:51	30	ZZZZZ		444208			
09/26/19 22:35	60	ZZZZZ		444208			

Detector: GV8

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 10:58		IC 160-12311/1		12311			JLW
03/29/12 01:58		ICV 160-12311/2		12311			JLW
09/06/19 17:37		ICB 160-442973/1		442973			JLW
09/26/19 00:49		CCB 160-444209/1		444209			KLS
09/26/19 01:24		CCV 160-444209/2		444209			
09/26/19 01:46		CCV 160-444209/3		444209			KLS
09/26/19 05:17	30	ZZZZZ		444209			
09/26/19 05:58	30	ZZZZZ		444209			
09/26/19 06:46	30	180-94764-2	JOF-BS-BG09-5.9/7.9-20 90823	444209	441817	901.1	KLS
09/26/19 07:51	30	ZZZZZ		444209			
09/26/19 08:28	30	ZZZZZ		444209			
09/26/19 09:34	30	ZZZZZ		444209			
09/26/19 10:20	30	ZZZZZ		444209			
09/26/19 12:26	30	ZZZZZ		444209			

Gamma Spectroscopy Run Log

Detector: GV8 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/26/19 14:25	30	ZZZZZ		444209			
09/26/19 15:12	30	ZZZZZ		444209			
09/26/19 15:56	60	ZZZZZ		444209			
09/26/19 17:06	60	ZZZZZ		444209			
09/26/19 18:28	60	ZZZZZ		444209			

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
09/06/19 18:01		ICB 160-442127/1		442127			JLW
09/26/19 00:06		CCV 160-444206/1		444206			
09/26/19 00:27		CCV 160-444206/2		444206			KLS
09/26/19 01:18		CCB 160-444206/3		444206			KLS
09/26/19 05:15	30	ZZZZZ		444206			
09/26/19 06:00	30	ZZZZZ		444206			
09/26/19 06:44	30	MB 160-441817/1-A		444206	441817	901.1	KLS
09/26/19 07:46	30	180-94764-1 DU	JOF-BS-BG09-1.5/3.5-20 90823 DU	444206	441817	901.1	KLS
09/26/19 08:52	30	ZZZZZ		444206			
09/26/19 09:36	30	ZZZZZ		444206			
09/26/19 10:20	30	ZZZZZ		444206			
09/26/19 11:34		TCCLBA 160-444235/1-A		444206			
09/26/19 12:01		TCCLBB 160-444235/2-A		444206			
09/26/19 12:35		TCCLBC 160-444235/3-A		444206			
09/26/19 14:22	30	ZZZZZ		444206			
09/26/19 15:10	30	ZZZZZ		444206			
09/26/19 16:04		ZZZZZ		444206			
09/26/19 16:30		ZZZZZ		444206			
09/26/19 16:45		ZZZZZ		444206			
09/26/19 17:01		ZZZZZ		444206			
09/26/19 17:19		ZZZZZ		444206			
09/26/19 17:36		ZZZZZ		444206			
09/26/19 17:55		ZZZZZ		444206			
09/26/19 18:33	30	ZZZZZ		444206			
09/26/19 19:19	30	ZZZZZ		444206			
09/26/19 21:02	30	ZZZZZ		444206			
09/26/19 21:48	30	ZZZZZ		444206			

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
09/06/19 18:00		ICB 160-442126/1		442126			JLW
09/26/19 00:45		CCV 160-444207/1		444207			
09/26/19 01:06		CCV 160-444207/2		444207			KLS
09/26/19 02:25		CCB 160-444207/3		444207			KLS

Gamma Spectroscopy Run Log

Detector: GV12 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/26/19 05:17	30	ZZZZZ		444207			
09/26/19 06:02	30	ZZZZZ		444207			
09/26/19 06:47	30	LCS 160-441817/2-A		444207	441817	901.1	KLS
09/26/19 07:49	30	ZZZZZ		444207			
09/26/19 09:02	30	ZZZZZ		444207			
09/26/19 09:38	30	ZZZZZ		444207			
09/26/19 10:18	30	ZZZZZ		444207			
09/26/19 11:38		TCCLBB 160-444235/2-A		444207			
09/26/19 12:03		TCCLBC 160-444235/3-A		444207			
09/26/19 12:38		TCCLBA 160-444235/1-A		444207			
09/26/19 13:13		TCCLBA 160-444235/1-A		444207			
09/26/19 14:24	30	ZZZZZ		444207			
09/26/19 15:12	30	ZZZZZ		444207			
09/26/19 16:06		ZZZZZ		444207			
09/26/19 16:32		ZZZZZ		444207			
09/26/19 16:48		ZZZZZ		444207			
09/26/19 17:04		ZZZZZ		444207			
09/26/19 17:21		ZZZZZ		444207			
09/26/19 17:34		ZZZZZ		444207			
09/26/19 17:50		ZZZZZ		444207			
09/26/19 18:38	30	ZZZZZ		444207			
09/26/19 19:14	30	ZZZZZ		444207			
09/26/19 21:05	30	ZZZZZ		444207			
09/26/19 21:46	30	ZZZZZ		444207			

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
09/06/19 17:23		ICB 160-442128/1		442128			JLW
09/26/19 00:38		CCB 160-444233/1		444233			KLS
09/26/19 01:18		CCV 160-444233/2		444233			
09/26/19 01:39		CCV 160-444233/3		444233			KLS
09/26/19 05:14	120	MB 160-441833/1-A		444233	441833	901.1	KLS
09/26/19 07:55	60	ZZZZZ		444233			
09/26/19 09:00	120	180-94764-3	JOF-BS-FB01-20190823	444233	441833	901.1	KLS
09/26/19 14:14	120	ZZZZZ		444233			
09/26/19 16:36	60	ZZZZZ		444233			
09/26/19 18:36	120	ZZZZZ		444233			
09/26/19 22:31	120	ZZZZZ		444233			

Detector: GV16

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 15:43		IC 160-11759/1		11759			JLW
04/24/12 08:11		ICV 160-11759/2		11759			JLW
09/06/19 17:24		ICB 160-442130/1		442130			JLW

Gamma Spectroscopy Run Log

Detector: GV16 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/26/19 00:08		CCB 160-444234/1		444234			KLS
09/26/19 01:17		CCV 160-444234/2		444234			
09/26/19 01:38		CCV 160-444234/3		444234			KLS
09/26/19 05:14	120	LCS 160-441833/2-A		444234	441833	901.1	KLS
09/26/19 07:58		ZZZZZ		444234			
09/26/19 08:58	30	ZZZZZ		444234			
09/26/19 09:37	30	ZZZZZ		444234			
09/26/19 10:23	120	ZZZZZ		444234			
09/26/19 14:13	120	180-94764-3 DU	JOF-BS-FB01-20190823 DU	444234	441833	901.1	KLS
09/26/19 16:38	120	ZZZZZ		444234			
09/26/19 22:33	120	ZZZZZ		444234			

Radiological
Pre-Preparation Data

Subcontract Data

Shipping and Receiving Documents

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	1	of	1
COC No:	JOF_BS_20190823_1B		
1 of 1 Pages			
Task Desc:	Background Soil Investigation		

Rev 1 BB 8/30/19

Chain-of-Custody / Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate

Required Ship to Lab:

Lab Name:	TestAmerica Pittsburgh
Lab Address:	301 Alpha Drive Pittsburgh, PA 15238

Lab Manager Contact Information

Lab PM:	Gail Lage
Phone/Fax:	615-301-5741/615-726-3404
Lab Email:	Gail.Lage@testamericainc.com

Required Project Information:

Site ID #:	Johnsonville Fossil Plant		
Project #:	175568286		
Site Address	535 Steam Plant Road		
City	New Johnsonville	State, Zip:	TN, 37134
Site PM Name:	Roy Quinn		
Phone/Fax:	423-751-3753		
Site PM Email:	rquinn@tva.gov		

Required Sampler Information

Sampler: Catherine Burton			
Sampling Company:	Stantec		
Address: 3052 Beaumont Centre Cir			
City/State: Lexington, KY		Phone:	8593382791
Sampling Team Number:	1		
Send EDD/Hard Copy to:	tva_deliverables@envsci.com		

Analysis Turnaround Time

☐ CALENDAR DAYS ☑ WORKING DAYS

TAT if different from Below _____

☐ 24 Hours
☐ 3 Business Days
☐ 5 Business Days
☐ 10 Business Days

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Start Depth (Depth Unit / Select Unit)	Sample Depth: End Depth	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis: BACKGROUNDSOIL_RAD (Filtered N)	Analysis: BACKGROUNDSOIL_BLANKS_RAD (Filtered N)	Preserve: None	Preserve: HNO3
1	JOF-BS-BG09-1.5/3.5-20190823	JOF-BG09	1.5	3.5	BS	G	N	8/23/2019	0927	2		☐	X			
2	JOF-BS-BG09-5.9/7.9-20190823	JOF-BG09	5.9	7.9	BS	G	N	8/23/2019	0934	2		☐	X			
3	JOF-BS-FB01-~~20190828~~ 20190823	JOF-BG09	NA	NA	AQ	G	~~N~~ FB	8/23/2019	1042	2		☐	X	X		
4												☐				
5												☐				
6												☐				
7												☐				
8												☐				
9												☐				
10												☐				
11												☐				
12												☐				
13												☐				

BB 8/30/19

08/23/2019 CSB

180-94764 Chain of Custody

Additional Comments/Special Instructions:

Additional volume collected should be used for laboratory duplicate analysis.

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Catherine Burton/Stantec Catherine S. Burton	08/23/19	1:20pm	Casey Mullett Stantec	8/23/19	1:20
			Mullett TAT	8/27/19	90

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	
	Catherine Burton/Stantec	Catherine S. Burton
	Casey Mullett/Stantec	Casey Mullett

480.8847 5237 Truck 10
2.8 CF = 0.5 - 2.5

Form TVA 30067A

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	1	of	1
COC No:	JOF_BS_20190823_1B		
1 of 1 Pages			
Task Desc:	Background Soil Investigation		

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 Pittsburgh	Site ID #:	Johnsonville Fossil Plant	Sampler: Catherine Burton	
Lab Address:	301 Alpha Drive	Project #:	175568286	Sampling Company:	Stantec
	Pittsburgh, PA 15238	Site Address	535 Steam Plant Road	Address: 3052 Beaumont Centre Cir	
		City	New Johnsonville State, Zip: TN, 37134	City/State: Lexington, KY	Phone: 8593382791
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

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Start Depth	Sample Depth: End Depth (Depth Unit / Select Unit)	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Filtered	Preserve	Analysis: BACKGROUNDSOIL_RAD	Analysis: BACKGROUNDSOIL_BLANKS_RAD
1	JOF-BS-BG09-1.5/3.5-20190823	JOF-BG09	1.5	3.5	BS	G	N	8/23/2019	0927	2		☐	N	None	X	
2	JOF-BS-BG09-5.9/7.9-20190823	JOF-BG09	5.9	7.9	BS	G	N	8/23/2019	0934	2		☐	N	None	X	
3	JOF-BS-FB01-20190628	JOF-BG09	NA	NA	AQ	G	N	8/23/2019	1042	2		☐		HNO3	X	
4												☐				X
5												☐				
6												☐				
7												☐				
8												☐				
9												☐				
10												☐				
11												☐				
12												☐				
13												☐				

08/23/2019 CSB

08/23/2019 CSB

08/23/2019

180-94764 Chain of Custody

Additional Comments/Special Instructions:

Additional volume collected should be used for laboratory duplicate analysis.

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Catherine Burton/Stantec Catherine S. Burton	08/23/19	1:20pm	Casey Mullett Stantec	8/23/19	1:20
			Casey Mullett TAMU	8/23/19	900

Sample Receipt Conditions

Temperature in °C	Sample on Ice?	Sample Intact?	Trip Blank?
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE	
	Catherine Burton/Stantec	Catherine S. Burton
	Casey Mullett/Stantec	Casey Mullett

480.8847 5237 Truck 10
2.8 Cf = 0.3 = 2.5

Form TVA 30067A

eurofins | Environment Tes
TestAmerica

180-94764 Waybill

ORIGIN ID:RNCA (615) 726-0177
SHIPPING MGR
EUROFINS TESTAMERICA
2960 FOSTER CREIGHTON
ILLE, TN 37204
D STATES US

SHIP DATE: 26AUG19
ACTWGT: 10.00 LB MAN
CAD: 820425/CAFE3211

BILL RECIPIENT

AMPLE LOG IN
ESTAMERICA
01 ALPHA DRIVE
IDC DPARK
ITTSBURG PA 152382907
963-7058 REF:
DEPT:

FedEx
Express

TUE - 27 AUG 10:
PRIORITY OVERNI

4820 8847 5237

A AGCA

15
PA-US

Uncorrected temp
Thermometer ID
CF -0.3
Initials
PT-WI-SR-001 effective 11/8/18

°C

Custody Sea
DATE 8-26
SIGNATURE

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
785432

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone: 412-963-7058 Fax: 412-963-2468

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lage, Gail	Carrier Tracking No(s):	COC No: 180-372153.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: gail.lage@testamericainc.com	State of Origin: Tennessee	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 180-94764-1
Address: 13715 Rider Trail North, ,	Due Date Requested: 9/27/2019			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: JOF_BS_20190823_1B	Project #: 18020000			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	901.1_Ra/Dry_Grind Positive Combined Radium-226/228	901.1_Ra/Fill_Geo_21 Positive Combined Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
JOF-BS-BG09-1.5/3.5-20190823 (180-94764-1)	8/23/19	09:27 Central		Solid			X		2	TVA - Batch alone. Quarantine zone soil. Contact PM if insufficient volume for Tuna
JOF-BS-BG09-5.9/7.9-20190823 (180-94764-2)	8/23/19	09:34 Central		Solid			X		2	TVA - Batch alone. Quarantine zone soil. Contact PM if insufficient volume for Tuna
JOF-BS-FB019-20190823 (180-94764-3)	8/23/19	10:42 Central		Water				X	3	TVA - Batch alone

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
[signature]	8/29/19 1700	TAPA	[signature]	8/30/19 0910	TASTL

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: Environmental Standards Inc. Job Number: 180-94764-1

Login Number: 94764 **List Source: Eurofins TestAmerica, Pittsburgh**
List Number: 1
Creator: Kovitch, Christina M

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-94764-1

Login Number: 94764
List Number: 2
Creator: Harris, Lorin C

List Source: Eurofins TestAmerica, St. Louis
List Creation: 08/30/19 01:27 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.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-94764-1

Login Number: 94764
List Number: 3
Creator: Harris, Lorin C

List Source: Eurofins TestAmerica, St. Louis
List Creation: 08/30/19 01:58 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.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	