TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 160-6694-1

Job Description: EPA Region 5 START 3 Contract

For:
Weston Solutions, Inc.
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Attention: Denise Breen



Approved for release.
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5/30/2014 5:03 PM

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Louisiana Lab Certification ID (Non-Potable, Solid/Haz. Material): 106151
Florida Lab Certification ID (Drinking Water): E87689.

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Qualifiers

Metals

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B	Compound was found in the blank and sample.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
F1	MS and/or MSD Recovery exceeds the control limits

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
X	Carrier exceeds control 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, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: Weston Solutions, Inc.

Project: EPA Region 5 START 3 Contract

Report Number: 160-6694-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt
Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT
The samples were received on 5/16/2014 6:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.1º C and 1.3º C.

TOTAL METALS (ICP)
Samples 2222-SD01 (160-6694-1), 2222-SD02 (160-6694-2), 2222-SD03 (160-6694-3), 2222-SD04 (160-6694-4), 2222-SD05 (160-6694-5) and 2222-SD06 (160-6694-6) were analyzed for total metals (ICP) in accordance with EPA SW-846 Method 6010C. The samples were prepared on 05/19/2014 and analyzed on 05/22/2014.

Analytical Batch 123642
The following sample(s) was diluted due to the presence of iron which interferes with arsenic, chromium, lead, antimony, selenium, zinc. : (160-6694-1 MS), (160-6694-1 MSD), (160-6694-1 SD), 2222-SD01 (160-6694-1), 2222-SD02 (160-6694-2), 2222-SD03 (160-6694-3), 2222-SD04 (160-6694-4), 2222-SD05 (160-6694-5), 2222-SD06 (160-6694-6). Elevated reporting limits (RLs) are provided.

Zinc was detected in method blank MB 160-122752/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged.

The matrix spike and/or matrix spike duplicate (MS/MSD) recoveries for calcium, antimony, and barium were outside control limits. Sample matrix interference are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Due to the high concentration of aluminum, iron, calcium, and magnesium the matrix spike / matrix spike duplicate (MS/MSD) could not be evaluated for accuracy and precision. The presence of the '4' qualifier in the data indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount. The associated laboratory control sample (LCS) met acceptance criteria.

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

TOTAL METALS (ICP)

Sample 2222-RIN-01 (160-6694-7) was analyzed for total metals (ICP) in accordance with EPA SW-846 Method 6010C. The samples were prepared on 05/19/2014 and analyzed on 05/22/2014.

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

TOTAL MERCURY

Sample 2222-RIN-01 (160-6694-7) was analyzed for total mercury in accordance with EPA SW-846 Methods 7470A. The samples were prepared on 05/22/2014 and analyzed on 05/27/2014.

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

MERCURY

Samples 2222-SD01 (160-6694-1), 2222-SD02 (160-6694-2), 2222-SD03 (160-6694-3), 2222-SD04 (160-6694-4), 2222-SD05 (160-6694-5) and 2222-SD06 (160-6694-6) were analyzed for mercury in accordance with EPA SW-846 Method 7471B. The samples were prepared on 05/27/2014 and analyzed on 05/28/2014.

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

PERCENT SOLIDS

Samples 2222-SD01 (160-6694-1), 2222-SD02 (160-6694-2), 2222-SD03 (160-6694-3), 2222-SD04 (160-6694-4), 2222-SD05 (160-6694-5) and 2222-SD06 (160-6694-6) were analyzed for percent solids in accordance with EPA Method 160.3 MOD. The samples were analyzed on 05/17/2014.

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

TOTAL ALPHA RADIUM (GFPC)

Sample 2222-RIN-01 (160-6694-7) was analyzed for Total Alpha Radium (GFPC) in accordance with SW-846 Method 9315. The samples were prepared on 05/19/2014 and analyzed on 05/21/2014.

Insufficient volume of sample 2222-RIN-01 (160-6694-7) was available to perform a sample duplicate associated with total alpha radium batch 122912. A LCSD was performed.

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

RADIUM-228 (GFPC)

Sample 2222-RIN-01 (160-6694-7) was analyzed for Radium-228 (GFPC) in accordance with SW-846 Method 9320. The samples were prepared on 05/19/2014 and analyzed on 05/23/2014.

Insufficient volume of sample 2222-RIN-01 (160-6694-7) was available to perform a sample duplicate associated with radium-228 batch 122913. A LCSD was performed.

The barium carrier recovery was outside the upper control limit of 110% (114%). The blank activity is less than the MDC. The LCS/LCSD recoveries are within limits and all other carrier recoveries are acceptable. The laboratory believes this anomaly to be isolated to the blank and not indicative of the batch.

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

ISOTOPIC THORIUM (ALPHA SPECTROMETRY)

Samples 2222-SD01 (160-6694-1), 2222-SD02 (160-6694-2), 2222-SD03 (160-6694-3), 2222-SD04 (160-6694-4), 2222-SD05 (160-6694-5) and 2222-SD06 (160-6694-6) were analyzed for Isotopic Thorium (Alpha Spectrometry) in accordance with DOE A01R_Th. The samples were dried on 05/19/2014, prepared on 05/21/2014 and analyzed on 05/23/2014.

Samples contain rocks and are not homogeneous. Possible matrix interference: 2222-SD01 (160-6694-1), 2222-SD02 (160-6694-2), 2222-SD03 (160-6694-3), 2222-SD04 (160-6694-4), 2222-SD05 (160-6694-5), 2222-SD06 (160-6694-6).

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

ISOTOPIC THORIUM (ALPHA SPECTROMETRY)
Sample 2222-RIN-01 (160-6694-7) was analyzed for Isotopic Thorium (Alpha Spectrometry) in accordance with DOE. The samples were prepared on 05/20/2014 and analyzed on 05/21/2014.

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

ISOTOPIC URANIUM (ALPHA SPECTROMETRY)
Samples 2222-SD01 (160-6694-1), 2222-SD02 (160-6694-2), 2222-SD03 (160-6694-3), 2222-SD04 (160-6694-4), 2222-SD05 (160-6694-5) and 2222-SD06 (160-6694-6) were analyzed for Isotopic Uranium (Alpha Spectrometry) in accordance with DOE. The samples were dried on 05/19/2014, prepared on 05/21/2014 and analyzed on 05/23/2014.

Samples contain rocks and are not homogeneous. Possible matrix interference: 2222-SD01 (160-6694-1), 2222-SD02 (160-6694-2), 2222-SD03 (160-6694-3), 2222-SD04 (160-6694-4), 2222-SD05 (160-6694-5), 2222-SD06 (160-6694-6).

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

ISOTOPIC URANIUM (ALPHA SPECTROMETRY)
Sample 2222-RIN-01 (160-6694-7) was analyzed for Isotopic Uranium (Alpha Spectrometry) in accordance with DOE. The samples were prepared on 05/20/2014 and analyzed on 05/21/2014.

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

CESIUM-137 & OTHER GAMMA EMITTERS (GS)
Sample 2222-RIN-01 (160-6694-7) was analyzed for Cesium-137 & Other Gamma Emitters (GS) in accordance with DOE. The samples were prepared on 05/19/2014 and analyzed on 05/20/2014.

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

RADIUM 226 (NO INGROWTH)
Samples 2222-SD01 (160-6694-1), 2222-SD02 (160-6694-2), 2222-SD03 (160-6694-3), 2222-SD04 (160-6694-4), 2222-SD05 (160-6694-5) and 2222-SD06 (160-6694-6) were analyzed for Radium 226 (No ingrowth) in accordance with GA-01-R. The samples were dried on 05/19/2014, and prepared and analyzed on 05/21/2014.

Radium-226 by gamma spectroscopy is typically determined by inference from daughters (e.g. bismuth-214) after sealing the sample in an appropriate counting geometry/container and waiting 21 days to allow the radium-226 decay chain through radon-222 to reach secular equilibrium. Such an approach is considered to be the most reliable and representative means for establishing the true radium-226 concentration in the sample. The method requested by the client to report radium-226, using its own 186 keV gamma-ray emission, is subject to interference and potential bias due to the 185.7 keV uranium-235 gamma ray. Experience also indicates gamma spectroscopy software does not consistently assign accurate peak areas to radium-226 (186 keV), with the problem compounded by slight drift of the instrumentation. The laboratory considers radium-226 reported based upon the 186 keV gamma-ray emission to be best used by the client in a qualitative fashion.

The reporting limit for radium-226 analyzed by gamma spectroscopy was not met. The data is reported: (160-6694-1 DU), (MB 160-123290/1-A), 2222-SD01 (160-6694-1), 2222-SD02 (160-6694-2), 2222-SD03 (160-6694-3), 2222-SD04 (160-6694-4), 2222-SD05 (160-6694-5), 2222-SD06 (160-6694-6).

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

Detection Summary

Client: Weston Solutions, Inc.
Project/Site: EPA Region 5 START 3 Contract

TestAmerica Job ID: 160-6694-1

Client Sample ID: 2222-SD01 — Lab Sample ID: 160-6694-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	10000		270	57	mg/Kg	10	☼	6010C	Total/NA
Arsenic	4.2	J	13	3.1	mg/Kg	10	☼	6010C	Total/NA
Barium	150		66	1.5	mg/Kg	10	☼	6010C	Total/NA
Cadmium	0.80	J	6.6	0.45	mg/Kg	10	☼	6010C	Total/NA
Calcium	5200		3300	89	mg/Kg	10	☼	6010C	Total/NA
Chromium	44		13	1.8	mg/Kg	10	☼	6010C	Total/NA
Cobalt	10	J	66	1.9	mg/Kg	10	☼	6010C	Total/NA
Copper	41		33	3.3	mg/Kg	10	☼	6010C	Total/NA
Iron	16000		130	26	mg/Kg	10	☼	6010C	Total/NA
Lead	120		13	1.7	mg/Kg	10	☼	6010C	Total/NA
Magnesium	5000		1300	42	mg/Kg	10	☼	6010C	Total/NA
Manganese	220		13	1.1	mg/Kg	10	☼	6010C	Total/NA
Nickel	20	J	53	1.5	mg/Kg	10	☼	6010C	Total/NA
Potassium	1100	J	6600	960	mg/Kg	10	☼	6010C	Total/NA
Sodium	150	J	1300	100	mg/Kg	10	☼	6010C	Total/NA
Vanadium	24	J	66	6.7	mg/Kg	10	☼	6010C	Total/NA
Zinc	170	B	66	7.5	mg/Kg	10	☼	6010C	Total/NA
Mercury	0.097		0.041	0.014	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: 2222-SD02 — Lab Sample ID: 160-6694-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	5000		240	51	mg/Kg	10	☼	6010C	Total/NA
Barium	41	J	60	1.3	mg/Kg	10	☼	6010C	Total/NA
Calcium	26000		3000	80	mg/Kg	10	☼	6010C	Total/NA
Chromium	26		12	1.6	mg/Kg	10	☼	6010C	Total/NA
Cobalt	8.3	J	60	1.7	mg/Kg	10	☼	6010C	Total/NA
Copper	42		30	2.9	mg/Kg	10	☼	6010C	Total/NA
Iron	12000		120	24	mg/Kg	10	☼	6010C	Total/NA
Lead	71		12	1.5	mg/Kg	10	☼	6010C	Total/NA
Magnesium	10000		1200	38	mg/Kg	10	☼	6010C	Total/NA
Manganese	150		12	0.95	mg/Kg	10	☼	6010C	Total/NA
Nickel	16	J	48	1.4	mg/Kg	10	☼	6010C	Total/NA
Potassium	1000	J	6000	860	mg/Kg	10	☼	6010C	Total/NA
Sodium	140	J	1200	91	mg/Kg	10	☼	6010C	Total/NA
Vanadium	14	J	60	6.0	mg/Kg	10	☼	6010C	Total/NA
Zinc	140	B	60	6.7	mg/Kg	10	☼	6010C	Total/NA
Mercury	0.043	J	0.050	0.017	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: 2222-SD03 — Lab Sample ID: 160-6694-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	11000		350	76	mg/Kg	10	☼	6010C	Total/NA
Antimony	5.7	J	18	5.5	mg/Kg	10	☼	6010C	Total/NA
Arsenic	5.7	J	18	4.2	mg/Kg	10	☼	6010C	Total/NA
Barium	100		89	1.9	mg/Kg	10	☼	6010C	Total/NA
Cadmium	1.2	J	8.9	0.60	mg/Kg	10	☼	6010C	Total/NA
Calcium	17000		4400	120	mg/Kg	10	☼	6010C	Total/NA
Chromium	610		18	2.4	mg/Kg	10	☼	6010C	Total/NA
Cobalt	16	J	89	2.6	mg/Kg	10	☼	6010C	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: 2222-SD03 (Continued) — Lab Sample ID: 160-6694-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Copper	140		44	4.3	mg/Kg	10	☼	6010C	Total/NA
Iron	23000		180	35	mg/Kg	10	☼	6010C	Total/NA
Lead	290		18	2.3	mg/Kg	10	☼	6010C	Total/NA
Magnesium	7900		1800	56	mg/Kg	10	☼	6010C	Total/NA
Manganese	300		18	1.4	mg/Kg	10	☼	6010C	Total/NA
Nickel	40	J	71	2.1	mg/Kg	10	☼	6010C	Total/NA
Potassium	1800	J	8900	1300	mg/Kg	10	☼	6010C	Total/NA
Sodium	180	J	1800	140	mg/Kg	10	☼	6010C	Total/NA
Vanadium	33	J	89	9.0	mg/Kg	10	☼	6010C	Total/NA
Zinc	430	B	89	10	mg/Kg	10	☼	6010C	Total/NA
Mercury	0.18		0.061	0.020	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: 2222-SD04 — Lab Sample ID: 160-6694-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	9100		690	150	mg/Kg	10	☼	6010C	Total/NA
Arsenic	26	J	35	8.2	mg/Kg	10	☼	6010C	Total/NA
Barium	100	J	170	3.8	mg/Kg	10	☼	6010C	Total/NA
Cadmium	3.5	J	17	1.2	mg/Kg	10	☼	6010C	Total/NA
Calcium	17000		8600	230	mg/Kg	10	☼	6010C	Total/NA
Chromium	70		35	4.8	mg/Kg	10	☼	6010C	Total/NA
Cobalt	19	J	170	5.0	mg/Kg	10	☼	6010C	Total/NA
Copper	210		86	8.5	mg/Kg	10	☼	6010C	Total/NA
Iron	28000		350	69	mg/Kg	10	☼	6010C	Total/NA
Lead	520		35	4.5	mg/Kg	10	☼	6010C	Total/NA
Magnesium	7000		3500	110	mg/Kg	10	☼	6010C	Total/NA
Manganese	320		35	2.8	mg/Kg	10	☼	6010C	Total/NA
Nickel	58	J	140	4.0	mg/Kg	10	☼	6010C	Total/NA
Sodium	900	J	3500	260	mg/Kg	10	☼	6010C	Total/NA
Vanadium	23	J	170	18	mg/Kg	10	☼	6010C	Total/NA
Zinc	760	B	170	19	mg/Kg	10	☼	6010C	Total/NA
Mercury	0.045	J	0.10	0.035	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: 2222-SD05 — Lab Sample ID: 160-6694-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	4200		260	55	mg/Kg	10	☼	6010C	Total/NA
Barium	16	J	65	1.4	mg/Kg	10	☼	6010C	Total/NA
Calcium	16000		3200	87	mg/Kg	10	☼	6010C	Total/NA
Chromium	18		13	1.8	mg/Kg	10	☼	6010C	Total/NA
Cobalt	9.0	J	65	1.9	mg/Kg	10	☼	6010C	Total/NA
Copper	38		32	3.2	mg/Kg	10	☼	6010C	Total/NA
Iron	15000		130	26	mg/Kg	10	☼	6010C	Total/NA
Lead	42		13	1.7	mg/Kg	10	☼	6010C	Total/NA
Magnesium	6500		1300	41	mg/Kg	10	☼	6010C	Total/NA
Manganese	130		13	1.0	mg/Kg	10	☼	6010C	Total/NA
Nickel	17	J	52	1.5	mg/Kg	10	☼	6010C	Total/NA
Sodium	110	J	1300	99	mg/Kg	10	☼	6010C	Total/NA
Vanadium	13	J	65	6.6	mg/Kg	10	☼	6010C	Total/NA
Zinc	130	B	65	7.3	mg/Kg	10	☼	6010C	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: 2222-SD05 (Continued)

Lab Sample ID: 160-6694-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury	0.11		0.038	0.013	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: 2222-SD06

Lab Sample ID: 160-6694-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	10000		310	66	mg/Kg	10	☼	6010C	Total/NA
Antimony	5.3	J	15	4.8	mg/Kg	10	☼	6010C	Total/NA
Arsenic	5.6	J	15	3.6	mg/Kg	10	☼	6010C	Total/NA
Barium	99		77	1.7	mg/Kg	10	☼	6010C	Total/NA
Cadmium	2.0	J	7.7	0.53	mg/Kg	10	☼	6010C	Total/NA
Calcium	29000		3900	100	mg/Kg	10	☼	6010C	Total/NA
Chromium	510		15	2.1	mg/Kg	10	☼	6010C	Total/NA
Cobalt	18	J	77	2.2	mg/Kg	10	☼	6010C	Total/NA
Copper	180		39	3.8	mg/Kg	10	☼	6010C	Total/NA
Iron	22000		150	31	mg/Kg	10	☼	6010C	Total/NA
Lead	390		15	2.0	mg/Kg	10	☼	6010C	Total/NA
Magnesium	8500		1500	49	mg/Kg	10	☼	6010C	Total/NA
Manganese	260		15	1.2	mg/Kg	10	☼	6010C	Total/NA
Nickel	38	J	62	1.8	mg/Kg	10	☼	6010C	Total/NA
Potassium	1600	J	7700	1100	mg/Kg	10	☼	6010C	Total/NA
Sodium	170	J	1500	120	mg/Kg	10	☼	6010C	Total/NA
Vanadium	31	J	77	7.8	mg/Kg	10	☼	6010C	Total/NA
Zinc	550	B	77	8.7	mg/Kg	10	☼	6010C	Total/NA
Mercury	0.24		0.056	0.019	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: 2222-RIN-01

Lab Sample ID: 160-6694-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Zinc	9.2	J	20	8.3	ug/L	1		6010C	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: 2222-SD01
Date Collected: 05/15/14 08:25
Date Received: 05/16/14 06:45

Lab Sample ID: 160-6694-1
Matrix: Solid
Percent Solids: 72.3

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**10000**		270	57	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10
Antimony	4.1	U	13	4.1	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10
Arsenic	**4.2**	**J**	13	3.1	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10
Barium	**150**		66	1.5	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10
Beryllium	1.0	U	6.6	1.0	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10
Cadmium	**0.80**	**J**	6.6	0.45	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10
Calcium	**5200**		3300	89	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10
Chromium	**44**		13	1.8	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10
Cobalt	**10**	**J**	66	1.9	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10
Copper	**41**		33	3.3	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10
Iron	**16000**		130	26	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10
Lead	**120**		13	1.7	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10
Magnesium	**5000**		1300	42	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10
Manganese	**220**		13	1.1	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10
Nickel	**20**	**J**	53	1.5	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10
Potassium	**1100**	**J**	6600	960	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10
Selenium	2.7	U	20	2.7	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10
Silver	0.93	U	13	0.93	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10
Sodium	**150**	**J**	1300	100	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10
Thallium	2.5	U	27	2.5	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10
Vanadium	**24**	**J**	66	6.7	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10
Zinc	**170**	**B**	66	7.5	mg/Kg	☼	05/19/14 08:37	05/22/14 15:31	10

Method: 7471B - Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.097**		0.041	0.014	mg/Kg	☼	05/27/14 10:17	05/28/14 09:35	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.320**		0.133	0.136	1.00	0.115	pCi/g	05/21/14 09:37	05/23/14 19:02	1
Thorium-230	**0.578**		0.169	0.176	1.00	0.0779	pCi/g	05/21/14 09:37	05/23/14 19:02	1
Thorium-232	**0.333**		0.127	0.130	1.00	0.0545	pCi/g	05/21/14 09:37	05/23/14 19:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*78.2*		*30 - 110*	*05/21/14 09:37*	*05/23/14 19:02*	*1*

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.585**		0.199	0.205	1.00	0.111	pCi/g	05/21/14 09:37	05/23/14 18:57	1
Uranium-235/236	0.0165	U	0.0413	0.0413	1.00	0.0924	pCi/g	05/21/14 09:37	05/23/14 18:57	1
Uranium-238	**0.352**		0.153	0.156	1.00	0.0846	pCi/g	05/21/14 09:37	05/23/14 18:57	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*60.1*		*30 - 110*	*05/21/14 09:37*	*05/23/14 18:57*	*1*

Client Sample ID: 2222-SD01 — Lab Sample ID: 160-6694-1

Date Collected: 05/15/14 08:25 — **Matrix: Solid**
Date Received: 05/16/14 06:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.780	U	1.07	1.08	1.00	1.87	pCi/g	05/21/14 11:19	05/21/14 12:22	1
Radium-228	**0.628**		0.189	0.199		0.322	pCi/g	05/21/14 11:19	05/21/14 12:22	1
Lead-210	0.877	U	1.34	1.35		2.40	pCi/g	05/21/14 11:19	05/21/14 12:22	1
Lead-212	**0.586**		0.159	0.176		0.161	pCi/g	05/21/14 11:19	05/21/14 12:22	1
Lead-214	**0.451**		0.143	0.150		0.174	pCi/g	05/21/14 11:19	05/21/14 12:22	1

Client Sample ID: 2222-SD02 — Lab Sample ID: 160-6694-2

Date Collected: 05/15/14 09:45 — **Matrix: Solid**
Date Received: 05/16/14 06:45 — **Percent Solids: 71.9**

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**5000**		240	51	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10
Antimony	3.7	U	12	3.7	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10
Arsenic	2.8	U	12	2.8	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10
Barium	**41**	**J**	60	1.3	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10
Beryllium	0.89	U	6.0	0.89	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10
Cadmium	0.40	U	6.0	0.40	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10
Calcium	**26000**		3000	80	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10
Chromium	**26**		12	1.6	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10
Cobalt	**8.3**	**J**	60	1.7	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10
Copper	**42**		30	2.9	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10
Iron	**12000**		120	24	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10
Lead	**71**		12	1.5	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10
Magnesium	**10000**		1200	38	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10
Manganese	**150**		12	0.95	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10
Nickel	**16**	**J**	48	1.4	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10
Potassium	**1000**	**J**	6000	860	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10
Selenium	2.5	U	18	2.5	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10
Silver	0.83	U	12	0.83	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10
Sodium	**140**	**J**	1200	91	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10
Thallium	2.3	U	24	2.3	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10
Vanadium	**14**	**J**	60	6.0	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10
Zinc	**140**	**B**	60	6.7	mg/Kg	☼	05/19/14 08:37	05/22/14 15:54	10

Method: 7471B - Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.043**	**J**	0.050	0.017	mg/Kg	☼	05/27/14 10:17	05/28/14 09:37	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.314**		0.123	0.126	1.00	0.0840	pCi/g	05/21/14 09:37	05/23/14 19:02	1
Thorium-230	**0.417**		0.139	0.143	1.00	0.0593	pCi/g	05/21/14 09:37	05/23/14 19:02	1
Thorium-232	**0.321**		0.123	0.125	1.00	0.0693	pCi/g	05/21/14 09:37	05/23/14 19:02	1

Client Sample ID: 2222-SD02 — Lab Sample ID: 160-6694-2

Date Collected: 05/15/14 09:45 — **Matrix: Solid**
Date Received: 05/16/14 06:45

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	83.0		30 - 110	05/21/14 09:37	05/23/14 19:02	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.369**		0.131	0.134	1.00	0.0647	pCi/g	05/21/14 09:37	05/23/14 18:57	1
Uranium-235/236	0.0230	U	0.0407	0.0408	1.00	0.0735	pCi/g	05/21/14 09:37	05/23/14 18:57	1
Uranium-238	**0.459**		0.145	0.151	1.00	0.0645	pCi/g	05/21/14 09:37	05/23/14 18:57	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	81.5		30 - 110	05/21/14 09:37	05/23/14 18:57	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.231	U	0.799	0.800	1.00	1.44	pCi/g	05/21/14 11:19	05/21/14 14:32	1
Radium-228	**0.647**		0.160	0.173		0.208	pCi/g	05/21/14 11:19	05/21/14 14:32	1
Lead-210	-0.270	U	1.54	1.54		1.95	pCi/g	05/21/14 11:19	05/21/14 14:32	1
Lead-212	**0.472**		0.110	0.126		0.119	pCi/g	05/21/14 11:19	05/21/14 14:32	1
Lead-214	**0.450**		0.116	0.125		0.119	pCi/g	05/21/14 11:19	05/21/14 14:32	1

Client Sample ID: 2222-SD03 — Lab Sample ID: 160-6694-3

Date Collected: 05/15/14 08:50 — **Matrix: Solid**
Date Received: 05/16/14 06:45 — **Percent Solids: 52.4**

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**11000**		350	76	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10
Antimony	**5.7**	**J**	18	5.5	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10
Arsenic	**5.7**	**J**	18	4.2	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10
Barium	**100**		89	1.9	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10
Beryllium	1.3	U	8.9	1.3	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10
Cadmium	**1.2**	**J**	8.9	0.60	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10
Calcium	**17000**		4400	120	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10
Chromium	**610**		18	2.4	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10
Cobalt	**16**	**J**	89	2.6	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10
Copper	**140**		44	4.3	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10
Iron	**23000**		180	35	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10
Lead	**290**		18	2.3	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10
Magnesium	**7900**		1800	56	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10
Manganese	**300**		18	1.4	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10
Nickel	**40**	**J**	71	2.1	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10
Potassium	**1800**	**J**	8900	1300	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10
Selenium	3.7	U	27	3.7	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10
Silver	1.2	U	18	1.2	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10
Sodium	**180**	**J**	1800	140	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10
Thallium	3.4	U	35	3.4	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10
Vanadium	**33**	**J**	89	9.0	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10
Zinc	**430**	**B**	89	10	mg/Kg	☼	05/19/14 08:37	05/22/14 15:58	10

Client Sample ID: 2222-SD03 — Lab Sample ID: 160-6694-3

Date Collected: 05/15/14 08:50 — **Matrix: Solid**
Date Received: 05/16/14 06:45 — **Percent Solids: 52.4**

Method: 7471B - Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.18**		0.061	0.020	mg/Kg	☼	05/27/14 10:17	05/28/14 09:39	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**1.07**		0.235	0.251	1.00	0.0898	pCi/g	05/21/14 09:37	05/23/14 19:02	1
Thorium-230	**0.745**		0.194	0.204	1.00	0.0379	pCi/g	05/21/14 09:37	05/23/14 19:02	1
Thorium-232	**0.604**		0.174	0.181	1.00	0.0377	pCi/g	05/21/14 09:37	05/23/14 19:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*72.2*		*30 - 110*	*05/21/14 09:37*	*05/23/14 19:02*	*1*

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.666**		0.172	0.181	1.00	0.0706	pCi/g	05/21/14 09:37	05/23/14 18:57	1
Uranium-235/236	0.0110	U	0.0276	0.0276	1.00	0.0618	pCi/g	05/21/14 09:37	05/23/14 18:57	1
Uranium-238	**0.591**		0.162	0.169	1.00	0.0665	pCi/g	05/21/14 09:37	05/23/14 18:57	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*88.0*		*30 - 110*	*05/21/14 09:37*	*05/23/14 18:57*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**2.86**		2.01	2.07	1.00	2.56	pCi/g	05/21/14 11:19	05/21/14 14:26	1
Radium-228	**0.913**		0.302	0.316		0.507	pCi/g	05/21/14 11:19	05/21/14 14:26	1
Lead-210	**4.29**		2.24	2.29		3.09	pCi/g	05/21/14 11:19	05/21/14 14:26	1
Lead-212	**0.619**		0.197	0.213		0.219	pCi/g	05/21/14 11:19	05/21/14 14:26	1
Lead-214	**0.754**		0.184	0.200		0.163	pCi/g	05/21/14 11:19	05/21/14 14:26	1

Client Sample ID: 2222-SD04 — Lab Sample ID: 160-6694-4

Date Collected: 05/15/14 09:05 — **Matrix: Solid**
Date Received: 05/16/14 06:45 — **Percent Solids: 28.6**

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**9100**		690	150	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10
Antimony	11	U	35	11	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10
Arsenic	**26**	**J**	35	8.2	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10
Barium	**100**	**J**	170	3.8	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10
Beryllium	2.6	U	17	2.6	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10
Cadmium	**3.5**	**J**	17	1.2	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10
Calcium	**17000**		8600	230	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10
Chromium	**70**		35	4.8	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10
Cobalt	**19**	**J**	170	5.0	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10
Copper	**210**		86	8.5	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10
Iron	**28000**		350	69	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10

Client Sample ID: 2222-SD04 **Lab Sample ID: 160-6694-4**
Date Collected: 05/15/14 09:05 **Matrix: Solid**
Date Received: 05/16/14 06:45 **Percent Solids: 28.6**

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	520		35	4.5	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10
Magnesium	7000		3500	110	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10
Manganese	320		35	2.8	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10
Nickel	58	J	140	4.0	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10
Potassium	2500	U	17000	2500	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10
Selenium	7.1	U	52	7.1	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10
Silver	2.4	U	35	2.4	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10
Sodium	900	J	3500	260	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10
Thallium	6.6	U	69	6.6	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10
Vanadium	23	J	170	18	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10
Zinc	760	B	170	19	mg/Kg	☼	05/19/14 08:37	05/22/14 16:02	10

Method: 7471B - Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.045	J	0.10	0.035	mg/Kg	☼	05/27/14 10:17	05/28/14 09:41	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.561		0.165	0.172	1.00	0.103	pCi/g	05/21/14 09:37	05/23/14 19:02	1
Thorium-230	0.695		0.178	0.188	1.00	0.0520	pCi/g	05/21/14 09:37	05/23/14 19:02	1
Thorium-232	0.445		0.143	0.148	1.00	0.0562	pCi/g	05/21/14 09:37	05/23/14 19:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.6*		*30 - 110*	*05/21/14 09:37*	*05/23/14 19:02*	*1*

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	1.15		0.234	0.253	1.00	0.0672	pCi/g	05/21/14 09:37	05/23/14 18:57	1
Uranium-235/236	0.0854		0.0722	0.0726	1.00	0.0669	pCi/g	05/21/14 09:37	05/23/14 18:57	1
Uranium-238	1.08		0.226	0.244	1.00	0.0537	pCi/g	05/21/14 09:37	05/23/14 18:57	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*83.5*		*30 - 110*	*05/21/14 09:37*	*05/23/14 18:57*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	4.76		1.85	2.02	1.00	1.96	pCi/g	05/21/14 11:19	05/21/14 14:27	1
Radium-228	0.763		0.243	0.255		0.369	pCi/g	05/21/14 11:19	05/21/14 14:27	1
Lead-210	4.05		2.62	2.67		3.95	pCi/g	05/21/14 11:19	05/21/14 14:27	1
Lead-212	0.767		0.169	0.196		0.195	pCi/g	05/21/14 11:19	05/21/14 14:27	1
Lead-214	0.690		0.186	0.200		0.213	pCi/g	05/21/14 11:19	05/21/14 14:27	1

Client Sample ID: 2222-SD05
Date Collected: 05/15/14 09:15
Date Received: 05/16/14 06:45

Lab Sample ID: 160-6694-5
Matrix: Solid
Percent Solids: 76.9

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**4200**		260	55	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10
Antimony	4.0	U	13	4.0	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10
Arsenic	3.1	U	13	3.1	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10
Barium	**16**	**J**	65	1.4	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10
Beryllium	0.97	U	6.5	0.97	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10
Cadmium	0.44	U	6.5	0.44	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10
Calcium	**16000**		3200	87	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10
Chromium	**18**		13	1.8	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10
Cobalt	**9.0**	**J**	65	1.9	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10
Copper	**38**		32	3.2	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10
Iron	**15000**		130	26	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10
Lead	**42**		13	1.7	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10
Magnesium	**6500**		1300	41	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10
Manganese	**130**		13	1.0	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10
Nickel	**17**	**J**	52	1.5	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10
Potassium	940	U	6500	940	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10
Selenium	2.7	U	19	2.7	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10
Silver	0.91	U	13	0.91	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10
Sodium	**110**	**J**	1300	99	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10
Thallium	2.5	U	26	2.5	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10
Vanadium	**13**	**J**	65	6.6	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10
Zinc	**130**	**B**	65	7.3	mg/Kg	☼	05/19/14 08:37	05/22/14 16:06	10

Method: 7471B - Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.11**		0.038	0.013	mg/Kg	☼	05/27/14 10:17	05/28/14 09:43	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.296**		0.117	0.120	1.00	0.0829	pCi/g	05/21/14 09:37	05/23/14 19:02	1
Thorium-230	**0.296**		0.115	0.118	1.00	0.0662	pCi/g	05/21/14 09:37	05/23/14 19:02	1
Thorium-232	**0.282**		0.111	0.113	1.00	0.0523	pCi/g	05/21/14 09:37	05/23/14 19:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.9*		*30 - 110*	*05/21/14 09:37*	*05/23/14 19:02*	*1*

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.289**		0.120	0.122	1.00	0.0831	pCi/g	05/21/14 09:37	05/23/14 18:57	1
Uranium-235/236	-0.00545	U	0.00771	0.00773	1.00	0.0756	pCi/g	05/21/14 09:37	05/23/14 18:57	1
Uranium-238	**0.243**		0.107	0.109	1.00	0.0531	pCi/g	05/21/14 09:37	05/23/14 18:57	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*85.0*		*30 - 110*	*05/21/14 09:37*	*05/23/14 18:57*	*1*

Client Sample ID: 2222-SD05

Lab Sample ID: 160-6694-5

Date Collected: 05/15/14 09:15

Matrix: Solid

Date Received: 05/16/14 06:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.109	U	1.08	1.09	1.00	2.00	pCi/g	05/21/14 11:19	05/21/14 15:46	1
Radium-228	**0.554**		0.221	0.229		0.176	pCi/g	05/21/14 11:19	05/21/14 15:46	1
Lead-210	1.53	U	1.41	1.43		2.16	pCi/g	05/21/14 11:19	05/21/14 15:46	1
Lead-212	**0.450**		0.121	0.134		0.121	pCi/g	05/21/14 11:19	05/21/14 15:46	1
Lead-214	**0.353**		0.107	0.113		0.166	pCi/g	05/21/14 11:19	05/21/14 15:46	1

Client Sample ID: 2222-SD06

Lab Sample ID: 160-6694-6

Date Collected: 05/15/14 08:45

Matrix: Solid

Date Received: 05/16/14 06:45

Percent Solids: 54.9

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**10000**		310	66	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10
Antimony	**5.3**	**J**	15	4.8	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10
Arsenic	**5.6**	**J**	15	3.6	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10
Barium	**99**		77	1.7	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10
Beryllium	1.2	U	7.7	1.2	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10
Cadmium	**2.0**	**J**	7.7	0.53	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10
Calcium	**29000**		3900	100	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10
Chromium	**510**		15	2.1	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10
Cobalt	**18**	**J**	77	2.2	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10
Copper	**180**		39	3.8	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10
Iron	**22000**		150	31	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10
Lead	**390**		15	2.0	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10
Magnesium	**8500**		1500	49	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10
Manganese	**260**		15	1.2	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10
Nickel	**38**	**J**	62	1.8	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10
Potassium	**1600**	**J**	7700	1100	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10
Selenium	3.2	U	23	3.2	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10
Silver	1.1	U	15	1.1	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10
Sodium	**170**	**J**	1500	120	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10
Thallium	2.9	U	31	2.9	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10
Vanadium	**31**	**J**	77	7.8	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10
Zinc	**550**	**B**	77	8.7	mg/Kg	☼	05/19/14 08:37	05/22/14 16:10	10

Method: 7471B - Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.24**		0.056	0.019	mg/Kg	☼	05/27/14 10:17	05/28/14 09:45	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.520**		0.157	0.163	1.00	0.0666	pCi/g	05/21/14 09:37	05/23/14 19:02	1
Thorium-230	**0.548**		0.161	0.167	1.00	0.0533	pCi/g	05/21/14 09:37	05/23/14 19:02	1
Thorium-232	**0.586**		0.166	0.173	1.00	0.0530	pCi/g	05/21/14 09:37	05/23/14 19:02	1

Client Sample ID: 2222-SD06 — Lab Sample ID: 160-6694-6

Date Collected: 05/15/14 08:45 — **Matrix: Solid**
Date Received: 05/16/14 06:45

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	81.1		30 - 110	05/21/14 09:37	05/23/14 19:02	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.859**		0.198	0.211	1.00	0.0796	pCi/g	05/21/14 09:37	05/23/14 18:57	1
Uranium-235/236	-0.00784	U	0.00906	0.00908	1.00	0.0793	pCi/g	05/21/14 09:37	05/23/14 18:57	1
Uranium-238	**0.588**		0.163	0.170	1.00	0.0581	pCi/g	05/21/14 09:37	05/23/14 18:57	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	87.3		30 - 110	05/21/14 09:37	05/23/14 18:57	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**2.93**		1.63	1.71	1.00	1.92	pCi/g	05/21/14 11:19	05/21/14 15:45	1
Radium-228	**0.608**		0.220	0.229		0.434	pCi/g	05/21/14 11:19	05/21/14 15:45	1
Lead-210	**3.67**		1.60	1.66		2.17	pCi/g	05/21/14 11:19	05/21/14 15:45	1
Lead-212	**0.811**		0.204	0.229		0.194	pCi/g	05/21/14 11:19	05/21/14 15:45	1
Lead-214	**0.664**		0.159	0.174		0.155	pCi/g	05/21/14 11:19	05/21/14 15:45	1

Client Sample ID: 2222-RIN-01 — Lab Sample ID: 160-6694-7

Date Collected: 05/15/14 08:10 — **Matrix: Water**
Date Received: 05/16/14 06:45

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	22	U	200	22	ug/L		05/19/14 10:57	05/22/14 13:15	1
Antimony	3.7	U	10	3.7	ug/L		05/19/14 10:57	05/22/14 13:15	1
Arsenic	1.8	U	10	1.8	ug/L		05/19/14 10:57	05/22/14 13:15	1
Barium	2.1	U	50	2.1	ug/L		05/19/14 10:57	05/22/14 13:15	1
Beryllium	0.28	U	5.0	0.28	ug/L		05/19/14 10:57	05/22/14 13:15	1
Cadmium	0.34	U	5.0	0.34	ug/L		05/19/14 10:57	05/22/14 13:15	1
Calcium	54	U	1000	54	ug/L		05/19/14 10:57	05/22/14 13:15	1
Chromium	3.4	U	10	3.4	ug/L		05/19/14 10:57	05/22/14 13:15	1
Cobalt	2.7	U	50	2.7	ug/L		05/19/14 10:57	05/22/14 13:15	1
Copper	2.1	U	25	2.1	ug/L		05/19/14 10:57	05/22/14 13:15	1
Iron	13	U	100	13	ug/L		05/19/14 10:57	05/22/14 13:15	1
Lead	0.60	U	10	0.60	ug/L		05/19/14 10:57	05/22/14 13:15	1
Magnesium	51	U	1000	51	ug/L		05/19/14 10:57	05/22/14 13:15	1
Manganese	1.0	U	15	1.0	ug/L		05/19/14 10:57	05/22/14 13:15	1
Nickel	2.6	U	40	2.6	ug/L		05/19/14 10:57	05/22/14 13:15	1
Potassium	460	U	5000	460	ug/L		05/19/14 10:57	05/22/14 13:15	1
Selenium	2.1	U	15	2.1	ug/L		05/19/14 10:57	05/22/14 13:15	1
Silver	0.99	U	10	0.99	ug/L		05/19/14 10:57	05/22/14 13:15	1
Sodium	110	U	1000	110	ug/L		05/19/14 10:57	05/22/14 13:15	1
Thallium	2.4	U	20	2.4	ug/L		05/19/14 10:57	05/22/14 13:15	1
Vanadium	4.4	U	50	4.4	ug/L		05/19/14 10:57	05/22/14 13:15	1
Zinc	**9.2**	**J**	20	8.3	ug/L		05/19/14 10:57	05/22/14 13:15	1

Client Sample ID: 2222-RIN-01
Date Collected: 05/15/14 08:10
Date Received: 05/16/14 06:45

Lab Sample ID: 160-6694-7
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.060	U	0.20	0.060	ug/L		05/22/14 07:51	05/27/14 10:12	1

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.0991	U	0.130	0.130	1.00	0.217	pCi/L	05/19/14 13:41	05/21/14 16:16	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*91.4*		*40 - 110*	*05/19/14 13:41*	*05/21/14 16:16*	*1*

Method: 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0584	U	0.181	0.181	1.00	0.314	pCi/L	05/19/14 13:43	05/23/14 09:50	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*98.2*		*40 - 110*	*05/19/14 13:43*	*05/23/14 09:50*	*1*
Y Carrier	*88.2*		*40 - 110*	*05/19/14 13:43*	*05/23/14 09:50*	*1*

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.0369	U	0.0789	0.0789	1.00	0.156	pCi/L	05/20/14 13:36	05/21/14 19:04	1
Thorium-230	**0.132**		0.108	0.108	1.00	0.0717	pCi/L	05/20/14 13:36	05/21/14 19:04	1
Thorium-232	-0.00817	U	0.0116	0.0116	1.00	0.113	pCi/L	05/20/14 13:36	05/21/14 19:04	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.0*		*30 - 110*	*05/20/14 13:36*	*05/21/14 19:04*	*1*

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.147**		0.118	0.118	1.00	0.115	pCi/L	05/20/14 13:36	05/21/14 17:20	1
Uranium-235/236	0.0275	U	0.0551	0.0551	1.00	0.0826	pCi/L	05/20/14 13:36	05/21/14 17:20	1
Uranium-238	0.0842	U	0.0887	0.0890	1.00	0.101	pCi/L	05/20/14 13:36	05/21/14 17:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*88.0*		*30 - 110*	*05/20/14 13:36*	*05/21/14 17:20*	*1*

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-1.19	U	7.49	7.49	20.0	13.4	pCi/L	05/19/14 12:24	05/20/14 13:46	1

Default Detection Limits

Client: Weston Solutions, Inc.
Project/Site: EPA Region 5 START 3 Contract

TestAmerica Job ID: 160-6694-1

Method: 6010C - Metals (ICP)

Analyte	RL	MDL	Units	Method
Aluminum	20	4.3	mg/Kg	6010C
Aluminum	200	22	ug/L	6010C
Antimony	1.0	0.31	mg/Kg	6010C
Antimony	10	3.7	ug/L	6010C
Arsenic	1.0	0.24	mg/Kg	6010C
Arsenic	10	1.8	ug/L	6010C
Barium	5.0	0.11	mg/Kg	6010C
Barium	50	2.1	ug/L	6010C
Beryllium	0.50	0.075	mg/Kg	6010C
Beryllium	5.0	0.28	ug/L	6010C
Cadmium	0.50	0.034	mg/Kg	6010C
Cadmium	5.0	0.34	ug/L	6010C
Calcium	250	6.7	mg/Kg	6010C
Calcium	1000	54	ug/L	6010C
Chromium	1.0	0.14	mg/Kg	6010C
Chromium	10	3.4	ug/L	6010C
Cobalt	5.0	0.14	mg/Kg	6010C
Cobalt	50	2.7	ug/L	6010C
Copper	2.5	0.25	mg/Kg	6010C
Copper	25	2.1	ug/L	6010C
Iron	10	2.0	mg/Kg	6010C
Iron	100	13	ug/L	6010C
Lead	1.0	0.13	mg/Kg	6010C
Lead	10	0.60	ug/L	6010C
Magnesium	100	3.2	mg/Kg	6010C
Magnesium	1000	51	ug/L	6010C
Manganese	1.0	0.080	mg/Kg	6010C
Manganese	15	1.0	ug/L	6010C
Nickel	4.0	0.12	mg/Kg	6010C
Nickel	40	2.6	ug/L	6010C
Potassium	500	72	mg/Kg	6010C
Potassium	5000	460	ug/L	6010C
Selenium	1.5	0.21	mg/Kg	6010C
Selenium	15	2.1	ug/L	6010C
Silver	1.0	0.070	mg/Kg	6010C
Silver	10	0.99	ug/L	6010C
Sodium	100	7.6	mg/Kg	6010C
Sodium	1000	110	ug/L	6010C
Thallium	2.0	0.19	mg/Kg	6010C
Thallium	20	2.4	ug/L	6010C
Vanadium	5.0	0.51	mg/Kg	6010C
Vanadium	50	4.4	ug/L	6010C
Zinc	5.0	0.56	mg/Kg	6010C
Zinc	20	8.3	ug/L	6010C

Method: 7470A - Mercury (CVAA)

Analyte	RL	MDL	Units	Method
Mercury	0.20	0.060	ug/L	7470A

Method: 7471B - Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Default Detection Limits

Client: Weston Solutions, Inc.
Project/Site: EPA Region 5 START 3 Contract

TestAmerica Job ID: 160-6694-1

Method: 7471B - Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Analyte	RL	MDL	Units	Method
Mercury	0.033	0.011	mg/Kg	7471B

Tracer/Carrier Summary

Client: Weston Solutions, Inc.
Project/Site: EPA Region 5 START 3 Contract

TestAmerica Job ID: 160-6694-1

Method: 9315 - Total Apha Radium (GFPC)

Matrix: Water — **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
		Ba
Lab Sample ID	Client Sample ID	(40-110)
160-6694-7	2222-RIN-01	91.4
LCS 160-122912/2-A	Lab Control Sample	85.8
LCSD 160-122912/3-A	Lab Control Sample Dup	92.6
MB 160-122912/1-A	Method Blank	86.1

Tracer/Carrier Legend

Ba = Ba Carrier

Method: 9320 - Radium-228 (GFPC)

Matrix: Water — **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)	
		Ba	Y
Lab Sample ID	Client Sample ID	(40-110)	(40-110)
160-6694-7	2222-RIN-01	98.2	88.2
LCS 160-122913/2-A	Lab Control Sample	108	87.5
LCSD 160-122913/3-A	Lab Control Sample Dup	104	90.5
MB 160-122913/1-A	Method Blank	114 X	86.7

Tracer/Carrier Legend

Ba = Ba Carrier

Y = Y Carrier

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

Matrix: Solid — **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
		Th-229
Lab Sample ID	Client Sample ID	(30-110)
160-6694-1	2222-SD01	78.2
160-6694-2	2222-SD02	83.0
160-6694-3	2222-SD03	72.2
160-6694-4	2222-SD04	83.6
160-6694-5	2222-SD05	87.9
160-6694-6	2222-SD06	81.1
LCS 160-123276/2-A	Lab Control Sample	93.1
MB 160-123276/1-A	Method Blank	95.4

Tracer/Carrier Legend

Th-229 = Thorium-229

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

Matrix: Water — **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
		Th-229
Lab Sample ID	Client Sample ID	(30-110)
160-6694-7	2222-RIN-01	89.0
LCS 160-123197/2-A	Lab Control Sample	84.0
MB 160-123197/1-A	Method Blank	81.9

Tracer/Carrier Legend

Th-229 = Thorium-229

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

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
		U-232
Lab Sample ID	Client Sample ID	(30-110)
160-6694-1	2222-SD01	60.1
160-6694-2	2222-SD02	81.5
160-6694-3	2222-SD03	88.0
160-6694-4	2222-SD04	83.5
160-6694-5	2222-SD05	85.0
160-6694-6	2222-SD06	87.3
LCS 160-123278/2-A	Lab Control Sample	88.4
MB 160-123278/1-A	Method Blank	84.3

Tracer/Carrier Legend

U-232 = Uranium-232

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

Matrix: Water **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
		U-232
Lab Sample ID	Client Sample ID	(30-110)
160-6694-7	2222-RIN-01	88.0
LCS 160-123200/2-A	Lab Control Sample	79.8
MB 160-123200/1-A	Method Blank	89.8

Tracer/Carrier Legend

U-232 = Uranium-232

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 160-122752/1-A
Matrix: Solid
Analysis Batch: 123642

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 122752

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	3.8	U	18	3.8	mg/Kg		05/19/14 08:37	05/22/14 15:24	1
Antimony	0.27	U	0.88	0.27	mg/Kg		05/19/14 08:37	05/22/14 15:24	1
Arsenic	0.21	U	0.88	0.21	mg/Kg		05/19/14 08:37	05/22/14 15:24	1
Barium	0.097	U	4.4	0.097	mg/Kg		05/19/14 08:37	05/22/14 15:24	1
Beryllium	0.066	U	0.44	0.066	mg/Kg		05/19/14 08:37	05/22/14 15:24	1
Cadmium	0.030	U	0.44	0.030	mg/Kg		05/19/14 08:37	05/22/14 15:24	1
Calcium	5.9	U	220	5.9	mg/Kg		05/19/14 08:37	05/22/14 15:24	1
Chromium	0.12	U	0.88	0.12	mg/Kg		05/19/14 08:37	05/22/14 15:24	1
Cobalt	0.13	U	4.4	0.13	mg/Kg		05/19/14 08:37	05/22/14 15:24	1
Copper	0.22	U	2.2	0.22	mg/Kg		05/19/14 08:37	05/22/14 15:24	1
Iron	1.8	U	8.8	1.8	mg/Kg		05/19/14 08:37	05/22/14 15:24	1
Lead	0.11	U	0.88	0.11	mg/Kg		05/19/14 08:37	05/22/14 15:24	1
Magnesium	2.8	U	88	2.8	mg/Kg		05/19/14 08:37	05/22/14 15:24	1
Manganese	0.071	U	0.88	0.071	mg/Kg		05/19/14 08:37	05/22/14 15:24	1
Nickel	0.10	U	3.5	0.10	mg/Kg		05/19/14 08:37	05/22/14 15:24	1
Potassium	64	U	440	64	mg/Kg		05/19/14 08:37	05/22/14 15:24	1
Selenium	0.18	U	1.3	0.18	mg/Kg		05/19/14 08:37	05/22/14 15:24	1
Silver	0.062	U	0.88	0.062	mg/Kg		05/19/14 08:37	05/22/14 15:24	1
Sodium	6.7	U	88	6.7	mg/Kg		05/19/14 08:37	05/22/14 15:24	1
Thallium	0.17	U	1.8	0.17	mg/Kg		05/19/14 08:37	05/22/14 15:24	1
Vanadium	0.45	U	4.4	0.45	mg/Kg		05/19/14 08:37	05/22/14 15:24	1
Zinc	1.49	J	4.4	0.50	mg/Kg		05/19/14 08:37	05/22/14 15:24	1

Lab Sample ID: LCSSRM 160-122752/2-A
Matrix: Solid
Analysis Batch: 123642

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 122752

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	9390	6720		mg/Kg		71.6	43.5 - 156.5
Antimony	129	80.3		mg/Kg		62.2	22.4 - 249.6
Arsenic	88.4	87.7		mg/Kg		99.3	69.0 - 131.2
Barium	210	190		mg/Kg		90.7	73.3 - 126.7
Beryllium	55.8	54.0		mg/Kg		96.8	73.1 - 127.1
Cadmium	142	148		mg/Kg		104.3	73.2 - 128.2
Calcium	7530	8030		mg/Kg		106.6	74.6 - 125.4
Chromium	86.8	90.8		mg/Kg		104.6	69.1 - 131.3
Cobalt	199	217		mg/Kg		109.1	74.4 - 125.6
Copper	268	271		mg/Kg		101.2	76.1 - 123.9
Iron	12800	10400		mg/Kg		81.4	31.6 - 168.0

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCSSRM 160-122752/2-A
Matrix: Solid
Analysis Batch: 123642

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 122752

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	97.9	104		mg/Kg		105.9	70.8 - 128.7
Magnesium	2850	2480		mg/Kg		86.9	65.3 - 134.7
Manganese	425	413		mg/Kg		97.1	76.2 - 123.5
Nickel	236	256		mg/Kg		108.7	74.2 - 128.0
Potassium	2570	2110		mg/Kg		82.2	61.1 - 138.9
Selenium	127	126		mg/Kg		99.4	66.6 - 133.9
Silver	66.2	65.3		mg/Kg		98.6	67.1 - 132.9
Sodium	1040	965		mg/Kg		92.8	60.4 - 139.4
Thallium	140	162		mg/Kg		115.9	68.3 - 132.1
Vanadium	156	145		mg/Kg		92.7	71.8 - 129.5
Zinc	130	130		mg/Kg		99.9	66.9 - 133.1

Lab Sample ID: 160-6694-1 MS
Matrix: Solid
Analysis Batch: 123642

Client Sample ID: 2222-SD01
Prep Type: Total/NA
Prep Batch: 122752

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	10000		1200	13800	4	mg/Kg	☼	299	75 - 125
Antimony	4.1	U	60.0	36.2	F1	mg/Kg	☼	60	75 - 125
Arsenic	4.2	J	120	127		mg/Kg	☼	103	75 - 125
Barium	150		120	236	F1	mg/Kg	☼	71	75 - 125
Beryllium	1.0	U	120	122		mg/Kg	☼	101	75 - 125
Cadmium	0.80	J	120	131		mg/Kg	☼	108	75 - 125
Calcium	5200		1200	6280	4	mg/Kg	☼	90	75 - 125
Chromium	44		120	169		mg/Kg	☼	104	75 - 125
Cobalt	10	J	120	146		mg/Kg	☼	113	75 - 125
Copper	41		120	169		mg/Kg	☼	106	75 - 125
Iron	16000		1200	17000	4	mg/Kg	☼	54	75 - 125
Lead	120		120	234		mg/Kg	☼	92	75 - 125
Magnesium	5000		1200	5850	4	mg/Kg	☼	69	75 - 125
Manganese	220		120	327		mg/Kg	☼	93	75 - 125
Nickel	20	J	120	157		mg/Kg	☼	114	75 - 125
Potassium	1100	J	1200	2450	J	mg/Kg	☼	114	75 - 125
Selenium	2.7	U	60.0	60.6		mg/Kg	☼	101	75 - 125
Silver	0.93	U	24.0	25.9		mg/Kg	☼	108	75 - 125
Sodium	150	J	1200	1380		mg/Kg	☼	102	75 - 125
Thallium	2.5	U	24.0	27.7		mg/Kg	☼	116	75 - 125
Vanadium	24	J	120	154		mg/Kg	☼	109	75 - 125
Zinc	170	B	120	267		mg/Kg	☼	80	75 - 125

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: 160-6694-1 MSD
Matrix: Solid
Analysis Batch: 123642

Client Sample ID: 2222-SD01
Prep Type: Total/NA
Prep Batch: 122752

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	10000		1360	15500	4	mg/Kg	☼	388	75 - 125	12	30
Antimony	4.1	U	68.2	41.1	F1	mg/Kg	☼	60	75 - 125	12	30
Arsenic	4.2	J	136	149		mg/Kg	☼	106	75 - 125	15	30
Barium	150		136	268		mg/Kg	☼	86	75 - 125	13	30
Beryllium	1.0	U	136	141		mg/Kg	☼	103	75 - 125	15	30
Cadmium	0.80	J	136	149		mg/Kg	☼	108	75 - 125	13	30
Calcium	5200		1360	4860	F1	mg/Kg	☼	-25	75 - 125	25	30
Chromium	44		136	184		mg/Kg	☼	103	75 - 125	8	30
Cobalt	10	J	136	164		mg/Kg	☼	112	75 - 125	11	30
Copper	41		136	184		mg/Kg	☼	105	75 - 125	9	30
Iron	16000		1360	17000	4	mg/Kg	☼	44	75 - 125	0	30
Lead	120		136	245		mg/Kg	☼	88	75 - 125	4	30
Magnesium	5000		1360	5780	F1	mg/Kg	☼	56	75 - 125	1	30
Manganese	220		136	325		mg/Kg	☼	81	75 - 125	1	30
Nickel	20	J	136	177		mg/Kg	☼	115	75 - 125	12	30
Potassium	1100	J	1360	2650	J	mg/Kg	☼	116	75 - 125	8	30
Selenium	2.7	U	68.2	72.4		mg/Kg	☼	106	75 - 125	18	30
Silver	0.93	U	27.3	28.8		mg/Kg	☼	106	75 - 125	10	30
Sodium	150	J	1360	1570		mg/Kg	☼	104	75 - 125	13	30
Thallium	2.5	U	27.3	32.6		mg/Kg	☼	120	75 - 125	16	30
Vanadium	24	J	136	173		mg/Kg	☼	110	75 - 125	12	30
Zinc	170	B	136	278		mg/Kg	☼	78	75 - 125	4	30

Lab Sample ID: MB 160-122863/1-A
Matrix: Water
Analysis Batch: 123642

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 122863

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	22	U	200	22	ug/L		05/19/14 10:57	05/22/14 12:45	1
Antimony	3.7	U	10	3.7	ug/L		05/19/14 10:57	05/22/14 12:45	1
Arsenic	1.8	U	10	1.8	ug/L		05/19/14 10:57	05/22/14 12:45	1
Barium	2.1	U	50	2.1	ug/L		05/19/14 10:57	05/22/14 12:45	1
Beryllium	0.28	U	5.0	0.28	ug/L		05/19/14 10:57	05/22/14 12:45	1
Cadmium	0.34	U	5.0	0.34	ug/L		05/19/14 10:57	05/22/14 12:45	1
Calcium	54	U	1000	54	ug/L		05/19/14 10:57	05/22/14 12:45	1
Chromium	3.4	U	10	3.4	ug/L		05/19/14 10:57	05/22/14 12:45	1
Cobalt	2.7	U	50	2.7	ug/L		05/19/14 10:57	05/22/14 12:45	1
Copper	2.1	U	25	2.1	ug/L		05/19/14 10:57	05/22/14 12:45	1
Iron	13	U	100	13	ug/L		05/19/14 10:57	05/22/14 12:45	1
Lead	0.60	U	10	0.60	ug/L		05/19/14 10:57	05/22/14 12:45	1
Magnesium	51	U	1000	51	ug/L		05/19/14 10:57	05/22/14 12:45	1
Manganese	1.0	U	15	1.0	ug/L		05/19/14 10:57	05/22/14 12:45	1
Nickel	2.6	U	40	2.6	ug/L		05/19/14 10:57	05/22/14 12:45	1
Potassium	460	U	5000	460	ug/L		05/19/14 10:57	05/22/14 12:45	1
Selenium	2.1	U	15	2.1	ug/L		05/19/14 10:57	05/22/14 12:45	1
Silver	0.99	U	10	0.99	ug/L		05/19/14 10:57	05/22/14 12:45	1
Sodium	110	U	1000	110	ug/L		05/19/14 10:57	05/22/14 12:45	1
Thallium	2.4	U	20	2.4	ug/L		05/19/14 10:57	05/22/14 12:45	1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: MB 160-122863/1-A
Matrix: Water
Analysis Batch: 123642

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 122863

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vanadium	4.4	U	50	4.4	ug/L		05/19/14 10:57	05/22/14 12:45	1
Zinc	8.3	U	20	8.3	ug/L		05/19/14 10:57	05/22/14 12:45	1

Lab Sample ID: LCS 160-122863/2-A
Matrix: Water
Analysis Batch: 123642

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 122863

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	10000	11000		ug/L		110	80 - 120
Antimony	500	540		ug/L		108	80 - 120
Arsenic	1000	1080		ug/L		108	80 - 120
Barium	1000	1090		ug/L		109	80 - 120
Beryllium	1000	1070		ug/L		107	80 - 120
Cadmium	1000	1110		ug/L		111	80 - 120
Calcium	10000	11100		ug/L		111	80 - 120
Chromium	1000	1110		ug/L		111	80 - 120
Cobalt	1000	1110		ug/L		111	80 - 120
Copper	1000	1150		ug/L		115	80 - 120
Iron	10000	10800		ug/L		108	80 - 120
Lead	1000	1140		ug/L		114	80 - 120
Magnesium	10000	9980		ug/L		100	80 - 120
Manganese	1000	1080		ug/L		108	80 - 120
Nickel	1000	1150		ug/L		115	80 - 120
Potassium	10000	11500		ug/L		115	80 - 120
Selenium	500	542		ug/L		108	80 - 120
Silver	200	211		ug/L		106	80 - 120
Sodium	10000	11700		ug/L		117	80 - 120
Thallium	200	238		ug/L		119	80 - 120
Vanadium	1000	1060		ug/L		106	80 - 120
Zinc	1000	1110		ug/L		111	80 - 120

Lab Sample ID: LRC 160-123642/10
Matrix: Water
Analysis Batch: 123642

Client Sample ID: Lab Control Sample

Analyte	Spike Added	LRC Result	LRC Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100000	104000		ug/L		104	90 - 110
Antimony	2000	2040		ug/L		102	90 - 110
Arsenic	10000	10100		ug/L		101	90 - 110
Barium	10000	10100		ug/L		101	90 - 110
Beryllium	10000	9940		ug/L		99	90 - 110
Cadmium	10000	10200		ug/L		102	90 - 110
Calcium	100000	98400		ug/L		98	90 - 110
Chromium	10000	9930		ug/L		99	90 - 110
Cobalt	10000	9810		ug/L		98	90 - 110
Copper	10000	10200		ug/L		102	90 - 110
Iron	100000	99000		ug/L		99	90 - 110
Lead	10000	9980		ug/L		100	90 - 110
Magnesium	100000	101000		ug/L		101	90 - 110

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LRC 160-123642/10 — **Client Sample ID: Lab Control Sample**
Matrix: Water
Analysis Batch: 123642

Analyte	Spike Added	LRC Result	LRC Qualifier	Unit	D	%Rec	%Rec. Limits
Manganese	10000	10000		ug/L		100	90 - 110
Nickel	10000	10000		ug/L		100	90 - 110
Potassium	100000	104000		ug/L		104	90 - 110
Selenium	2000	2030		ug/L		101	90 - 110
Silver	2000	2000		ug/L		100	90 - 110
Sodium	100000	102000		ug/L		102	90 - 110
Thallium	2000	1950		ug/L		98	90 - 110
Vanadium	10000	9870		ug/L		99	90 - 110
Zinc	10000	10000		ug/L		100	90 - 110

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 160-123407/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 123936 — **Prep Batch: 123407**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.060	U	0.20	0.060	ug/L		05/22/14 07:51	05/27/14 10:12	1

Lab Sample ID: LCS 160-123407/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 123936 — **Prep Batch: 123407**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	5.00	4.74		ug/L		95	80 - 120

Lab Sample ID: 160-6694-7 MS — **Client Sample ID: 2222-RIN-01**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 123936 — **Prep Batch: 123407**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.060	U	5.00	5.11		ug/L		102	80 - 120

Lab Sample ID: 160-6694-7 MSD — **Client Sample ID: 2222-RIN-01**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 123936 — **Prep Batch: 123407**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.060	U	5.00	5.05		ug/L		101	80 - 120	1	20

Method: 7471B - Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Lab Sample ID: MB 160-123919/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 124146 — **Prep Batch: 123919**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.010	U	0.030	0.010	mg/Kg		05/27/14 10:17	05/28/14 09:31	1

Method: 7471B - Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique) (Continued)

Lab Sample ID: LCSSRM 160-123919/2-A
Matrix: Solid
Analysis Batch: 124146

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 123919

Analyte			Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			9.03	7.70		mg/Kg		85.3	51.3 - 148.4		

Lab Sample ID: 160-6694-6 MS
Matrix: Solid
Analysis Batch: 124146

Client Sample ID: 2222-SD06
Prep Type: Total/NA
Prep Batch: 123919

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury	0.24		1.47	1.59		mg/Kg	☼	92	80 - 120		

Lab Sample ID: 160-6694-6 MSD
Matrix: Solid
Analysis Batch: 124146

Client Sample ID: 2222-SD06
Prep Type: Total/NA
Prep Batch: 123919

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.24		1.32	1.36		mg/Kg	☼	84	80 - 120	16	30

Method: 9315 - Total Apha Radium (GFPC)

Lab Sample ID: MB 160-122912/1-A
Matrix: Water
Analysis Batch: 123289

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 122912

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.01052	U	0.0992	0.0992	1.00	0.198	pCi/L	05/19/14 13:41	05/21/14 16:15	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*86.1*		*40 - 110*	*05/19/14 13:41*	*05/21/14 16:15*	*1*

Lab Sample ID: LCS 160-122912/2-A
Matrix: Water
Analysis Batch: 123289

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 122912

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Total Alpha Radium			11.2	11.86		1.34	1.00	0.235	pCi/L	106	67 - 133		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*85.8*		*40 - 110*

Method: 9315 - Total Apha Radium (GFPC) (Continued)

Lab Sample ID: LCSD 160-122912/3-A
Matrix: Water
Analysis Batch: 123289

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 122912

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Total Alpha Radium			11.2	11.62		1.31	1.00	0.346	pCi/L	103	67 - 133	0.09	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Ba Carrier	*92.6*		*40 - 110*

Method: 9320 - Radium-228 (GFPC)

Lab Sample ID: MB 160-122913/1-A
Matrix: Water
Analysis Batch: 123737

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 122913

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.2086	U	0.162	0.163	1.00	0.254	pCi/L	05/19/14 13:43	05/23/14 09:50	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*114*	*X*	*40 - 110*	*05/19/14 13:43*	*05/23/14 09:50*	*1*
Y Carrier	*86.7*		*40 - 110*	*05/19/14 13:43*	*05/23/14 09:50*	*1*

Lab Sample ID: LCS 160-122913/2-A
Matrix: Water
Analysis Batch: 123737

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 122913

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-228			3.85	3.751		0.520	1.00	0.312	pCi/L	97	56 - 140

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*108*		*40 - 110*
Y Carrier	*87.5*		*40 - 110*

Lab Sample ID: LCSD 160-122913/3-A
Matrix: Water
Analysis Batch: 123737

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 122913

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228			3.85	3.208		0.462	1.00	0.276	pCi/L	83	56 - 140	0.55	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Ba Carrier	*104*		*40 - 110*
Y Carrier	*90.5*		*40 - 110*

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

Lab Sample ID: MB 160-123197/1-A
Matrix: Water
Analysis Batch: 123332

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 123197

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.02379	U	0.0476	0.0476	1.00	0.0714	pCi/L	05/20/14 13:36	05/21/14 19:04	1
Thorium-230	0.2388		0.151	0.152	1.00	0.0714	pCi/L	05/20/14 13:36	05/21/14 19:04	1
Thorium-232	0.04293	U	0.0676	0.0677	1.00	0.108	pCi/L	05/20/14 13:36	05/21/14 19:04	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*81.9*		*30 - 110*	*05/20/14 13:36*	*05/21/14 19:04*	*1*

Lab Sample ID: LCS 160-123197/2-A
Matrix: Water
Analysis Batch: 123333

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 123197

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			8.64	9.421		1.22	1.00	0.103	pCi/L	109	81 - 125		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*84.0*		*30 - 110*

Lab Sample ID: MB 160-123276/1-A
Matrix: Solid
Analysis Batch: 123806

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 123276

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.01892	U	0.0362	0.0362	1.00	0.0686	pCi/g	05/21/14 09:37	05/23/14 19:02	1
Thorium-230	0.04828		0.0452	0.0454	1.00	0.0460	pCi/g	05/21/14 09:37	05/23/14 19:02	1
Thorium-232	0.008162	U	0.0204	0.0205	1.00	0.0457	pCi/g	05/21/14 09:37	05/23/14 19:02	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*95.4*		*30 - 110*	*05/21/14 09:37*	*05/23/14 19:02*	*1*

Lab Sample ID: LCS 160-123276/2-A
Matrix: Solid
Analysis Batch: 123807

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 123276

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	23.35		2.39	1.00	0.115	pCi/g	95	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*93.1*		*30 - 110*

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

Lab Sample ID: MB 160-123200/1-A
Matrix: Water
Analysis Batch: 123362

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 123200

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.01901	U	0.0646	0.0646	1.00	0.148	pCi/L	05/20/14 13:36	05/21/14 17:20	1
Uranium-235/236	0.0000	U	0.0101	0.0101	1.00	0.0811	pCi/L	05/20/14 13:36	05/21/14 17:20	1
Uranium-238	0.1301		0.106	0.107	1.00	0.0650	pCi/L	05/20/14 13:36	05/21/14 17:20	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*89.8*		*30 - 110*	*05/20/14 13:36*	*05/21/14 17:20*	*1*

Lab Sample ID: LCS 160-123200/2-A
Matrix: Water
Analysis Batch: 123363

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 123200

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Uranium-233/234			12.7	13.22		1.57	1.00	0.150	pCi/L	104	84 - 120		
Uranium-238			13.0	13.79		1.62	1.00	0.0696	pCi/L	106	83 - 121		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Uranium-232	*79.8*		*30 - 110*

Lab Sample ID: MB 160-123278/1-A
Matrix: Solid
Analysis Batch: 124262

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 123278

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.004946	U	0.0488	0.0488	1.00	0.110	pCi/g	05/21/14 09:37	05/28/14 15:45	1
Uranium-235/236	-0.01407	U	0.0450	0.0451	1.00	0.130	pCi/g	05/21/14 09:37	05/28/14 15:45	1
Uranium-238	0.01551	U	0.0478	0.0478	1.00	0.0994	pCi/g	05/21/14 09:37	05/28/14 15:45	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*84.3*		*30 - 110*	*05/21/14 09:37*	*05/28/14 15:45*	*1*

Lab Sample ID: LCS 160-123278/2-A
Matrix: Solid
Analysis Batch: 123762

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 123278

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Uranium-233/234			6.37	6.226		0.733	1.00	0.0683	pCi/g	98	84 - 120		
Uranium-238			6.51	6.834		0.786	1.00	0.0681	pCi/g	105	82 - 122		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Uranium-232	*88.4*		*30 - 110*

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-122895/1-A
Matrix: Water
Analysis Batch: 123127

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 122895

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	1.139	U	6.53	6.53	20.0	12.3	pCi/L	05/19/14 12:24	05/20/14 15:18	1

Lab Sample ID: LCS 160-122895/2-A
Matrix: Water
Analysis Batch: 123145

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 122895

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	137000	134000		15500		489	pCi/L	98	90 - 111
Cesium-137	50100	50940		5060	20.0	167	pCi/L	102	90 - 111
Cobalt-60	57100	56820		5610		89.8	pCi/L	100	89 - 110

Lab Sample ID: 160-6694-7 DU
Matrix: Water
Analysis Batch: 123147

Client Sample ID: 2222-RIN-01
Prep Type: Total/NA
Prep Batch: 122895

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Cesium-137	-1.19	U	-0.2213	U	5.10	20.0	9.54	pCi/L	0.08	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-123290/1-A
Matrix: Solid
Analysis Batch: 123298

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 123290

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.3399	U	0.705	0.707	1.00	1.23	pCi/g	05/21/14 11:19	05/21/14 12:20	1
Radium-228	0.0000	U	0.0468	0.0468		0.173	pCi/g	05/21/14 11:19	05/21/14 12:20	1
Lead-210	0.8642	U	0.905	0.911		1.57	pCi/g	05/21/14 11:19	05/21/14 12:20	1
Lead-212	-0.007971	U	0.0561	0.0561		0.110	pCi/g	05/21/14 11:19	05/21/14 12:20	1
Lead-214	-0.04299	U	1.29	1.29		0.192	pCi/g	05/21/14 11:19	05/21/14 12:20	1

Lab Sample ID: LCS 160-123290/2-A
Matrix: Solid
Analysis Batch: 123327

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 123290

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.4	103.6		11.0		1.44	pCi/g	106	87 - 116
Cesium-137	31.1	30.03		3.29		0.382	pCi/g	97	87 - 120
Cobalt-60	22.4	22.05		2.33		0.0869	pCi/g	98	87 - 115

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-6694-1 DU
Matrix: Solid
Analysis Batch: 123245

Client Sample ID: 2222-SD01
Prep Type: Total/NA
Prep Batch: 123290

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Radium-226	0.780	U	1.162	U	0.852	1.00	1.29	pCi/g	0.20	1
Radium-228	0.628		0.7152		0.192		0.0811	pCi/g	0.22	1
Lead-210	0.877	U	0.4692	U	0.968		1.64	pCi/g	0.18	1
Lead-212	0.586		0.5914		0.131		0.0950	pCi/g	0.02	1
Lead-214	0.451		0.5125		0.135		0.121	pCi/g	0.22	1

Metals

Prep Batch: 122752

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6694-1	2222-SD01	Total/NA	Solid	3050B	
160-6694-1 MS	2222-SD01	Total/NA	Solid	3050B	
160-6694-1 MSD	2222-SD01	Total/NA	Solid	3050B	
160-6694-1 SD	2222-SD01	Total/NA	Solid	3050B	
160-6694-2	2222-SD02	Total/NA	Solid	3050B	
160-6694-3	2222-SD03	Total/NA	Solid	3050B	
160-6694-4	2222-SD04	Total/NA	Solid	3050B	
160-6694-5	2222-SD05	Total/NA	Solid	3050B	
160-6694-6	2222-SD06	Total/NA	Solid	3050B	
LCSSRM 160-122752/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-122752/1-A	Method Blank	Total/NA	Solid	3050B	

Prep Batch: 122863

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6694-7	2222-RIN-01	Total/NA	Water	3010A	
LCS 160-122863/2-A	Lab Control Sample	Total/NA	Water	3010A	
MB 160-122863/1-A	Method Blank	Total/NA	Water	3010A	

Prep Batch: 123407

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6694-7	2222-RIN-01	Total/NA	Water	7470A	
160-6694-7 MS	2222-RIN-01	Total/NA	Water	7470A	
160-6694-7 MSD	2222-RIN-01	Total/NA	Water	7470A	
160-6694-7 SD	2222-RIN-01	Total/NA	Water	7470A	
LCS 160-123407/2-A	Lab Control Sample	Total/NA	Water	7470A	
MB 160-123407/1-A	Method Blank	Total/NA	Water	7470A	

Analysis Batch: 123642

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6694-1	2222-SD01	Total/NA	Solid	6010C	122752
160-6694-1 MS	2222-SD01	Total/NA	Solid	6010C	122752
160-6694-1 MSD	2222-SD01	Total/NA	Solid	6010C	122752
160-6694-1 SD	2222-SD01	Total/NA	Solid	6010C	122752
160-6694-2	2222-SD02	Total/NA	Solid	6010C	122752
160-6694-3	2222-SD03	Total/NA	Solid	6010C	122752
160-6694-4	2222-SD04	Total/NA	Solid	6010C	122752
160-6694-5	2222-SD05	Total/NA	Solid	6010C	122752
160-6694-6	2222-SD06	Total/NA	Solid	6010C	122752
160-6694-7	2222-RIN-01	Total/NA	Water	6010C	122863
CRI 160-123642/7	DL		Water	6010C	
ICSA 160-123642/8	ICS		Water	6010C	
ICSAB 160-123642/9	ICS		Water	6010C	
LCS 160-122863/2-A	Lab Control Sample	Total/NA	Water	6010C	122863
LCSSRM 160-122752/2-A	Lab Control Sample	Total/NA	Solid	6010C	122752
LRC 160-123642/10	Lab Control Sample		Water	6010C	
MB 160-122752/1-A	Method Blank	Total/NA	Solid	6010C	122752
MB 160-122863/1-A	Method Blank	Total/NA	Water	6010C	122863

Prep Batch: 123919

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6694-1	2222-SD01	Total/NA	Solid	7471B	

Metals (Continued)

Prep Batch: 123919 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6694-2	2222-SD02	Total/NA	Solid	7471B	
160-6694-3	2222-SD03	Total/NA	Solid	7471B	
160-6694-4	2222-SD04	Total/NA	Solid	7471B	
160-6694-5	2222-SD05	Total/NA	Solid	7471B	
160-6694-6	2222-SD06	Total/NA	Solid	7471B	
160-6694-6 MS	2222-SD06	Total/NA	Solid	7471B	
160-6694-6 MSD	2222-SD06	Total/NA	Solid	7471B	
160-6694-6 SD	2222-SD06	Total/NA	Solid	7471B	
LCSSRM 160-123919/2-A	Lab Control Sample	Total/NA	Solid	7471B	
MB 160-123919/1-A	Method Blank	Total/NA	Solid	7471B	

Analysis Batch: 123936

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6694-7	2222-RIN-01	Total/NA	Water	7470A	123407
160-6694-7 MS	2222-RIN-01	Total/NA	Water	7470A	123407
160-6694-7 MSD	2222-RIN-01	Total/NA	Water	7470A	123407
160-6694-7 SD	2222-RIN-01	Total/NA	Water	7470A	123407
LCS 160-123407/2-A	Lab Control Sample	Total/NA	Water	7470A	123407
MB 160-123407/1-A	Method Blank	Total/NA	Water	7470A	123407

Analysis Batch: 124146

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6694-1	2222-SD01	Total/NA	Solid	7471B	123919
160-6694-2	2222-SD02	Total/NA	Solid	7471B	123919
160-6694-3	2222-SD03	Total/NA	Solid	7471B	123919
160-6694-4	2222-SD04	Total/NA	Solid	7471B	123919
160-6694-5	2222-SD05	Total/NA	Solid	7471B	123919
160-6694-6	2222-SD06	Total/NA	Solid	7471B	123919
160-6694-6 MS	2222-SD06	Total/NA	Solid	7471B	123919
160-6694-6 MSD	2222-SD06	Total/NA	Solid	7471B	123919
160-6694-6 SD	2222-SD06	Total/NA	Solid	7471B	123919
LCSSRM 160-123919/2-A	Lab Control Sample	Total/NA	Solid	7471B	123919
MB 160-123919/1-A	Method Blank	Total/NA	Solid	7471B	123919

General Chemistry

Analysis Batch: 122677

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6694-1	2222-SD01	Total/NA	Solid	Moisture	
160-6694-2	2222-SD02	Total/NA	Solid	Moisture	
160-6694-3	2222-SD03	Total/NA	Solid	Moisture	
160-6694-4	2222-SD04	Total/NA	Solid	Moisture	
160-6694-5	2222-SD05	Total/NA	Solid	Moisture	
160-6694-6	2222-SD06	Total/NA	Solid	Moisture	

Rad

Leach Batch: 122857

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6694-1	2222-SD01	Total/NA	Solid	Dry and Grind	

Rad (Continued)

Leach Batch: 122857 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6694-1 DU	2222-SD01	Total/NA	Solid	Dry and Grind	
160-6694-2	2222-SD02	Total/NA	Solid	Dry and Grind	
160-6694-3	2222-SD03	Total/NA	Solid	Dry and Grind	
160-6694-4	2222-SD04	Total/NA	Solid	Dry and Grind	
160-6694-5	2222-SD05	Total/NA	Solid	Dry and Grind	
160-6694-6	2222-SD06	Total/NA	Solid	Dry and Grind	

Prep Batch: 122895

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6694-7	2222-RIN-01	Total/NA	Water	Fill_Geo-0	
160-6694-7 DU	2222-RIN-01	Total/NA	Water	Fill_Geo-0	
LCS 160-122895/2-A	Lab Control Sample	Total/NA	Water	Fill_Geo-0	
MB 160-122895/1-A	Method Blank	Total/NA	Water	Fill_Geo-0	

Prep Batch: 122912

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6694-7	2222-RIN-01	Total/NA	Water	PrecSep_0	
LCS 160-122912/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-122912/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	
MB 160-122912/1-A	Method Blank	Total/NA	Water	PrecSep_0	

Prep Batch: 122913

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6694-7	2222-RIN-01	Total/NA	Water	PrecSep_0	
LCS 160-122913/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-122913/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	
MB 160-122913/1-A	Method Blank	Total/NA	Water	PrecSep_0	

Prep Batch: 123197

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6694-7	2222-RIN-01	Total/NA	Water	ExtChrom	
LCS 160-123197/2-A	Lab Control Sample	Total/NA	Water	ExtChrom	
MB 160-123197/1-A	Method Blank	Total/NA	Water	ExtChrom	

Prep Batch: 123200

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6694-7	2222-RIN-01	Total/NA	Water	ExtChrom	
LCS 160-123200/2-A	Lab Control Sample	Total/NA	Water	ExtChrom	
MB 160-123200/1-A	Method Blank	Total/NA	Water	ExtChrom	

Prep Batch: 123276

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6694-1	2222-SD01	Total/NA	Solid	ExtChrom	122857
160-6694-2	2222-SD02	Total/NA	Solid	ExtChrom	122857
160-6694-3	2222-SD03	Total/NA	Solid	ExtChrom	122857
160-6694-4	2222-SD04	Total/NA	Solid	ExtChrom	122857
160-6694-5	2222-SD05	Total/NA	Solid	ExtChrom	122857
160-6694-6	2222-SD06	Total/NA	Solid	ExtChrom	122857
LCS 160-123276/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-123276/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Rad (Continued)

Prep Batch: 123278

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6694-1	2222-SD01	Total/NA	Solid	ExtChrom	122857
160-6694-2	2222-SD02	Total/NA	Solid	ExtChrom	122857
160-6694-3	2222-SD03	Total/NA	Solid	ExtChrom	122857
160-6694-4	2222-SD04	Total/NA	Solid	ExtChrom	122857
160-6694-5	2222-SD05	Total/NA	Solid	ExtChrom	122857
160-6694-6	2222-SD06	Total/NA	Solid	ExtChrom	122857
LCS 160-123278/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-123278/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 123290

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6694-1	2222-SD01	Total/NA	Solid	Fill_Geo-0	122857
160-6694-1 DU	2222-SD01	Total/NA	Solid	Fill_Geo-0	122857
160-6694-2	2222-SD02	Total/NA	Solid	Fill_Geo-0	122857
160-6694-3	2222-SD03	Total/NA	Solid	Fill_Geo-0	122857
160-6694-4	2222-SD04	Total/NA	Solid	Fill_Geo-0	122857
160-6694-5	2222-SD05	Total/NA	Solid	Fill_Geo-0	122857
160-6694-6	2222-SD06	Total/NA	Solid	Fill_Geo-0	122857
LCS 160-123290/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-0	
MB 160-123290/1-A	Method Blank	Total/NA	Solid	Fill_Geo-0	

Client Sample ID: 2222-SD01

Lab Sample ID: 160-6694-1

Date Collected: 05/15/14 08:25
Matrix: Solid
Date Received: 05/16/14 06:45
Percent Solids: 72.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			122752	05/19/14 08:37	LJT	TAL SL
Total/NA	Analysis	6010C		10	123642	05/22/14 15:31	FLC	TAL SL
Total/NA	Prep	7471B			123919	05/27/14 10:17	MTS	TAL SL
Total/NA	Analysis	7471B		1	124146	05/28/14 09:35	FLC	TAL SL
Total/NA	Analysis	Moisture		1	122677	05/17/14 08:15	SDB	TAL SL
Total/NA	Leach	Dry and Grind			122857	05/19/14 10:39	DRO	TAL SL
Total/NA	Prep	ExtChrom			123278	05/21/14 09:37	MLM	TAL SL
Total/NA	Analysis	A-01-R		1	123793	05/23/14 18:57	MLK	TAL SL
Total/NA	Leach	Dry and Grind			122857	05/19/14 10:39	DRO	TAL SL
Total/NA	Prep	ExtChrom			123276	05/21/14 09:37	MLM	TAL SL
Total/NA	Analysis	A-01-R		1	123811	05/23/14 19:02	RTM	TAL SL
Total/NA	Leach	Dry and Grind			122857	05/19/14 10:39	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			123290	05/21/14 11:19	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	123296	05/21/14 12:22	SMP	TAL SL

Client Sample ID: 2222-SD02

Lab Sample ID: 160-6694-2

Date Collected: 05/15/14 09:45
Matrix: Solid
Date Received: 05/16/14 06:45
Percent Solids: 71.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			122752	05/19/14 08:37	LJT	TAL SL
Total/NA	Analysis	6010C		10	123642	05/22/14 15:54	FLC	TAL SL
Total/NA	Prep	7471B			123919	05/27/14 10:17	MTS	TAL SL
Total/NA	Analysis	7471B		1	124146	05/28/14 09:37	FLC	TAL SL
Total/NA	Analysis	Moisture		1	122677	05/17/14 08:15	SDB	TAL SL
Total/NA	Leach	Dry and Grind			122857	05/19/14 10:39	DRO	TAL SL
Total/NA	Prep	ExtChrom			123278	05/21/14 09:37	MLM	TAL SL
Total/NA	Analysis	A-01-R		1	123794	05/23/14 18:57	MLK	TAL SL
Total/NA	Leach	Dry and Grind			122857	05/19/14 10:39	DRO	TAL SL
Total/NA	Prep	ExtChrom			123276	05/21/14 09:37	MLM	TAL SL
Total/NA	Analysis	A-01-R		1	123812	05/23/14 19:02	RTM	TAL SL
Total/NA	Leach	Dry and Grind			122857	05/19/14 10:39	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			123290	05/21/14 11:19	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	123247	05/21/14 14:32	SMP	TAL SL

Client Sample ID: 2222-SD03

Lab Sample ID: 160-6694-3

Date Collected: 05/15/14 08:50
Matrix: Solid
Date Received: 05/16/14 06:45
Percent Solids: 52.4

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			122752	05/19/14 08:37	LJT	TAL SL
Total/NA	Analysis	6010C		10	123642	05/22/14 15:58	FLC	TAL SL
Total/NA	Prep	7471B			123919	05/27/14 10:17	MTS	TAL SL
Total/NA	Analysis	7471B		1	124146	05/28/14 09:39	FLC	TAL SL

Client Sample ID: 2222-SD03

Lab Sample ID: 160-6694-3

Date Collected: 05/15/14 08:50

Matrix: Solid

Date Received: 05/16/14 06:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	122677	05/17/14 08:15	SDB	TAL SL
Total/NA	Leach	Dry and Grind			122857	05/19/14 10:39	DRO	TAL SL
Total/NA	Prep	ExtChrom			123278	05/21/14 09:37	MLM	TAL SL
Total/NA	Analysis	A-01-R		1	123795	05/23/14 18:57	MLK	TAL SL
Total/NA	Leach	Dry and Grind			122857	05/19/14 10:39	DRO	TAL SL
Total/NA	Prep	ExtChrom			123276	05/21/14 09:37	MLM	TAL SL
Total/NA	Analysis	A-01-R		1	123813	05/23/14 19:02	RTM	TAL SL
Total/NA	Leach	Dry and Grind			122857	05/19/14 10:39	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			123290	05/21/14 11:19	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	123296	05/21/14 14:26	SMP	TAL SL

Client Sample ID: 2222-SD04

Lab Sample ID: 160-6694-4

Date Collected: 05/15/14 09:05

Matrix: Solid

Date Received: 05/16/14 06:45

Percent Solids: 28.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			122752	05/19/14 08:37	LJT	TAL SL
Total/NA	Analysis	6010C		10	123642	05/22/14 16:02	FLC	TAL SL
Total/NA	Prep	7471B			123919	05/27/14 10:17	MTS	TAL SL
Total/NA	Analysis	7471B		1	124146	05/28/14 09:41	FLC	TAL SL
Total/NA	Analysis	Moisture		1	122677	05/17/14 08:15	SDB	TAL SL
Total/NA	Leach	Dry and Grind			122857	05/19/14 10:39	DRO	TAL SL
Total/NA	Prep	ExtChrom			123278	05/21/14 09:37	MLM	TAL SL
Total/NA	Analysis	A-01-R		1	123796	05/23/14 18:57	MLK	TAL SL
Total/NA	Leach	Dry and Grind			122857	05/19/14 10:39	DRO	TAL SL
Total/NA	Prep	ExtChrom			123276	05/21/14 09:37	MLM	TAL SL
Total/NA	Analysis	A-01-R		1	123815	05/23/14 19:02	RTM	TAL SL
Total/NA	Leach	Dry and Grind			122857	05/19/14 10:39	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			123290	05/21/14 11:19	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	123294	05/21/14 14:27	EMN	TAL SL

Client Sample ID: 2222-SD05

Lab Sample ID: 160-6694-5

Date Collected: 05/15/14 09:15

Matrix: Solid

Date Received: 05/16/14 06:45

Percent Solids: 76.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			122752	05/19/14 08:37	LJT	TAL SL
Total/NA	Analysis	6010C		10	123642	05/22/14 16:06	FLC	TAL SL
Total/NA	Prep	7471B			123919	05/27/14 10:17	MTS	TAL SL
Total/NA	Analysis	7471B		1	124146	05/28/14 09:43	FLC	TAL SL
Total/NA	Analysis	Moisture		1	122677	05/17/14 08:15	SDB	TAL SL
Total/NA	Leach	Dry and Grind			122857	05/19/14 10:39	DRO	TAL SL
Total/NA	Prep	ExtChrom			123278	05/21/14 09:37	MLM	TAL SL
Total/NA	Analysis	A-01-R		1	123797	05/23/14 18:57	MLK	TAL SL

Client Sample ID: 2222-SD05

Lab Sample ID: 160-6694-5

Date Collected: 05/15/14 09:15

Matrix: Solid

Date Received: 05/16/14 06:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			122857	05/19/14 10:39	DRO	TAL SL
Total/NA	Prep	ExtChrom			123276	05/21/14 09:37	MLM	TAL SL
Total/NA	Analysis	A-01-R		1	123816	05/23/14 19:02	RTM	TAL SL
Total/NA	Leach	Dry and Grind			122857	05/19/14 10:39	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			123290	05/21/14 11:19	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	123327	05/21/14 15:46	SMP	TAL SL

Client Sample ID: 2222-SD06

Lab Sample ID: 160-6694-6

Date Collected: 05/15/14 08:45

Matrix: Solid

Date Received: 05/16/14 06:45

Percent Solids: 54.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			122752	05/19/14 08:37	LJT	TAL SL
Total/NA	Analysis	6010C		10	123642	05/22/14 16:10	FLC	TAL SL
Total/NA	Prep	7471B			123919	05/27/14 10:17	MTS	TAL SL
Total/NA	Analysis	7471B		1	124146	05/28/14 09:45	FLC	TAL SL
Total/NA	Analysis	Moisture		1	122677	05/17/14 08:15	SDB	TAL SL
Total/NA	Leach	Dry and Grind			122857	05/19/14 10:39	DRO	TAL SL
Total/NA	Prep	ExtChrom			123278	05/21/14 09:37	MLM	TAL SL
Total/NA	Analysis	A-01-R		1	123798	05/23/14 18:57	MLK	TAL SL
Total/NA	Leach	Dry and Grind			122857	05/19/14 10:39	DRO	TAL SL
Total/NA	Prep	ExtChrom			123276	05/21/14 09:37	MLM	TAL SL
Total/NA	Analysis	A-01-R		1	123817	05/23/14 19:02	RTM	TAL SL
Total/NA	Leach	Dry and Grind			122857	05/19/14 10:39	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			123290	05/21/14 11:19	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	123299	05/21/14 15:45	SMP	TAL SL

Client Sample ID: 2222-RIN-01

Lab Sample ID: 160-6694-7

Date Collected: 05/15/14 08:10

Matrix: Water

Date Received: 05/16/14 06:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			122863	05/19/14 10:57	LJT	TAL SL
Total/NA	Analysis	6010C		1	123642	05/22/14 13:15	FLC	TAL SL
Total/NA	Prep	7470A			123407	05/22/14 07:51	MTS	TAL SL
Total/NA	Analysis	7470A		1	123936	05/27/14 10:12	MTS	TAL SL
Total/NA	Prep	PrecSep_0			122912	05/19/14 13:41	LEM	TAL SL
Total/NA	Analysis	9315		1	123289	05/21/14 16:16	MLK	TAL SL
Total/NA	Prep	PrecSep_0			122913	05/19/14 13:43	LEM	TAL SL
Total/NA	Analysis	9320		1	123737	05/23/14 09:50	SMP	TAL SL
Total/NA	Prep	ExtChrom			123200	05/20/14 13:36	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	123366	05/21/14 17:20	RTM	TAL SL
Total/NA	Prep	ExtChrom			123197	05/20/14 13:36	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	123337	05/21/14 19:04	RTM	TAL SL

Lab Chronicle

Client: Weston Solutions, Inc.
Project/Site: EPA Region 5 START 3 Contract

TestAmerica Job ID: 160-6694-1

Client Sample ID: 2222-RIN-01
Date Collected: 05/15/14 08:10
Date Received: 05/16/14 06:45

Lab Sample ID: 160-6694-7
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-0			122895	05/19/14 12:24	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	123230	05/20/14 13:46	SMP	TAL SL

Laboratory References:

MCL = Materials and Chemistry Laboratory Inc, PO BOX 5808, Oak Ridge, TN 37831

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

Certification Summary

Client: Weston Solutions, Inc. TestAmerica Job ID: 160-6694-1
Project/Site: EPA Region 5 START 3 Contract

Laboratory: TestAmerica St. Louis

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

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-14 *
California	NELAP	9	09266CA	03-31-14 *
Connecticut	State Program	1	PH-0241	03-31-15
Florida	NELAP	4	E87689	06-30-14 *
Illinois	NELAP	5	200023	11-30-14
Iowa	State Program	7	373	12-01-14
Kansas	NELAP	7	E-10236	10-31-14
Kentucky (DW)	State Program	4	90125	12-31-14
L-A-B	DoD ELAP		L2305	01-10-16
Louisiana	NELAP	6	LA140007	12-31-14
Maryland	State Program	3	310	09-30-14
Missouri	State Program	7	780	06-30-14 *
Nevada	State Program	9	MO000542013-1	07-31-14
New Jersey	NELAP	2	MO002	06-30-14 *
New Mexico	State Program	6		06-30-10 *
New York	NELAP	2	11616	03-31-15
North Dakota	State Program	8	R207	06-30-14 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	2013-049	08-31-14
Pennsylvania	NELAP	3	68-00540	02-28-15
South Carolina	State Program	4	85002001	06-30-14 *
Texas	NELAP	6	T104704193-13-6	07-31-14
USDA	Federal		P330-07-00122	01-09-17
USEPA Reg V SDWA	Federal	1	WG-15J	08-30-14
Utah	NELAP	8	MO000542013-5	07-31-14
Virginia	NELAP	3	2236	06-14-14 *
Washington	State Program	10	C592	08-30-14
West Virginia DEP	State Program	3	381	08-30-14

* Expired certification is currently pending renewal and is considered valid.

Method Summary

Client: Weston Solutions, Inc.
Project/Site: EPA Region 5 START 3 Contract

TestAmerica Job ID: 160-6694-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL SL
7470A	Mercury (CVAA)	SW846	TAL SL
7471B	Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)	SW846	TAL SL
Moisture	Percent Moisture	EPA	TAL SL
9315	Total Apha Radium (GFPC)	SW846	TAL SL
9320	Radium-228 (GFPC)	SW846	TAL SL
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL SL
GA-01-R	Cesium-137 & Other Gamma Emitters (GS)	DOE	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
Lead sub to MCL	General Sub Contract Method	NONE	MCL
Lead to MCL	General Sub Contract Method	NONE	MCL

Protocol References:

DOE = U.S. Department of Energy

EPA = US Environmental Protection Agency

NONE = NONE

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

MCL = Materials and Chemistry Laboratory Inc, PO BOX 5808, Oak Ridge, TN 37831

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

Sample Summary

Client: Weston Solutions, Inc.
Project/Site: EPA Region 5 START 3 Contract

TestAmerica Job ID: 160-6694-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-6694-1	2222-SD01	Solid	05/15/14 08:25	05/16/14 06:45
160-6694-2	2222-SD02	Solid	05/15/14 09:45	05/16/14 06:45
160-6694-3	2222-SD03	Solid	05/15/14 08:50	05/16/14 06:45
160-6694-4	2222-SD04	Solid	05/15/14 09:05	05/16/14 06:45
160-6694-5	2222-SD05	Solid	05/15/14 09:15	05/16/14 06:45
160-6694-6	2222-SD06	Solid	05/15/14 08:45	05/16/14 06:45
160-6694-7	2222-RIN-01	Water	05/15/14 08:10	05/16/14 06:45

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
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
1L Marn_00004	02/15/14		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_00007	03/02/16		Eckert & Ziegler, Lot 81592-334		(Purchased Reagent)		Americium-241	5373.3 pCi/L
							Cesium-137	2145.7 pCi/L
							Cobalt-60	3426.5 pCi/L
1L Marn_00008	11/22/14		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
82232-334_00001	06/03/60		Eckert & Ziegler, Lot 82232-334		(Purchased Reagent)		Americium-241	7.281 Bq
							Pu-239	7.137 Bq
							Pulser	
							Thorium-230	7.63 Bq
							U	
82233-334_00001	06/03/60		Eckert & Zigler, Lot 82233-334		(Purchased Reagent)		Americium-241	5.114 Bq
							Pu-239	6.064 Bq
							Thorium-230	4.95 Bq
82234-334_00001	06/02/60		Eckert & Zigler, Lot 82234-334		(Purchased Reagent)		Americium-241	5.652 Bq
							Pu-239	5.936 Bq
							Thorium-230	5.685 Bq
82235-334_00001	06/04/60		Eckert & Ziegler, Lot 82235-334		(Purchased Reagent)		Americium-241	7.466 Bq
							Pu-239	6.897 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Thorium-230	7.167 Bq
82236-334_00001	06/02/60	Eckert & Ziegler, Lot 82236-334			(Purchased Reagent)		Americium-241	6.891 Bq
							Pu-239	6.664 Bq
							Pulser	
							Thorium-230	7.107 Bq
							U	
82237-334_00003							Pulser	
							U	
82240-334_00001	06/08/60	Eckert & Ziegler, Lot 82240-334			(Purchased Reagent)		Americium-241	8.298 Bq
							Pu-239	7.163 Bq
							Thorium-230	6.304 Bq
82241-334_00001	06/08/60	Eckert & Ziegler, Lot 82241-334			(Purchased Reagent)		Americium-241	6.638 Bq
							Pu-239	6.797 Bq
							Thorium-230	6.629 Bq
82242-334_00001	06/08/60	Eckert & Ziegler, Lot 82242-334			(Purchased Reagent)		Americium-241	7.145 Bq
							Pu-239	6.414 Bq
							Thorium-230	6.583 Bq
82243-334_00001	06/09/60	Eckert & Ziegler, Lot 82243-334			(Purchased Reagent)		Americium-241	6.39 Bq
							Pu-239	5.979 Bq
							Thorium-230	5.856 Bq
82244-334_00001	06/09/60	Eckert & Zigler, Lot 82244-334			(Purchased Reagent)		Americium-241	6.897 Bq
							Pu-239	6.717 Bq
							Pulser	
							Thorium-230	7.352 Bq
							U	
82245-334_00001	06/09/60	Eckert & Ziegler, Lot 82245-334			(Purchased Reagent)		Americium-241	5.528 Bq
							Pu-239	5.437 Bq
							Pulser	
							Thorium-230	6.727 Bq
							U	
82246-334_00001	06/09/60	Eckert & Ziegler, Lot 82246-334			(Purchased Reagent)		Americium-241	6.002 Bq
							Pu-239	5.353 Bq
							Thorium-230	5.57 Bq
82247-334_00001	06/10/60	Eckert & Ziegler, Lot 82247-334			(Purchased Reagent)		Americium-241	6.291 Bq
							Pu-239	5.746 Bq
							Thorium-230	6.251 Bq
Ba Carrier_00008	12/16/14	CPI, Lot 13L009			(Purchased Reagent)		Ba Carrier	20000 ug/mL
Hg Curve Int._00401	05/22/14	05/21/14	2% Nitric Acid, Lot 309914	100 mL	HG CAL_00006	0.1 mL	Mercury	0.1 ug/mL
.HG CAL_00006	08/30/14	Spex, Lot 18-136HGY			(Purchased Reagent)		Mercury	100 ug/mL
Hg Curve Int._00403	05/23/14	05/22/14	2% Nitric Acid, Lot 309914	100 mL	HG CAL_00006	0.1 mL	Mercury	0.1 ug/mL
.HG CAL_00006	08/30/14	Spex, Lot 18-136HGY			(Purchased Reagent)		Mercury	100 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
Hg Curve Int._00404	05/23/14	05/22/14	2% Nitric Acid, Lot 309914	100 mL	HG CAL_00006	0.1 mL	Mercury	0.1 ug/mL
.HG CAL_00006	08/30/14		Spex, Lot 18-136HGY		(Purchased Reagent)		Mercury	100 ug/mL
Hg Curve Int._00405	05/28/14	05/27/14	2% Nitric Acid, Lot 309914	100 mL	HG CAL_00006	0.1 mL	Mercury	0.1 ug/mL
.HG CAL_00006	08/30/14		Spex, Lot 18-136HGY		(Purchased Reagent)		Mercury	100 ug/mL
Hg QC Int._00388	05/28/14	05/27/14	2% Nitric Acid, Lot 309914	100 mL	HG QC_00004	0.1 mL	Mercury	0.1 ug/mL
.HG QC_00004	09/01/14		Leeman Labs, Lot 1323201		(Purchased Reagent)		Mercury	100 ug/mL
ICP CAL1/LLC_00012	06/12/14	05/12/14	5% HCl/5%HN03, Lot 336380	1000 mL	ICPC13 LLC A_00002	2 mL	Aluminum	0.2 ug/mL
							Arsenic	0.01 ug/mL
							Ba Carrier	0.05 ug/mL
							Beryllium	0.005 ug/mL
							Cadmium	0.005 ug/mL
							Calcium	1 ug/mL
							Chromium	0.01 ug/mL
							Cobalt	0.05 ug/mL
							Copper	0.025 ug/mL
							Iron	0.1 ug/mL
							Lead	0.01 ug/mL
							Magnesium	1 ug/mL
							Manganese	0.015 ug/mL
							Nickel	0.04 ug/mL
							Potassium	5 ug/mL
							Selenium	0.015 ug/mL
							Sodium	1 ug/mL
							Thallium	0.02 ug/mL
							Vanadium	0.05 ug/mL
							Zinc	0.02 ug/mL
					ICPC13 LLC B_00001	2 mL	Antimony	0.01 ug/mL
							Silver	0.01 ug/mL
.ICPC13 LLC A_00002	09/10/14		AccuScience, Lot 1050477		(Purchased Reagent)		Aluminum	100 ug/mL
							Arsenic	5 ug/mL
							Ba Carrier	25 ug/mL
							Beryllium	2.5 ug/mL
							Cadmium	2.5 ug/mL
							Calcium	500 ug/mL
							Chromium	5 ug/mL
							Cobalt	25 ug/mL
							Copper	12.5 ug/mL
							Iron	50 ug/mL
							Lead	5 ug/mL
							Magnesium	500 ug/mL
							Manganese	7.5 ug/mL
							Nickel	20 ug/mL
							Potassium	2500 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Selenium	7.5 ug/mL
							Sodium	500 ug/mL
							Thallium	10 ug/mL
							Vanadium	25 ug/mL
							Zinc	10 ug/mL
.ICPC13 LLC B_00001	09/10/14		AccuScience, Lot 1050477		(Purchased Reagent)		Antimony	5 ug/mL
							Silver	5 ug/mL
ICP CAL2/CCV_00018	06/12/14	05/12/14	5% HCl/5@HN03, Lot 363689	1000 mL	ICPC13 CAL A_00001	5 mL	Antimony	1 ug/mL
							Silver	1 ug/mL
					ICPC13 CAL B_00001	5 mL	Potassium	50 ug/mL
							Sodium	50 ug/mL
					ICPC13 CAL C_00001	5 mL	Aluminum	50 ug/mL
							Calcium	50 ug/mL
							Iron	50 ug/mL
							Magnesium	50 ug/mL
					ICPC13 CAL D_00001	5 mL	Ba Carrier	5 ug/mL
							Lead	5 ug/mL
							Vanadium	5 ug/mL
							Zinc	5 ug/mL
					ICPC13 CAL E_00001	5 mL	Arsenic	5 ug/mL
							Beryllium	5 ug/mL
							Cadmium	5 ug/mL
							Chromium	5 ug/mL
							Cobalt	5 ug/mL
							Copper	5 ug/mL
							Manganese	5 ug/mL
							Nickel	5 ug/mL
							Selenium	1 ug/mL
							Thallium	1 ug/mL
.ICPC13 CAL A_00001	09/16/14		AccuScience, Lot 1050679		(Purchased Reagent)		Antimony	200 ug/mL
							Silver	200 ug/mL
.ICPC13 CAL B_00001	09/16/14		AccuScience, Lot 1050680		(Purchased Reagent)		Potassium	10000 ug/mL
							Sodium	10000 ug/mL
.ICPC13 CAL C_00001	09/16/14		AccuScience, Lot 1050681		(Purchased Reagent)		Aluminum	10000 ug/mL
							Calcium	10000 ug/mL
							Iron	10000 ug/mL
							Magnesium	10000 ug/mL
.ICPC13 CAL D_00001	09/16/14		AccuScience, Lot 1050682		(Purchased Reagent)		Ba Carrier	1000 ug/mL
							Lead	1000 ug/mL
							Vanadium	1000 ug/mL
							Zinc	1000 ug/mL
.ICPC13 CAL E_00001	09/16/14		AccuScience, Lot 1050696		(Purchased Reagent)		Arsenic	1000 ug/mL
							Beryllium	1000 ug/mL
							Cadmium	1000 ug/mL
							Chromium	1000 ug/mL
							Cobalt	1000 ug/mL
							Copper	1000 ug/mL

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Manganese	1000 ug/mL
							Nickel	1000 ug/mL
							Selenium	200 ug/mL
							Thallium	200 ug/mL
ICP CAL3\LRC_00010	06/12/14	05/12/14	5% HCl /5%HN03, Lot 363689	1000 mL	ICPC13 CAL A_00001	10 mL	Antimony	2 ug/mL
							Silver	2 ug/mL
					ICPC13 CAL B_00001	10 mL	Potassium	100 ug/mL
							Sodium	100 ug/mL
					ICPC13 CAL C_00001	10 mL	Aluminum	100 ug/mL
							Calcium	100 ug/mL
							Iron	100 ug/mL
							Magnesium	100 ug/mL
					ICPC13 CAL D_00001	10 mL	Ba Carrier	10 ug/mL
							Lead	10 ug/mL
							Vanadium	10 ug/mL
							Zinc	10 ug/mL
					ICPC13 CAL E_00001	10 mL	Arsenic	10 ug/mL
							Beryllium	10 ug/mL
							Cadmium	10 ug/mL
							Chromium	10 ug/mL
							Cobalt	10 ug/mL
							Copper	10 ug/mL
							Manganese	10 ug/mL
							Nickel	10 ug/mL
							Selenium	2 ug/mL
							Thallium	2 ug/mL
.ICPC13 CAL A_00001	09/16/14		AccuScience, Lot 1050679		(Purchased Reagent)		Antimony	200 ug/mL
							Silver	200 ug/mL
.ICPC13 CAL B_00001	09/16/14		AccuScience, Lot 1050680		(Purchased Reagent)		Potassium	10000 ug/mL
							Sodium	10000 ug/mL
.ICPC13 CAL C_00001	09/16/14		AccuScience, Lot 1050681		(Purchased Reagent)		Aluminum	10000 ug/mL
							Calcium	10000 ug/mL
							Iron	10000 ug/mL
							Magnesium	10000 ug/mL
.ICPC13 CAL D_00001	09/16/14		AccuScience, Lot 1050682		(Purchased Reagent)		Ba Carrier	1000 ug/mL
							Lead	1000 ug/mL
							Vanadium	1000 ug/mL
							Zinc	1000 ug/mL
.ICPC13 CAL E_00001	09/16/14		AccuScience, Lot 1050696		(Purchased Reagent)		Arsenic	1000 ug/mL
							Beryllium	1000 ug/mL
							Cadmium	1000 ug/mL
							Chromium	1000 ug/mL
							Cobalt	1000 ug/mL
							Copper	1000 ug/mL
							Manganese	1000 ug/mL
							Nickel	1000 ug/mL
							Selenium	200 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Thallium	200 ug/mL
ICP ICV_00008	06/12/14	05/12/14	5% Nitric Acid, Lot 363689	1000 mL	ICPC ICV 1_00001	5 mL	Antimony	1 ug/mL
					ICPC ICV 3_00001	5 mL	Aluminum	50 ug/mL
							Calcium	50 ug/mL
							Iron	50 ug/mL
							Sodium	50 ug/mL
					ICPC ICV 4_00001	5 mL	Arsenic	5 ug/mL
							Ba Carrier	5 ug/mL
							Beryllium	5 ug/mL
							Cadmium	5 ug/mL
							Chromium	5 ug/mL
							Cobalt	5 ug/mL
							Copper	5 ug/mL
							Lead	5 ug/mL
							Manganese	5 ug/mL
							Nickel	5 ug/mL
							Selenium	1 ug/mL
							Silver	1 ug/mL
							Thallium	1 ug/mL
							Vanadium	5 ug/mL
							Zinc	5 ug/mL
					ICPC ICV2_00001	5 mL	Magnesium	50 ug/mL
							Potassium	50 ug/mL
.ICPC ICV 1_00001	11/01/14	Inorganic Venures, Lot G2-MEB499048			(Purchased Reagent)		Antimony	200 ug/mL
.ICPC ICV 3_00001	10/24/14	Inorganic Ventures, Lot G2-MEB499049			(Purchased Reagent)		Aluminum	10000 ug/mL
							Calcium	10000 ug/mL
							Iron	10000 ug/mL
							Sodium	10000 ug/mL
.ICPC ICV 4_00001	11/01/14	Inorganic Ventures, Lot G2-MEB499047			(Purchased Reagent)		Arsenic	1000 ug/mL
							Ba Carrier	1000 ug/mL
							Beryllium	1000 ug/mL
							Cadmium	1000 ug/mL
							Chromium	1000 ug/mL
							Cobalt	1000 ug/mL
							Copper	1000 ug/mL
							Lead	1000 ug/mL
							Manganese	1000 ug/mL
							Nickel	1000 ug/mL
							Selenium	200 ug/mL
							Silver	200 ug/mL
							Thallium	200 ug/mL
							Vanadium	1000 ug/mL
							Zinc	1000 ug/mL
.ICPC ICV2_00001	11/01/14	Inorganic Ventures, Lot G2-MEB499050			(Purchased Reagent)		Magnesium	10000 ug/mL
							Potassium	10000 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
ICPC MIX AB_00041	06/12/14	05/12/14	5% HCl /5%HN03, Lot 363689	1000 mL	ICPC13 AB 1_00001	5 mL	Arsenic	2.5 ug/mL
							Ba Carrier	2.5 ug/mL
							Beryllium	2.5 ug/mL
							Lead	2.5 ug/mL
							Selenium	0.5 ug/mL
							Vanadium	2.5 ug/mL
							Zinc	2.5 ug/mL
					ICPC13 AB 2_00001	5 mL	Antimony	0.5 ug/mL
							Cadmium	2.5 ug/mL
							Chromium	2.5 ug/mL
							Cobalt	2.5 ug/mL
							Copper	2.5 ug/mL
							Manganese	2.5 ug/mL
							Nickel	2.5 ug/mL
							Silver	0.5 ug/mL
							Thallium	0.5 ug/mL
					ICPC13 ICSA 1_00001	5 mL	Potassium	100 ug/mL
							Sodium	100 ug/mL
					ICPC13 ICSA 2_00001	5 mL	Aluminum	100 ug/mL
							Calcium	100 ug/mL
							Iron	100 ug/mL
							Magnesium	100 ug/mL
.ICPC13 AB 1_00001	09/10/14		AccuScience, Lot 105480		(Purchased Reagent)		Arsenic	500 ug/mL
							Ba Carrier	500 ug/mL
							Beryllium	500 ug/mL
							Lead	500 ug/mL
							Selenium	100 ug/mL
							Vanadium	500 ug/mL
							Zinc	500 ug/mL
.ICPC13 AB 2_00001	09/10/14		AccuScience, Lot 105048		(Purchased Reagent)		Antimony	100 ug/mL
							Cadmium	500 ug/mL
							Chromium	500 ug/mL
							Cobalt	500 ug/mL
							Copper	500 ug/mL
							Manganese	500 ug/mL
							Nickel	500 ug/mL
							Silver	100 ug/mL
							Thallium	100 ug/mL
.ICPC13 ICSA 1_00001	09/20/14		AccuScience, Lot 1050486		(Purchased Reagent)		Potassium	20000 ug/mL
							Sodium	20000 ug/mL
.ICPC13 ICSA 2_00001	09/20/14		AccuScience, Lot 1050486		(Purchased Reagent)		Aluminum	20000 ug/mL
							Calcium	20000 ug/mL
							Iron	20000 ug/mL
							Magnesium	20000 ug/mL
ICPC MIX ICSA_00037	06/12/14	05/12/14	5% HCl/5%HN03, Lot 363689	1000 mL	ICPC13 ICSA 1_00001	5 mL	Potassium	100 ug/mL
							Sodium	100 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					ICPC13 ICSA 2_00001	5 mL	Aluminum	100 ug/mL
							Calcium	100 ug/mL
							Iron	100 ug/mL
							Magnesium	100 ug/mL
.ICPC13 ICSA 1_00001	09/20/14	AccuScience, Lot 1050486			(Purchased Reagent)		Potassium	20000 ug/mL
							Sodium	20000 ug/mL
.ICPC13 ICSA 2_00001	09/20/14	AccuScience, Lot 1050486			(Purchased Reagent)		Aluminum	20000 ug/mL
							Calcium	20000 ug/mL
							Iron	20000 ug/mL
							Magnesium	20000 ug/mL
Marn Soil_00002	03/01/16	Eckert & Ziegler, Lot 83814-334			(Purchased Reagent)		Americium-241	2870 Bq
							Cd-109	39231 Bq
							Ce-139	1302 Bq
							Cesium-137	1087 Bq
							Co-57	849 Bq
							Cobalt-60	1788 Bq
							Hg-203	2820 Bq
							Lead-210	35040 Bq
							Sn-113	2306 Bq
							Y-88	3762 Bq
MarnSolid_00002	02/09/17	Eckert & Ziegler, Lot 90099			(Purchased Reagent)		Americium-241	2797 Bq
							Cd-109	39337 Bq
							Ce-139	1320 Bq
							Cesium-137	1122 Bq
							Co-57	870 Bq
							Hg-203	2814 Bq
							Lead-210	35883 Bq
							Sn-113	2322 Bq
							Y-88	3821 Bq
PR_LCSSRM_00004	10/31/16	ERA, Lot DO81-540			(Purchased Reagent)		Aluminum	9390 mg/Kg
							Antimony	129 mg/Kg
							Arsenic	88.4 mg/Kg
							B	101 mg/Kg
							Ba Carrier	210 mg/Kg
							Beryllium	55.8 mg/Kg
							Cadmium	142 mg/Kg
							Calcium	7530 mg/Kg
							Chromium	86.8 mg/Kg
							Cobalt	199 mg/Kg
							Copper	268 mg/Kg
							Iron	12800 mg/Kg
							Lead	97.9 mg/Kg
							Magnesium	2850 mg/Kg
							Manganese	425 mg/Kg
							Mercury	9.03 mg/Kg
							Mo	103 mg/Kg
							Nickel	236 mg/Kg

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Potassium	2570 mg/Kg
							Selenium	127 mg/Kg
							Silver	66.2 mg/Kg
							Sn	149 mg/Kg
							Sodium	1040 mg/Kg
							Sr	167 mg/Kg
							Thallium	140 mg/Kg
							Ti	215 mg/Kg
							Vanadium	156 mg/Kg
							Zinc	130 mg/Kg
PR_LCSSRM_00006	10/31/16		ERA, Lot DO81-540		(Purchased Reagent)		Aluminum	9390 mg/Kg
							Antimony	129 mg/Kg
							Arsenic	88.4 mg/Kg
							B	101 mg/Kg
							Ba Carrier	210 mg/Kg
							Beryllium	55.8 mg/Kg
							Cadmium	142 mg/Kg
							Calcium	7530 mg/Kg
							Chromium	86.8 mg/Kg
							Cobalt	199 mg/Kg
							Copper	268 mg/Kg
							Iron	12800 mg/Kg
							Lead	97.9 mg/Kg
							Magnesium	2850 mg/Kg
							Manganese	425 mg/Kg
							Mercury	9.03 mg/Kg
							Mo	103 mg/Kg
							Nickel	236 mg/Kg
							Potassium	2570 mg/Kg
							Selenium	127 mg/Kg
							Silver	66.2 mg/Kg
							Sn	149 mg/Kg
							Sodium	1040 mg/Kg
							Sr	167 mg/Kg
							Thallium	140 mg/Kg
							Ti	215 mg/Kg
							Vanadium	156 mg/Kg
							Zinc	130 mg/Kg
PREP 1 and 2_00002	01/30/15		AccuScience, Lot 1055262		(Purchased Reagent)		Aluminum	2000 mg/L
							Antimony	100 mg/L
							Arsenic	200 mg/L
							B	400 mg/L
							Ba Carrier	200 mg/L
							Beryllium	200 mg/L
							Bi	200 mg/L
							Cadmium	200 mg/L
							Calcium	2000 mg/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Chromium	200 mg/L
							Cobalt	200 mg/L
							Copper	200 mg/L
							Iron	2000 mg/L
							Lead	200 mg/L
							Li	200 mg/L
							Magnesium	2000 mg/L
							Manganese	200 mg/L
							Mo	100 mg/L
							Nb	100 mg/L
							Nickel	200 mg/L
							P	200 mg/L
							Potassium	2000 mg/L
							Selenium	100 mg/L
							Silver	40 mg/L
							Sm	200 mg/L
							Sn	200 mg/L
							Sodium	2000 mg/L
							Sr	200 mg/L
							Sulfur	2000 mg/L
							Th	200 mg/L
							Thallium	40 mg/L
							Ti	200 mg/L
							U	200 mg/L
							Vanadium	200 mg/L
							W	200 mg/L
							Zinc	200 mg/L
							Zr	200 mg/L
Ra-226_00008	09/21/13	08/28/12	1M HNO3, Lot 0	1000 mL	Ra-226_00003	3 mL	Ra	25.0433 dpm/mL
							Radium-226	25.0433 dpm/mL
							Total Alpha Radium	25.0433 dpm/mL
.Ra-226_00003	09/09/41	03/07/03	1M HNO3, Lot 0	100 mL	Ra-226_00001	5.0931 g	Ra	8347.78 dpm/mL
							Radium-226	8347.78 dpm/mL
							Total Alpha Radium	8347.78 dpm/mL
..Ra-226_00001	09/09/41	NIST, Lot SRM 4967			(Purchased Reagent)		Ra	2729 Bq/g
							Radium-226	2729 Bq/g
							Total Alpha Radium	2729 Bq/g
Ra-228_00007	07/16/14	06/18/12	0.5M HCL, Lot 0	500 mL	Ra-228_00003	2 mL	Radium-228	23.2417 dpm/mL
.Ra-228_00003	02/03/34	09/01/06	0.5M HCL, Lot 0	200 mL	Ra-228_00002	4.9582 g	Radium-228	5810.43 dpm/mL
..Ra-228_00002	02/03/34	Analytics, Lot 72287-334			(Purchased Reagent)		Radium-228	3906.28 Bq/g

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
Ra226 Cal_00001	10/06/52	10/06/03	0.5M HNO3, Lot 10/06/2003	100 mL	Th-230 Ra226_00001	5.1498 g	Thorium-230	4567.94 dpm/g
.Th-230 Ra226_00001	12/19/52	Analytics, Lot 65090-334			(Purchased Reagent)		Thorium-230	88701.2 dpm/g
RA22609A120_00003	05/16/14	Eckert & Ziegler, Lot 1388-74			(Purchased Reagent)		Ra	100.02 dpm/mL
							Radium-226	100.02 dpm/mL
							Total Alpha Radium	100.02 dpm/mL
Source A_00001	04/01/59	02/23/11	water, Lot 79670-334	0.9986 Source	Gamma Ampuole_00001	0.9986 g	Americium-241	9.4429 Bq
							Cd-109	132.909 Bq
							Ce-139	4.4538 Bq
							Cesium-137	3.7296 Bq
							Co-57	2.9513 Bq
							Cobalt-60	6.2002 Bq
							Hg-203	9.6996 Bq
							Sn-113	7.6266 Bq
							Y-88	12.712 Bq
.Gamma Ampuole_00001	04/07/59	Analytics, Lot 79670-334			(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source C_00001	04/01/59	02/23/12	water, Lot 79670-334	1.0148 g	Gamma Ampuole_00001	1.0148 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59	Analytics, Lot 79670-334			(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source D_00001	04/01/59	02/23/11	water, Lot 79670-334	0.9781 g	Gamma Ampuole_00001	0.9781 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source E_00001	04/01/59	02/23/11	water, Lot 79670-334	1.0205 g	Gamma Ampuole_00001	1.0205 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source F_00001	01/01/61	02/23/11	water, Lot 83725-334	10 mL	Gamma Ampuole_00003	2.0327 mL	Americium-241	1846.42 Bq
							Cd-109	26819.3 Bq
							Ce-139	890.424 Bq
							Cesium-137	743.562 Bq
							Co-57	580.6 Bq
							Cobalt-60	1222.38 Bq
							Hg-203	1926.02 Bq
							Sn-113	1576.93 Bq
							Y-88	2572.87 Bq
.Gamma Ampuole_00003	01/19/61		Analytics, Lot 83725-334		(Purchased Reagent)		Americium-241	9083.6 Bq
							Cd-109	131939 Bq
							Ce-139	4380.5 Bq
							Cesium-137	3658 Bq
							Co-57	2856.3 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Cobalt-60	6013.6 Bq
							Hg-203	9475.2 Bq
							Sn-113	7757.8 Bq
							Y-88	12657.4 Bq
Source G_00001	01/01/61	01/01/11	water, Lot 83725-334	10 mL	Gamma Ampuole_00003	1.8639 g	Americium-241	1693.09 Bq
							Cd-109	24592.1 Bq
							Ce-139	816.481 Bq
							Cesium-137	681.815 Bq
							Co-57	532.386 Bq
							Cobalt-60	1120.87 Bq
							Hg-203	1766.08 Bq
							Sn-113	1445.98 Bq
							Y-88	2359.21 Bq
.Gamma Ampuole_00003	01/19/61		Analytics, Lot 83725-334		(Purchased Reagent)		Americium-241	9083.6 Bq
							Cd-109	131939 Bq
							Ce-139	4380.5 Bq
							Cesium-137	3658 Bq
							Co-57	2856.3 Bq
							Cobalt-60	6013.6 Bq
							Hg-203	9475.2 Bq
							Sn-113	7757.8 Bq
							Y-88	12657.4 Bq
Source H_00002	01/01/51	01/01/12	wataer, Lot 83725-334	10 mL	Gamma Ampuole_00003	2.1184 g	Americium-241	1924.27 Bq
							Cd-109	27950 Bq
							Ce-139	927.965 Bq
							Cesium-137	774.911 Bq
							Co-57	605.079 Bq
							Cobalt-60	1273.92 Bq
							Hg-203	2007.23 Bq
							Sn-113	1643.41 Bq
							Y-88	2681.34 Bq
.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
Sr-90_00004	09/17/59	06/21/11	0.1M HCL, Lot 0	100 mL	Sr-90_00001	5.0139 g	Gross Beta	45120.6 dpm/mL
							Sr	22560.3 dpm/mL
							Sr-90	22560.3 dpm/mL
.Sr-90_00001	09/17/59		Eckert & Ziegler, Lot 80573-334		(Purchased Reagent)		Gross Beta	14998.5 Bq/g

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Sr	7499.25 Bq/g
							Sr-90	7499.25 Bq/g
Sr-90_00018	11/29/62	11/28/12	0.1M HCL, Lot 0	100 mL	Sr-90_00017	4.9997 g	Gross Beta	44774.2 dpm/mL
							Sr-90	22387.1 dpm/mL
.Sr-90_00017	11/29/62	Analytics, Lot 92352			(Purchased Reagent)		Gross Beta	14925.6 Bq/g
							Sr-90	7462.82 Bq/g
Th-229_00012	12/26/14	12/23/13	0.1M HNO3, Lot L0022	500 mL	Th-229_00004	15 mL	Thorium-229	67.9293 dpm/mL
.Th-229_00004	07/14/60	01/26/11	0.1M HNO3, Lot 0	100 mL	Th-229_00002	5.0613 g	Thorium-229	2264.31 dpm/mL
..Th-229_00002	07/14/60	Eckert & Ziegler, Lot 82832-334			(Purchased Reagent)		Thorium-229	745.63 Bq/g
Th-230_00003	04/11/61	06/24/11	1M HNO3, Lot 0	100 mL	Th-230_00001	5.0878 g	Gross Alpha	2397.01 dpm/mL
							Thorium-230	2397.01 dpm/mL
.Th-230_00001	04/11/61	Eckert & Ziegler, Lot 84460-334			(Purchased Reagent)		Gross Alpha	785.217 Bq/g
							Thorium-230	785.217 Bq/g
Th-230_00016	11/29/62	11/28/12	0.5M HNO3, Lot 0	100 mL	Th-230_00015	5.0489 g	Gross Alpha	2374.49 dpm/mL
							Thorium-230	2374.49 dpm/mL
.Th-230_00015	11/29/62	Analytics, Lot 92523			(Purchased Reagent)		Gross Alpha	783.829 Bq/g
							Thorium-230	783.829 Bq/g
Th-230_00023	01/28/15	02/04/13	1M HNO3, Lot 0	200 mL	Th-230_00006	4 mL	Thorium-230	47.9403 dpm/mL
.Th-230_00006	04/11/61	06/24/11	1M HNO3, Lot 0	100 mL	Th-230_00002	5.0878 g	Thorium-230	2397.01 dpm/mL
..Th-230_00002	04/11/61	Eckert & Ziegler, Lot 84460-334			(Purchased Reagent)		Thorium-230	785.217 Bq/g
TRM-2_00001	03/20/50	DOE, Lot TRM-2			(Purchased Reagent)		Lead-210	22.1 pCi/g
							Radium-226	25.4 pCi/g
							Thorium-230	24.5 pCi/g
							Uranium-233/234	6.2 pCi/g
							Uranium-238	6 pCi/g
Tuna Can LCS_00002	01/22/14	Analytics, Lot 74139-334			(Purchased Reagent)		Americium-241	219 dpm/g
							Cesium-137	82.3 dpm/g
							Cobalt-60	136 dpm/g
Tuna Can LCS_00003	10/31/14	Analytics, Lot 74139-334			(Purchased Reagent)		Americium-241	219 dpm/g
							Cesium-137	82.3 dpm/g
							Cobalt-60	136 dpm/g
Tuna Can_00002	02/03/15	Eckert & Ziegler, Lot 81427-334			(Purchased Reagent)		Americium-241	1164 Bq
							Cd-109	16063 Bq
							Ce-139	546 Bq
							Cesium-137	465 Bq
							Co-57	357 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Cobalt-60	742 Bq
							Hg-203	1208 Bq
							Lead-210	15186 Bq
							Sn-113	943 Bq
							Y-88	1571 Bq
Tuna Can_00003	02/09/17	Eckert & Ziegler, Lot 90099			(Purchased Reagent)		Americium-241	1164 Bq
							Cd-109	16373 Bq
							Ce-139	549 Bq
							Cesium-137	467 Bq
							Co-57	362 Bq
							Cobalt-60	735 Bq
							Hg-203	1171 Bq
							Lead-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
							Lead-210	14606 Bq
							Sn-113	961 Bq
							Y-88	1568 Bq
U-232_00025	05/11/15	05/07/14	DI Water, Lot 0	250 mL	U-232_00009	2 mL	Uranium-232	82.2457 dpm/mL
.U-232_00009	08/25/61	08/29/11	1M HNO3, Lot 0	100 mL	U-232_00003	5.1609 g	Uranium-232	10280.7 dpm/mL
..U-232_00003	08/25/61	Eckert & Ziegler, Lot 85539-334			(Purchased Reagent)		Uranium-232	3320.07 Bq/g
U-232_00026	05/06/15	06/13/13	2M HNO3, Lot n/a	1000 mL	U-232_00009	8 mL	Uranium-232	82.2457 dpm/mL
.U-232_00009	08/25/61	08/29/11	1M HNO3, Lot 0	100 mL	U-232_00003	5.1609 g	Uranium-232	10280.7 dpm/mL
..U-232_00003	08/25/61	Eckert & Ziegler, Lot 85539-334			(Purchased Reagent)		Uranium-232	3320.07 Bq/g
UNAT Spike_00001	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	UNAT Parent_00001	20 mL	Uranium-233/234	70.6912 dpm/mL
							Uranium-235/236	3.37064 dpm/mL
							Uranium-238	72.265 dpm/mL
.UNAT Parent_00001	03/30/58	05/03/13	1M HNO3, Lot n/a	200 mL	UNAT Ampoule_00001	19.2509 g	Uranium-233/234	706.912 dpm/mL
							Uranium-235/236	33.7064 dpm/mL
							Uranium-238	722.65 dpm/mL
..UNAT Ampoule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		Uranium-233/234	7344.2 dpm/g
							Uranium-235/236	350.18 dpm/g

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Uranium-238	7507.7 dpm/g
Y Carrier_00008	09/28/15	CPI, Lot 1058681			(Purchased Reagent)		Y Carrier	50000 mg/L

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 1956

6675
ID: 1L Marn_00002
Exp: 03/02/16 Prpd: JW Opn: 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

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

1L Marn_00004

St. Louis Radiological Standard Reverification Form

Standard ID Number: 1L Marn_6675
True Value = 5097.5 Bq/Sample
Date Analyzed: 2/15/2013

Radionuclide: Am-241

	Replicates	
#1	4993	Bq/Sample
#2	5086	Bq/Sample
#3	4995	Bq/Sample

Mean = 5024.667

1 sigma = 53.12564 1.96 sigma = 104.1262

True Value minus 5% = 4842.625 (True Value - 5%)
True Value plus 5% = 5352.375 (True Value + 5%)

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

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

Standard Reverification Acceptable? **Yes**

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

Reviewed By/Date: JW 2/20/13

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: 1L Marn_6675
True Value = 3294.5 Bq/Sample
Date Analyzed: 2/15/2013

Radionuclide: Co-60 1L

	Replicates	
#1	3157	Bq/Sample
#2	3243	Bq/Sample
#3	3135	Bq/Sample

Mean = 3178.333

1 sigma = 57.07305 1.96 sigma = 111.8632

True Value minus 5% = 3129.775 (True Value - 5%)
True Value plus 5% = 3459.225 (True Value + 5%)

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

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

Standard Reverification Acceptable? **Yes**

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

Reviewed By/Date: JW 2/20/13

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: 1l Marn_6675
True Value = 2003.5 Bq/Sample
Date Analyzed: 2/15/2013

Radionuclide: Cs-137

	Replicates	
#1	1933	Bq/Sample
#2	1961	Bq/Sample
#3	1949	Bq/Sample

Mean = 1947.667

1 sigma = 14.04754 1.96 sigma = 27.53318

True Value minus 5% = 1903.325 (True Value - 5%)
True Value plus 5% = 2103.675 (True Value + 5%)

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

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

Standard Reverification Acceptable? **Yes**

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

Reviewed By/Date: JW 4/12/11

SOP Reference: STL-QA-0002, Current Revision

Test America St. Louis Spectrum ID: 12_1LMarn_20130204

Sample Description: 12_1LMarn_6675_re-ver
Detector: Ge12 S/N10034336
Batch ID: 12
Work Order Number: 1LMarn
Lot Number: 6675_re-ver

Decay to Time: 1/1/2011 11:00 Live Time: 7200 sec
Acquisition Time: 2/15/2013 03:32:29 Real Time: 7597 sec
Analysis Time: 2/20/2013 09:54 Dead Time: 5.23 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Liquid_Marinelli 1L.Clb
Efficiency Cal Desc: Ge12_Marn1LCal_90062_032612
Efficiency Cal Date: 4/2/2012 17:17
Energy Cal Date: 2/28/2012 13:26
Library: DET_EnergyStandardMix & Mn, Zn.l
Bkgd Correction File: 12_2013-02-02_0428.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
AM-241	4.993E+03	0.2	8.575E+00	3.142E+02	1.328E+01
CD-109	6.962E+04	0.2	1.672E+02	4.406E+03	2.479E+02
CO-57	1.616E+03	0.6	1.035E+01	9.820E+01	1.838E+01
Ce-139	2.398E+03	2.7	6.538E+01	2.331E+02	1.366E+02
SN-113	4.125E+03	5.4	2.209E+02	3.294E+02	4.796E+02
CS-137	1.933E+03	0.3	5.094E+00	9.761E+01	5.422E+00
Mn-54	2.982E+03	0.7	2.108E+01	1.487E+02	2.977E+01
Y-898	7.047E+03	5.8	4.103E+02	5.371E+02	8.058E+02
Zn-65	6.569E+03	1.2	7.682E+01	3.282E+02	1.117E+02
Co-1173	3.101E+03	0.3	8.067E+00	1.510E+02	7.041E+00
Co-1332	3.157E+03	0.2	7.828E+00	1.560E+02	4.920E+00
Y-1836	7.692E+03	3.1	2.377E+02	5.012E+02	3.034E+02
Total	1.152E+05				

Analyst: Jody Watson

TestAmerica, Inc Spectrum name: 12_1LMarn_20130204.An1

Sample description
12_1LMarn_6675_re-ver

Spectrum Filename: C:\User\SPC\Det12\12_1LMarn_20130204.An1

Acquisition information

Start time:	2/15/2013 3:32:29 AM
Live time:	7200
Real time:	7597
Dead time:	5.23 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Liquid_Marinelli 1L.Clb
Ge12_Marn1LCal_90062_032612

Energy Calibration

Created:	2/28/2012 1:26:42 PM
Zero offset:	0.049 keV
Gain:	0.250 keV/channel
Quadratic:	-3.945E-08 keV/channel^2

Efficiency Calibration

Created:	4/2/2012 5:17:10 PM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 2.18 %
Log(Eff):	-2.771167E+00 + (4.009767E-01*Log(E)) + (-8.911171E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 0.25 %
Log(Eff):	-1.324587E+01 + (4.570937E+00*Log(E)) + (-5.039442E-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 (37.58keV)
Stop channel:	8000 (1999.36keV)
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

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	12_2013-02-02_0428.PBC 2/2/2013 4:28:50 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0584

***** 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
36.76	5138.	7.55	0.84	3.624E-02				
43.53	616.	56.59	0.85	4.187E-02				
48.69	11606.	4.22	0.89	4.530E-02				
49.86	18202.	2.91	0.89	4.600E-02				
59.54	648225.	0.17	0.91	5.068E-02	59.54	35.700	4.993E+03	AM241
88.03	316880.	0.24	0.96	5.599E-02	88.03	3.610	6.962E+04	CD109
102.95	456.	45.02	1.11	5.581E-02				
122.10	74467.	0.64	1.01	5.407E-02	122.06	85.600	1.615E+03	CO57
136.49	8641.	3.11	1.00	5.213E-02				
140.88	250.	68.28	0.46	5.147E-02				
154.79	170.	80.90	0.57	4.927E-02				
165.91	13146.	2.73	1.00	4.737E-02	165.85	79.900	2.398E+03	Ce139
194.47	428.	51.24	0.33	4.358E-02				
263.92	325.	73.81	0.38	3.667E-02				
344.31	944.	21.10	1.38	3.113E-02				
391.58	5189.	3.36	1.21	2.862E-02	391.69	64.000	4.205E+03	SN113
395.19	381.	39.22	1.22	2.845E-02				
455.45	273.	54.35	1.27	2.584E-02				
459.06	280.	53.16	1.27	2.570E-02				
510.93	3274.	8.35	2.36	2.384E-02				
579.94	138.	70.65	0.52	2.176E-02				
602.40	379.	50.83	0.44	2.116E-02				
613.62	470.	50.91	0.40	2.087E-02				
661.61	222792.	0.26	1.43	1.973E-02	661.66	85.210	1.933E+03	CS137
690.22	165.	83.10	0.50	1.910E-02				
816.21	109.	83.32	0.33	1.676E-02				
834.77	63184.	0.71	1.62	1.647E-02	834.85	99.980	2.982E+03	Mn54
876.46	229.	53.88	0.48	1.583E-02				

885.61	187.	61.97	0.31	1.570E-02				
897.98	4761.	5.82	1.72	1.553E-02	898.02	93.700	7.047E+03	Y898
918.14	272.	56.40	1.67	1.525E-02				
919.93	319.	48.16	1.67	1.523E-02				
948.57	744.	29.95	0.29	1.485E-02				
1015.37	371.	48.30	0.36	1.404E-02				
1089.44	434.	39.48	0.49	1.323E-02				
1115.38	34358.	1.17	1.81	1.297E-02	1115.55	50.600	6.569E+03	Zn65
1173.10	209549.	0.26	1.82	1.242E-02	1173.24	99.900	3.101E+03	Co1173
1203.75	205.	30.79	1.89	1.215E-02				
1208.51	159.	45.21	1.90	1.211E-02				
1249.20	248.	46.34	0.36	1.177E-02				
1270.02	63.	67.58	0.45	1.160E-02				
1332.36	191117.	0.25	1.91	1.112E-02	1332.50	99.982	3.157E+03	Co1332
1405.23	14.	126.57	0.46	1.061E-02				
1606.84	145.	38.49	0.67	9.398E-03				
1626.74	92.	41.34	0.33	9.293E-03				
1686.46	98.	41.34	0.53	8.990E-03				
1778.89	137.	39.94	0.34	8.555E-03				
1835.71	2943.	3.09	2.07	8.307E-03	1836.01	99.200	7.692E+03	Y1836
1883.88	168.	27.97	0.82	8.107E-03				
1897.64	66.	36.27	0.50	8.052E-03				
1956.93	68.	35.28	0.70	7.821E-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 Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
146.70	36.76	43650.	5138.	1.418E+05	7.55	0.837	- s
173.77	43.53	48366.	616.	1.471E+04	56.59	0.850	- s
194.41	48.63	113899.	11606.	2.562E+05	4.22	0.891	- D

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
199.07	49.79	130727.	18202.	3.957E+05	2.91	0.892	-	D
411.27	102.95	15657.	456.	8.177E+03	45.02	1.110	-	s
545.32	136.49	19063.	8641.	1.658E+05	3.11	1.004	-	
562.86	140.88	11602.	250.	4.867E+03	68.28	0.458	-	c
618.48	154.79	8685.	170.	3.457E+03	80.90	0.573	-	c
777.08	194.47	15890.	428.	9.820E+03	51.24	0.326	-	s
1054.68	263.92	16350.	325.	8.862E+03	73.81	0.375	-	s
1376.06	344.31	11620.	944.	3.033E+04	21.10	1.382	-	
1579.53	395.20	7807.	269.	9.467E+03	53.92	0.786	-	sM
1820.40	455.44	5006.	139.	5.378E+03	72.48	0.538	-	sc
1834.82	459.04	10946.	240.	9.337E+03	77.84	0.480	-	sc
2042.29	510.93	14793.	3274.	1.373E+05	8.35	2.357	-	s
2318.27	579.94	4035.	138.	6.357E+03	70.65	0.520	-	sc
2408.11	602.40	9183.	379.	1.791E+04	50.83	0.439	-	s
2452.99	613.62	11757.	470.	2.253E+04	50.91	0.399	-	s
2759.35	690.22	5567.	165.	8.620E+03	83.10	0.505	-	sc
3263.32	816.21	3488.	109.	6.502E+03	83.32	0.327	-	sc
3504.38	876.46	5276.	229.	1.444E+04	53.88	0.484	-	s
3540.98	885.61	4965.	187.	1.191E+04	61.97	0.305	-	s
3671.10	918.13	11618.	272.	1.783E+04	56.40	1.666	-	D
3678.29	919.93	11672.	319.	2.098E+04	48.16	1.667	-	D
3792.86	948.57	11290.	744.	5.011E+04	29.95	0.287	-	s
4060.14	1015.37	7632.	371.	2.646E+04	48.30	0.356	-	s
4356.55	1089.44	6938.	434.	3.279E+04	39.48	0.485	-	s
4813.99	1203.74	2058.	250.	2.055E+04	37.63	0.717	-	s
4833.06	1208.50	1794.	168.	1.383E+04	50.10	0.460	-	s
4995.96	1249.20	1986.	248.	2.104E+04	46.34	0.358	-	s
5079.30	1270.02	614.	63.	5.418E+03	67.58	0.447	-	s
5620.52	1405.23	150.	14.	1.320E+03	126.57	0.457	-	sc
6427.77	1606.84	495.	145.	1.543E+04	38.49	0.668	-	s
6507.48	1626.74	301.	92.	9.900E+03	41.34	0.325	-	s
6746.62	1686.46	318.	98.	1.088E+04	41.34	0.533	-	s
7116.83	1778.89	431.	137.	1.605E+04	39.94	0.344	-	s
7537.37	1883.88	306.	168.	2.072E+04	27.97	0.818	-	s
7592.48	1897.64	142.	66.	8.135E+03	36.27	0.501	-	s
7830.00	1956.93	145.	68.	8.695E+03	35.28	0.696	-	s

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

This section based on library: DET_EnergyStandardMix & Mn, Zn.l

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.76	59.54	136413.	648225.	90.031	0.17	0.907
CD-109	351.61	88.03	58352.	316880.	44.011	0.24	0.963
CO-57	487.80	122.10	32850.	74467.	10.343	0.64	1.009
Ce-139	662.90	165.91	25630.	13146.	1.826	2.73	1.002
Hg-203	1114.99	279.00	22973.	-66.	-0.009	324.64	1.109s
SN-113	1565.09	391.59	15977.	5089.	0.707	5.36	1.252
CS-137	2644.90	661.61	17821.	222792.	30.943	0.26	1.432
Mn-54	3337.58	834.77	18168.	63184.	8.776	0.71	1.620
Y-898	3590.46	897.98	13511.	4761.	0.661	5.82	1.720s
Zn-65	4460.38	1115.38	15559.	34358.	4.772	1.17	1.808
Co-1173	4691.36	1173.10	10305.	209549.	29.104	0.26	1.819
Co-1332	5328.82	1332.36	4011.	191117.	26.544	0.25	1.913
Y-1836	7344.42	1835.71	592.	2943.	0.409	3.09	2.074

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
AM-241		4.9933E+03				1.58E+05		
			59.54	4.993E+03	(	1.328E+01	1.72E-01 3.57E+01 G	
CD-109		6.9615E+04				4.63E+02		
			88.03	6.962E+04	(	2.479E+02	2.40E-01 3.61E+00 G	
CO-57		1.6155E+03				2.72E+02		
			122.06	1.615E+03	(	1.838E+01	6.41E-01 8.56E+01 G	
Ce-139		2.3981E+03				1.38E+02		
			165.85	2.398E+03	(	1.366E+02	2.73E+00 7.99E+01 G	
Hg-203		-3.1754E-01				4.66E+01		
			279.17	-3.175E-01	?(	3.407E+00	3.25E+02 8.15E+01 G	
SN-113		4.1246E+03				1.15E+02		
			391.69	4.125E+03	(	4.796E+02	5.36E+00 6.40E+01 G	
CS-137		1.9333E+03				1.10E+04		
			661.66	1.933E+03	(	5.422E+00	2.63E-01 8.52E+01 G	

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Mn-54		2.9820E+03					3.12E+02	
			834.85	2.982E+03	(	2.977E+01	7.07E-01	1.00E+02 G
Y-898		7.0471E+03					1.07E+02	
			898.02	7.047E+03	@(	8.058E+02	5.82E+00	9.37E+01 G
Zn-65	F	6.5691E+03					2.44E+02	
			1115.55	6.569E+03	(	1.117E+02	1.17E+00	5.06E+01 G
Co-1173		3.1012E+03					1.93E+03	
			1173.24	3.101E+03	(	7.041E+00	2.60E-01	9.99E+01 G
Co-1332		3.1570E+03					1.93E+03	
			1332.50	3.157E+03	(	4.920E+00	2.48E-01	1.00E+02 G
Y-1836		7.6919E+03					1.07E+02	
			1836.01	7.692E+03	(	3.034E+02	3.09E+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:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

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

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	279.00	22973.	-66.	-0.009	324.64	0.000E+00

P - Peakbackground subtraction

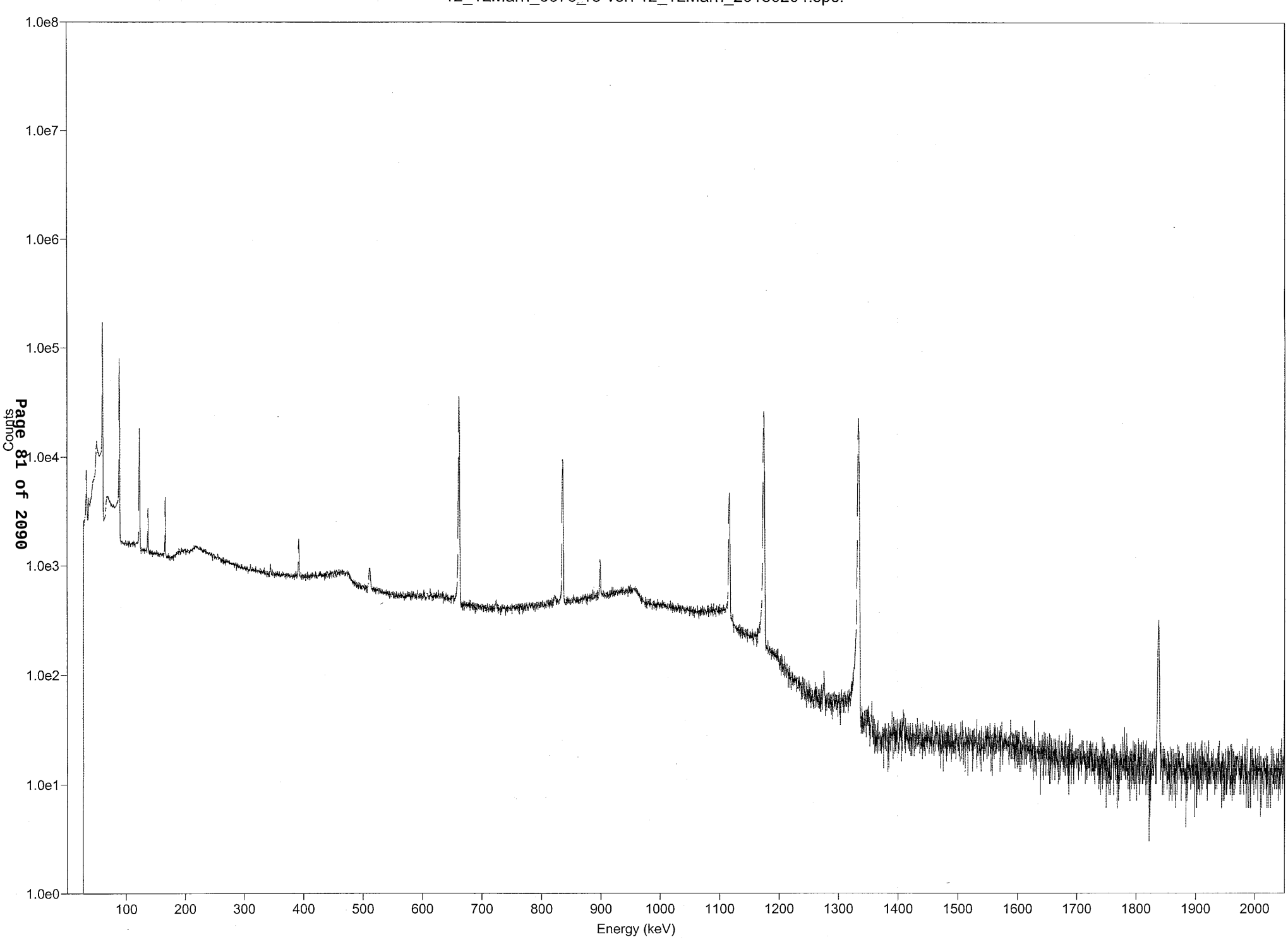
***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
AM-241	4.9763E+03	4.9933E+03	1.717E-01%		1.33E+01
CD-109	2.1774E+04	6.9615E+04	2.402E-01%		2.48E+02
CO-57	2.2346E+02	1.6155E+03	6.409E-01%		1.84E+01
Ce-139	4.8235E+01	2.3981E+03	2.727E+00%		1.37E+02
Hg-203 #A	-3.1754E-01	>12 Halflives	3.2464E+02%	3.4074E+00	
SN-113	3.8591E+01	4.1246E+03	5.357E+00%		4.80E+02
CS-137	1.8409E+03	1.9333E+03	2.635E-01%		5.42E+00
Mn-54	5.3310E+02	2.9820E+03	7.068E-01%		2.98E+01
Y-898 #	4.5449E+01	7.0471E+03	5.822E+00%		8.06E+02
Zn-65	7.2726E+02	6.5691E+03	1.169E+00%		1.12E+02
Co-1173	2.3455E+03	3.1012E+03	2.601E-01%		7.04E+00
Co-1332	2.3877E+03	3.1570E+03	2.479E-01%		4.92E+00
Y-1836	4.9607E+01	7.6919E+03	3.090E+00%		3.03E+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 (948.4 to 1999.4 keV) 3.499E+04 Bq/Sample
Total Decayed Activity (948.4 to 1999.4 keV) 1.1522832E+05 Bq/Sample


12_1LMarn_6675_re-ver. 12_1LMarn_20130204.spc.
1.0e8
1.0e7
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 15_1LMarn_20130225

Sample Description: 15_1LMarn_6675_re-ver
Detector: Ge15 SN/11012216
Batch ID: 15
Work Order Number: 1LMarn
Lot Number: 6675_re-ver

Decay to Time: 1/1/2011 11:00 Live Time: 7200 sec
Acquisition Time: 2/19/2013 21:03:28 Real Time: 7487 sec
Analysis Time: 2/20/2013 07:54 Dead Time: 3.84 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 15_Liquid_Marinelli 1L.Clb
Efficiency Cal Desc: 15_1LMarinelli_90062_030512
Efficiency Cal Date: 3/14/2012 17:18
Energy Cal Date: 2/28/2012 16:29
Library: DET_EnergyStandardMix & Mn, Zn.l
Bkgd Correction File: 15_2013-02-02_0428.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
AM-241	5.086E+03	0.2	1.011E+01	3.201E+02	1.571E+01
CD-109	7.057E+04	0.3	2.093E+02	4.469E+03	3.174E+02
CO-57	1.609E+03	0.7	1.171E+01	9.794E+01	2.150E+01
Ce-139	2.385E+03	3.2	7.640E+01	2.353E+02	1.655E+02
SN-113	4.642E+03	5.9	2.758E+02	3.895E+02	6.198E+02
CS-137	1.961E+03	0.3	6.690E+00	9.909E+01	7.312E+00
Mn-54	3.011E+03	0.9	2.768E+01	1.512E+02	4.059E+01
Y-898	7.964E+03	8.3	6.571E+02	7.650E+02	1.244E+03
Zn-65	6.522E+03	1.3	8.535E+01	3.281E+02	1.353E+02
Co-1173	3.195E+03	0.3	1.021E+01	1.557E+02	8.479E+00
Co-1332	3.243E+03	0.3	1.025E+01	1.603E+02	5.804E+00
Y-1836	7.187E+03	3.6	2.616E+02	4.883E+02	3.454E+02
Total	1.174E+05				

Analyst: Jody Watson

TestAmerica, Inc. Spectrum name: 15_1LMarn_20130225.An1

Sample description
15_1LMarn_6675_re-ver

Spectrum Filename: C:\User\SPC\Det15\15_1LMarn_20130225.An1

Acquisition information
Start time: 2/19/2013 9:03:28 PM
Live time: 7200
Real time: 7487
Dead time: 3.84 %
Detector ID: 15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_Liquid_Marinelli 1L.Clb
15_1LMarinelli_90062_030512

Energy Calibration
Created: 2/28/2012 4:29:17 PM
Zero offset: 0.044 keV
Gain: 0.250 keV/channel
Quadratic: -3.267E-08 keV/channel^2

Efficiency Calibration
Created: 3/14/2012 5:18:02 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.47 %
Log(Eff): -1.572527E+00 + (-4.580173E-02*Log(E)) + (-6.063230E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.05 %
Log(Eff): -1.327166E+01 + (4.478511E+00*Log(E)) + (-4.979721E-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 (37.57keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

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	15_2013-02-02_0428.PBC 2/2/2013 4:28:03 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0535

***** 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
36.48	2825.	10.89	0.91	2.717E-02				
42.57	608.	49.87	0.60	3.083E-02				
49.55	21252.	3.12	1.86	3.412E-02				
59.58	487285.	0.20	0.95	3.741E-02	59.54	35.700	5.086E+03	AM241
66.42	63.	398.25	0.77	3.888E-02				
88.11	231633.	0.30	0.98	4.066E-02	88.03	3.610	7.057E+04	CD109
103.26	462.	39.69	0.44	4.027E-02				
122.16	52563.	0.73	1.04	3.879E-02	122.06	85.600	1.609E+03	CO57
128.83	200.	57.27	0.37	3.810E-02				
136.53	6618.	3.95	1.08	3.725E-02				
165.96	9080.	3.20	1.09	3.368E-02	165.85	79.900	2.385E+03	Ce139
184.19	174.	79.03	1.07	3.142E-02				
186.87	356.	46.85	1.07	3.112E-02				
215.85	223.	57.70	0.65	2.815E-02				
255.26	394.	44.34	0.49	2.500E-02				
278.40	126.	143.74	1.16	2.343E-02	279.17	81.500	HL>Cutoff	Hg203
310.34	456.	44.10	0.40	2.168E-02				
344.08	422.	42.50	0.83	2.007E-02				
391.75	3537.	5.94	1.27	1.818E-02	391.69	64.000	4.642E+03	SN113
463.90	281.	67.27	0.57	1.593E-02				
623.89	190.	65.05	0.72	1.254E-02				
661.74	135608.	0.29	1.47	1.194E-02	661.66	85.210	1.944E+03	CS137
666.97	106.	105.63	1.48	1.186E-02				
672.06	141.	77.32	1.48	1.179E-02				
796.20	392.	39.17	0.80	1.021E-02				
834.93	37602.	0.92	1.59	9.807E-03	834.85	99.980	3.011E+03	Mn54
875.76	104.	63.24	0.46	9.410E-03				
885.01	208.	59.12	0.45	9.325E-03				
898.25	3094.	8.25	1.28	9.205E-03	898.02	93.700	7.964E+03	Y898
926.17	194.	65.73	0.51	8.963E-03				

1115.57	19728.	1.31	1.77	7.601E-03	1115.55	50.600	6.521E+03	Zn65
1173.26	126035.	0.32	1.80	7.264E-03	1173.24	99.900	3.195E+03	Co1173
1186.58	94.	68.35	0.46	7.190E-03				
1213.78	62.	61.82	0.45	7.044E-03				
1321.38	155.	32.46	0.83	6.519E-03				
1332.53	114010.	0.32	1.89	6.469E-03	1332.50	99.982	3.242E+03	Co1332
1415.02	139.	29.65	0.35	6.121E-03				
1836.04	1538.	3.64	2.23	4.790E-03	1836.01	99.200	7.187E+03	Y1836

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.63	36.48	30600.	2825.	1.040E+05	10.89	0.914	-	
169.96	42.57	36525.	608.	1.972E+04	49.87	0.605	-	s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
197.88	49.55	119732.	21252.	6.228E+05	3.12	1.864	-	s
265.30	66.42	25155.	63.	1.620E+03	398.25	0.774	-	sc
412.55	103.26	12418.	462.	1.146E+04	39.69	0.444	-	s
514.77	128.83	6460.	200.	5.249E+03	57.27	0.373	-	s
545.55	136.53	16853.	6618.	1.776E+05	3.95	1.077	-	s
736.09	183.97	9389.	174.	5.543E+03	79.03	1.072	-	sc
746.78	186.65	13737.	356.	1.144E+04	46.85	1.074	-	D
862.65	215.85	7526.	223.	7.915E+03	57.70	0.654	-	s
1020.21	255.26	10044.	394.	1.576E+04	44.34	0.491	-	s
1240.43	310.34	10923.	456.	2.105E+04	44.10	0.399	-	s
1375.30	344.08	9092.	422.	2.105E+04	42.50	0.832	-	s
1854.40	463.90	9645.	281.	1.761E+04	67.27	0.567	-	s
2494.23	623.89	4738.	190.	1.511E+04	65.05	0.719	-	s
2666.38	666.93	1799.	70.	5.900E+03	86.52	0.448	-	sc
2686.75	672.02	4425.	185.	1.569E+04	67.67	0.520	-	s
3183.47	796.20	5554.	392.	3.834E+04	39.17	0.795	-	s
3501.72	875.76	2111.	104.	1.105E+04	63.24	0.460	-	sc
3538.74	885.01	4717.	208.	2.232E+04	59.12	0.451	-	s
3703.39	926.17	5092.	194.	2.168E+04	65.73	0.508	-	s
4745.38	1186.58	1274.	94.	1.307E+04	68.35	0.465	-	s
4854.23	1213.78	554.	62.	8.731E+03	61.82	0.451	-	s
5284.84	1321.38	594.	155.	2.378E+04	32.46	0.826	-	s
5659.64	1415.02	260.	139.	2.271E+04	29.65	0.352	-	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	237.95	59.58	103990.	487285.	67.678	0.20	0.951
CD-109	352.01	88.11	49711.	231633.	32.171	0.30	0.976
CO-57	488.11	122.16	22553.	52563.	7.300	0.73	1.044
Ce-139	663.19	165.96	18123.	9080.	1.261	3.20	1.087
Hg-203	1112.69	278.40	16344.	126.	0.018	143.74	1.156
SN-113	1565.92	391.75	10152.	3537.	0.491	5.94	1.270s
CS-137	2645.47	661.70	11853.	136770.	18.996	0.34	1.451
Mn-54	3338.37	834.93	11706.	37602.	5.222	0.92	1.588
Y-898	3591.68	898.25	10638.	3094.	0.430	8.25	1.284
Zn-65	4461.20	1115.57	7610.	19728.	2.740	1.31	1.767
Co-1173	4692.08	1173.26	5069.	126035.	17.505	0.32	1.801
Co-1332	5329.49	1332.53	1868.	114010.	15.835	0.32	1.891

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Y-1836	7345.28	1836.04	233.	1538.	0.214	3.64	2.228

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample			COMMENTS
AM-241		5.0860E+03				1.58E+05			
			59.54	5.086E+03	(	1.571E+01	1.99E-01	3.57E+01	G
CD-109		7.0570E+04				4.63E+02			
			88.03	7.057E+04	(	3.174E+02	2.97E-01	3.61E+00	G
CO-57		1.6086E+03				2.72E+02			
			122.06	1.609E+03	(	2.150E+01	7.28E-01	8.56E+01	G
Ce-139		2.3853E+03				1.38E+02			
			165.85	2.385E+03	(	1.655E+02	3.20E+00	7.99E+01	G
Hg-203		9.1644E-01				4.66E+01			
			279.17	9.164E-01	(	4.352E+00	1.44E+02	8.15E+01	G
SN-113		4.6424E+03				1.15E+02			
			391.69	4.642E+03	@(	6.198E+02	5.94E+00	6.40E+01	G
CS-137		1.9608E+03				1.10E+04			
			661.66	1.961E+03	(	7.312E+00	3.41E-01	8.52E+01	G
Mn-54		3.0107E+03				3.12E+02			
			834.85	3.011E+03	(	4.059E+01	9.20E-01	1.00E+02	G
Y-898		7.9643E+03				1.07E+02			
			898.02	7.964E+03	(	1.244E+03	8.25E+00	9.37E+01	G
Zn-65	F	6.5215E+03				2.44E+02			
			1115.55	6.521E+03	(	1.353E+02	1.31E+00	5.06E+01	G
Co-1173		3.1948E+03				1.93E+03			
			1173.24	3.195E+03	(	8.479E+00	3.20E-01	9.99E+01	G
Co-1332		3.2425E+03				1.93E+03			
			1332.50	3.242E+03	(	5.804E+00	3.16E-01	1.00E+02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Y-1836	7.1870E+03				1.07E+02	
		1836.01	7.187E+03	(	3.454E+02 3.64E+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:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

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

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	278.40	16344.	126.	0.018	143.74	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
AM-241	5.0686E+03	5.0860E+03	1.987E-01%		1.57E+01
CD-109	2.1917E+04	7.0570E+04	2.966E-01%		3.17E+02
CO-57	2.1983E+02	1.6086E+03	7.283E-01%		2.15E+01
Ce-139	4.6849E+01	2.3853E+03	3.203E+00%		1.66E+02
Hg-203 #A	9.1644E-01	>12 Halflives	1.4374E+02%	4.3521E+00	
SN-113 #	4.2216E+01	4.6424E+03	5.940E+00%		6.20E+02
CS-137	1.8665E+03	1.9608E+03	3.412E-01%		7.31E+00
Mn-54	5.3261E+02	3.0107E+03	9.195E-01%		4.06E+01
Y-898	4.9809E+01	7.9643E+03	8.250E+00%		1.24E+03
Zn-65	7.1237E+02	6.5215E+03	1.309E+00%		1.35E+02
Co-1173	2.4122E+03	3.1948E+03	3.197E-01%		8.48E+00
Co-1332	2.4482E+03	3.2425E+03	3.161E-01%		5.80E+00
Y-1836	4.4948E+01	7.1870E+03	3.640E+00%		3.45E+02

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

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

Total Activity (215.7 to 1999.5 keV) 3.536E+04 Bq/Sample
Total Decayed Activity (215.7 to 1999.5 keV) 1.1737398E+05 Bq/Sample

Test America St. Louis Spectrum ID: 16_1lmarn_20130150

Sample Description: 16_1lmarn_6675_re-ver
Detector: Ge16 SN/11012217
Batch ID: 16
Work Order Number: 1lmarn
Lot Number: 6675_re-ver

Decay to Time: 1/1/2011 11:00 Live Time: 7200 sec
Acquisition Time: 2/20/2013 07:07:02 Real Time: 7664 sec
Analysis Time: 2/20/2013 09:16 Dead Time: 6.06 %
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: DET_EnergyStandardMix & Mn, Zn.l
Bkgd Correction File: 16_2013-02-02_0437.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
AM-241	4.995E+03	0.2	7.945E+00	3.143E+02	1.209E+01
CD-109	6.962E+04	0.2	1.615E+02	4.406E+03	2.381E+02
CO-57	1.581E+03	0.6	9.705E+00	9.609E+01	1.738E+01
Ce-139	2.334E+03	2.4	5.500E+01	2.246E+02	1.222E+02
SN-113	4.452E+03	5.0	2.245E+02	3.464E+02	4.866E+02
CS-137	1.949E+03	0.2	4.602E+00	9.837E+01	4.488E+00
Mn-54	2.998E+03	0.7	2.042E+01	1.494E+02	2.919E+01
Y-898	6.786E+03	6.7	4.568E+02	5.658E+02	8.765E+02
Zn-65	6.656E+03	1.1	7.303E+01	3.315E+02	1.081E+02
Co-1173	3.100E+03	0.2	7.705E+00	1.510E+02	6.398E+00
Co-1332	3.135E+03	0.2	7.399E+00	1.549E+02	3.628E+00
Y-1836	7.386E+03	2.9	2.152E+02	4.752E+02	2.898E+02
Total	1.150E+05				

Analyst: Jody Watson

TestAmerica, Inc. Spectrum name: 16_1lmarn_20130150.An1

Sample description
16_1lmarn_6675_re-ver

Spectrum Filename: C:\User\SPC\Det16\16_1lmarn_20130150.An1

Acquisition information
Start time: 2/20/2013 7:07:02 AM
Live time: 7200
Real time: 7664
Dead time: 6.06 %
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: DET_EnergyStandardMix & Mn, Zn.l
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.57keV)
Stop channel: 8000 (1999.63keV)
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

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_2013-02-02_0437.PBC 2/2/2013 4:37:12 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0764

***** 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
36.64	6554.	6.16	1.13	4.231E-02				
43.27	3917.	12.59	1.41	4.817E-02				
49.55	29490.	2.63	1.90	5.248E-02				
59.57	732872.	0.16	0.96	5.728E-02	59.54	35.700	4.995E+03	AM241
66.98	5569.	8.82	3.12	5.953E-02				
84.75	4830.	6.57	0.99	6.176E-02				
88.11	350640.	0.19	1.00	6.181E-02	88.03	3.610	7.032E+04	CD109
105.60	486.	43.69	0.51	6.086E-02				
122.16	78162.	0.61	1.05	5.873E-02	122.06	85.600	1.581E+03	CO57
136.58	9264.	3.31	1.03	5.634E-02				
159.49	188.	76.63	0.44	5.213E-02				
165.95	13383.	2.36	1.09	5.083E-02	165.85	79.900	2.334E+03	Ce139
179.75	417.	44.01	0.40	4.864E-02				
214.45	512.	68.00	0.45	4.397E-02				
221.76	425.	63.14	0.67	4.311E-02				
288.24	223.	62.62	0.54	3.671E-02				
310.48	648.	43.36	0.39	3.500E-02				
344.31	1070.	27.39	0.97	3.271E-02				
387.01	233.	66.59	1.27	3.023E-02				
391.68	5449.	3.33	1.27	2.999E-02	391.69	64.000	4.348E+03	SN113
450.79	474.	51.20	0.32	2.719E-02				
460.40	436.	41.52	0.36	2.679E-02				
514.67	99.	90.85	0.28	2.473E-02				
661.77	233169.	0.24	1.49	2.048E-02	661.66	85.210	1.949E+03	CS137
705.25	101.	79.96	0.47	1.950E-02				

821.67	1060.	21.99	0.83	1.728E-02				
834.98	65043.	0.68	1.61	1.705E-02	834.85	99.980	2.997E+03	Mn54
898.26	4589.	6.73	1.72	1.607E-02	898.02	93.700	6.786E+03	Y898
919.13	570.	36.10	0.52	1.577E-02				
980.41	96.	79.78	0.36	1.495E-02				
1000.96	342.	45.57	0.37	1.469E-02				
1010.03	69.	93.75	0.32	1.458E-02				
1022.53	145.	69.20	0.34	1.443E-02				
1037.21	438.	46.06	0.39	1.426E-02				
1115.71	35468.	1.10	1.85	1.340E-02	1115.55	50.600	6.656E+03	Zn65
1173.42	216115.	0.25	1.88	1.284E-02	1173.24	99.900	3.100E+03	Co1173
1278.68	23.	214.64	2.04	1.192E-02				
1281.65	148.	42.62	2.04	1.189E-02				
1313.27	148.	39.70	0.53	1.164E-02				
1332.70	195742.	0.24	1.99	1.149E-02	1332.50	99.982	3.135E+03	Co1332
1785.14	34.	52.89	0.48	8.813E-03				
1836.18	2825.	2.91	2.45	8.585E-03	1836.01	99.200	7.386E+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
146.27	36.64	46940.	6554.	1.549E+05	6.16	1.125	- s
172.81	43.27	75556.	3917.	8.131E+04	12.59	1.413	- s
197.92	49.55	163115.	29490.	5.619E+05	2.63	1.901	- s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
267.58	66.98	64240.	5569.	9.354E+04	8.82	3.116	- s
338.56	84.73	43714.	487.	7.885E+03	72.41	0.396	- sc
422.01	105.60	16698.	486.	7.980E+03	43.69	0.505	- s
545.88	136.58	23085.	9264.	1.644E+05	3.31	1.033	-
637.48	159.49	9492.	188.	3.606E+03	76.63	0.441	- c
718.46	179.75	12492.	417.	8.580E+03	44.01	0.398	- s
857.23	214.45	28991.	512.	1.165E+04	68.00	0.453	- s
886.44	221.76	21443.	425.	9.851E+03	63.14	0.673	- s
1152.29	288.24	8287.	223.	6.084E+03	62.62	0.539	- s
1241.22	310.48	18762.	648.	1.850E+04	43.36	0.388	- s
1376.50	344.31	18844.	1070.	3.271E+04	27.39	0.974	-
1547.21	387.00	10130.	297.	9.823E+03	58.98	0.485	- sM
1802.30	450.79	15274.	474.	1.745E+04	51.20	0.323	- s
1840.74	460.40	10780.	436.	1.627E+04	41.52	0.357	- s
2057.79	514.67	3995.	99.	4.004E+03	90.85	0.275	- sc
2820.07	705.25	2974.	101.	5.189E+03	79.96	0.474	- sc
3285.74	821.67	11021.	1060.	6.137E+04	21.99	0.829	- s
3675.65	919.13	10443.	570.	3.615E+04	36.10	0.523	- s
3920.78	980.41	2885.	96.	6.422E+03	79.78	0.363	- sc
4003.00	1000.96	6862.	342.	2.331E+04	45.57	0.367	- s
4039.32	1010.03	2256.	69.	4.743E+03	93.75	0.318	- sc
4089.32	1022.53	3969.	145.	1.005E+04	69.20	0.342	- sc
4148.05	1037.21	8928.	438.	3.068E+04	46.06	0.391	- s
5114.23	1278.33	1227.	23.	1.946E+03	214.64	2.037	- sc
5126.14	1281.31	1922.	148.	1.247E+04	42.62	2.040	- D
5252.64	1313.27	938.	148.	1.267E+04	39.70	0.535	- s
7141.29	1785.14	124.	34.	3.858E+03	52.89	0.478	- s

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

This section based on library: DET_EnergyStandardMix & Mn, Zn.l

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.95	59.57	144475.	732814.	101.780	0.16	0.962
CD-109	351.98	88.09	64599.	347155.	48.216	0.23	0.987
CO-57	488.19	122.16	33758.	78162.	10.856	0.61	1.051
Ce-139	663.30	165.95	22443.	13383.	1.859	2.36	1.088
Hg-203	1116.50	279.29	25583.	-102.	-0.014	220.98	1.173s
SN-113	1565.89	391.67	16977.	5580.	0.775	5.04	1.355
CS-137	2646.15	661.77	13142.	233148.	32.382	0.24	1.485

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Mn-54	3338.98	834.98	18315.	65043.	9.034	0.68	1.610
Y-898	3592.14	898.26	16035.	4589.	0.637	6.73	1.721
Zn-65	4462.14	1115.71	15127.	35468.	4.926	1.10	1.846
Co-1173	4693.02	1173.42	9051.	216115.	30.016	0.25	1.884
Co-1332	5330.40	1332.70	2307.	195742.	27.186	0.24	1.990
Y-1836	7345.61	1836.18	538.	2825.	0.392	2.91	2.445

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
AM-241		4.9949E+03				1.58E+05	
			59.54	4.995E+03	(P	1.209E+01 1.59E-01 3.57E+01	G
CD-109		6.9618E+04				4.63E+02	
			88.03	6.962E+04	(	2.381E+02 2.32E-01 3.61E+00	G
CO-57		1.5814E+03				2.72E+02	
			122.06	1.581E+03	(	1.738E+01 6.14E-01 8.56E+01	G
Ce-139		2.3344E+03				1.38E+02	
			165.85	2.334E+03	(	1.222E+02 2.36E+00 7.99E+01	G
Hg-203		-4.6620E-01				4.66E+01	
			279.17	-4.662E-01	&(	3.404E+00 2.21E+02 8.15E+01	G
SN-113		4.4524E+03				1.15E+02	
			391.69	4.452E+03	(	4.866E+02 5.04E+00 6.40E+01	G
CS-137		1.9488E+03				1.10E+04	
			661.66	1.949E+03	(P	4.488E+00 2.36E-01 8.52E+01	G
Mn-54		2.9975E+03				3.12E+02	
			834.85	2.997E+03	(	2.919E+01 6.81E-01 1.00E+02	G
Y-898		6.7857E+03				1.07E+02	
			898.02	6.786E+03	(	8.765E+02 6.73E+00 9.37E+01	G
Zn-65	F	6.6559E+03				2.44E+02	
			1115.55	6.656E+03	(	1.081E+02 1.10E+00 5.06E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-1173	3.1000E+03					1.93E+03	
		1173.24	3.100E+03	(	6.398E+00	2.49E-01	9.99E+01 G
Co-1332	3.1350E+03					1.93E+03	
		1332.50	3.135E+03	(	3.628E+00	2.36E-01	1.00E+02 G
Y-1836	7.3858E+03					1.07E+02	
		1836.01	7.386E+03	(	2.898E+02	2.91E+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:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

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

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	279.29	25583.	-102.	-0.014	220.98	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
AM-241	4.9778E+03	4.9949E+03	1.591E-01%		1.21E+01
CD-109	2.1607E+04	6.9618E+04	2.320E-01%		2.38E+02
CO-57	2.1589E+02	1.5814E+03	6.137E-01%		1.74E+01
Ce-139	4.5753E+01	2.3344E+03	2.356E+00%		1.22E+02
Hg-203 #A	-4.6620E-01	>12 Halflives	2.2098E+02%	3.4036E+00	
SN-113	4.0386E+01	4.4524E+03	5.041E+00%		4.87E+02
CS-137	1.8551E+03	1.9488E+03	2.362E-01%		4.49E+00
Mn-54	5.2978E+02	2.9975E+03	6.812E-01%		2.92E+01
Y-898	4.2322E+01	6.7857E+03	6.732E+00%		8.76E+02
Zn-65	7.2618E+02	6.6559E+03	1.097E+00%		1.08E+02
Co-1173	2.3403E+03	3.1000E+03	2.485E-01%		6.40E+00
Co-1332	2.3667E+03	3.1350E+03	2.360E-01%		3.63E+00
Y-1836	4.6065E+01	7.3858E+03	2.913E+00%		2.90E+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 (1313.1 to 1999.6 keV) 3.479E+04 Bq/Sample
Total Decayed Activity (1313.1 to 1999.6 keV) 1.1498970E+05 Bq/Sample

2013 1L Marn Re-Verification per geometry

Geometry: 1L Marn

Reference date 1/1/2011

Calibration Standard: 83925-334

Standard volume g / vial: 1

Standard volume transferred in g / geometry: 1

lab ID# of cal standard: Rad11-0032 / TALS#6675

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	abundance	Activity Bq/sample
Am-241	1830	1830	0.359	**5097.5**
Cs-137	1705	1705	0.851	**2003.5**
Co-60	3294	3294	0.99986	**3294.5**

Reviewed By: Jody Watson

Date: 1/20/2013

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING



Reagent ID: 1L Marn_00002

Type:	ASTD	Expiration Date:	03/02/2016
Description:	Mixed Gamma 1L Marn 2011	Laboratory:	TestAmerica St. Louis
No. of Bottles:	1	Prepared By:	Watson, Jody
Storage Location:	RAD STDs Cabinet in Gamma	Vendor:	Eckert & Ziegler
Reagent Volume:	1.000 L	Vendor Lot #:	83924-334
Creation Date:	02/25/2011	Vendor Cat #:	
Container(s):	6675		
Comment:			

Reagent Analyte Information

Analyte	Source ID	Source Expiration Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
Am-241					5097.50000	pCi/L
Ce-139					2399.20000	pCi/L
Co-57					1564.30000	pCi/L
Co-60					3293.90000	pCi/L
Cs-137					2003.50000	pCi/L
Mn-54					3083.60000	pCi/L
Sn-113					4248.40000	pCi/L
Y-88					6929.60000	pCi/L

TestAmerica St. Louis

Standards Preparation Logbook Record

Feb-20-2013

Logbook: \\Qstlmo01\Stdslog\RAD_STD.std

RAD11-0032, Mixed Gamma 1L Marn — Analyst: watsonj

Vendor: Eckert & Ziegler — Lot No.: 83924-334
Solvent: None
Date Prep./Opened: 03-02-2011 — Date Received: 02-25-2011
Date Expires(1): 03-02-2016 (5 Years)
Date Expires(2): 03-02-2016 (5 Years)
1L Marn 2011 Calibration Source 83924-334 Ref Date 1/1/2011

Component	Initial Conc (Bq/sample)	Final Conc (Bq/sample)
Am-241	5,097.5	5,097.5
Cd-109	72,272	72,272
Ce-139	2,399.2	2,399.2
Co-57	1,564.3	1,564.3
Co-60	3,293.9	3,293.9
Co-60	3,294.5	3,294.5
Cs-137	2,003.5	2,003.5
Hg-203	5,195.2	5,195.2
Mn-54	3,083.6	3,083.6
Sn-113	4,248.4	4,248.4
Y-88	6,929.6	6,929.6
Y-88	6,929.4	6,929.4

Reviewed By: _____

Page 1 of 1

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 FOUNDED 1956

Page 101 of 2090

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: 2/23/14
J. D. McCorvey, QA Manager Alternate

Reagent

1L Marn_00007

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

81592-334

1.0 Liter Solid in 130G GA-MA Beaker

Customer: Test America/Earth City, MO
P.O. No.: 2344874, Item 1
Reference Date: 01-Jan-2010 12:00 PM EST **Grams of Master Source:** 0.016663

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	———	1.929E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.606E+05	2.676E+03	0.4	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	8.471E+04	1.412E+03	0.5	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.209E+05	2.015E+03	0.4	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.726E+05	4.542E+03	0.4	1.9	3.9	HPGe
Sn-113	391.7	1.151E+02	1.672E+05	2.786E+03	0.5	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.096E+05	1.826E+03	0.6	1.9	4.0	HPGe
Mn-54	834.9	3.121E+02	———	3.069E+03	0.1	1.7	3.3	IC
Y-88	898.0	1.066E+02	4.077E+05	6.794E+03	0.4	1.9	3.9	HPGe
Zn-65	1115.6	2.441E+02	———	2.105E+03	0.1	1.7	3.5	IC
Co-60	1173.2	1.925E+03	2.055E+05	3.424E+03	0.5	1.9	3.9	HPGe
Co-60	1332.5	1.925E+03	2.056E+05	3.426E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.308E+05	7.178E+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

This standard will expire one year after the reference date.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ for Date: 3-22-10
J. D. McCorvey, QA Manager Alternate

Reagent

1L Marn_00008

St. Louis Radiological Standard Reverification Form

Standard ID Number: 1L Marn_00008 (255911)
True Value = 5097.49 Bq/Sample
Date Analyzed: 11/22/2013

Radionuclide: Am-241

	Replicates	
#1	5038	Bq/Sample
#2	5045	Bq/Sample
#3	5140	Bq/Sample

Mean = 5074.333

1 sigma = 56.9766

1.96 sigma = 111.6741

True Value minus 5% = 4842.6155 (True Value - 5%)
True Value plus 5% = 5352.3645 (True Value + 5%)

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

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

Standard Reverification Acceptable? **Yes**

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

Reviewed By/Date: Jody Watson 11/22/13

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: 1L Marn_00008 (255911)
True Value = 2003.53 Bq/Sample
Date Analyzed: 11/22/2013

Radionuclide: Cs-137

	Replicates	
#1	1974	Bq/Sample
#2	1972	Bq/Sample
#3	2010	Bq/Sample

Mean = 1985.333

1 sigma = 21.38535

1.96 sigma = 41.91529

True Value minus 5% = 1903.3535 (True Value - 5%)
True Value plus 5% = 2103.7065 (True Value + 5%)

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

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

Standard Reverification Acceptable? Yes

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

Reviewed By/Date: Jody Watson 11/22/13

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: 1L Marn_00008 (255911)
True Value = 3293.47 Bq/Sample
Date Analyzed: 11/22/2013

Radionuclide: Co-60

Replicates		
#1	3211	Bq/Sample
#2	3238	Bq/Sample
#3	3226	Bq/Sample

Mean = 3225

1 sigma = 13.52775

1.96 sigma = 26.51439

True Value minus 5% = 3128.7965 (True Value - 5%)
True Value plus 5% = 3458.1435 (True Value + 5%)

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

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

Standard Reverification Acceptable? Yes

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

Reviewed By/Date: Jody Watson 11/22/13

SOP Reference: STL-QA-0002, Current Revision

Gamma LCS per Geometry - 1L Marn

Reagent ID: 1L Marn_00008
Container: 255911
Reference date 1/1/2011
Calibration Standard: 83924-334
Standard volume: 1000 g/vial
Standard volume transferred: 1000 g/geometry

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	dpm/g	Bq/sample
Am-241	1830	1830.0	0.359	305.85	5097.49
Cs-137	1705	1705.0	0.851	120.21	2003.53
Co-60	3293	3293.0	0.999856	197.61	3293.47

Reviewed By: Jody Watson

Date: 12/1/2013

SOP Reference: ST-RD-0102, Current Rev **Form:** RAD-0080 **Revised:** 11/27/2013

Test America St. Louis Spectrum ID: 14_83924-334_20131712

Sample Description: 1L Marn_83924-334_2011Cal
Detector: Ge14 SN/11080670
Batch ID: 1L Marn
Work Order Number: 83924-334
Lot Number: 2011Cal

Decay to Time: 1/1/2011 12:00 Live Time: 3600 sec
Acquisition Time: 11/22/2013 10:57:47 Real Time: 3750 sec
Analysis Time: 11/22/2013 12:00 Dead Time: 4.00 %
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_Routine Short Rev1.lib
Bkgd Correction File: 14_2013-11-02_0117.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
K-40	8.495E-01	867.9	7.373E+00	7.373E+00	2.543E+01
CO-60	3.211E+03	0.3	9.328E+00	1.587E+02	5.759E+00
CS-134	1.470E+00	297.5	4.373E+00	4.374E+00	1.532E+01
CS-137	1.974E+03	0.4	7.651E+00	9.898E+01	7.115E+00
EU-152	2.481E+01	24.1	5.967E+00	6.105E+00	1.499E+01
EU-154	2.075E+01	28.9	5.993E+00	6.079E+00	8.480E+01
EU-155	5.806E+00	97.3	5.651E+00	5.661E+00	1.866E+01
TL-208	5.627E+00	97.5	5.485E+00	5.493E+00	1.814E+01
PB-210	-2.937E+02	20.7	6.071E+01	6.626E+01	1.896E+02
PB-212	3.881E+00	199.5	7.744E+00	7.747E+00	2.564E+01
PB-214	3.309E+00	90.8	3.005E+00	3.009E+00	1.100E+01
BI-212	-5.834E+01	102.9	6.003E+01	6.010E+01	1.986E+02
BI-214	-6.621E+00	68.1	4.506E+00	4.518E+00	1.185E+01
AC-228	1.083E+01	106.8	1.157E+01	1.158E+01	4.440E+01
Pa-234	4.849E+00	113.3	5.493E+00	5.499E+00	1.510E+01
TH-234	-3.063E+01	126.3	3.867E+01	3.871E+01	9.050E+01
PA-234M	-4.729E+02	69.8	3.300E+02	3.308E+02	1.088E+03
U-235	3.923E+00	230.0	9.021E+00	9.024E+00	2.438E+01
AM-241	5.038E+03	0.2	1.150E+01	2.911E+02	1.662E+01
Total	1.031E+04				

Analyst: Jody Watson

TestAmerica, Inc. Spectrum name: 14_83924-334_20131712.An1

Sample description
1L Marn_83924-334_2011Cal

Spectrum Filename: C:\User\SPC\Det14\14_83924-334_20131712.An1

Acquisition information
Start time: 11/22/2013 10:57:47 AM
Live time: 3600
Real time: 3750
Dead time: 4.00 %
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_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 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

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 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2013-11-02_0117.PBC 11/2/2013 1:17:51 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

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

Energy Calibration

Normalized diff: 0.0644

***** 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
36.62	2067.	10.16	0.85	3.141E-02				
48.93	5047.	6.05	0.75	3.983E-02				
49.91	6988.	4.67	0.75	4.035E-02				
59.62	288463.	0.23	0.79	4.454E-02	59.54	35.900	5.038E+03	AM241
66.52	278.	54.43	0.40	4.654E-02				
87.99	93420.	0.43	0.85	4.914E-02				
92.32	109.	87.47	0.80	4.919E-02				
103.02	264.	50.15	0.66	4.885E-02				
105.29	144.	97.33	0.81	4.871E-02	105.31	21.200	PBC<MDA	EU155
122.02	16652.	1.43	0.90	4.715E-02	121.78	28.580	3.978E+02	EU152
123.10	38.	398.99	0.83	4.702E-02	123.10	40.790	PBC<MDA	EU154
					123.10	40.790	6.870E-01	EU154
136.42	1797.	9.14	0.86	4.530E-02				
143.34	31.	408.02	0.85	4.425E-02	143.79	10.960	PBC<MDA	U235
163.38	30.	495.12	0.87	4.129E-02	163.38	5.080	PBC<MDA	U235
165.81	1590.	9.60	0.91	4.092E-02				
195.69	118.	74.72	0.49	3.670E-02				
205.52	55.	253.55	0.91	3.553E-02	205.33	5.010	PBC<MDA	U235
212.94	110.	82.72	0.66	3.466E-02				
239.03	68.	152.55	0.94	3.205E-02	238.63	43.300	PBC<MDA	PB212
294.37	95.	105.71	1.00	2.759E-02	295.09	19.300	PBC<MDA	PB214
					295.09	19.300	PBC<MDA	PB214
339.70	50.	218.91	1.04	2.498E-02	338.32	12.010	PBC<MDA	AC228
344.43	500.	24.05	1.05	2.465E-02	344.29	26.500	2.463E+01	EU152
351.19	80.	108.49	1.06	2.426E-02	351.93	37.600	PBC<MDA	PB214
					351.93	37.600	PBC<MDA	PB214
391.65	390.	38.33	1.09	2.240E-02				
447.44	117.	58.20	0.65	2.024E-02				

501.44	266.	38.69	0.53	1.853E-02				
559.23	281.	36.01	0.52	1.700E-02				
562.49	32.	297.50	1.25	1.691E-02	563.24	8.350	PBC<MDA	CS134
					563.24	8.350	1.641E+01	CS134
579.75	161.	49.44	0.43	1.652E-02				
583.07	99.	87.84	1.27	1.645E-02	583.02	84.500	PBC<MDA	TL208
661.67	84081.	0.39	1.34	1.485E-02	661.66	85.210	1.974E+03	CS137
723.29	262.	36.98	0.64	1.380E-02	723.36	20.220	3.287E+01	EU154
					723.36	20.220	3.287E+01	EU154
733.78	74.	76.93	0.65	1.364E-02				
768.83	122.	49.99	0.49	1.312E-02				
784.84	80.	66.85	0.37	1.290E-02				
834.84	12806.	1.53	1.48	1.224E-02				
852.33	357.	28.82	0.50	1.203E-02				
872.61	107.	99.19	1.52	1.179E-02	873.23	12.270	PBC<MDA	EU154
					873.23	12.270	2.587E+01	EU154
880.43	72.	150.13	1.53	1.171E-02	880.53	6.000	PBC<MDA	Pa234
					880.53	6.000	2.835E+01	Pa234
898.11	293.	38.52	0.96	1.151E-02				
911.72	105.	106.79	1.55	1.137E-02	911.07	29.000	PBC<MDA	AC228
946.23	33.	354.85	1.58	1.101E-02	946.02	13.400	PBC<MDA	Pa234
					946.02	13.400	6.256E+00	Pa234
964.08	91.	123.19	1.60	1.083E-02	964.11	14.605	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
995.88	162.	62.98	1.62	1.053E-02	996.33	10.600	PBC<MDA	EU154
					996.33	10.600	5.080E+01	EU154
1005.09	327.	35.42	0.31	1.045E-02				
1005.35	123.	84.31	1.63	1.045E-02	1004.77	18.010	PBC<MDA	EU154
					1004.77	18.010	2.284E+01	EU154
1015.27	118.	60.67	1.64	1.036E-02				
1018.03	267.	27.40	1.64	1.033E-02				
1047.15	108.	47.96	0.40	1.008E-02				
1067.52	210.	40.07	0.73	9.917E-03				
1085.97	118.	67.40	0.32	9.770E-03				
1112.06	129.	68.42	1.71	9.569E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	5835.	3.20	1.62	9.543E-03				
1130.70	122.	52.90	0.54	9.430E-03				
1160.81	153.	46.10	0.54	9.214E-03				
1173.20	72050.	0.42	1.74	9.128E-03	1173.24	99.900	3.210E+03	CO60
1274.48	133.	28.88	1.83	8.481E-03	1274.54	35.190	1.565E+01	EU154
					1274.54	35.190	1.565E+01	EU154
1332.44	64400.	0.41	1.84	8.150E-03	1332.50	99.980	3.211E+03	CO60
1408.09	61.	38.96	1.92	7.754E-03	1408.00	21.005	PBC<MDA	EU152
1460.60	2.	176.54	1.96	7.499E-03	1460.83	10.670	PBC<MDA	K40
1764.44	5.	303.05	2.14	6.302E-03	1764.49	15.400	PBC<MDA	BI214

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

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.92	36.62	14850.	2067.	6.581E+04	10.16	0.845	-	
195.15	48.90	44158.	5047.	1.267E+05	6.05	0.750	-	D
199.05	49.87	49696.	6988.	1.732E+05	4.67	0.751	-	D
265.45	66.52	9692.	278.	5.974E+03	54.43	0.398	-	s
351.34	87.99	16882.	93420.	1.901E+06	0.43	0.854	-	
411.43	103.02	6094.	264.	5.400E+03	42.30	0.659	-	s
544.98	136.42	7551.	1797.	3.968E+04	9.14	0.863	-	
662.54	165.81	6516.	1589.	3.884E+04	7.61	0.912	-	s
782.02	195.69	3554.	118.	3.225E+03	74.72	0.494	-	sc
850.98	212.94	3747.	110.	3.164E+03	82.72	0.664	-	sc
1565.75	391.65	5490.	390.	1.741E+04	38.33	1.091	-	s
1788.86	447.44	2092.	117.	5.789E+03	58.20	0.647	-	s
2004.87	501.44	3089.	266.	1.434E+04	38.69	0.525	-	s
2236.02	559.23	2710.	280.	1.648E+04	26.95	0.517	-	s
2318.13	579.75	2059.	160.	9.670E+03	40.94	0.429	-	sM
2892.32	723.29	2440.	193.	1.395E+04	36.99	0.638	-	s
2934.30	733.78	1250.	74.	5.389E+03	76.93	0.653	-	sc
3074.48	768.83	1357.	122.	9.308E+03	43.61	0.491	-	s
3138.57	784.84	1180.	81.	6.281E+03	60.99	0.367	-	s
3338.60	834.84	4513.	12806.	1.046E+06	1.53	1.477	-	
3408.54	852.33	2666.	357.	2.966E+04	28.82	0.502	-	s
3591.73	898.11	3247.	293.	2.546E+04	38.52	0.963	-	sM
4019.78	1005.09	3149.	205.	1.959E+04	39.39	0.311	-	s
4060.50	1015.42	2516.	118.	1.142E+04	60.67	1.637	-	D
4071.52	1018.17	2547.	267.	2.586E+04	27.40	1.639	-	D
4188.05	1047.15	1111.	108.	1.074E+04	47.96	0.402	-	s
4269.57	1067.52	1972.	210.	2.123E+04	40.07	0.735	-	s
4343.41	1085.97	1862.	118.	1.208E+04	67.40	0.320	-	s
4461.66	1115.55	2816.	5870.	6.152E+05	1.83	1.714	-	D
4522.39	1130.70	1206.	122.	1.290E+04	52.90	0.541	-	s

4642.86	1160.81	1258.	153.	1.660E+04	46.10	0.536	-	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_Routine Short Rev1.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	190.08	47.67	47682.	-1581.	-0.439	20.18	0.750s
AM-241	237.90	59.62	41475.	288463.	80.129	0.23	0.788
TH-234	252.24	63.21	14671.	-192.	-0.053	107.83	0.765s
TH-234	368.65	92.32	9376.	109.	0.030	87.47	0.796s
AC-228	372.76	93.35	5008.	-280.	-0.078	36.29	0.797D
U-235	372.76	93.35	5008.	-280.	-0.078	36.29	0.797D
EU-155	420.51	105.29	9765.	144.	0.040	97.33	0.809
EU-152	487.40	122.02	10014.	16652.	4.626	1.43	0.900s
EU-154	491.73	123.10	11217.	38.	0.010	398.99	0.827s
Pa-234	524.25	131.23	9215.	-120.	-0.033	113.29	0.836s
U-235	572.69	143.34	8234.	31.	0.009	408.02	0.849s
U-235	652.80	163.38	10716.	30.	0.008	495.12	0.869s
U-235	821.34	205.52	9656.	55.	0.015	253.55	0.911s
PB-212	955.36	239.03	9156.	68.	0.019	152.55	0.945s
I-131	1134.10	283.73	7784.	-68.	-0.019	184.27	0.990s
PB-214	1176.66	294.37	6597.	95.	0.027	105.71	1.001s
AC-228	1357.97	339.70	6064.	50.	0.014	218.91	1.043s
EU-152	1376.89	344.43	4181.	500.	0.139	24.05	1.048
PB-214	1403.91	351.19	5901.	80.	0.022	108.49	1.056s
I-131	1458.60	364.86	6548.	-36.	-0.010	316.70	1.069s
BE-7	1909.70	477.65	6947.	-83.	-0.023	141.66	1.176s
CS-134	2249.06	562.49	4404.	32.	0.009	297.50	1.255s
CS-134	2275.09	568.99	4739.	-41.	-0.011	238.49	1.260s
Pa-234	2276.09	569.24	4723.	-33.	-0.009	290.80	1.261s
TL-208	2331.39	583.07	4575.	99.	0.027	87.84	1.273s
BI-214	2431.71	608.15	4397.	-174.	-0.048	61.13	1.296s
I-131	2548.68	637.39	4868.	-95.	-0.026	104.34	1.321s
CS-137	2645.83	661.67	4156.	84081.	23.356	0.39	1.336
EU-154	2892.98	723.46	4315.	71.	0.020	131.53	1.397s
BI-212	2897.16	724.50	3044.	-76.	-0.021	102.90	1.400s
CS-134	3178.79	794.90	4240.	-63.	-0.017	147.55	1.459s
CS-134	3208.91	802.43	4567.	-32.	-0.009	295.73	1.464s
TL-208	3450.30	862.76	4635.	-71.	-0.020	135.94	1.513s
EU-154	3489.71	872.61	5545.	107.	0.030	99.19	1.523s
Pa-234	3520.99	880.43	5756.	72.	0.020	150.13	1.529s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Pa-234	3538.19	884.73	5396.	-45.	-0.012	231.95	1.531s
AC-228	3646.19	911.72	6279.	105.	0.029	106.79	1.554s
Pa-234	3784.26	946.23	6934.	33.	0.009	354.85	1.582s
EU-152	3855.67	964.08	6226.	91.	0.025	123.19	1.597
AC-228	3873.07	968.43	5841.	-121.	-0.034	89.48	1.601s
EU-154	3982.92	995.88	5101.	162.	0.045	62.98	1.622s
PA-234M	3999.68	1000.07	5362.	-149.	-0.042	69.78	1.626s
EU-154	4020.79	1005.35	5281.	123.	0.034	84.31	1.629s
EU-152	4447.85	1112.07	3851.	129.	0.036	68.42	1.712D
BI-214	4475.74	1119.05	7013.	-1033.	-0.287	11.92	1.718s
CO-60	4692.43	1173.20	2424.	72050.	20.014	0.42	1.737
EU-154	5097.75	1274.48	673.	133.	0.037	28.88	1.831s
CO-60	5329.70	1332.44	586.	64400.	17.889	0.41	1.845
EU-152	5632.46	1408.09	256.	61.	0.017	38.96	1.923s
K-40	5842.63	1460.60	229.	2.	0.001	176.54	1.958s
BI-214	7058.84	1764.44	126.	5.	0.001	303.05	2.145s

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	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.1450E+01				5.31E+01	
			477.60	-1.145E+01	&(	5.366E+01 1.42E+02 1.05E+01	G
K-40	N	8.4954E-01				4.66E+11	
			1460.83	8.495E-01	(P	2.543E+01 1.77E+02 1.07E+01	G
CO-60	F	3.2106E+03				1.93E+03	
			1332.50	3.211E+03	(	5.759E+00 4.07E-01 1.00E+02	G
			1173.24	3.210E+03	(	1.034E+01 4.15E-01 9.99E+01	G
I-131	I	-5.2049E-01				8.02E+00	
			364.48	-5.205E-01	?(	5.463E+00 3.17E+02 8.17E+01	G
			284.30	-1.083E+01	&	6.608E+01 1.84E+02 6.14E+00	G
			636.97	-2.404E+01	+	8.294E+01 1.04E+02 7.17E+00	G
CS-134	I	1.4699E+00				7.54E+02	
			604.71	1.916E-01	&(	1.532E+01 2.41E+03 9.76E+01	G
			795.87	-4.212E+00	&	2.059E+01 1.48E+02 8.55E+01	G
			569.32	-1.164E+01	&	9.201E+01 2.38E+02 1.54E+01	G
			801.95	-2.156E+01	+	2.116E+02 2.96E+02 8.69E+00	G
			563.24	1.641E+01	&(	1.620E+02 2.98E+02 8.35E+00	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-137	I	1.9735E+03					1.10E+04	
			661.66	1.974E+03	(	7.115E+00	3.88E-01	8.52E+01 G
EU-152	F	2.4812E+01					4.94E+03	
			344.29	2.463E+01	(	1.499E+01	2.40E+01	2.65E+01 G
			121.78	3.978E+02	+	1.121E+01	1.43E+00	2.86E+01 G
			778.92	-1.272E+00	&	6.017E+01	1.42E+03	1.29E+01 G
			964.11	1.851E+01	(	7.542E+01	1.23E+02	1.46E+01 G
			1112.07	3.191E+01	(	7.201E+01	6.84E+01	1.36E+01 G
			1408.00	1.215E+01	-	1.528E+01	3.90E+01	2.10E+01 G
EU-154	I	2.0752E+01					3.14E+03	
			873.23	2.587E+01	?(	8.480E+01	9.92E+01	1.23E+01 G
			123.10	6.870E-01	-	9.075E+00	3.99E+02	4.08E+01 G
			1274.54	1.565E+01	*(	1.452E+01	2.89E+01	3.52E+01 G
			723.36	8.913E+00	?(	3.881E+01	1.32E+02	2.02E+01 G
			1004.77	2.284E+01	?(	6.360E+01	8.43E+01	1.80E+01 G
			996.33	5.080E+01	*(	1.054E+02	6.30E+01	1.06E+01 G
EU-155	I	5.8061E+00					1.81E+03	
			105.31	5.806E+00	(	1.866E+01	9.73E+01	2.12E+01 G
			86.54	0.000E+00	-	1.144E+01	1.00E+03	3.07E+01 G
TL-208	N	5.6266E+00					6.98E+02	
			583.02	5.627E+00	?(P	1.814E+01	8.78E+01	8.45E+01 G
			277.28	-1.556E+00	% P	1.736E+02	3.71E+03	6.31E+00 G
			860.56	-3.804E+01	&	1.712E+02	1.36E+02	1.24E+01 G
PB-210	N	-2.9373E+02					8.14E+03	
			46.54	-2.937E+02	?(P	1.896E+02	2.02E+01	4.25E+00 G
PB-212	N	3.8808E+00					6.98E+02	
			238.63	3.881E+00	@(P	2.564E+01	1.53E+02	4.33E+01 G
			300.03	-3.236E+00	&	3.278E+02	3.05E+03	3.28E+00 G
PB-214	N	3.3085E+00					5.84E+05	
			351.93	2.446E+00	(P	1.100E+01	1.08E+02	3.76E+01 G
			295.09	4.989E+00	@(P	1.991E+01	1.06E+02	1.93E+01 G
			242.00	-1.187E+00	% P	5.298E+01	2.20E+03	7.43E+00 G
BI-212	N	-5.8339E+01					6.98E+02	
			727.17	-5.834E+01	&(	1.986E+02	1.03E+02	7.55E+00 G
			785.42	-1.313E+01	%	1.527E+03	3.50E+03	1.28E+00 G
BI-214	N	-6.6206E+00					5.84E+05	
			609.31	-6.621E+00	&(P	1.185E+01	6.11E+01	4.61E+01 G
			1120.29	-2.002E+02	& P	7.613E+01	1.19E+01	1.51E+01 G

Nuclide	Ave	activity	Energy	Activity	Code	Peak	MDA	Comments
			1764.49	1.403E+00	+ P	1.577E+01	3.03E+02	1.54E+01 G
AC-228	N	1.0832E+01					2.10E+03	
			911.07	1.258E+01	(	4.440E+01	1.07E+02	2.90E+01 G
			968.97	-2.538E+01	&	7.501E+01	8.95E+01	1.75E+01 G
			338.32	6.615E+00	?(	4.797E+01	2.19E+02	1.20E+01 G
							Energy duplication	
			93.35	-4.024E+01	&	4.785E+01	3.63E+01	5.56E+00 XA
Pa-234	N	4.8490E+00					1.63E+12	
			131.29	-4.034E+00	?(	1.510E+01	1.13E+02	1.80E+01 G
			569.47	-6.768E+00	+	6.529E+01	2.91E+02	8.20E+00 G
			946.02	6.256E+00	?(	7.357E+01	3.55E+02	1.34E+01 G
			883.24	-1.112E+01	+	8.551E+01	2.32E+02	9.60E+00 G
			880.53	2.835E+01	*(	1.409E+02	1.50E+02	6.00E+00 G
TH-234	N	-3.0627E+01					1.63E+12	
			63.29	-3.063E+01	?(P	9.050E+01	1.08E+02	3.81E+00 G
			92.59	1.099E+01	+ P	4.591E+01	8.75E+01	5.58E+00 G
PA-234M	N	-4.7291E+02					1.63E+12	
			1001.00	-4.729E+02	?(	1.088E+03	6.98E+01	8.37E-01 G
			766.41	2.233E+00	%	1.641E+03	2.20E+04	2.94E-01 G
U-235	N	3.9231E+00					2.57E+11	
			143.79	1.803E+00	&(	2.438E+01	4.08E+02	1.10E+01 G
			205.33	8.566E+00	?(	7.189E+01	2.54E+02	5.01E+00 G
			163.38	3.918E+00	?(	6.424E+01	4.95E+02	5.08E+00 G
							Energy duplication	
			93.35	-2.718E+01	&	3.232E+01	3.63E+01	5.81E+00 X
AM-241	T	5.0379E+03					1.58E+05	
			59.54	5.038E+03	(	1.662E+01	2.28E-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:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

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

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	47.67	47682.	-1581.	-0.439	20.18	-2.937E+02	P
TH-234	63.21	14671.	-192.	-0.053	107.83	-3.063E+01	P
TH-234	92.32	9376.	109.	0.030	87.47	1.099E+01	P
AC-228	93.35	5008.	-280.	-0.078	36.29	-4.024E+01	
U-235	93.35	5008.	-280.	-0.078	36.29	-2.718E+01	
EU-155	105.29	9765.	144.	0.040	97.33	5.806E+00	
EU-154	123.10	11217.	38.	0.010	398.99	6.870E-01	
Pa-234	131.23	9215.	-120.	-0.033	113.29	-4.034E+00	
U-235	143.34	8234.	31.	0.009	408.02	1.803E+00	
U-235	163.38	10716.	30.	0.008	495.12	3.918E+00	
U-235	205.52	9656.	55.	0.015	253.55	8.566E+00	
PB-212	239.03	9156.	68.	0.019	152.55	3.881E+00	P
I-131	283.73	7784.	-68.	-0.019	184.27	0.000E+00	
PB-214	294.37	6597.	95.	0.027	105.71	4.989E+00	P
AC-228	339.70	6064.	50.	0.014	218.91	6.615E+00	
PB-214	351.19	5901.	80.	0.022	108.49	2.446E+00	P
I-131	364.86	6548.	-36.	-0.010	316.70	0.000E+00	
BE-7	477.65	6947.	-83.	-0.023	141.66	0.000E+00	
CS-134	562.49	4404.	32.	0.009	297.50	1.641E+01	
CS-134	568.99	4739.	-41.	-0.011	238.49	-1.164E+01	
Pa-234	569.24	4723.	-33.	-0.009	290.80	-6.768E+00	
BI-214	608.15	4397.	-174.	-0.048	61.13	-6.621E+00	P
I-131	637.39	4868.	-95.	-0.026	104.34	0.000E+00	
EU-154	723.46	4315.	71.	0.020	131.53	8.913E+00	
BI-212	724.50	3044.	-76.	-0.021	102.90	-5.834E+01	
CS-134	794.90	4240.	-63.	-0.017	147.55	-4.212E+00	
CS-134	802.43	4567.	-32.	-0.009	295.73	-2.156E+01	
EU-154	872.61	5545.	107.	0.030	99.19	2.587E+01	
Pa-234	880.43	5756.	72.	0.020	150.13	2.835E+01	
Pa-234	884.73	5396.	-45.	-0.012	231.95	-1.112E+01	
AC-228	911.72	6279.	105.	0.029	106.79	1.258E+01	
Pa-234	946.23	6934.	33.	0.009	354.85	6.256E+00	
AC-228	968.43	5841.	-121.	-0.034	89.48	-2.538E+01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-154	995.88	5101.	162.	0.045	62.98	5.080E+01		
PA-234M	1000.07	5362.	-149.	-0.042	69.78	-4.729E+02		
EU-154	1005.35	5281.	123.	0.034	84.31	2.284E+01		
BI-214	1119.05	7013.	-1033.	-0.287	11.92	-2.002E+02		P
EU-154	1274.48	673.	133.	0.037	28.88	1.565E+01		
K-40	1460.60	229.	2.	0.001	176.54	8.495E-01		P
BI-214	1764.44	126.	5.	0.001	303.05	1.403E+00		P

P - Peakbackground subtraction

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

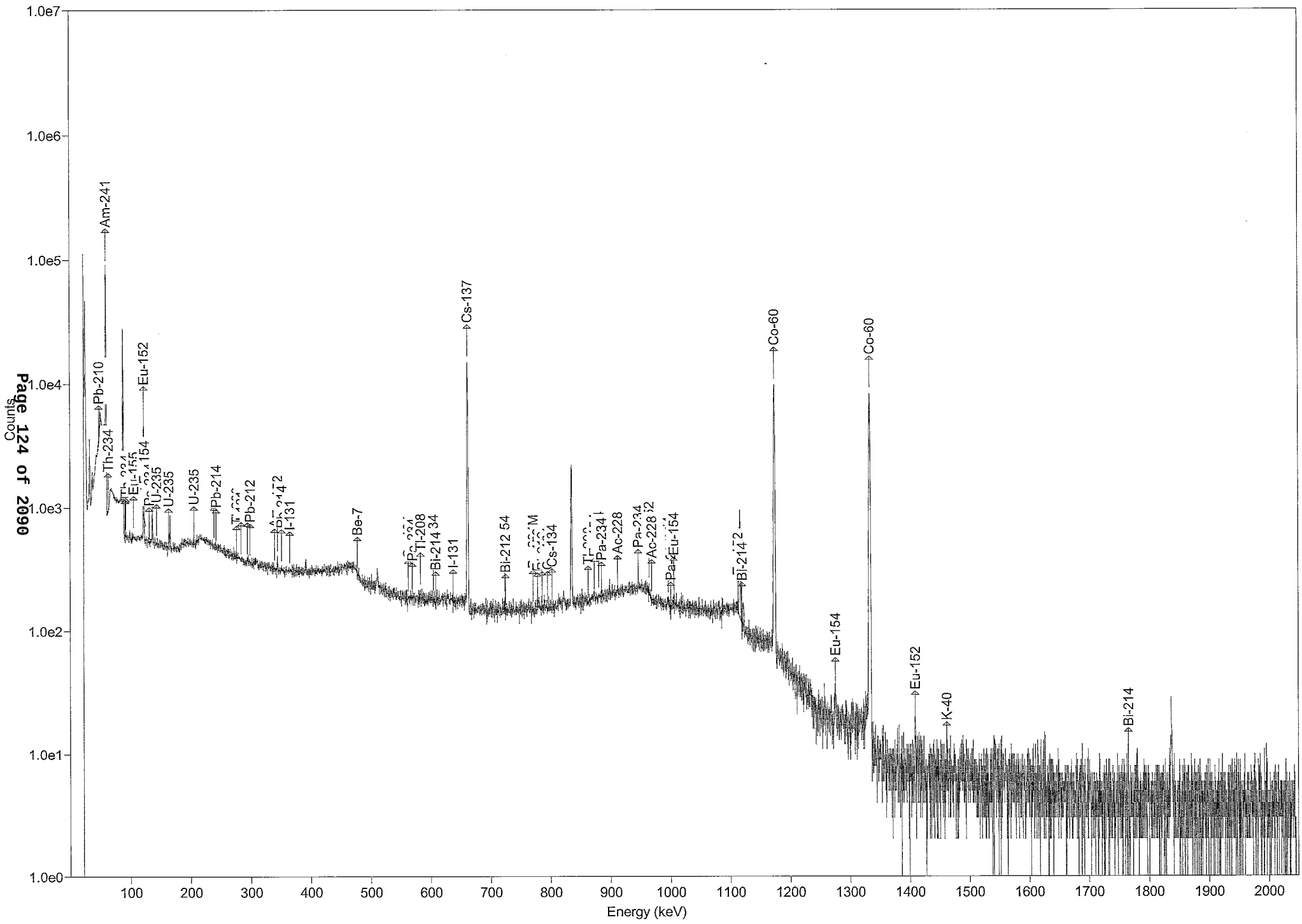
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
BE-7	#A	-1.1450E+01	>12 Halflives	1.4166E+02%	5.3658E+01	
K-40	#A	8.4954E-01	8.4954E-01	8.679E+02%		2.54E+01
CO-60		2.1952E+03	3.2106E+03	2.905E-01%		5.76E+00
I-131	#A	-5.2049E-01	>12 Halflives	3.1670E+02%	5.4632E+00	
CS-134	#A	5.5691E-01	1.4699E+00	2.975E+02%		1.53E+01
CS-137		1.8460E+03	1.9735E+03	3.877E-01%		7.11E+00
EU-152		2.1398E+01	2.4812E+01	2.405E+01%		1.50E+01
EU-154	#A	1.6435E+01	2.0752E+01	2.888E+01%		8.48E+01
EU-155	#A	3.8763E+00	5.8061E+00	9.733E+01%		1.87E+01
TL-208	#A	1.9705E+00	5.6266E+00	9.749E+01%		1.81E+01
PB-210	#A	-2.6848E+02	-2.9373E+02	2.067E+01%		1.90E+02
PB-212	#A	1.3591E+00	3.8808E+00	1.995E+02%		2.56E+01
PB-214	#A	3.3044E+00	3.3085E+00	9.081E+01%		1.10E+01
BI-212	#A	-2.0431E+01	-5.8339E+01	1.029E+02%		1.99E+02
BI-214	#A	-6.6123E+00	-6.6206E+00	6.806E+01%		1.19E+01
AC-228	#A	7.6446E+00	1.0832E+01	1.068E+02%		4.44E+01
Pa-234	#A	4.8490E+00	4.8490E+00	1.133E+02%		1.51E+01
TH-234	#A	-3.0627E+01	-3.0627E+01	1.263E+02%		9.05E+01
PA-234M	#A	-4.7291E+02	-4.7291E+02	6.978E+01%		1.09E+03
U-235	#A	3.9231E+00	3.9231E+00	2.300E+02%		2.44E+01
AM-241		5.0146E+03	5.0379E+03	2.283E-01%		1.66E+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 (1130.6 to 1999.5 keV) 9.077E+03 Bq/Sample
Total Decayed Activity (1130.6 to 1999.5 keV) 1.0246803E+04 Bq/Sample

The library has energies which are not separable.


1L Marn_83924-334_2011Cal. 14_83924-334_20131712.spc.
Counts
Energy (keV)
Am-241
Pb-210
Th-234
Eu-152
U-235
Pb-214
Pb-212
I-131
Be-7
Cs-137
Bi-212 54
Cs-134
Pa-234
Ac-228
Co-60
Eu-154
K-40
Bi-214

Test America St. Louis Spectrum ID: 15_83924-334_20131458

Sample Description: 1L Marn_83924-334_2011Cal
Detector: Ge15 SN/11012216
Batch ID: 1L Marn
Work Order Number: 83924-334
Lot Number: 2011Cal

Decay to Time: 1/1/2011 12:00 Live Time: 3600 sec
Acquisition Time: 11/22/2013 09:53:42 Real Time: 3712 sec
Analysis Time: 11/22/2013 10:55 Dead Time: 3.02 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 15_Liquid_Marinelli 1L.Clb
Efficiency Cal Desc: 15_1LMarinelli_90062_030512
Efficiency Cal Date: 3/14/2012 17:18
Energy Cal Date: 2/28/2012 16:29
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 15_2013-11-02_0115.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
K-40	5.431E+00	148.7	8.076E+00	8.081E+00	2.766E+01
CO-60	3.238E+03	0.3	1.066E+01	1.601E+02	7.520E+00
CS-134	3.363E+00	90.4	3.040E+00	3.045E+00	1.827E+01
CS-137	1.972E+03	0.5	9.082E+00	9.900E+01	9.211E+00
EU-152	2.791E+01	31.6	8.812E+00	8.931E+00	2.006E+01
EU-154	1.508E+02	1.4	2.110E+00	7.714E+00	1.032E+02
EU-155	1.475E+00	408.5	6.028E+00	6.028E+00	1.997E+01
TL-208	7.526E-01	322.4	2.426E+00	2.426E+00	2.057E+01
PB-210	-3.725E+02	21.6	8.027E+01	8.703E+01	2.479E+02
PB-212	9.094E+00	92.4	8.405E+00	8.425E+00	2.778E+01
PB-214	6.813E-01	633.2	4.314E+00	4.314E+00	1.431E+01
BI-212	-7.353E+01	106.0	7.797E+01	7.805E+01	2.580E+02
BI-214	3.390E+00	73.9	2.506E+00	2.511E+00	8.575E+00
AC-228	3.106E+01	39.1	1.215E+01	1.225E+01	3.982E+01
Pa-234	4.721E+00	138.6	6.543E+00	6.548E+00	1.836E+01
TH-234	-1.958E+02	20.5	4.007E+01	4.149E+01	1.233E+02
PA-234M	-1.282E+02	148.9	1.908E+02	1.909E+02	1.306E+03
U-235	2.806E+00	202.7	5.687E+00	5.689E+00	3.026E+01
AM-241	5.045E+03	0.3	1.387E+01	2.916E+02	2.099E+01
Total	1.050E+04				

Analyst: Jody Watson

TestAmerica, Inc. Spectrum name: 15_83924-334_20131458.An1

Sample description
1L Marn_83924-334_2011Cal

Spectrum Filename: C:\User\SPC\Det15\15_83924-334_20131458.An1

Acquisition information

Start time:	11/22/2013 9:53:42 AM
Live time:	3600
Real time:	3712
Dead time:	3.02 %
Detector ID:	15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_Liquid_Marinelli 1L.Clb
15_1LMarinelli_90062_030512

Energy Calibration

Created:	2/28/2012 4:29:17 PM
Zero offset:	0.044 keV
Gain:	0.250 keV/channel
Quadratic:	-3.267E-08 keV/channel^2

Efficiency Calibration

Created:	3/14/2012 5:18:02 PM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 1.47 %
Log(Eff):	-1.572527E+00 + (-4.580173E-02*Log(E)) + (-6.063230E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 0.05 %
Log(Eff):	-1.327166E+01 + (4.478511E+00*Log(E)) + (-4.979721E-01*Log(E)^2)

Library Files

Main analysis library:	Client_Routine Short Rev1.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.57keV)
Stop channel:	8000 (1999.52keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

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 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2013-11-02_0115.PBC 11/2/2013 1:15:02 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 23 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.1414

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.57	1998.	12.38	0.95	2.723E-02				
49.53	9830.	4.71	1.74	3.411E-02				
59.52	242718.	0.27	0.96	3.740E-02	59.54	35.900	5.045E+03	AM241
88.07	78275.	0.48	1.01	4.066E-02				
98.91	219.	51.58	0.70	4.048E-02				
103.81	30.	408.53	1.00	4.015E-02	105.31	21.200	PBC<MDA	EU155
122.14	13524.	1.79	1.05	3.879E-02	121.78	28.580	3.926E+02	EU152
					123.10	40.790	3.005E+02	EU154
					123.10	40.790	3.005E+02	EU154
136.63	1806.	8.80	1.04	3.724E-02				
166.01	1118.	12.64	1.02	3.367E-02				
182.81	104.	65.78	0.38	3.156E-02				
206.21	68.	202.67	1.09	2.915E-02	205.33	5.010	PBC<MDA	U235
					205.33	5.010	1.302E+01	U235
240.87	130.	80.09	1.12	2.623E-02	238.63	43.300	PBC<MDA	PB212
247.76	169.	80.17	0.51	2.554E-02				
276.80	39.	322.36	1.15	2.355E-02	277.28	6.310	PBC<MDA	TL208
					277.28	6.310	2.056E+01	TL208
284.47	95.	127.51	1.16	2.312E-02	284.30	6.140	HL>Cutoff	I131
					284.30	6.140	HL>Cutoff	I131
307.11	153.	62.71	0.66	2.185E-02				
344.79	461.	31.57	0.84	2.004E-02	344.29	26.500	2.791E+01	EU152
351.84	18.	633.21	1.22	1.973E-02	351.93	37.600	PBC<MDA	PB214
364.48	27.	414.99	1.23	1.921E-02	364.48	81.700	HL>Cutoff	I131
					364.48	81.700	HL>Cutoff	I131
391.80	406.	33.58	0.93	1.818E-02				
418.37	75.	72.58	0.41	1.728E-02				
426.56	128.	58.93	0.39	1.702E-02				

609.58	65.	64.61	1.43	1.279E-02	609.31	46.090	PBC<MDA	BI214
612.27	86.	65.88	0.38	1.274E-02				
612.53	71.	90.87	1.43	1.274E-02				
661.73	67564.	0.46	1.45	1.194E-02	661.66	85.210	1.972E+03	CS137
722.46	69.	122.38	1.52	1.108E-02	723.36	20.220	PBC<MDA	EU154
					723.36	20.220	1.077E+01	EU154
723.01	230.	45.74	0.72	1.109E-02				
768.46	29.	283.18	1.55	1.055E-02	766.41	0.294	PBC<MDA	PA234M
785.08	174.	54.07	0.33	1.034E-02				
801.97	98.	92.72	1.58	1.015E-02	801.95	8.690	PBC<MDA	CS134
					801.95	8.690	8.106E+01	CS134
834.98	10366.	1.55	1.58	9.806E-03				
873.73	27.	384.70	1.63	9.434E-03	873.23	12.270	PBC<MDA	EU154
					873.23	12.270	8.086E+00	EU154
884.50	39.	263.61	1.64	9.341E-03	883.24	9.600	PBC<MDA	Pa234
					883.24	9.600	1.206E+01	Pa234
907.74	271.	37.23	0.37	9.121E-03				
910.96	208.	39.14	1.66	9.092E-03	911.07	29.000	PBC<MDA	AC228
946.13	42.	264.01	1.68	8.798E-03	946.02	13.400	PBC<MDA	Pa234
					946.02	13.400	9.867E+00	Pa234
953.11	161.	65.10	0.53	8.740E-03				
981.21	184.	50.75	0.50	8.520E-03				
995.94	94.	104.12	1.72	8.406E-03	996.33	10.600	PBC<MDA	EU154
					996.33	10.600	3.691E+01	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1004.35	119.	82.72	1.72	8.343E-03	1004.77	18.010	PBC<MDA	EU154
					1004.77	18.010	2.768E+01	EU154
1029.71	247.	42.92	0.24	8.164E-03				
1115.54	5012.	3.88	1.85	7.601E-03				
1144.14	137.	44.72	0.66	7.430E-03				
1173.36	57410.	0.47	1.79	7.263E-03	1173.24	99.900	3.214E+03	CO60
1195.51	87.	59.49	0.34	7.142E-03				
1236.75	66.	45.61	0.40	6.925E-03				
1274.27	228.	21.30	0.61	6.739E-03	1274.54	35.190	3.373E+01	EU154
1274.84	104.	32.18	1.90	6.738E-03	1274.54	35.190	PBC<MDA	EU154
1332.66	51930.	0.46	1.92	6.468E-03	1332.50	99.980	3.262E+03	CO60
1408.51	60.	32.31	1.98	6.149E-03	1408.00	21.005	PBC<MDA	EU152
1461.17	12.	87.17	2.02	5.942E-03	1460.83	10.670	PBC<MDA	K40
1764.99	12.	78.94	2.18	4.975E-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	
145.97	36.57	16912.	1998.	7.336E+04	12.38	0.946	-	sM
197.81	49.53	58866.	10188.	2.986E+05	3.51	1.744	-	sM
351.84	88.07	15162.	78716.	1.936E+06	0.42	1.008	-	
395.18	98.91	4717.	219.	5.419E+03	51.58	0.703	-	s
545.94	136.63	6698.	1806.	4.851E+04	8.80	1.038	-	s
663.39	166.01	5669.	1127.	3.347E+04	9.91	1.020	-	
730.57	182.81	2288.	104.	3.296E+03	65.78	0.379	-	c
990.22	247.76	5434.	169.	6.604E+03	80.17	0.512	-	c
1227.49	307.11	3188.	153.	6.995E+03	62.71	0.662	-	s
1566.13	391.80	4545.	406.	2.233E+04	33.58	0.928	-	s
1672.36	418.37	1444.	75.	4.341E+03	72.58	0.410	-	sc
1705.09	426.56	2242.	128.	7.550E+03	58.93	0.391	-	s
2448.81	612.27	2040.	71.	5.567E+03	90.87	1.433	-	sc
2890.69	723.01	2487.	162.	1.458E+04	44.33	0.723	-	sM
3138.98	785.08	2177.	166.	1.602E+04	40.60	0.330	-	s
3338.60	834.98	3216.	10366.	1.057E+06	1.55	1.584	-	
3629.21	907.74	2592.	260.	2.854E+04	28.34	1.656	-	D
3811.18	953.11	2952.	161.	1.842E+04	65.10	0.534	-	s
3923.59	981.21	2227.	184.	2.160E+04	50.75	0.500	-	sM
4117.66	1029.71	2443.	247.	3.025E+04	42.92	0.240	-	sM
4461.10	1115.54	3719.	6784.	8.925E+05	1.76	1.850	-	sM
4575.55	1144.14	981.	137.	1.839E+04	44.72	0.657	-	s
4781.09	1195.51	648.	87.	1.218E+04	59.49	0.339	-	s
4946.16	1236.75	240.	66.	9.530E+03	45.61	0.399	-	s
5096.32	1274.27	459.	124.	1.839E+04	26.05	0.605	-	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_Routine Short Rev1.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	189.26	47.39	59326.	-1709.	-0.475	20.92	0.946
AM-241	237.72	59.52	46727.	242718.	67.422	0.27	0.964
TH-234	251.82	63.05	19122.	-1028.	-0.286	19.86	0.962s
EU-155	353.93	88.59	23344.	-442.	-0.123	49.16	0.983s
EU-155	414.75	103.81	7589.	30.	0.008	408.53	1.000
EU-152	488.02	122.14	10000.	13524.	3.757	1.79	1.049
EU-154	487.94	122.12	9037.	12494.	3.471	1.40	1.017s
Pa-234	523.79	131.09	9221.	-74.	-0.021	183.58	1.024s
U-235	654.06	163.67	9720.	-334.	-0.093	42.49	1.053s
U-235	824.09	206.21	9593.	68.	0.019	202.67	1.091s
PB-212	962.67	240.87	7190.	130.	0.036	80.09	1.120s
PB-214	970.14	242.74	9363.	-215.	-0.060	64.13	1.123s
TL-208	1106.33	276.80	7688.	39.	0.011	322.36	1.154s
I-131	1136.98	284.47	7359.	95.	0.027	127.51	1.160
PB-214	1179.66	295.14	7165.	-57.	-0.016	210.36	1.170s
PB-212	1204.54	301.37	6660.	-51.	-0.014	225.11	1.174s
AC-228	1352.26	338.31	6910.	-62.	-0.017	191.28	1.207s
EU-152	1378.13	344.79	4965.	461.	0.128	31.57	0.836s
PB-214	1406.32	351.84	6612.	18.	0.005	633.21	1.219s
I-131	1456.90	364.48	6489.	27.	0.008	414.99	1.229s
CS-134	2249.00	562.57	4075.	-101.	-0.028	90.21	1.394s
CS-134	2279.06	570.09	4740.	-95.	-0.026	103.23	1.399s
Pa-234	2279.05	570.08	4731.	-93.	-0.026	105.09	1.399s
CS-134	2420.41	605.43	4434.	-61.	-0.017	155.21	1.427s
BI-214	2435.94	609.31	1475.	65.	0.018	64.61	1.431D
CS-137	2645.57	661.73	4510.	67564.	18.768	0.46	1.451
EU-154	2888.51	722.46	3512.	69.	0.019	122.38	1.519s
BI-212	2900.45	725.45	3315.	-77.	-0.021	106.03	1.522s
PA-234M	3072.47	768.46	3405.	29.	0.008	283.18	1.552s
CS-134	3183.03	796.09	4114.	-74.	-0.021	122.79	1.574s
CS-134	3206.53	801.97	4041.	98.	0.027	92.72	1.578s
EU-154	3493.61	873.73	5257.	27.	0.007	384.70	1.631s
Pa-234	3536.70	884.50	5245.	39.	0.011	263.61	1.638s
AC-228	3642.99	911.07	3211.	208.	0.058	39.14	1.658D
Pa-234	3783.27	946.13	6090.	42.	0.012	264.01	1.683s
EU-152	3853.95	963.80	5838.	-72.	-0.020	150.48	1.696s
AC-228	3875.45	969.17	5165.	-118.	-0.033	86.29	1.699s
EU-154	3982.53	995.94	4719.	94.	0.026	104.12	1.718s
PA-234M	4001.90	1000.78	4919.	-67.	-0.019	148.87	1.722s
EU-154	4016.18	1004.35	4751.	119.	0.033	82.72	1.724s
EU-152	4447.58	1112.16	6928.	-654.	-0.182	18.43	1.797
BI-214	4472.17	1118.31	7236.	-1129.	-0.314	11.10	1.803
CO-60	4692.47	1173.36	2276.	57410.	15.947	0.47	1.788
EU-154	5098.60	1274.84	510.	104.	0.029	32.18	1.902s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	5329.98	1332.66	630.	51930.	14.425	0.46	1.919
EU-152	5633.60	1408.51	159.	60.	0.017	32.31	1.984s
K-40	5844.41	1461.17	168.	12.	0.003	87.17	2.015s
BI-214	7060.78	1764.99	106.	12.	0.003	78.94	2.180

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	-1.0130E+00				5.31E+01	
			477.60	-1.013E+00	&(	6.332E+01	1.88E+03 1.05E+01 G
K-40	N	5.4314E+00				4.66E+11	
			1460.83	5.431E+00	?(P	2.766E+01	8.72E+01 1.07E+01 G
CO-60	F	3.2379E+03				1.93E+03	
			1332.50	3.262E+03	(	7.520E+00	4.58E-01 1.00E+02 G
			1173.24	3.214E+03	(	1.260E+01	4.73E-01 9.99E+01 G
I-131	I	1.7576E+00				8.02E+00	
			364.48	4.863E-01	?(	6.691E+00	4.15E+02 8.17E+01 G
			284.30	1.867E+01	?(	7.874E+01	1.28E+02 6.14E+00 G
			636.97	5.576E-01	&	9.345E+01	5.04E+03 7.17E+00 G
CS-134	I	3.3633E+00				7.54E+02	
			604.71	-3.553E+00	?(	1.827E+01	1.55E+02 9.76E+01 G
			795.87	-6.224E+00	+	2.530E+01	1.23E+02 8.55E+01 G
			569.32	-3.343E+01	&	1.141E+02	1.03E+02 1.54E+01 G
			801.95	8.106E+01	(	2.484E+02	9.27E+01 8.69E+00 G
			563.24	-6.483E+01	+	1.933E+02	9.02E+01 8.35E+00 G
CS-137	I	1.9715E+03				1.10E+04	
			661.66	1.972E+03	(	9.211E+00	4.61E-01 8.52E+01 G
EU-152	F	2.7912E+01				4.94E+03	
			344.29	2.791E+01	(	2.006E+01	3.16E+01 2.65E+01 G
			121.78	3.926E+02	+	1.361E+01	1.79E+00 2.86E+01 G
			778.92	1.414E+00	%	7.177E+01	1.53E+03 1.29E+01 G
			964.11	-1.836E+01	&	9.145E+01	1.50E+02 1.46E+01 G
			1112.07	-2.024E+02	-	1.210E+02	1.84E+01 1.36E+01 G
			1408.00	1.499E+01	&	1.531E+01	3.23E+01 2.10E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	1.5078E+02					3.14E+03	
			873.23	8.086E+00	?(	1.032E+02	3.85E+02	1.23E+01 G
			123.10	2.777E+02	?(	9.905E+00	1.40E+00	4.08E+01 G
			1274.54	1.541E+01	-	1.597E+01	3.22E+01	3.52E+01 G
			723.36	1.077E+01	-	4.365E+01	1.22E+02	2.02E+01 G
			1004.77	2.768E+01	?(	7.561E+01	8.27E+01	1.80E+01 G
			996.33	3.691E+01	(	1.271E+02	1.04E+02	1.06E+01 G
EU-155	I	1.4754E+00					1.81E+03	
			105.31	1.475E+00	(	1.997E+01	4.09E+02	2.12E+01 G
			86.54	-1.473E+01	+	2.383E+01	4.92E+01	3.07E+01 G
TL-208	N	7.5256E-01					6.98E+02	
			583.02	-7.263E-01	&(P	2.057E+01	1.00E+05	8.45E+01 G
			277.28	2.056E+01	&(	2.195E+02	3.22E+02	6.31E+00 G
			860.56	-3.685E+00	%	2.138E+02	1.75E+03	1.24E+01 G
PB-210	N	-3.7246E+02					8.14E+03	
			46.54	-3.725E+02	(P	2.479E+02	2.09E+01	4.25E+00 G
PB-212	N	9.0935E+00					6.98E+02	
			238.63	9.093E+00	(P	2.778E+01	8.01E+01	4.33E+01 G
			300.03	-5.588E+01	+	4.166E+02	2.25E+02	3.28E+00 G
PB-214	N	6.8131E-01					5.84E+05	
			351.93	6.813E-01	?(	1.431E+01	6.33E+02	3.76E+01 G
			295.09	-3.652E+00	+	2.544E+01	2.10E+02	1.93E+01 G
			242.00	-3.093E+01	+	6.538E+01	6.41E+01	7.43E+00 G
BI-212	N	-7.3531E+01					6.98E+02	
			727.17	-7.353E+01	?(	2.580E+02	1.06E+02	7.55E+00 G
			785.42	5.041E+01	%	1.733E+03	1.03E+03	1.28E+00 G
BI-214	N	3.3896E+00					5.84E+05	
			609.31	3.048E+00	(P	8.575E+00	6.46E+01	4.61E+01 G
			1120.29	-2.747E+02	+ P	9.708E+01	1.11E+01	1.51E+01 G
			1764.49	4.413E+00	(P	1.837E+01	7.89E+01	1.54E+01 G
AC-228	N	3.1056E+01					2.10E+03	
			911.07	3.106E+01	(	3.982E+01	3.91E+01	2.90E+01 G
			968.97	-3.100E+01	-	8.835E+01	8.63E+01	1.75E+01 G
			338.32	-9.932E+00	-	6.290E+01	1.91E+02	1.20E+01 G
							Energy duplication	
			93.35	5.734E-01	%	8.128E+01	4.28E+03	5.56E+00 XA
Pa-234	N	4.7207E+00					1.63E+12	
			131.29	-3.023E+00	?(	1.836E+01	1.84E+02	1.80E+01 G
			569.47	-2.331E+01	+	8.102E+01	1.05E+02	8.20E+00 G

Nuclide	Ave	activity	Energy	Activity	Code	Peak	MDA	Comments
			946.02	9.867E+00	?(	8.633E+01	2.64E+02	1.34E+01 G
			883.24	1.206E+01	&(	1.054E+02	2.64E+02	9.60E+00 G
			880.53	-1.580E+00	%	1.694E+02	3.23E+03	6.00E+00 G
TH-234	N	-1.9578E+02					1.63E+12	
			63.29	-1.958E+02	&(P	1.233E+02	1.99E+01	3.81E+00 G
			92.59	-5.213E+00	& P	5.839E+01	1.46E+03	5.58E+00 G
PA-234M	N	-1.2816E+02					1.63E+12	
			1001.00	-2.650E+02	?(	1.306E+03	1.49E+02	8.37E-01 G
			766.41	2.615E+02	&(	2.459E+03	2.83E+02	2.94E-01 G
U-235	N	2.8061E+00					2.57E+11	
			143.79	-1.865E+00	%(P	3.026E+01	7.92E+02	1.10E+01 G
			205.33	1.302E+01	&(	8.734E+01	2.03E+02	5.01E+00 G
			163.38	-5.375E+01	+ P	7.430E+01	4.25E+01	5.08E+00 G
							Energy	duplication
			93.35	3.873E-01	%	5.490E+01	4.28E+03	5.81E+00 X
AM-241	T	5.0447E+03					1.58E+05	
			59.54	5.045E+03	(	2.099E+01	2.75E-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:
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

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
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	
PB-210	47.39	59326.	-1709.	-0.475	20.92	-3.725E+02	P
TH-234	63.05	19122.	-1028.	-0.286	19.86	-1.958E+02	P
EU-155	88.59	23344.	-442.	-0.123	49.16	-1.473E+01	
EU-155	103.81	7589.	30.	0.008	408.53	1.475E+00	
EU-154	122.12	9037.	12494.	3.471	1.40	2.777E+02	
Pa-234	131.09	9221.	-74.	-0.021	183.58	-3.023E+00	
U-235	163.67	9720.	-334.	-0.093	42.49	-5.375E+01	P
U-235	206.21	9593.	68.	0.019	202.67	1.302E+01	
PB-212	240.87	7190.	130.	0.036	80.09	9.093E+00	P
PB-214	242.74	9363.	-215.	-0.060	64.13	-3.093E+01	
TL-208	276.80	7688.	39.	0.011	322.36	2.056E+01	
I-131	284.47	7359.	95.	0.027	127.51	0.000E+00	
PB-214	295.14	7165.	-57.	-0.016	210.36	-3.652E+00	
PB-212	301.37	6660.	-51.	-0.014	225.11	-5.588E+01	
PB-214	351.84	6612.	18.	0.005	633.21	6.813E-01	
I-131	364.48	6489.	27.	0.008	414.99	0.000E+00	
CS-134	562.57	4075.	-101.	-0.028	90.21	-6.483E+01	
CS-134	570.09	4740.	-95.	-0.026	103.23	-3.343E+01	
Pa-234	570.08	4731.	-93.	-0.026	105.09	-2.331E+01	
CS-134	605.43	4434.	-61.	-0.017	155.21	-3.553E+00	
EU-154	722.46	3512.	69.	0.019	122.38	1.077E+01	
BI-212	725.45	3315.	-77.	-0.021	106.03	-7.353E+01	
PA-234M	768.46	3405.	29.	0.008	283.18	2.615E+02	
CS-134	796.09	4114.	-74.	-0.021	122.79	-6.224E+00	
CS-134	801.97	4041.	98.	0.027	92.72	8.106E+01	
EU-154	873.73	5257.	27.	0.007	384.70	8.086E+00	
Pa-234	884.50	5245.	39.	0.011	263.61	1.206E+01	
Pa-234	946.13	6090.	42.	0.012	264.01	9.867E+00	
EU-154	995.94	4719.	94.	0.026	104.12	3.691E+01	
PA-234M	1000.78	4919.	-67.	-0.019	148.87	-2.650E+02	
EU-154	1004.35	4751.	119.	0.033	82.72	2.768E+01	
EU-154	1274.84	510.	104.	0.029	32.18	1.541E+01	
K-40	1461.17	168.	12.	0.003	87.17	5.431E+00	P

P - Peakbackground subtraction

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

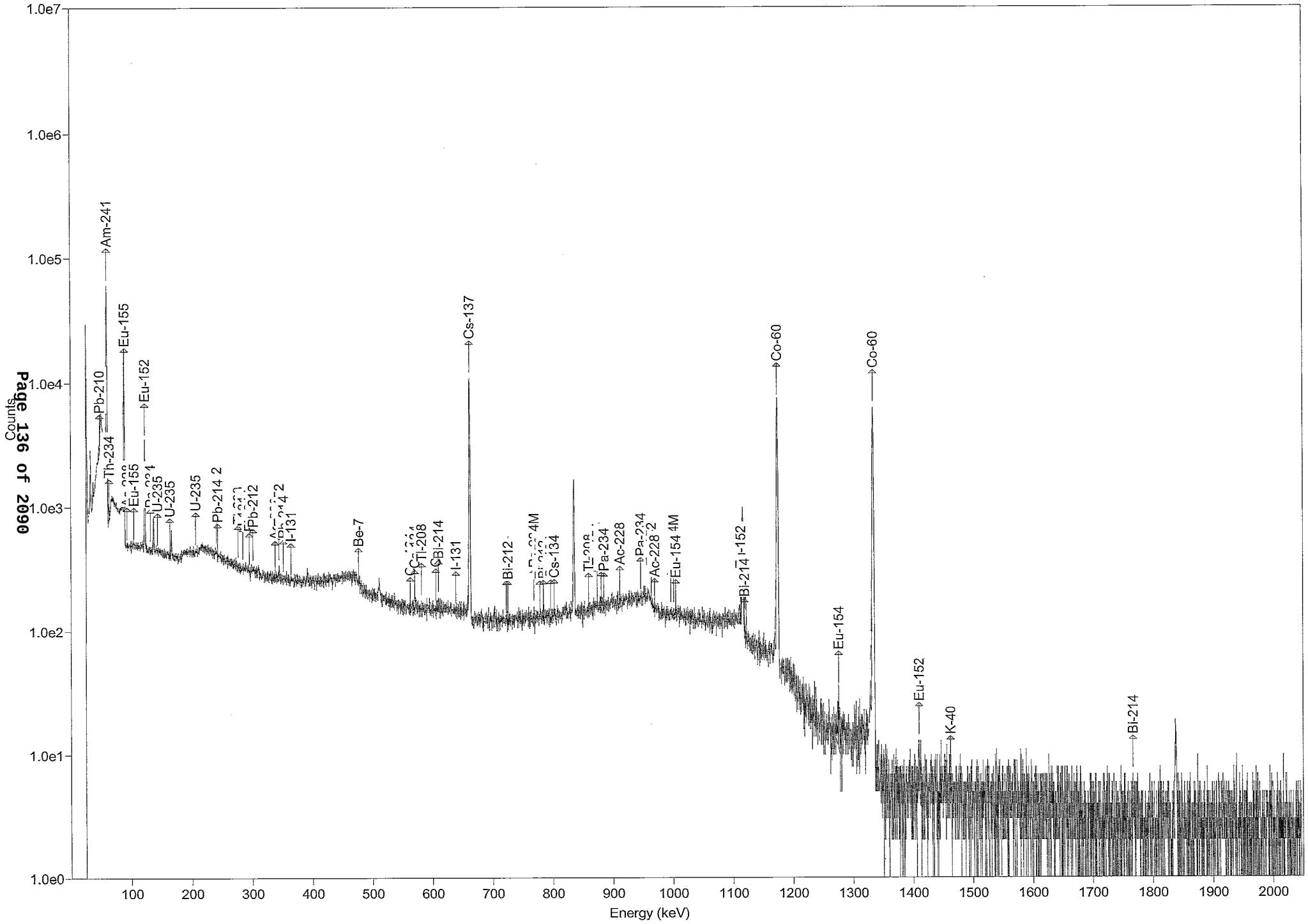
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
BE-7	#A	-1.0130E+00	>12 Halflives	1.8836E+03%	6.3317E+01	
K-40	#A	5.4314E+00	5.4314E+00	1.487E+02%		2.77E+01
CO-60		2.2139E+03	3.2379E+03	3.293E-01%		7.52E+00
I-131	#A	1.7576E+00	>12 Halflives	1.2751E+02%	6.6912E+00	
CS-134	#A	1.2743E+00	3.3633E+00	9.040E+01%		1.83E+01
CS-137		1.8441E+03	1.9715E+03	4.607E-01%		9.21E+00
EU-152		2.4072E+01	2.7912E+01	3.157E+01%		2.01E+01
EU-154	#C	1.1942E+02	1.5078E+02	1.399E+00%		1.03E+02
EU-155	#A	9.8505E-01	1.4754E+00	4.085E+02%		2.00E+01
TL-208	#A	2.6357E-01	7.5256E-01	3.224E+02%		2.06E+01
PB-210	#A	-3.4045E+02	-3.7246E+02	2.155E+01%		2.48E+02
PB-212	#A	3.1848E+00	9.0935E+00	9.243E+01%		2.78E+01
PB-214	#A	6.8045E-01	6.8131E-01	6.332E+02%		1.43E+01
BI-212	#A	-2.5753E+01	-7.3531E+01	1.060E+02%		2.58E+02
BI-214	A	3.3853E+00	3.3896E+00	7.392E+01%		8.57E+00
AC-228	A	2.1918E+01	3.1056E+01	3.914E+01%		3.98E+01
Pa-234	#A	4.7207E+00	4.7207E+00	1.386E+02%		1.84E+01
TH-234	#A	-1.9578E+02	-1.9578E+02	2.047E+01%		1.23E+02
PA-234M	#A	-1.2816E+02	-1.2816E+02	1.489E+02%		1.31E+03
U-235	#A	2.8061E+00	2.8061E+00	2.027E+02%		3.03E+01
AM-241		5.0214E+03	5.0447E+03	2.749E-01%		2.10E+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 (953.1 to 1999.5 keV) 9.125E+03 Bq/Sample
Total Decayed Activity (953.1 to 1999.5 keV) 1.0313123E+04 Bq/Sample

The library has energies which are not separable.


1L Marn_83924-334_2011Cal. 15_83924-334_20131458.spc.
Counts
Energy (keV)
1.0e7
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Am-241
Pb-210
Th-234
Eu-155
Eu-152
U-235
U-235
U-235
Pb-214
Pb-212
I-131
Be-7
Tl-208
Bi-214
I-131
Cs-137
Bi-212
Cs-134
Pa-234
Ac-228
Ac-228
Eu-154
Bi-214
Co-60
Co-60
Eu-154
Eu-152
K-40
Bi-214

Test America St. Louis Spectrum ID: 18_83924-334_20130931

Sample Description: 1L Marn_83924-334_2011Cal
Detector: Ge18 SN/11164036
Batch ID: 1L Marn
Work Order Number: 83924-334
Lot Number: 2011Cal

Decay to Time: 1/1/2011 12:00 Live Time: 3600 sec
Acquisition Time: 11/22/2013 08:29:35 Real Time: 3758 sec
Analysis Time: 11/22/2013 09:32 Dead Time: 4.21 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 18_1LMarinelli.Clb
Efficiency Cal Desc: 18_1Lmarn_83924-334_120711
Efficiency Cal Date: 12/8/2011 10:14
Energy Cal Date: 3/1/2012 13:27
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 18_2013-11-02_0120.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
K-40	4.025E+01	23.9	9.618E+00	9.830E+00	1.819E+01
CO-60	3.226E+03	0.3	8.914E+00	1.593E+02	7.263E+00
CS-134	4.627E+00	97.1	4.493E+00	4.499E+00	1.334E+01
CS-137	2.010E+03	0.4	7.710E+00	1.001E+02	7.902E+00
EU-152	1.338E+01	36.6	4.889E+00	4.947E+00	1.905E+01
EU-154	2.242E+02	1.1	2.535E+00	1.137E+01	7.933E+01
EU-155	1.533E+03	0.4	5.520E+00	8.917E+01	1.807E+01
TL-208	-2.664E+00	232.6	6.197E+00	6.198E+00	1.790E+01
PB-210	-3.870E+02	17.6	6.800E+01	7.641E+01	2.130E+02
PB-212	-1.820E-01	4773.0	8.687E+00	8.687E+00	2.351E+01
PB-214	4.260E+00	82.8	3.529E+00	3.537E+00	1.166E+01
BI-212	-1.079E+02	62.8	6.771E+01	6.792E+01	2.231E+02
BI-214	-2.768E-02	60.2	1.665E-02	1.670E-02	1.191E+01
AC-228	6.535E+00	191.9	1.254E+01	1.254E+01	4.150E+01
Pa-234	1.506E+00	67.0	1.009E+00	1.012E+00	1.566E+01
TH-234	-1.603E+02	21.3	3.416E+01	3.528E+01	1.017E+02
PA-234M	1.349E+01	2211.0	2.982E+02	2.982E+02	9.895E+02
U-235	3.412E+00	228.3	7.791E+00	7.793E+00	2.577E+01
AM-241	5.140E+03	0.2	1.213E+01	2.970E+02	1.820E+01
Total	1.222E+04				

Analyst: Jody Watson

Test America Spectrum name: 18_83924-334_20130931.An1

Sample description
1L Marn_83924-334_2011Cal

Spectrum Filename: C:\User\SPC\Det18\18_83924-334_20130931.An1

Acquisition information

Start time:	11/22/2013 8:29:35 AM
Live time:	3600
Real time:	3758
Dead time:	4.21 %
Detector ID:	18

Detector system
Ge18 SN/11164036

Calibration
Filename: 18_1LMarinelli.Clb
18_1Lmarn_83924-334_120711

Energy Calibration

Created:	3/1/2012 1:27:55 PM
Zero offset:	0.007 keV
Gain:	0.250 keV/channel
Quadratic:	-3.202E-08 keV/channel^2

Efficiency Calibration

Created:	12/8/2011 10:14:04 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 2.55 %
Log(Eff):	-1.645931E+00 + (3.227669E-02*Log(E)) + (-6.187585E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 0.90 %
Log(Eff):	-1.318185E+01 + (4.538566E+00*Log(E)) + (-5.017483E-01*Log(E)^2)

Library Files

Main analysis library:	Client_Routine Short Rev1.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.54keV)
Stop channel:	8000 (1999.55keV)
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

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 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	18_2013-11-02_0120.PBC 11/2/2013 1:20:35 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 22 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 179.3500

***** 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
36.41	2725.	9.39	0.92	3.507E-02				
42.28	528.	43.96	0.17	3.985E-02				
49.45	13420.	3.85	1.81	4.449E-02				
55.21	180.	133.43	0.40	4.737E-02				
59.43	324650.	0.24	0.95	4.906E-02	59.54	35.900	5.140E+03	AM241
87.92	104101.	0.41	1.01	5.396E-02	86.54	30.700	2.617E+03	EU155
122.03	18305.	1.39	1.04	5.191E-02	121.78	28.580	3.972E+02	EU152
					123.10	40.790	3.040E+02	EU154
					121.78	28.580	3.972E+02	EU152
136.39	2134.	8.35	1.00	4.999E-02				
144.00	66.	228.33	1.05	4.890E-02	143.79	10.960	PBC<MDA	U235
149.02	129.	76.92	0.52	4.809E-02				
165.89	1654.	10.21	1.18	4.516E-02				
240.71	-4.	439.57	1.15	3.601E-02	238.63	43.300	PBC<MDA	PB212
					238.63	43.300	PBC<MDA	PB212
344.29	286.	46.97	1.25	2.819E-02	344.29	26.500	PBC<MDA	EU152
					344.29	26.500	1.233E+01	EU152
352.08	160.	71.55	1.26	2.777E-02	351.93	37.600	PBC<MDA	PB214
391.60	615.	17.97	1.27	2.577E-02				
520.46	42.	127.38	0.50	2.097E-02				
564.05	63.	174.57	1.45	1.977E-02	563.24	8.350	PBC<MDA	CS134
					563.24	8.350	2.795E+01	CS134
569.31	113.	97.12	1.46	1.961E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.957E+01	Pa234
					569.32	15.380	2.753E+01	CS134
					569.47	8.200	1.957E+01	Pa234
569.33	103.	107.15	1.46	1.960E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.778E+01	Pa234

602.95	20.	497.78	1.49	1.873E-02	604.71	97.620	PBC<MDA	CS134
					604.71	97.620	8.077E-01	CS134
635.92	25.	435.48	1.51	1.801E-02	636.97	7.170	HL>Cutoff	I131
661.68	100873.	0.38	1.47	1.749E-02	661.66	85.210	2.010E+03	CS137
723.21	305.	33.05	1.59	1.632E-02	723.36	20.220	PBC<MDA	EU154
					723.36	20.220	3.240E+01	EU154
778.97	278.	35.82	0.55	1.539E-02	778.92	12.940	4.501E+01	EU152
					778.92	12.940	4.501E+01	EU152
785.20	50.	212.42	1.64	1.529E-02	785.42	1.280	PBC<MDA	BI212
795.81	46.	235.56	1.64	1.513E-02	795.87	85.530	PBC<MDA	CS134
					795.87	85.530	2.590E+00	CS134
804.95	346.	41.31	0.37	1.500E-02				
834.89	15686.	1.55	1.60	1.457E-02				
860.56	12.	975.06	1.70	1.422E-02	860.56	12.420	PBC<MDA	TL208

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
874.57	48.	244.94	1.70	1.405E-02	873.23	12.270	PBC<MDA	EU154
					873.23	12.270	9.777E+00	EU154
911.14	65.	191.85	1.73	1.358E-02	911.07	29.000	PBC<MDA	AC228
927.30	120.	55.25	0.42	1.338E-02				
948.53	472.	39.16	0.41	1.314E-02				
963.71	58.	223.34	1.77	1.296E-02	964.11	14.605	PBC<MDA	EU152
					964.11	14.605	9.797E+00	EU152
972.86	138.	56.31	0.37	1.287E-02				
998.18	27.	410.08	1.80	1.262E-02	996.33	10.600	PBC<MDA	EU154
					996.33	10.600	7.131E+00	EU154
1004.81	133.	85.58	1.80	1.253E-02	1004.77	18.010	PBC<MDA	EU154
					1004.77	18.010	2.063E+01	EU154
1115.48	7455.	2.93	1.73	1.149E-02				
1173.31	86649.	0.40	1.86	1.101E-02	1173.24	99.900	3.199E+03	CO60
1202.37	192.	32.00	0.41	1.079E-02				
1274.66	182.	25.93	1.98	1.027E-02	1274.54	35.190	1.768E+01	EU154
					1274.54	35.190	1.768E+01	EU154
1332.61	79149.	0.38	1.93	9.884E-03	1332.50	99.980	3.253E+03	CO60
1408.32	77.	36.55	2.06	9.427E-03	1408.00	21.005	PBC<MDA	EU152
					1408.00	21.005	1.255E+01	EU152
1460.73	141.	21.30	0.59	9.130E-03	1460.83	10.670	4.025E+01	K40
1528.95	113.	32.88	0.63	8.774E-03				
1762.55	35.	60.06	2.23	7.731E-03	1764.49	15.400	PBC<MDA	BI214
					1764.49	15.400	PBC<MDA	BI214
1835.68	314.	12.52	1.06	7.462E-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
145.51	36.41	18849.	2725.	7.771E+04	9.39	0.922	-	s
168.94	42.28	21376.	528.	1.326E+04	43.96	0.165	-	s
197.63	49.45	72749.	13916.	3.128E+05	2.87	1.810	-	s
220.65	55.21	28753.	180.	3.800E+03	133.43	0.400	-	sc
351.38	87.92	121935.	887.	1.643E+04	55.79	1.006	-	M
545.13	136.39	8468.	2134.	4.267E+04	8.35	0.995	-	
595.61	149.02	4164.	129.	2.682E+03	76.92	0.524	-	c
663.05	165.89	7674.	1655.	3.664E+04	7.88	1.179	-	M
1565.44	391.60	3868.	615.	2.387E+04	17.97	1.275	-	M
2080.70	520.46	1410.	42.	2.003E+03	127.38	0.498	-	c
3114.63	778.97	2763.	150.	9.721E+03	50.35	0.553	-	s
3218.54	804.95	4063.	393.	2.619E+04	23.50	0.372	-	s
3338.31	834.89	6306.	15686.	1.077E+06	1.55	1.598	-	
3707.99	927.30	1843.	120.	8.992E+03	55.25	0.424	-	s
3792.90	948.53	6349.	495.	3.766E+04	23.21	0.407	-	s
3890.26	972.86	2077.	138.	1.071E+04	47.53	0.367	-	s
4460.89	1115.48	5090.	9524.	8.288E+05	1.47	1.726	-	s
4808.59	1202.37	858.	192.	1.778E+04	32.00	0.414	-	s
6115.71	1528.95	187.	113.	1.292E+04	32.88	0.629	-	s
7343.76	1835.68	157.	314.	4.206E+04	12.52	1.057	-	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_Routine Short Rev1.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	189.27	47.36	74417.	-2314.	-0.643	17.18	0.947s
AM-241	237.50	59.43	60537.	324650.	90.181	0.24	0.954
TH-234	252.01	63.06	22527.	-1107.	-0.307	20.35	0.965s
EU-155	351.47	87.94	17487.	103216.	28.671	0.36	0.989s
TH-234	369.15	92.36	13364.	-156.	-0.043	223.18	0.996s
AC-228	373.09	93.35	10787.	-92.	-0.025	160.48	0.997D
U-235	373.09	93.35	10787.	-92.	-0.025	160.48	0.997D
EU-155	417.47	104.45	11065.	-140.	-0.039	106.41	1.009
EU-152	487.65	122.01	13083.	17462.	4.851	1.20	1.026
EU-154	487.66	122.01	10631.	17385.	4.829	1.13	1.028s
Pa-234	526.58	131.75	12069.	-194.	-0.054	80.34	1.036s
U-235	575.55	144.00	11262.	66.	0.018	228.33	1.049s
U-235	651.23	162.93	11857.	-123.	-0.034	125.49	1.070
U-235	823.60	206.05	13175.	-105.	-0.029	154.40	1.112s
PB-214	967.35	242.01	12423.	-158.	-0.044	104.73	1.149s
I-131	1135.61	284.09	10742.	-134.	-0.037	109.37	1.191
PB-214	1182.37	295.79	10204.	-135.	-0.038	114.33	1.202s
PB-212	1198.06	299.72	10181.	-68.	-0.019	210.18	1.207s
EU-152	1376.27	344.29	8880.	286.	0.079	46.97	1.249s
PB-214	1407.44	352.08	8707.	160.	0.044	71.55	1.257s
I-131	1460.05	365.24	8793.	-95.	-0.026	139.51	1.269
CS-134	2255.02	564.05	6001.	63.	0.017	174.57	1.451s
CS-134	2276.07	569.31	5993.	113.	0.031	97.12	1.456s
Pa-234	2276.14	569.33	6027.	103.	0.029	107.15	1.456s
TL-208	2331.23	583.10	6124.	-79.	-0.022	186.43	1.468s
CS-134	2410.59	602.95	5020.	20.	0.006	497.78	1.487s
BI-214	2436.33	609.38	6131.	-86.	-0.024	164.39	1.491s
I-131	2542.48	635.92	5834.	25.	0.007	435.48	1.514
CS-137	2645.49	661.68	7140.	100873.	28.020	0.38	1.465
EU-154	2891.57	723.21	4923.	305.	0.085	33.05	1.587s
BI-212	2907.52	727.19	5401.	-167.	-0.046	62.76	1.590s
PA-234M	3055.06	764.08	4431.	-97.	-0.027	97.75	1.622s
EU-152	3113.65	778.73	5737.	129.	0.036	83.29	1.631s
BI-212	3139.54	785.20	5669.	50.	0.014	212.42	1.637s
CS-134	3181.98	795.81	5777.	46.	0.013	235.56	1.645s
CS-134	3208.23	802.37	6068.	-101.	-0.028	109.13	1.650s
TL-208	3441.01	860.56	6875.	12.	0.003	975.06	1.695s
EU-154	3497.02	874.57	6904.	48.	0.013	244.94	1.705s
AC-228	3643.35	911.14	7833.	65.	0.018	191.85	1.734s
Pa-234	3782.59	945.95	9079.	-137.	-0.038	98.92	1.759s
EU-152	3853.66	963.71	8244.	58.	0.016	223.34	1.773s
AC-228	3870.55	967.93	7239.	-127.	-0.035	95.08	1.776
EU-154	3991.54	998.18	6206.	27.	0.008	410.08	1.796s
EU-154	4018.08	1004.81	6388.	133.	0.037	85.58	1.802s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	4447.22	1112.06	9810.	-770.	-0.214	18.55	1.876s
BI-214	4473.83	1118.71	10780.	-1869.	-0.519	8.22	1.882s
CO-60	4692.29	1173.31	4158.	86649.	24.069	0.40	1.856
EU-154	5097.87	1274.66	1024.	182.	0.051	25.93	1.980
CO-60	5329.83	1332.61	1394.	79149.	21.986	0.38	1.927
EU-152	5632.82	1408.32	359.	77.	0.021	36.55	2.058s
K-40	5842.61	1460.73	172.	141.	0.039	21.30	0.593s
BI-214	7050.92	1762.55	207.	35.	0.010	60.06	2.234s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	2.6868E-02				5.31E+01	
			477.60	2.687E-02	&(	5.263E+01 5.91E+04 1.05E+01	G
K-40	N	4.0251E+01				4.66E+11	
			1460.83	4.025E+01	*(P	1.819E+01 2.13E+01 1.07E+01	G
CO-60	F	3.2262E+03				1.93E+03	
			1332.50	3.253E+03	(	7.263E+00 3.79E-01 1.00E+02	G
			1173.24	3.199E+03	(	1.119E+01 4.02E-01 9.99E+01	G
I-131	I	-6.6842E-01				8.02E+00	
			364.48	-1.196E+00	(	5.517E+00 1.40E+02 8.17E+01	G
			284.30	-1.895E+01	+	6.845E+01 1.09E+02 6.14E+00	G
			636.97	5.343E+00	(	7.717E+01 4.35E+02 7.17E+00	G
CS-134	I	4.6266E+00				7.54E+02	
			604.71	8.077E-01	?(	1.334E+01 4.98E+02 9.76E+01	G
			795.87	2.590E+00	?(	2.022E+01 2.36E+02 8.55E+01	G
			569.32	2.753E+01	*(	8.835E+01 9.71E+01 1.54E+01	G
			801.95	-5.686E+01	+	2.051E+02 1.09E+02 8.69E+00	G
			563.24	2.795E+01	&(	1.615E+02 1.75E+02 8.35E+00	G
CS-137	I	2.0104E+03				1.10E+04	
			661.66	2.010E+03	(	7.902E+00 3.84E-01 8.52E+01	G
EU-152	F	1.3378E+01				4.94E+03	
			344.29	1.233E+01	*(	1.905E+01 4.70E+01 2.65E+01	G
			121.78	3.789E+02	+	1.162E+01 1.20E+00 2.86E+01	G
			778.92	2.091E+01	(	5.752E+01 8.33E+01 1.29E+01	G
			964.11	9.797E+00	&(	7.243E+01 2.23E+02 1.46E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1112.07	-1.577E+02	&	9.513E+01	1.85E+01	1.36E+01 G
		1408.00	1.255E+01	@(	1.480E+01	3.65E+01	2.10E+01 G
EU-154	I 2.2418E+02					3.14E+03	
		873.23	9.777E+00	?(	7.933E+01	2.45E+02	1.23E+01 G
		123.10	2.887E+02	?(	8.023E+00	1.13E+00	4.08E+01 G
		1274.54	1.768E+01	-	1.474E+01	2.59E+01	3.52E+01 G
		723.36	3.240E+01	-	3.505E+01	3.31E+01	2.02E+01 G
		1004.77	2.063E+01	-	5.829E+01	8.56E+01	1.80E+01 G
		996.33	7.131E+00	-	9.696E+01	4.10E+02	1.06E+01 G
EU-155	I 1.5326E+03					1.81E+03	
		105.31	-5.142E+00	?(	1.807E+01	1.06E+02	2.12E+01 G
		86.54	2.595E+03	?(	1.556E+01	3.60E-01	3.07E+01 G
TL-208	N -2.6637E+00					6.98E+02	
		583.02	-3.850E+00	?(P	1.790E+01	1.86E+02	8.45E+01 G
		277.28	4.872E+00	%	1.819E+02	1.13E+03	6.31E+00 G
		860.56	5.404E+00	?(	1.748E+02	9.75E+02	1.24E+01 G
PB-210	N -3.8697E+02					8.14E+03	
		46.54	-3.870E+02	?(P	2.130E+02	1.72E+01	4.25E+00 G
PB-212	N -1.8200E-01					6.98E+02	
		238.63	-1.820E-01	%(P	2.351E+01	4.40E+02	4.33E+01 G
		300.03	-5.310E+01	+	3.693E+02	2.10E+02	3.28E+00 G
PB-214	N 4.2599E+00					5.84E+05	
		351.93	4.260E+00	(P	1.166E+01	7.15E+01	3.76E+01 G
		295.09	-6.236E+00	& P	2.179E+01	1.14E+02	1.93E+01 G
		242.00	-1.656E+01	+ P	5.477E+01	1.05E+02	7.43E+00 G
BI-212	N -1.0788E+02					6.98E+02	
		727.17	-1.079E+02	?(	2.231E+02	6.28E+01	7.55E+00 G
		785.42	2.035E+02	&	1.433E+03	2.12E+02	1.28E+00 G
BI-214	N -2.7676E-02					5.84E+05	
		609.31	-2.786E+00	?(P	1.191E+01	1.64E+02	4.61E+01 G
		1120.29	-3.006E+02	+ P	7.827E+01	8.22E+00	1.51E+01 G
		1764.49	8.228E+00	?(P	1.629E+01	6.01E+01	1.54E+01 G
AC-228	N 6.5354E+00					2.10E+03	
		911.07	6.535E+00	?(	4.150E+01	1.92E+02	2.90E+01 G
		968.97	-2.219E+01	&	6.970E+01	9.51E+01	1.75E+01 G
		338.32	-2.027E-01	%	5.132E+01	7.64E+03	1.20E+01 G
							Energy duplication
		93.35	-1.202E+01	&	6.378E+01	1.60E+02	5.56E+00 XA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Pa-234	N 1.5062E+00					1.63E+12	
		131.29-5.908E+00		?(	1.566E+01	8.03E+01	1.80E+01 G
		569.47 1.778E+01		*(	6.298E+01	1.07E+02	8.20E+00 G
		946.02-2.153E+01		+	7.033E+01	9.89E+01	1.34E+01 G
		883.24-1.063E+00		%	8.378E+01	2.38E+03	9.60E+00 G
		880.53-3.528E-01		%	1.338E+02	1.14E+04	6.00E+00 G
TH-234	N -1.6028E+02					1.63E+12	
		63.29-1.603E+02		&(P	1.017E+02	2.03E+01	3.81E+00 G
		92.59-1.437E+01		+ P	4.986E+01	2.23E+02	5.58E+00 G
PA-234M	N 1.3485E+01					1.63E+12	
		1001.00 1.349E+01		%(	9.895E+02	2.21E+03	8.37E-01 G
		766.41-5.868E+02		+	1.896E+03	9.77E+01	2.94E-01 G
U-235	N 3.4121E+00					2.57E+11	
		143.79 3.412E+00		?(	2.577E+01	2.28E+02	1.10E+01 G
		205.33-1.474E+01		+	7.523E+01	1.54E+02	5.01E+00 G
		163.38-1.469E+01		+	6.090E+01	1.25E+02	5.08E+00 G
							Energy duplication
		93.35-8.119E+00		+	4.308E+01	1.60E+02	5.81E+00 X
AM-241	T 5.1398E+03					1.58E+05	
		59.54 5.140E+03		(	1.820E+01	2.36E-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:
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

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	
PB-210	47.36	74417.	-2314.	-0.643	17.18	-3.870E+02	P
TH-234	63.06	22527.	-1107.	-0.307	20.35	-1.603E+02	P
EU-155	87.94	17487.	103216.	28.671	0.36	2.595E+03	
TH-234	92.36	13364.	-156.	-0.043	223.18	-1.437E+01	P
AC-228	93.35	10787.	-92.	-0.025	160.48	-1.202E+01	
EU-155	104.45	11065.	-140.	-0.039	106.41	-5.142E+00	
EU-152	122.01	13083.	17462.	4.851	1.20	3.789E+02	
EU-154	122.01	10631.	17385.	4.829	1.13	2.887E+02	
Pa-234	131.75	12069.	-194.	-0.054	80.34	-5.908E+00	
PB-214	242.01	12423.	-158.	-0.044	104.73	-1.656E+01	P
PB-214	295.79	10204.	-135.	-0.038	114.33	-6.236E+00	P
PB-212	299.72	10181.	-68.	-0.019	210.18	-5.310E+01	
EU-152	344.29	8880.	286.	0.079	46.97	1.233E+01	
PB-214	352.08	8707.	160.	0.044	71.55	4.260E+00	P
CS-134	564.05	6001.	63.	0.017	174.57	2.795E+01	
CS-134	569.31	5993.	113.	0.031	97.12	2.753E+01	
Pa-234	569.33	6027.	103.	0.029	107.15	1.778E+01	
TL-208	583.10	6124.	-79.	-0.022	186.43	-3.850E+00	P
CS-134	602.95	5020.	20.	0.006	497.78	8.077E-01	
BI-214	609.38	6131.	-86.	-0.024	164.39	-2.786E+00	P
EU-154	723.21	4923.	305.	0.085	33.05	3.240E+01	
BI-212	727.19	5401.	-167.	-0.046	62.76	-1.079E+02	
PA-234M	764.08	4431.	-97.	-0.027	97.75	-5.868E+02	
EU-152	778.73	5737.	129.	0.036	83.29	2.091E+01	
BI-212	785.20	5669.	50.	0.014	212.42	2.035E+02	
CS-134	795.81	5777.	46.	0.013	235.56	2.590E+00	
CS-134	802.37	6068.	-101.	-0.028	109.13	-5.686E+01	
TL-208	860.56	6875.	12.	0.003	975.06	5.404E+00	
EU-154	874.57	6904.	48.	0.013	244.94	9.777E+00	
AC-228	911.14	7833.	65.	0.018	191.85	6.535E+00	
Pa-234	945.95	9079.	-137.	-0.038	98.92	-2.153E+01	
EU-152	963.71	8244.	58.	0.016	223.34	9.797E+00	
AC-228	967.93	7239.	-127.	-0.035	95.08	-2.219E+01	
EU-154	998.18	6206.	27.	0.008	410.08	7.131E+00	
EU-154	1004.81	6388.	133.	0.037	85.58	2.063E+01	
EU-152	1112.06	9810.	-770.	-0.214	18.55	-1.577E+02	
BI-214	1118.71	10780.	-1869.	-0.519	8.22	-3.006E+02	P
EU-154	1274.66	1024.	182.	0.051	25.93	1.768E+01	
EU-152	1408.32	359.	77.	0.021	36.55	1.255E+01	
BI-214	1762.55	207.	35.	0.010	60.06	8.228E+00	P

P - Peakbackground subtraction

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

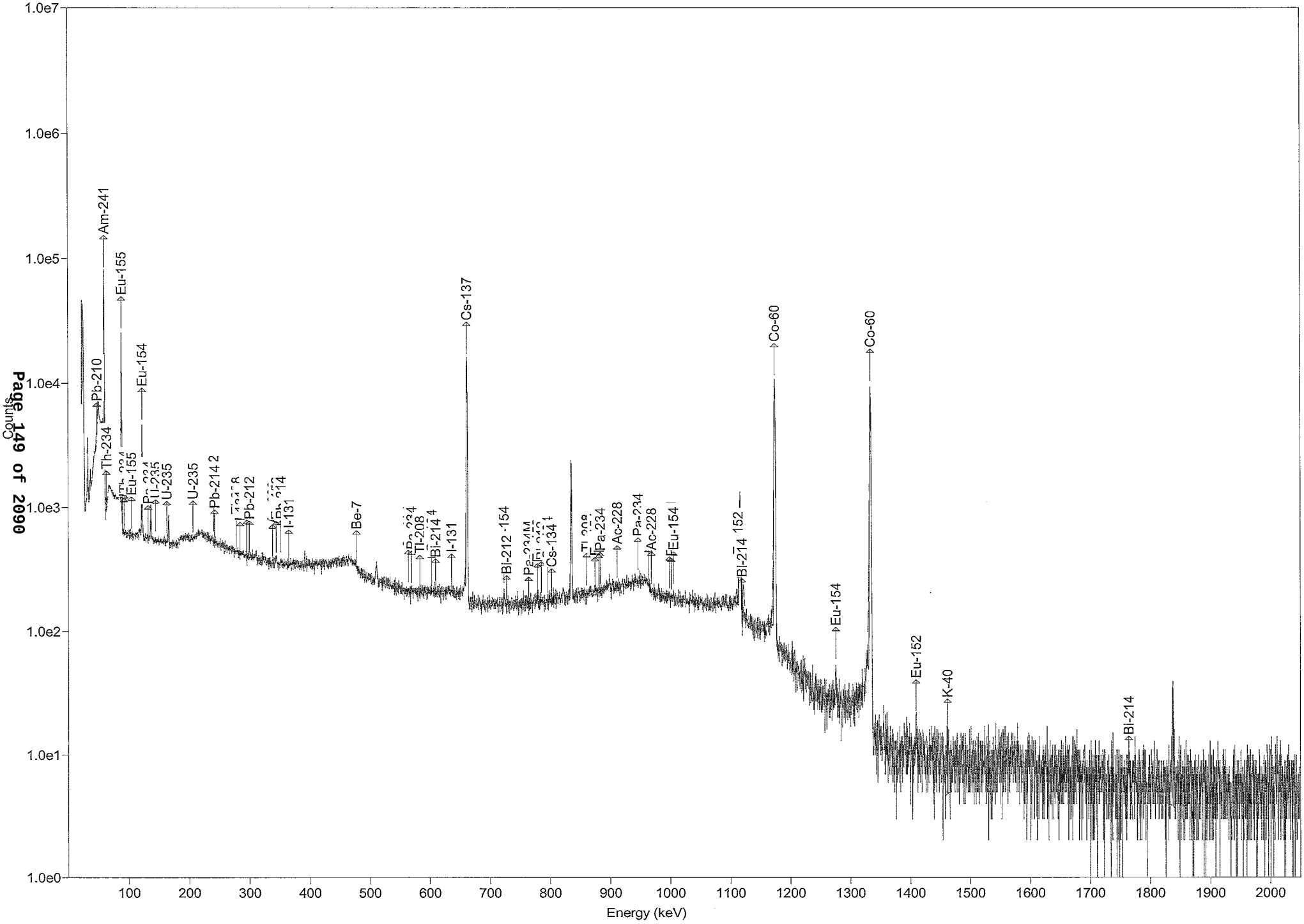
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
BE-7	#A	2.6868E-02	>12 Halflives	5.9081E+04%	5.2627E+01	
K-40	#	4.0251E+01	4.0251E+01	2.390E+01%		1.82E+01
CO-60		2.2060E+03	3.2262E+03	2.763E-01%		7.26E+00
I-131	A	-6.6842E-01	>12 Halflives	1.3951E+02%	5.5170E+00	
CS-134	#A	1.7531E+00	4.6266E+00	9.712E+01%		1.33E+01
CS-137		1.8805E+03	2.0104E+03	3.835E-01%		7.90E+00
EU-152	#A	1.1537E+01	1.3378E+01	3.655E+01%		1.91E+01
EU-154	#C	1.7755E+02	2.2418E+02	1.131E+00%		7.93E+01
EU-155	#C	1.0233E+03	1.5326E+03	3.602E-01%		1.81E+01
TL-208	#A	-9.3296E-01	-2.6637E+00	2.326E+02%		1.79E+01
PB-210	#A	-3.5372E+02	-3.8697E+02	1.757E+01%		2.13E+02
PB-212	#A	-6.3745E-02	-1.8200E-01	4.773E+03%		2.35E+01
PB-214	#A	4.2546E+00	4.2599E+00	8.284E+01%		1.17E+01
BI-212	#A	-3.7784E+01	-1.0788E+02	6.276E+01%		2.23E+02
BI-214	#A	-2.7642E-02	-2.7676E-02	6.015E+01%		1.19E+01
AC-228	#A	4.6124E+00	6.5354E+00	1.919E+02%		4.15E+01
Pa-234	#A	1.5062E+00	1.5062E+00	6.696E+01%		1.57E+01
TH-234	#A	-1.6028E+02	-1.6028E+02	2.131E+01%		1.02E+02
PA-234M	#A	1.3485E+01	1.3485E+01	2.211E+03%		9.89E+02
U-235	#A	3.4121E+00	3.4121E+00	2.283E+02%		2.58E+01
AM-241		5.1161E+03	5.1398E+03	2.360E-01%		1.82E+01

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

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

Total Activity (37.5 to 1999.5 keV) 9.243E+03 Bq/Sample
Total Decayed Activity (37.5 to 1999.5 keV) 1.0416781E+04 Bq/Sample

The library has energies which are not separable.


1L Marn_83924-334_2011Cal. 18_83924-334_20130931.spc.
Counts
1.0e7
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)
Am-241
Pb-210
Th-234
Eu-155
Eu-154
U-235
Pb-214
Pb-212
I-131
Be-7
Cs-137
Bi-212
Cs-134
Ac-228
Bi-214
Co-60
Co-60
Eu-154
Eu-152
K-40
Bi-214

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 Opn: 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

82232-334_00001

Eckert & Ziegler
Analytics

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Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82232-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82233-334_00001

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Analytics

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www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82233-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82234-334_00001

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Analytics

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www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82234-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82235-334_00001

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Analytics

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www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82235-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

Reference Date: 4-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.167E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.897E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	7.466E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	2.161E+01	3000-8000		0.5	1.1	2.4

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1958

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82236-334_00001

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Analytics

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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82236-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.107E+00	4420-4800	7.540E+04	0.7	1.1	2.6
Pu-239	6.664E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.891E+00	5280-5600	4.326E+02	0.7	1.1	2.6
Total Activity	2.071E+01	3000-8000		0.4	1.1	2.3

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.46 mm thick stainless steel disk.

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82237-334_00003

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Analytics

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www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82237-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

Reference Date: 1-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.856E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	6.424E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	5.608E+00	5280-5600	4.326E+02	1.0	1.1	3.0
Total Activity	1.793E+01	3000-8000		0.6	1.1	2.5

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82240-334_00001

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Analytics

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Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82240-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82241-334_00001

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Analytics

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Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82241-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82242-334_00001

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Analytics

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Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82242-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82243-334_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82243-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1966

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82244-334_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82244-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82245-334_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82245-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

82246-334_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82246-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06.24.2010
E. A. Taskaev, QA Manager Alternate

Reagent

82247-334_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82247-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

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

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

Source Calibrated by: _____
A. Chen, Spectroscopist

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

Reagent

Gamma Ampuole_00001

Eckert & Ziegler
Analytics

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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: for
W. Mao, Radiochemist

QA Approved: 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)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

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: MTaskaeva
M. I. Taskaeva, Radiochemist

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

Reagent

ICPC ICV 1_00001

INORGANIC VENTURES
300 Technology Drive
Christiansburg, VA 24073 · USA
inorganicventures.com

CERTIFICATE OF ANALYSIS

232147
ID: ICPC ICV 1_00001
Exp 11/01/14 Prod Opn:10/24/13
ICP ICV 1

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01
ACCREDITED Reference Material Producer Certificate 883.02

2.0 **DESCRIPTION OF CRM** **Custom Solution**

Catalog No.: TA-64

Lot Number: **G2-MEB499048**

Matrix: 5% HNO3(v/v), 2.5% HF(v/v)

1,000 µg/mL ea:
Si, Sn, Ti,

200 µg/mL ea:
Mo, Sb

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE
Antimony, Sb	200.0 ± 1.5 µg/mL	Molybdenum, Mo	200.0 ± 1.0 µg/mL	Silicon, Si	1,000 ± 7 µg/mL
Tin, Sn	1,000 ± 7 µg/mL	Titanium, Ti	1,000 ± 7 µg/mL		

Certified Density: 1.041 g/mL (measured at 20 ± 1° C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

$$\text{Certified Value } (\bar{x}) = \frac{\Sigma x_i}{n}$$

$$\text{Uncertainty } (\pm) = 2\,[\,\Sigma(s_i)^2\,]^{1/2}$$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
2 = the coverage factor.
$[\,\Sigma(s_i)^2\,]^{1/2}$ = The square root of the sum of the squares of the most common errors (where 's' stands for the standard deviation) from instrumental measurement, density, NIST SRM uncertainty, weighing, dilution to volume, homogeneity, long term stability and short term stability.

4.0 **TRACEBILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 ASSAY INFORMATION

ELEMENT	METHOD	NIST SRM#	SRM LOT#
Mo	Calculated		See Sec. 4.2
Mo	ICP Assay	3134	891307
Sb	Calculated		See Sec. 4.2
Sb	ICP Assay	3102A	061229
Si	Calculated		See Sec. 4.2
Si	ICP Assay	3150	071204
Sn	Calculated		See Sec. 4.2
Sn	ICP Assay	3161a	070330
Ti	ICP Assay	3162a	060808

4.2 BALANCE CALIBRATION - All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 THERMOMETER CALIBRATION - All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 GLASSWARE CALIBRATION - An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES IN µg/mL - N/A

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Electrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm doubly deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep **Tightly** sealed when not in use. Store and use at 20 ± 4ºC. **Do Not** pipette from the container. **Do Not** return portions removed from pipetting to container.

Element Specific Information - For specific information regarding any element: Contact technical staff.

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

HF Note: This standard should not be prepared or stored in glass.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous.

Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies of chemically-stable solutions performed at the manufacturer's facility show a CRM shelf-life of twenty one months for solutions packaged in 125-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: October 16, 2013

Expiration Date: 01 NOV 2014

Stability Testing Note: This solution is a newly designed product undergoing stability testing. You will be notified if any chemical instability is observed.

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Donna Senn
Product Documentation Technician

Certificate Approved By: Brian Alexander
PhD., Technical Process Director

Certifying Officer: Paul Gaines
PhD., Senior Technical Director

Reagent

ICPC ICV 3_00001

INORGANIC VENTURES
300 Technology Drive
Christiansburg VA 24073 · USA
inorganicventures.com

CERTIFICATE OF ANALYSIS

232149
ID. ICPC ICV 3_00001
Exp 10/24/14 Prpd Opn 10/24/13
ICPC ICV 3

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01
ACCREDITED Reference Material Producer Certificate 883.02

2.0 **DESCRIPTION OF CRM** **Custom Solution**

Catalog No.: TA-65

Lot Number: **G2-MEB499049**

Matrix: 5% HNO3(v/v)

10,000 µg/mL ea:
Al, Ca, Fe, Na

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE
Aluminum, Al	10,000.0 ± 60.0 µg/mL	Calcium, Ca	10,000.0 ± 40.0 µg/mL	Iron, Fe	10,000.0 ± 60.0 µg/mL
Sodium, Na	10,000.0 ± 40.0 µg/mL				

Certified Density: 1.147 g/mL (measured at 20 ± 1° C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

$$\text{Certified Value } (\bar{x}) = \frac{\sum x_i}{n}$$

$$\text{Uncertainty } (\pm) = 2\,[\,\Sigma(s_i)^2\,]^{1/2}$$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
2 = the coverage factor.
$[\,\Sigma(s_i)^2\,]^{1/2}$ = The square root of the sum of the squares of the most common errors (where 's' stands for the standard deviation) from instrumental measurement, density, NIST SRM uncertainty, weighing, dilution to volume, homogeneity, long term stability and short term stability.

4.0 TRACEBILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 ASSAY INFORMATION

ELEMENT	METHOD	NIST SRM#	SRM LOT#
Al	ICP Assay	3101a	060502
Al	EDTA	928	928
Ca	ICP Assay	3109a	050825
Ca	EDTA	928	928
Fe	ICP Assay	3126a	051031
Fe	EDTA	928	928
Na	Gravimetric		See Sec. 4.2
Na	ICP Assay	3152a	120715

4.2 BALANCE CALIBRATION - All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 THERMOMETER CALIBRATION - All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 GLASSWARE CALIBRATION - An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES IN µg/mL - N/A

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Electrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm doubly deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep **Tightly** sealed when not in use. Store and use at 20 ± 4°C. **Do Not** pipette from the container. **Do Not** return portions removed from pipetting to container.

Element Specific Information - For specific information regarding any element: Contact technical staff.

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous.

Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies of chemically-stable solutions performed at the manufacturer's facility show a CRM shelf-life of twenty one months for solutions packaged in 125-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: October 16, 2013

Expiration Date: 01 Nov 2014

Stability Testing Note: This solution is a newly designed product undergoing stability testing. You will be notified if any chemical instability is observed.

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Donna Senn
Product Documentation Technician



Certificate Approved By: Brian Alexander
PhD., Technical Process Director



Certifying Officer: Paul Gaines
PhD., Senior Technical Director



Reagent

ICPC ICV 4_00001

INORGANIC VENTURES™
300 Technology Drive
Christiansburg, VA 24073 · USA
inorganicventures.com

CERTIFICATE OF ANALYSIS

232150
ID ICPC ICV 4_00001
Exp 11/01/14 Prpd Opn 10/24/13
ICPC ICV 4

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01
ACCREDITED Reference Material Producer Certificate 883.02

2.0 **DESCRIPTION OF CRM** **Custom Solution**

Catalog No.: TA-63

Lot Number: **G2-MEB499047**

Matrix: 7% HNO3(v/v)

1,000 µg/mL ea:

As, B, Ba, Be, Bi, Cd, Co, Cr3, Cu,
Li, Mn, Ni, P, Pb, Sr, Th, U, V,
Zn,

200 µg/mL ea:

Ag, Se, Tl

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE
Arsenic, As	1,000 ± 7 µg/mL	Barium, Ba	1,000 ± 7 µg/mL	Beryllium, Be	1,000 ± 6 µg/mL
Bismuth, Bi	1,000 ± 7 µg/mL	Boron, B	1,000 ± 7 µg/mL	Cadmium, Cd	1,000 ± 6 µg/mL
Chromium+3, Cr3	1,000 ± 6 µg/mL	Cobalt, Co	1,000 ± 7 µg/mL	Copper, Cu	1,000 ± 7 µg/mL
Lead, Pb	1,000 ± 7 µg/mL	Lithium, Li	1,000 ± 7 µg/mL	Manganese, Mn	1,000 ± 6 µg/mL
Nickel, Ni	1,000 ± 7 µg/mL	Phosphorus, P	1,000 ± 5 µg/mL	Selenium, Se	200.0 ± 1.3 µg/mL
Silver, Ag	200.0 ± 1.3 µg/mL	Strontium, Sr	1,000 ± 6 µg/mL	Thallium, Tl	200.0 ± 1.3 µg/mL
Thorium, Th	1,000 ± 7 µg/mL	Uranium, U	1,000 ± 7 µg/mL	Vanadium, V	1,000 ± 7 µg/mL
Zinc, Zn	1,000 ± 6 µg/mL				

Certified Density: 1.109 g/mL (measured at 20 ± 1° C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded

4.2 **BALANCE CALIBRATION -** All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 **THERMOMETER CALIBRATION -** All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 **GLASSWARE CALIBRATION -** An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES IN µg/mL - N/A

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Electrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm doubly deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep **Tightly** sealed when not in use. Store and use at 20 ± 4°C. **Do Not** pipette from the container. **Do Not** return portions removed from pipetting to container.

Element Specific Information - For specific information regarding any element: Contact technical staff.

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous.

Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 **ISO 9001 Quality Management System Registration**
- SAI Global File Number 010105

10.2 **ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"**
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 **ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"**
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 **10CFR50 Appendix B - Nuclear Regulatory Commission**
- Domestic Licensing of Production and Utilization Facilities

10.5 **10CFR21 - Nuclear Regulatory Commission**
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies of chemically-stable solutions performed at the manufacturer's facility show a CRM shelf-life of twenty one months for solutions packaged in 125-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: October 16, 2013

Expiration Date: 01 NOV 2014

Stability Testing Note: This solution is a newly designed product undergoing stability testing. You will be notified if any chemical instability is observed.

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Donna Senn
Product Documentation Technician

Certificate Approved By: Brian Alexander
PhD., Technical Process Director

Certifying Officer: Paul Gaines
PhD., Senior Technical Director

Reagent

ICPC ICV2_00001

INORGANIC VENTURES
300 Technology Drive
Christiansburg, VA 24073 - USA
inorganicventures.com

CERTIFICATE OF ANALYSIS

232148
ID ICPC ICV2_00001
Exp 11/01/14 Prpd Opn 10/24/13
ICPC ICV2

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01
ACCREDITED Reference Material Producer Certificate 883.02

2.0 **DESCRIPTION OF CRM** **Custom Solution**

Catalog No.: TA-66

Lot Number: **G2-MEB499050**

Matrix: 1% HNO3(v/v)

10,000 µg/mL ea:
K, Mg, S

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE
Magnesium, Mg	10,000.0 ± 60.0 µg/mL	Potassium, K	10,000.0 ± 40.0 µg/mL	Sulfur, S	10,000.0 ± 60.0 µg/mL

Certified Density: 1.080 g/mL (measured at 20 ± 1° C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

$$\text{Certified Value } (\bar{x}) = \frac{\Sigma x_i}{n}$$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements

$$\text{Uncertainty } (\pm) = 2\,[\,\Sigma(s_i)^2\,]^{1/2}$$

2 = the coverage factor.
$[\,\Sigma(s_i)^2\,]^{1/2}$ = The square root of the sum of the squares of the most common errors (where 's' stands for the standard deviation) from instrumental measurement, density, NIST SRM uncertainty, weighing, dilution to volume, homogeneity, long term stability and short term stability.

4.0 TRACEBILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 ASSAY INFORMATION

ELEMENT	METHOD	NIST SRM#	SRM LOT#
K	Gravimetric		See Sec. 4.2
K	ICP Assay	3141a	051220
Mg	ICP Assay	3131a	050302
Mg	EDTA	928	928
S	ICP Assay	3154	892205
S	Acidimetric	84k	84k

4.2 BALANCE CALIBRATION - All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 THERMOMETER CALIBRATION - All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 GLASSWARE CALIBRATION - An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES IN µg/mL - N/A

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Electrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm doubly deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep **Tightly** sealed when not in use. Store and use at 20 ± 4ºC. **Do Not** pipette from the container. **Do Not** return portions removed from pipetting to container.

Element Specific Information - For specific information regarding any element: Contact technical staff.

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous.

Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies of chemically-stable solutions performed at the manufacturer's facility show a CRM shelf-life of twenty one months for solutions packaged in 125-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: October 16, 2013

Expiration Date: 01 NOV 2014

Stability Testing Note: This solution is a newly designed product undergoing stability testing. You will be notified if any chemical instability is observed.

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Donna Senn
Product Documentation Technician

Certificate Approved By: Brian Alexander
PhD., Technical Process Director

Certifying Officer: Paul Gaines
PhD., Senior Technical Director

Reagent

ICPC13 AB 1_00001

AccuScience
15520 Oakwood Street
Pierrefonds QC Canada H9H1Y2
877-723-2220
www.accuscience.com

199808
AB ID: ICPC13 AB 1_00001
Exp:09/10/14 Prpd:CDS Opn:09/10/13
ICPC 2013 AB 1

199815
ID: ICPC13 AB 2_00001
Exp 09/10/14 Prpd CDS Opn:09/10/13
ICPC 2013 AB 2

Certificate of Analysis

Rev 0

Description: Custom 26 Element Mix, #2368, 250 mL
mg/L ± 2% in 5% HNO_3
Ag, Mo, Sb, Tl, Bi, Cd, Co, Cr, Cu, Mn, Ni, Si, Sn, Ti shipped separately.

Catalog No:	Matrix:	Lot No:	Storage:	Exp. Date:	Date Received:
ACSM2368-01-250ML	5% HNO3 + Tr HF	1050480	Ambient	10/1/2014	

Element	Symbol	CAS No	Purity %	Source Lot No	Concentration mg/L
Selenium	Se	7782-49-2	99.999	7027.46.4	100
Arsenic	As	7440-38-2	99.9999	7002.46.5	500
Boron	B	7440-42-8	99.999	7003.46.5	500
Barium	Ba	7440-39-3	99.997	7004.29.2	500
Beryllium	Be	7440-41-7	99.999	7005.46.5	500
Lithium	Li	7439-93-2	99.999	7015.46.5	500
Lead	Pb	7439-92-1	99.999	7023.29.2	500
Strontium	Sr	7440-24-6	99.998	7030.46.4	500
Thorium	Th	7440-29-1	99.99	7031.46.3	500
Uranium	U	7440-61-1	99.8	7035.330.1	500
Vanadium	V	7440-62-2	99.99	7036.46.5	500
Zinc	Zn	7440-66-6	99.9995	7037.46.5	500
Silver	Ag	7440-22-4	99.999	7000.29.1	100
Molybdenum	Mo	7439-98-7	99.999	7018.29.3	100
Antimony	Sb	7440-36-0	99.999	7026.46.3	100
Thallium	Tl	7440-28-0	99.999	7236.46.1	100
Bismuth	Bi	7440-69-9	99.999	7040.46.2	500
Cadmium	Cd	7440-43-9	99.9999	7007.29.3	500
Cobalt	Co	7440-48-4	99.999	7008.46.8	500
Chromium	Cr	7440-47-3	99.998	7009.46.3	500
Copper	Cu	7440-50-8	99.9995	7011.46.5	500
Manganese	Mn	7439-96-5	99.95	7017.46.4	500
Nickel	Ni	7440-02-0	99.995	7021.46.8	500
Silicon	Si	7440-21-3	99.999	7028.46.12	500
Tin	Sn	7440-31-5	99.999	7029.46.4	500
Titanium	Ti	7440-32-6	99.995	7033.38.2	500

Certified By: Carrie Bibbins

All weights are traceable through N. I. S. T. Test No. 822/264157-00.
Concentration (correct for purity) and uncertainty (95% confidence) values listed are determined gravimetricllly.

Manufacturer's Quality System
Audited & Registered
by NSF-ISR to ISO 9001:2008

Reagent

ICPC13 AB 2_00001

AccuScience
15520 Oakwood Street
Pierrefonds QC Canada H9H1Y2
877-723-2220
www.accuscience.com

199808
AB ID: ICPC13 AB 1_00001
Exp:09/10/14 Prpd:CDS Opn:09/10/13
ICPC 2013 AB 1

199815
ID: ICPC13 AB 2_00001
Exp 09/10/14 Prpd CDS Opn:09/10/13
ICPC 2013 AB 2

Certificate of Analysis

Rev 0

Description: Custom 26 Element Mix, #2368, 250 mL
mg/L ± 2% in 5% HNO_3
Ag, Mo, Sb, Tl, Bi, Cd, Co, Cr, Cu, Mn, Ni, Si, Sn, Ti shipped separately.

Catalog No:	Matrix:	Lot No:	Storage:	Exp. Date:	Date Received:
ACSM2368-01-250ML	5% HNO3 + Tr HF	1050480	Ambient	10/1/2014	

Element	Symbol	CAS No	Purity %	Source Lot No	Concentration mg/L
Selenium	Se	7782-49-2	99.999	7027.46.4	100
Arsenic	As	7440-38-2	99.9999	7002.46.5	500
Boron	B	7440-42-8	99.999	7003.46.5	500
Barium	Ba	7440-39-3	99.997	7004.29.2	500
Beryllium	Be	7440-41-7	99.999	7005.46.5	500
Lithium	Li	7439-93-2	99.999	7015.46.5	500
Lead	Pb	7439-92-1	99.999	7023.29.2	500
Strontium	Sr	7440-24-6	99.998	7030.46.4	500
Thorium	Th	7440-29-1	99.99	7031.46.3	500
Uranium	U	7440-61-1	99.8	7035.330.1	500
Vanadium	V	7440-62-2	99.99	7036.46.5	500
Zinc	Zn	7440-66-6	99.9995	7037.46.5	500
Silver	Ag	7440-22-4	99.999	7000.29.1	100
Molybdenum	Mo	7439-98-7	99.999	7018.29.3	100
Antimony	Sb	7440-36-0	99.999	7026.46.3	100
Thallium	Tl	7440-28-0	99.999	7236.46.1	100
Bismuth	Bi	7440-69-9	99.999	7040.46.2	500
Cadmium	Cd	7440-43-9	99.9999	7007.29.3	500
Cobalt	Co	7440-48-4	99.999	7008.46.8	500
Chromium	Cr	7440-47-3	99.998	7009.46.3	500
Copper	Cu	7440-50-8	99.9995	7011.46.5	500
Manganese	Mn	7439-96-5	99.95	7017.46.4	500
Nickel	Ni	7440-02-0	99.995	7021.46.8	500
Silicon	Si	7440-21-3	99.999	7028.46.12	500
Tin	Sn	7440-31-5	99.999	7029.46.4	500
Titanium	Ti	7440-32-6	99.995	7033.38.2	500

Certified By: Carrie Bibbins

All weights are traceable through N. I. S. T. Test No. 822/264157-00.
Concentration (correct for purity) and uncertainty (95% confidence) values listed are determined gravimetricllly.

Manufacturer's Quality System
Audited & Registered
by NSF-ISR to ISO 9001:2008

Reagent

ICPC13 CAL A_00001

AccuScience
15520 Oakwood Street
Pierrefonds QC Canada H9H1Y2
877-723-2220
www.accuscience.com

203129
ID: ICPC13 CAL A_00001
Exp 09/16/14 Prpd Opn 09/16/13
ICPC 2013 CAL 2,3 A

Certificate of Analysis

Rev 0

Description: Custom 34 Element Mix (ICPC- 2013- Cal 2,3), #2366, 500 mL
mg/L ± 2% in 10% HNO_3 + Tr HF

Catalog No:	Matrix:	Lot No:	Storage:	Exp. Date:	Date Received:
ACSM2366-01-500ml-A	10% HNO3 + Tr HF	1050679	Ambient	10/1/2014	

Element	Symbol	CAS No	Purity %	Source Lot No	Concentration mg/L
Silver	Ag	7440-22-4	99.999	7000.29.1	200
Molybdenum	Mo	7439-98-7	99.999	7018.29.3	200
Antimony	Sb	7440-36-0	99.999	7026.46.3	200
Silicon	Si	7440-21-3	99.999	7028.46.12	1000
Tin	Sn	7440-31-5	99.999	7029.46.4	1000
Titanium	Ti	7440-32-6	99.995	7033.38.2	1000
Sulfur	S	7704-34-9	95.9	7025.43.5	10000

Certified By: Carrie Bibbins

All weights are traceable through N. I. S. T. Test No. 822/264157-00.
Concentration (correct for purity) and uncertainty (95% confidence) values listed are determined gravimetricly.

Manufacturer's Quality System
Audited & Registered
by NSF-ISR to ISO 9001:2008

Reagent

ICPC13 CAL B_00001

AccuScience
15520 Oakwood Street
Pierrefonds QC Canada H9H1Y2
877-723-2220
www.accuscience.com

203132
ID: ICPC13 CAL B_00001
Exp:09/16/14 Prpd: Opn:09/16/13
ICPC 2013 CAL 2,3 B

Certificate of Analysis

Rev 0

Description: Custom 34 Element Mix (ICPC- 2013- Cal 2,3), #2366, 500 mL
mg/L ± 2% in 5% HNO_3

Catalog No:	Matrix:	Lot No:	Storage:	Exp. Date:	Date Received:
ACSM2366-01-500ml-B	10% HNO_3 + Tr HF	1050680	Ambient	10/1/2014	

Element	Symbol	CAS No	Purity %	Source Lot No	Concentration mg/L
Potassium	K	7440-09-7	99.999	7013.46.9	10000
Sodium	Na	7440-23-5	99.999	7020.46.6	10000
Phosphorus	P	7723-14-0	99.995	7022.46.11	10000

Certified By: Carrie Bibbins

All weights are traceable through N. I. S. T. Test No. 822/264157-00.
Concentration (correct for purity) and uncertainty (95% confidence) values listed are determined gravimetricly.

Manufacturer's Quality System
Audited & Registered
by NSF-ISR to ISO 9001:2008

Reagent

ICPC13 CAL C_00001

AccuScience
15520 Oakwood Street
Pierrefonds QC Canada H9H1Y2
877-723-2220
www.accuscience.com

203133
ID ICPC13 CAL C_00001
Exp: 09/16/14 Prpd
ICPC 2013 CAL 2,3 C

Certificate of Analysis

Rev 0

Description: Custom 34 Element Mix (ICPC- 2013- Cal 2,3), #2366, 500 mL
mg/L ± 2% in 10% HNO_3

Catalog No:	Matrix:	Lot No:	Storage:	Exp. Date:	Date Received:
ACSM2366-01-500ml-C	10% HNO_3	1050681	Ambient	10/1/2014	

Element	Symbol	CAS No	Purity %	Source Lot No	Concentration mg/L
Aluminum	Al	7429-90-5	99.9995	7001.46.7	10000
Calcium	Ca	7440-70-2	99.999	7006.46.12	10000
Iron	Fe	7439-89-6	99.99	7012.46.13	10000
Magnesium	Mg	7439-95-4	99.99	7016.46.4	10000

Certified By: Carrie Bibbins

All weights are traceable through N. I. S. T. Test No. 822/264157-00.
Concentration (correct for purity) and uncertainty (95% confidence) values listed are determined gravimetricllly.

Manufacturer's Quality System
Audited & Registered
by NSF-ISR to ISO 9001:2008

Reagent

ICPC13 CAL D_00001

AccuScience
15520 Oakwood Street
Pierrefonds QC Canada H9H1Y2
877-723-2220
www.accuscience.com

203134
ID ICPC13 CAL D_00001
Exp 09/16/14 Prpd Opn 09/16/13
ICPC 2013 CAL 2,3 D

Certificate of Analysis

Rev 0

Description: Custom 34 Element Mix (ICPC- 2013- Cal 2,3), #2366, 500 mL
mg/L ± 2% in 10% HNO_3

Catalog No:	Matrix:	Lot No:	Storage:	Exp. Date:	Date Received:
ACSM2366-01-500ml-D	10% HNO_3	1050682	Ambient	10/1/2014	

Element	Symbol	CAS No	Purity %	Source Lot No	Concentration mg/L
Boron	B	7440-42-8	99.999	7003.46.5	1000
Barium	Ba	7440-39-3	99.999	7004.29.1	1000
Lithium	Li	7439-93-2	99.999	7015.46.5	1000
Lead	Pb	7439-92-1	99.999	7023.29.2	1000
Strontium	Sr	7440-24-6	99.998	7030.46.4	1000
Thorium	Th	7440-29-1	99.99	7031.46.3	1000
Uranium	U	7440-61-1	99.8	7035.330.1	1000
Vanadium	V	7440-62-2	99.99	7036.46.5	1000
Zinc	Zn	7440-66-6	99.9995	7037.46.5	1000

Certified By: Mark Filla — Mark Filla

All weights are traceable through N. I. S. T. Test No. 822/264157-00.
Concentration (correct for purity) and uncertainty (95% confidence) values listed are determined gravimetricly.

Manufacturer's Quality System
Audited & Registered
by NSF-ISR to ISO 9001:2008

Reagent

ICPC13 CAL E_00001

AccuScience
15520 Oakwood Street
Pierrefonds QC Canada H9H1Y2
877-723-2220
www.accuscience.com

203135
ID ICPC13 CAL E_00001
Exp 09/16/14 Prpd: Opn:09/16/13
ICPC 2013 CAL 2,3 E

Certificate of Analysis

Rev 0

Description: Custom 34 Element Mix (ICPC- 2013- Cal 2,3), #2366, 500 mL
mg/L ± 2% in 10% HNO_3

Catalog No:	Matrix:	Lot No:	Storage:	Exp. Date:	Date Received:
ACSM2366-01-500ml-E	10% HNO_3 + Tr HF	1050696	Ambient	10/1/2014	

Element	Symbol	CAS No	Purity %	Source Lot No	Concentration mg/L
Thallium	Tl	7440-28-0	99.999	7034.29.3	200
Selenium	Se	7782-49-2	99.999	7027.46.4	200
Arsenic	As	7440-38-2	99.9999	7002.46.5	1000
Beryllium	Be	7440-41-7	99.999	7005.46.5	1000
Bismuth	Bi	7440-69-9	99.999	7040.46.2	1000
Cadmium	Cd	7440-43-9	99.9999	7007.29.3	1000
Cobalt	Co	7440-48-4	99.999	7008.46.8	1000
Chromium	Cr	7440-47-3	99.998	7009.46.3	1000
Copper	Cu	7440-50-8	99.9995	7011.46.5	1000
Manganese	Mn	7439-96-5	99.95	7017.46.4	1000
Nickel	Ni	7440-02-0	99.995	7021.46.8	1000

Certified By: Carrie Bibbins

All weights are traceable through N. I. S. T. Test No. 822/264157-00.
Concentration (correct for purity) and uncertainty (95% confidence) values listed are determined gravimetricly.

Manufacturer's Quality System
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by NSF-ISR to ISO 9001:2008

Reagent

ICPC13 ICSA 1_00001

AccuScience
15520 Oakwood Street
Pierrefonds QC Canada H9H1Y2
877-723-2220
www.accuscience.com

206501
ID ICPC13 ICSA 1_00001
Exp 09/20/14 Prpd CDS Opn 09/20/13
ICPC 2013 ICSA 1

206502
ID ICPC13 ICSA 2_00001
Exp 09/20/14 Prpd Opn 09/20/13
ICPC 2013 ICSA 2

Certificate of Analysis

Rev 0

Description: Custom 8 Element Mix, #2367, 500 mL
20,000 mg/L ± 2% in 5% HNO_3
Al, Ca, Fe, Mg shipped separately in 10% HNO_3.

Catalog No:	Matrix:	Lot No:	Storage:	Exp. Date:	Date Received:
ACSM2367-01-500ml	5% HNO3	1050486	Ambient	10/1/2014	

Element	Symbol	CAS No	Purity %	Source Lot No	Concentration mg/L
Potassium	K	7440-09-7	99.999	7013.46.9	20000
Sodium	Na	7440-23-5	99.999	7020.46.6	20000
Phosphorus	P	7723-14-0	99.995	7022.46.11	20000
Sulfur	S	7704-34-9	95.9	7025.43.5	20000
Aluminum	Al	7429-90-5	99.9995	7001.46.7	20000
Calcium	Ca	7440-70-2	99.999	7006.46.12	20000
Iron	Fe	7439-89-6	99.99	7012.46.13	20000
Magnesium	Mg	7439-95-4	99.99	7016.46.5	20000

Certified By: Carrie Bibbins

All weights are traceable through N. I. S. T. Test No. 822/264157-00.
Concentration (correct for purity) and uncertainty (95% confidence) values listed are determined gravimetricly.

Manufacturer's Quality System
Audited & Registered
by NSF-ISR to ISO 9001:2008

Reagent

ICPC13 ICSA 2_00001

AccuScience
15520 Oakwood Street
Pierrefonds QC Canada H9H1Y2
877-723-2220
www.accuscience.com

206501
ID ICPC13 ICSA 1_00001
Exp 09/20/14 Prpd CDS Opn 09/20/13
ICPC 2013 ICSA 1

206502
ID ICPC13 ICSA 2_00001
Exp 09/20/14 Prpd Opn 09/20/13
ICPC 2013 ICSA 2

Certificate of Analysis

Rev 0

Description: Custom 8 Element Mix, #2367, 500 mL
20,000 mg/L ± 2% in 5% HNO_3
Al, Ca, Fe, Mg shipped separately in 10% HNO_3.

Catalog No:	Matrix:	Lot No:	Storage:	Exp. Date:	Date Received:
ACSM2367-01-500ml	5% HNO3	1050486	Ambient	10/1/2014	

Element	Symbol	CAS No	Purity %	Source Lot No	Concentration mg/L
Potassium	K	7440-09-7	99.999	7013.46.9	20000
Sodium	Na	7440-23-5	99.999	7020.46.6	20000
Phosphorus	P	7723-14-0	99.995	7022.46.11	20000
Sulfur	S	7704-34-9	95.9	7025.43.5	20000
Aluminum	Al	7429-90-5	99.9995	7001.46.7	20000
Calcium	Ca	7440-70-2	99.999	7006.46.12	20000
Iron	Fe	7439-89-6	99.99	7012.46.13	20000
Magnesium	Mg	7439-95-4	99.99	7016.46.5	20000

Certified By: Carrie Bibbins

All weights are traceable through N. I. S. T. Test No. 822/264157-00.
Concentration (correct for purity) and uncertainty (95% confidence) values listed are determined gravimetricly.

Manufacturer's Quality System
Audited & Registered
by NSF-ISR to ISO 9001:2008

Reagent

ICPC13 LLC A_00002

AccuScience
15520 Oakwood Street
Pierrefonds QC Canada H9H1Y2
877-723-2220
www.accuscience.com

199804
ID ICPC13 LLC A_00001
Exp 09/10/14 Prpd:CDS Opn:09/10/13
ICPC LLC 2013 solution A

LLC

199805
ID ICPC13 LLC B_00001
Exp 09/10/14 Prpd:CDS Opn:09/10/13
ICPC 2013 LLC B

Certificate of Analysis

Rev 0

Description: Custom 34 Element Mix, #2365, 250 mL
mg/L ± 2% in 2% HNO_3
Ag, Sb, Ti, Mo, Sn, Si, S shipped separately.

Catalog No:	Matrix:	Lot No:	Storage:	Exp. Date:	Date Received:
ACSM2365-01-250ML	2% HNO3 + Tr HF	1050477	Ambient	10/1/2014	

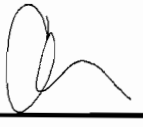
Element	Symbol	CAS No	Purity %	Source Lot No	Concentration mg/L
Beryllium	Be	7440-41-7	99.999	7005.46.4	2.5
Cadmium	Cd	7440-43-9	99.9999	7007.29.3	2.5
Strontium	Sr	7440-24-6	99.999	7030.46.2	2.5
Arsenic	As	7440-38-2	99.9999	7002.46.5	5.0
Chromium	Cr	7440-47-3	99.998	7009.46.3	5.0
Lead	Pb	7439-92-1	99.999	7023.29.1	5.0
Selenium	Se	7782-49-2	99.999	7027.46.4	7.5
Manganese	Mn	7439-96-5	99.95	7017.46.4	7.5
Thallium	Tl	7440-28-0	99.999	7236.46.1	10.0
Zinc	Zn	7440-66-6	99.9995	7037.46.5	10.0
Copper	Cu	7440-50-8	99.9999	7011.46.4	12.5
Nickel	Ni	7440-02-0	99.995	7021.46.8	20.0
Boron	B	7440-42-8	99.999	7003.46.5	25.0
Barium	Ba	7440-39-3	99.997	7004.29.2	25.0
Cobalt	Co	7440-48-4	99.999	7008.46.8	25.0
Lithium	Li	7439-93-2	99.999	7015.46.5	25.0
Vanadium	V	7440-62-2	99.99	7036.46.5	25.0
Iron	Fe	7439-89-6	99.99	7012.46.13	50.0
Aluminum	Al	7429-90-5	99.9995	7001.46.7	100.0
Bismuth	Bi	7440-69-9	99.999	7040.46.2	100.0
Thorium	Th	7440-29-1	99.99	7031.46.3	100.0
Phosphorus	P	7723-14-0	99.995	7022.46.11	125.0
Uranium	U	7440-61-1	99.8	7035.330.1	250.0
Calcium	Ca	7440-70-2	99.999	7006.46.12	500.0
Magnesium	Mg	7439-95-4	99.99	7016.46.5	500.0
Sodium	Na	7440-23-5	99.999	7020.46.6	500.0
Potassium	K	7440-09-7	99.999	7013.46.9	2500.0
Silver	Ag	7440-22-4	99.999	7000.29.1	5.0

Certified By: Carrie Bibbins

All weights are traceable through N. I. S. T. Test No. 822/264157-00.
Concentration (correct for purity) and uncertainty (95% confidence) values listed are determined gravimetricly.

Manufacturer's Quality System
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by NSF-ISR to ISO 9001:2008

Antimony	Sb	7440-36-0	99.999	7026.46.3	5
Titanium	Ti	7440-32-6	99.995	7033.38.2	10
Molybdenum	Mo	7439-98-7	99.999	7018.29.3	20
Tin	Sn	7440-31-5	99.999	7029.46.4	50
Silicon	Si	7440-21-3	99.999	7028.46.12	200
Sulfur	S	7704-34-9	95.9	7025.43.5	2500

Certified By:  Carrie Bibbins

All weights are traceable through N. I. S. T. Test No. 822/264157-00.
Concentration (correct for purity) and uncertainty (95% confidence) values listed are determined gravimetricly.

Manufacturer's Quality System
Audited & Registered
by NSF-ISR to ISO 9001:2008

Reagent

ICPC13 LLC B_00001

AccuScience
15520 Oakwood Street
Pierrefonds QC Canada H9H1Y2
877-723-2220
www.accuscience.com

199804
ID ICPC13 LLC A_00001
Exp 09/10/14 Prpd:CDS Opn:09/10/13
ICPC LLC 2013 solution A

LLC

199805
ID ICPC13 LLC B_00001
Exp 09/10/14 Prpd:CDS Opn:09/10/13
ICPC 2013 LLC B

Certificate of Analysis

Rev 0

Description: Custom 34 Element Mix, #2365, 250 mL
mg/L ± 2% in 2% HNO_3
Ag, Sb, Ti, Mo, Sn, Si, S shipped separately.

Catalog No:	Matrix:	Lot No:	Storage:	Exp. Date:	Date Received:
ACSM2365-01-250ML	2% HNO3 + Tr HF	1050477	Ambient	10/1/2014	

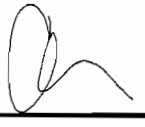
Element	Symbol	CAS No	Purity %	Source Lot No	Concentration mg/L
Beryllium	Be	7440-41-7	99.999	7005.46.4	2.5
Cadmium	Cd	7440-43-9	99.9999	7007.29.3	2.5
Strontium	Sr	7440-24-6	99.999	7030.46.2	2.5
Arsenic	As	7440-38-2	99.9999	7002.46.5	5.0
Chromium	Cr	7440-47-3	99.998	7009.46.3	5.0
Lead	Pb	7439-92-1	99.999	7023.29.1	5.0
Selenium	Se	7782-49-2	99.999	7027.46.4	7.5
Manganese	Mn	7439-96-5	99.95	7017.46.4	7.5
Thallium	Tl	7440-28-0	99.999	7236.46.1	10.0
Zinc	Zn	7440-66-6	99.9995	7037.46.5	10.0
Copper	Cu	7440-50-8	99.9999	7011.46.4	12.5
Nickel	Ni	7440-02-0	99.995	7021.46.8	20.0
Boron	B	7440-42-8	99.999	7003.46.5	25.0
Barium	Ba	7440-39-3	99.997	7004.29.2	25.0
Cobalt	Co	7440-48-4	99.999	7008.46.8	25.0
Lithium	Li	7439-93-2	99.999	7015.46.5	25.0
Vanadium	V	7440-62-2	99.99	7036.46.5	25.0
Iron	Fe	7439-89-6	99.99	7012.46.13	50.0
Aluminum	Al	7429-90-5	99.9995	7001.46.7	100.0
Bismuth	Bi	7440-69-9	99.999	7040.46.2	100.0
Thorium	Th	7440-29-1	99.99	7031.46.3	100.0
Phosphorus	P	7723-14-0	99.995	7022.46.11	125.0
Uranium	U	7440-61-1	99.8	7035.330.1	250.0
Calcium	Ca	7440-70-2	99.999	7006.46.12	500.0
Magnesium	Mg	7439-95-4	99.99	7016.46.5	500.0
Sodium	Na	7440-23-5	99.999	7020.46.6	500.0
Potassium	K	7440-09-7	99.999	7013.46.9	2500.0
Silver	Ag	7440-22-4	99.999	7000.29.1	5.0

Certified By: Carrie Bibbins

All weights are traceable through N. I. S. T. Test No. 822/264157-00.
Concentration (correct for purity) and uncertainty (95% confidence) values listed are determined gravimetricly.

Manufacturer's Quality System
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Antimony	Sb	7440-36-0	99.999	7026.46.3	5
Titanium	Ti	7440-32-6	99.995	7033.38.2	10
Molybdenum	Mo	7439-98-7	99.999	7018.29.3	20
Tin	Sn	7440-31-5	99.999	7029.46.4	50
Silicon	Si	7440-21-3	99.999	7028.46.12	200
Sulfur	S	7704-34-9	95.9	7025.43.5	2500

Certified By:  Carrie Bibbins

All weights are traceable through N. I. S. T. Test No. 822/264157-00.
Concentration (correct for purity) and uncertainty (95% confidence) values listed are determined gravimetricllly.

Manufacturer's Quality System
Audited & Registered
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AccuScience
15520 Oakwood Street
Pierrefonds QC Canada H9H1Y2
877-723-2220
www.accuscience.com

199804
ID ICPC13 LLC A_00001
Exp:09/10/14 Prpd:CDS Opn:09/10/13
ICPC LLC 2013 solution A

LLC

199805
ID ICPC13 LLC B_00001
Exp:09/10/14 Prpd:CDS Opn:09/10/13
ICPC 2013 LLC B

Certificate of Analysis

Rev 0

Description: Custom 34 Element Mix, #2365, 250 mL
mg/L ± 2% in 2% HNO_3
Ag, Sb, Ti, Mo, Sn, Si, S shipped separately.

Catalog No:	Matrix:	Lot No:	Storage:	Exp. Date:	Date Received:
ACSM2365-01-250ML	2% HNO3 + Tr HF	1050477	Ambient	10/1/2014	

Element	Symbol	CAS No	Purity %	Source Lot No	Concentration mg/L
Beryllium	Be	7440-41-7	99.999	7005.46.4	2.5
Cadmium	Cd	7440-43-9	99.9999	7007.29.3	2.5
Strontium	Sr	7440-24-6	99.999	7030.46.2	2.5
Arsenic	As	7440-38-2	99.9999	7002.46.5	5.0
Chromium	Cr	7440-47-3	99.998	7009.46.3	5.0
Lead	Pb	7439-92-1	99.999	7023.29.1	5.0
Selenium	Se	7782-49-2	99.999	7027.46.4	7.5
Manganese	Mn	7439-96-5	99.95	7017.46.4	7.5
Thallium	Tl	7440-28-0	99.999	7236.46.1	10.0
Zinc	Zn	7440-66-6	99.9995	7037.46.5	10.0
Copper	Cu	7440-50-8	99.9999	7011.46.4	12.5
Nickel	Ni	7440-02-0	99.995	7021.46.8	20.0
Boron	B	7440-42-8	99.999	7003.46.5	25.0
Barium	Ba	7440-39-3	99.997	7004.29.2	25.0
Cobalt	Co	7440-48-4	99.999	7008.46.8	25.0
Lithium	Li	7439-93-2	99.999	7015.46.5	25.0
Vanadium	V	7440-62-2	99.99	7036.46.5	25.0
Iron	Fe	7439-89-6	99.99	7012.46.13	50.0
Aluminum	Al	7429-90-5	99.9995	7001.46.7	100.0
Bismuth	Bi	7440-69-9	99.999	7040.46.2	100.0
Thorium	Th	7440-29-1	99.99	7031.46.3	100.0
Phosphorus	P	7723-14-0	99.995	7022.46.11	125.0
Uranium	U	7440-61-1	99.8	7035.330.1	250.0
Calcium	Ca	7440-70-2	99.999	7006.46.12	500.0
Magnesium	Mg	7439-95-4	99.99	7016.46.5	500.0
Sodium	Na	7440-23-5	99.999	7020.46.6	500.0
Potassium	K	7440-09-7	99.999	7013.46.9	2500.0
Silver	Ag	7440-22-4	99.999	7000.29.1	5.0

Certified By: Carrie Bibbins

All weights are traceable through N. I. S. T. Test No. 822/264157-00.
Concentration (correct for purity) and uncertainty (95% confidence) values listed are determined gravimetricly.

Manufacturer's Quality System
Audited & Registered
by NSF-ISR to ISO 9001:2008

Reagent

Marn Soil_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

83814-334

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

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

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

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

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

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

(Certificate continued on reverse side)

Corporate Office
Laboratory

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

Source Prepared by: _____
Z. Dimitrova, Radiochemist

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

Reagent

MarnSolid_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

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)

Corporate Office

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

PREP 1 and 2_00002

304576
ID PREP 1 and 2_00002
Exp 01/30/15 Prpd REV Opn 01/30/14
Spike 1 and 2

AccuScience
15520 Oakwood Street
Pierrefonds QC Canada H9H1Y2
877-723-2220
www.accuscience.com

Certificate of Analysis

Rev 0

Description: Custom 37 Element Mix, Prep Spike 1, 500 mL
mg/L ± 2% in 10% HNO_3
Ag, Mo, Nb, Sb, Bi, Sn, Ti, W, Zr and S Shipped Separately.

Catalog No:	Matrix:	Lot No:	Storage:	Exp. Date:	Date Received:
ACSM2381-01-500ML	10% HNO3	1055262	Ambient	2/1/2015	

Element	Symbol	CAS No	Purity %	Source Lot No	Concentration mg/L
Aluminum	Al	7429-90-5	99.9995	7001.46.7	2000
Calcium	Ca	7440-70-2	99.999	7006.29.2	2000
Iron	Fe	7439-89-6	99.99	7012.46.13	2000
Potassium	K	7440-09-7	99.999	7013.46.9	2000
Magnesium	Mg	7439-95-4	99.99	7016.46.5	2000
Sodium	Na	7440-23-5	99.999	7020.46.7	2000
Arsenic	As	7440-38-2	99.9999	7002.46.5	200
Barium	Ba	7440-39-3	99.997	7004.29.3	200
Beryllium	Be	7440-41-7	99.999	7005.46.5	200
Cadmium	Cd	7440-43-9	99.9999	7007.46.3	200
Cobalt	Co	7440-48-4	99.995	7008.46.8	200
Chromium	Cr	7440-47-3	99.998	7009.46.3	200
Copper	Cu	7440-50-8	99.9995	7011.46.5	200
Lithium	Li	7439-93-2	99.999	7015.46.5	200
Manganese	Mn	7439-96-5	99.95	7017.46.5	200
Nickel	Ni	7440-02-0	99.995	7021.46.8	200
Phosphorus	P	7723-14-0	99.995	7022.46.11	200
Lead	Pb	7439-92-1	99.999	7023.29.2	200
Samarium	Sm	7440-19-9	99.999	7066.46.1	200
Strontium	Sr	7440-24-6	99.998	7030.46.4	200
Thorium	Th	7440-29-1	99.98	7031.46.4	200
Uranium	U	7440-61-1	99.8	7035.330.1	200
Vanadium	V	7440-62-2	99.995	7036.46.6	200
Zinc	Zn	7440-66-6	99.9995	7037.46.5	200
Boron	B	7440-42-8	99.999	7003.46.5	400
Selenium	Se	7782-49-2	99.999	7027.46.4	100
Thallium	Tl	7440-28-0	99.99	7034.29.4	40
Sulfur	S	7704-34-9	95.9	7025.43.5	2000

Certified By: Zachary Spinelli

All weights are traceable through N. I. S. T. Test No. 822/264157-00.
Concentration (correct for purity) and uncertainty (95% confidence) values listed are determined gravimetricly.

Manufacturer's Quality System
Audited & Registered
by NSF-ISR to ISO 9001:2008

Bismuth	Bi	7440-69-9	99.999	7040.117.1	200
Tin	Sn	7440-31-5	99.999	7029.46.4	200
Titanium	Ti	7440-32-6	99.995	7033.38.3	200
Tungsten	W	7440-33-7	99.99	7072.46.2	200
Zirconium	Zr	7440-67-7	99.95	7038.29.2	200
Molybdenum	Mo	7439-98-7	99.999	7018.29.3	100
Niobium	Nb	7440-03-1	99.995	7108.46.3	100
Antimony	Sb	7440-36-0	99.999	7026.46.3	100
Silver	Ag	7440-22-4	99.999	7000.29.1	40

Certified By: Zachary Spinelli

All weights are traceable through N. I. S. T. Test No. 822/264157-00.
Concentration (correct for purity) and uncertainty (95% confidence) values listed are determined gravimetricly.

Manufacturer's Quality System
Audited & Registered
by NSF-ISR to ISO 9001:2008

Reagent

Ra-226_00001

National Institute of Standards & Technology

Certificate

Standard Reference Material 4967
Radioactivity Standard

Radionuclide	Radium-226 [1]*
Source identification	SRM 4967
Source description	Liquid in a 5-mL, flame-sealed NIST borosilicate-glass ampoule [2]
Solution composition	Approximately 1.4 mol•L^{-1} HCl[3] containing 1.74 mg $BaCl_2$ per gram of solution[4] and Ra^{+2} [5]
Solution density	1.019 ± 0.001 g•mL^{-1} at 22 °C [6]
Solution mass	5.1167 ± 0.0027 g [7]
Radium-226 activity concentration	2729 Bq•g^{-1} [8]
Reference time	1200 EST 9 September 1991
Overall uncertainty	1.18 percent [9]
Half life	1600 ± 7 years [10]
Calibration method	NIST pressurized "4π"γ ionization chamber "A" calibrated with the national radium standards[11]; and confirmatory measurements [12]

This standard reference material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, Dale D. Hoppes, Group Leader.

Gaithersburg, MD
January 1992

William P. Reed, Chief
Standard Reference Materials Program

*Notes on back

NOTES

(1) This standard was prepared by gravimetric dilutions of the "1947 series" of ^{226}Ra standards which were recalibrated at NIST (NBS) in 1967. The "age" of the radium, with accompanying in-growth of ^{210}Pb, is at least 44.3 years.

(2) Approximately five milliliters of solution. Ampoule specifications:

body diameter	16.5 ± 0.5 mm
wall thickness	0.60 ± 0.04 mm
barium content	less than 2.5 percent
lead oxide content	less than 0.02 percent
other heavy elements	trace quantities

(3) Corresponding to a 14.9% (by weight) solution of NIST, high-purity, vacuum-distilled hydrochloric acid (nominal 10 $mol \cdot L^{-1}$) in doubly-distilled water.

(4) The $BaCl_2$ reagent used to prepare the carrier solution was measured in a NaI(Tl) well counter and found to contain ≤ 0.01 Bq ^{226}Ra per gram of $BaCl_2$.

(5) The atom ratio of barium carrier to radium in the solution is approximately 2.5×10^4.

(6) The uncertainty in the density is three times the standard deviation of the mean for three independent gravimetric determinations. Confirmatory measurements based on the total master solution mass and individually dispensed masses in known volumes were in agreement.

(7) Mean mass of the dispensed solution in the ampoule. The uncertainty is three times the standard deviation of 19 individually weighed masses of solution from which the mean mass was calculated.

(8) Corresponding to 7.461×10^{-8} g ^{226}Ra per gram of solution assuming a conversion factor of 36.576 $kBq \cdot \mu g^{-1}$.

(9) The overall uncertainty, 1.18 percent, was formed by taking three times the quadratic combination of the standard deviation of the mean, or approximations thereof, for the following component uncertainties:

a) four ion chamber "A" measurements on samples of 2 dilutions	0.051 percent
b) twenty-two comparative ion chamber "A" measurements on 8 "1947(1967 recalibrated) series" of ^{226}Ra standards	0.040 percent
c) ion chamber calibration for the "1947(1967 recalibrated) series" [with respect to the "radiation balance" primary measurements on the "1957 series" and national radium standards (see note 11)]	0.34 percent
d) gravimetric dilution factor	0.1 percent
e) half-life correction	0.0046 percent
f) ^{226}Ra mass to activity conversion	0.16 percent

(10) NCRP Report No. 58, 2nd ed., Appendix A3 (Feb. 1985).

(11) For further details on NIST (NBS) radium series calibrations see W.B. Mann, et al., J. Res. NBS 62, 21-26 (1959). The 1967 recalibration of the "1947 series" and "1957 series" intercomparisons were made with chamber "A".

(12) For confirmation, this ^{226}Ra standard series was also directly compared against preparations of the "1947" (1967 recalibration)", "1978", and "1984" ^{226}Ra series by ^{222}Rn analyses with the NIST pulse-ionization-chamber Primary Radon Measurement System [R. Collé, et al., J. Res. NIST 95 155-165 (1990); J.M.R. Hutchinson, et al., Appl. Rad. Isot. 43, 175-189 (1992)], by liquid scintillation counting, and by NaI(Tl) well-crystal and Ge γ-spectrometry.

For further information please contact R. Collé, (301) 975-5527.

Reagent

Ra-228_00002

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 • U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

72287-334

Ra-228 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated with a germanium gamma spectrometer system.

Radionuclide purity and calibration were checked with a germanium gamma spectrometer system. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Ra-228
ACTIVITY (dps):	1.958 E4
HALF-LIFE:	5.75 years
CALIBRATION DATE:	February 3, 2006 12:00 EST
RELATIIVE EXPANDED UNCERTAINTY (k=2):	4.0%

Impurities: γ-impurities (other than decay products) <0.1%

5.01244 grams 0.1M HCl solution with 50 µg/g Ba carrier.

P O NUMBER 2135125, Item 1

SOURCE PREPARED BY: M. Dimitrova
M. Dimitrova, Radiochemist

Q A APPROVED: 2-6-06

Reagent

Ra-228_00007

TestAmerica St. Louis

Standards Preparation Logbook Record

Jul-17-2013

Logbook: \\Qstlmo01\Stdslog\RAD_STD.std

RAD06-0055, Ra-228 Ampoule

Analyst: kempemaj

Vendor: Analytics
Vendor's Expiration Date: 02-03-2031
Solvent: 0.1 M HCl
Date Prep./Opened: 09-01-2006 Date Received: 02-09-2006 Date Consumed: 04-22-2008
Date Expires(1): 02-03-2034 (25 Years)
Date Expires(2): 02-03-2034 (25 Years)
19580 dps/5.01244g, grams entered as mL to make dilution calculations work.

Component	Initial Conc (dpm/mL)	Final Conc (dpm/mL)
Ra-228	234,377	234,377

RAD06-0056, Ra-228 Parent

Analyst: kempemaj

Solvent: 0.5M HCl
Volume (ml): 200.00
Date Prep./Opened: 09-01-2006
Date Expires(1): 02-03-2034 (25 Years)
Date Expires(2): 02-03-2034 (25 Years)
grams transferred are entered as mL for the program to calculate correctly.

Parent Std No.: RAD06-0055, Ra-228 Ampoule
Aliquot Amount (ml): 4.9582
Parent Date Expires(1): 02-03-2034 Parent Date Expires(2): 02-03-2034

Component	Initial Conc (dpm/mL)	Final Conc (dpm/mL)
Ra-228	234,377	5,810.4

RAD12-0030, Ra-228 Spike

#15973
Ra-228-00007

Analyst: hursts

Solvent: 0.5M HCl
Volume (ml): 1,000.0
Date Prep./Opened: 06-18-2012
Date Expires(1): 07-16-2014 (1 Year)
Date Expires(2): 07-16-2014 (1 Year)

Parent Std No.: RAD06-0056, Ra-228 Parent
Aliquot Amount (ml): 4.0000
Parent Date Expires(1): 02-03-2034 Parent Date Expires(2): 02-03-2034

Component	Initial Conc (dpm/mL)	Final Conc (dpm/mL)
Ra-228	5,810.4	23.242

Reviewed By: SLB

Page 1 of 1

Ra-228 Spike

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING



Reagent ID: Ra-228_00007

		Expiration Date:	07/16/2014
Description:	Ra-228 Spike	Laboratory:	TestAmerica St. Louis
No. of Bottles:	1	Prepared By:	Hurst, Sarah
Storage Location:	RAD Separations Reagents -	Solvent:	0.5M HCL
Reagent Volume:	500.000 mL	Solvent Lot:	0
Creation Date:	06/18/2012		
Container(s):	15973		
Comment:	Rad12-0030 1L created and split into 2 bottles (Bottle A and Bottle B). Bottle B- re-verified 7/16/13. Prior to using bottle A, please re-verify by gamma spec.		

Reagent Analyte Information

Analyte	Source ID	Source Expiration Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
Ra-228	Ra-228_00003	02/03/2034	5810.431	dpm/mL	23.24172	dpm/mL

Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
Ra-228_00003	Ra-228 Parent		02/03/34				2.00000	mL

St. Louis Radiological Standard Reverification Form

Standard ID Number: Rad12-0030
True Value = 10470 DPM/L or g
Date Analyzed: 7/16/2013

Radionuclide: Radium-228

	Replicates	
#1	10260	DPM/L or g
#2	10710	DPM/L or g
#3	10750	DPM/L or g

Mean = 10573.33

1 sigma = 272.0907 1.96 sigma = 533.2977

True Value minus 5% = 9946.5 (True Value - 5%)
True Value plus 5% = 10993.5 (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 DOE QSAS and LANL Statements of Work

Reviewed By/Date: EMH 07/17/2013

SOP Reference: STL-QA-0002, Current Revision

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: M132730 **Operator:** 403135

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
Verification 1	M1AFF1AC	500.00mL	2.00	GammaVision	GV07	7 / 16 / 13 17:54	60

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA
RA-228	579	1.026E+004pCi/L	1.107E+003	4.955E+002	2.174E+002	9.560E+001	47.18

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
Verification 2	M1AFF1AC	500.00mL	2.00	GammaVision	GV08	7 / 16 / 13 14:30	60

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA
RA-228	579	1.071E+004pCi/L	1.144E+003	4.896E+002	2.321E+002	1.033E+002	46.14

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
Verification 3	M1AFF1AC	500.00mL	2.00	GammaVision	GV11	7 / 16 / 13 19:01	60

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA
RA-228	579	1.075E+004pCi/L	1.135E+003	4.432E+002	1.498E+002	6.641E+001	71.76

Laboratory Control Sample Information

Sample ID	WRKNO	Analyte	Activity		StdAdded	Recovery	ZFactor
Verification 1	M1AFF1AC	RA-228	1.026E+004	pCi/L	1.047E+004	97.97%	-0.2689
Verification 2		RA-228	1.071E+004	pCi/L	1.047E+004	102.32%	0.3040
Verification 3		RA-228	1.075E+004	pCi/L	1.047E+004	102.69%	0.3554

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

Gamma Barcode Report

Sample Description: M132730_NA_1
Instrument Operator: **Sample ID #:** NA **Sample Title:** 1
Sample Type: water **Batch ID:** M132730 **Geometry:** Marinelli, 0.5L

8

Sample Description: M132730_NA_2
Instrument Operator: **Sample ID #:** NA **Sample Title:** 2
Sample Type: water **Batch ID:** M132730 **Geometry:** Marinelli, 0.5L

7

Sample Description: M132730_NA_3
Instrument Operator: **Sample ID #:** NA **Sample Title:** 3
Sample Type: water **Batch ID:** M132730 **Geometry:** Marinelli, 0.5L

11

228 verification in 0.5C Marn
- I put '228ver1' for Sample ID
Short 1hr

-RS

Rad 12-0030 Ra 228 verification

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Prep Report for Gamma Spectroscopy

Batch: M132730 **Prep Analyst:** 260

SampID	WRKNO	Aliquot	Dilution	Adjusted Aliquot	GeometryDesc
1	NA	5.0000E+002 mL	1.00	5.0000E+002 mL	Marinelli, 0.5L
2	NA	5.0000E+002 mL	1.00	5.0000E+002 mL	Marinelli, 0.5L
3	NA	5.0000E+002 mL	1.00	5.0000E+002 mL	Marinelli, 0.5L

(8)

Spike Information

Sample ID	Standard ID	Analyte	Std Conc	Aliquot	Ref Date	StdAdded

— Spiked By — Spike Verified By — Spike Date

Standard Operating Procedures

SOPNumber	Title	Revision
☑ ST.RC.0025	Gamma Spec Prep	

EMH — Reviewed By — 7/17/13 Review Date

RS — Analyst/Relenquished By — 7.16.13 Release Date — EMH — Received By — 7/16/13 EMH 7/16/13 Receipt Date

Test America St. Louis Spectrum ID: 8__20130913

Sample Description: M132730_NA_1
Detector: Ge 8 SN/174
Batch ID: M132730
Work Order Number: NA
Lot Number: 1

Decay to Time: 2/3/2006 12:00 Live Time: 3600 sec
Acquisition Time: 7/16/2013 14:30:42 Real Time: 3611 sec
Analysis Time: 7/17/2013 08:38 Dead Time: 0.30 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 8_Liquid_Marinelli 0.5L.Clb
Efficiency Cal Desc: 8_0.5Lmarn_90101_032612
Efficiency Cal Date: 3/28/2012 10:24
Energy Cal Date: 2/28/2012 10:34
Library: Client_Routine Long_Rev4.lib
Bkgd Correction File: 8_2013-07-06_0316.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
NA-22	2.778E-01	441.1	1.225E+00	1.225E+00	4.513E+00
K-40	1.516E+00	122.5	1.857E+00	1.859E+00	7.261E+00
MN-54	1.743E+02	42.4	7.381E+01	7.429E+01	2.314E+02
CO-57	1.087E+02	87.7	9.539E+01	9.555E+01	7.534E+02
CO-60	-1.104E-02	5179.0	5.715E-01	5.715E-01	2.251E+00
ZN-65	7.318E+01	1100.0	8.049E+02	8.049E+02	2.935E+03
NB-94	-2.732E-01	108.7	2.968E-01	2.971E-01	9.979E-01
RH-106	5.366E+02	58.0	3.112E+02	3.123E+02	1.020E+03
AG-108M	8.481E-02	209.3	1.775E-01	1.776E-01	7.027E-01
AG-110M	6.141E+02	94.3	5.791E+02	5.799E+02	1.591E+03
SB-125	4.288E+01	9.1	3.894E+00	4.407E+00	1.456E+01
Gd-153	-1.023E+03	181.2	1.854E+03	1.855E+03	6.195E+03
BA-133	-3.473E-01	152.4	5.295E-01	5.298E-01	1.785E+00
CS-134	2.385E+01	10.4	2.476E+00	2.734E+00	1.083E+01
CS-137	-3.138E-01	875.6	2.748E+00	2.748E+00	1.351E+00
CE-144	-1.996E+03	66.2	1.321E+03	1.325E+03	4.360E+03
PM-144	2.997E+01	95.6	2.865E+01	2.869E+01	1.130E+02
EU-152	-1.761E-01	100.7	1.774E-01	1.776E-01	3.904E+00
EU-154	-2.899E-01	100.3	2.907E-01	2.910E-01	1.027E+01
EU-155	1.729E+01	21.0	3.635E+00	3.745E+00	8.248E+00
TL-208	2.871E+02	3.6	1.048E+01	1.745E+01	1.308E+01
pm-146	1.027E+00	83.0	8.523E-01	8.537E-01	7.717E+00
Cd-109	4.361E+02	118.7	5.178E+02	5.183E+02	1.720E+03
PB-210	1.480E+01	119.1	1.763E+01	1.765E+01	5.874E+01
PB-212	9.046E+02	1.8	1.588E+01	5.121E+01	1.944E+01
PB-214	4.790E-01	96.0	4.599E-01	4.605E-01	1.795E+00
BI-207	4.414E-01	51.4	2.269E-01	2.280E-01	9.831E-01
BI-212	8.963E+02	7.3	6.524E+01	7.847E+01	1.254E+02
BI-214	8.300E-01	64.8	5.380E-01	5.395E-01	1.776E+00
BI-210M	1.770E-02	1983.0	3.509E-01	3.509E-01	1.196E+00
RA-224	9.650E+02	14.1	1.365E+02	1.459E+02	4.254E+02
AC-228	1.982E+02	2.3	4.529E+00	1.058E+01	4.295E+00
TH-227	-3.823E+01	5.1	1.943E+00	2.838E+00	3.504E+00
TH-229	1.229E-01	2901.0	3.564E+00	3.564E+00	1.211E+01
TH-234	2.246E+01	51.1	1.148E+01	1.153E+01	2.950E+01
PA-231	-1.584E+01	58.0	9.181E+00	9.214E+00	3.020E+01
PA-233	3.980E+00	14.2	5.668E-01	5.997E-01	1.962E+00
PA-234	-2.293E+00	54.8	1.258E+00	1.263E+00	4.134E+00
PA-234M	-1.515E+01	2000.0	3.029E+02	3.029E+02	1.029E+02
U-235	9.133E-01	162.7	1.486E+00	1.487E+00	4.459E+00
AM-241	7.894E-02	1568.0	1.238E+00	1.238E+00	4.183E+00
Np-237	0.000E+00	0.0	2.077E+00	2.077E+00	6.975E+00

Total 5.355E+03

Analyst: Micha Korrinhizer

TestAmerica Spectrum name: 8__20130913.An1

Sample description
M132730_NA_1

Spectrum Filename: C:\User\SPC\Det8\8__20130913.An1

Acquisition information

Start time:	7/16/2013 2:30:42 PM
Live time:	3600
Real time:	3611
Dead time:	0.30 %
Detector ID:	8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Liquid_Marinelli 0.5L.Clb
8_0.5Lmarn_90101_032612

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 10:24:47 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 1.34 %
Log(Eff):	-1.169253E+00 + (-3.875994E-02*Log(E)) + (-6.194504E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 0.74 %
Log(Eff):	-2.783617E+01 + (1.016917E+01*Log(E)) + (-1.038451E+00*Log(E)^2)

Library Files

Main analysis library:	Client_Routine Long_Rev4.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.55keV)
Stop channel:	8000 (1999.96keV)
Peak rejection level:	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

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	2/3/2006 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2013-07-06_0316.PBC 7/6/2013 3:16:34 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 51 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 129.8629

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.74	49.	65.02	0.59	9.328E-03				
46.65	30.	119.14	1.01	1.660E-02	46.54	4.250	PBC<MDA	PB210
57.44	35.	87.66	0.46	2.515E-02				
59.68	3.	150.08	1.02	2.675E-02	59.54	35.900	PBC<MDA	AM241
63.39	91.	32.87	0.58	2.953E-02	63.29	3.810	PBC<MDA	TH234
74.77	850.	5.78	1.03	3.717E-02				
77.15	1351.	3.71	1.04	3.856E-02				
80.91	43.	90.78	1.04	4.068E-02	80.99	34.060	PBC<MDA	BA133
87.15	510.	7.76	1.04	4.364E-02	86.54	30.700	3.009E+01	EU155
88.09	41.	118.73	1.04	4.405E-02	88.04	3.790	PBC<MDA	Cd109
89.94	542.	7.10	1.05	4.484E-02				
92.59	45.	30.77	1.05	4.591E-02	92.59	5.584	PBC<MDA	TH234
93.27	557.	7.18	1.05	4.614E-02	93.35	5.561	1.467E+02	AC228
99.38	121.	30.73	1.05	4.824E-02	99.50	15.000	HL>Cutoff	Np239
105.26	232.	21.03	0.79	4.978E-02	105.31	21.200	1.729E+01	EU155
					106.13	22.700	HL>Cutoff	Np239
123.47	16.	214.01	1.07	5.246E-02	123.10	40.790	PBC<MDA	EU154
					122.06	85.600	1.019E+02	CO57
129.14	398.	14.75	1.18	5.277E-02				
135.50	15.	215.22	1.08	5.282E-02	136.30	5.850	HL>Cutoff	HF181
					136.30	5.850	HL>Cutoff	HF181
					136.47	10.680	7.651E+02	CO57
136.90	40.	87.73	1.08	5.282E-02	136.47	10.680	PBC<MDA	CO57
140.38	15.	252.24	1.08	5.271E-02	140.51	89.300	HL>Cutoff	Tc99m
143.72	8.	132.27	1.09	5.256E-02	143.79	10.960	PBC<MDA	U235
145.23	38.	55.50	0.36	5.248E-02				
165.97	10.	329.41	1.10	5.051E-02	165.85	79.900	HL>Cutoff	CE139
205.86	16.	121.84	0.62	4.364E-02	205.33	5.010	PBC<MDA	U235
209.33	556.	8.87	0.96	4.305E-02				
238.65	3722.	1.75	1.16	3.923E-02	238.63	43.300	9.045E+02	PB212
240.96	370.	14.21	1.16	3.896E-02	240.99	4.100	9.609E+02	RA224
					242.00	7.430	3.576E+01	PB214
270.23	389.	10.63	1.05	3.585E-02				
277.43	191.	21.53	1.24	3.517E-02	277.28	6.310	3.566E+02	TL208

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					279.20	81.460	HL>Cutoff	Hg203
294.05	7.	307.28	1.20	3.360E-02	295.09	19.300	PBC<MDA	PB214
					295.95	30.160	HL>Cutoff	Ir192
					295.09	19.300	3.220E-01	PB214
300.28	239.	13.85	0.87	3.316E-02	300.03	3.280	9.071E+02	PB212
					300.07	2.460	8.140E+01	PA231
					300.18	6.200	3.230E+01	PA233
					300.07	2.460	8.140E+01	PA231
327.94	293.	11.17	1.64	3.104E-02	328.76	20.300	HL>Cutoff	La140
					328.76	20.300	HL>Cutoff	La140
338.33	1078.	3.31	1.23	3.031E-02	338.32	12.010	2.009E+02	AC228
340.76	59.	48.96	1.23	3.015E-02	340.57	46.900	HL>Cutoff	Cs136
					340.57	46.900	HL>Cutoff	Cs136
351.82	22.	96.03	1.24	2.942E-02	351.93	37.600	PBC<MDA	PB214
					351.93	37.600	5.595E-01	PB214
366.15	28.	67.73	1.25	2.864E-02	364.48	81.700	HL>Cutoff	I131
392.02	23.	82.80	1.27	2.708E-02	391.69	64.000	HL>Cutoff	SN113
427.90	11.	163.69	1.30	2.527E-02	427.88	29.600	PBC<MDA	SB125
					427.88	29.600	2.624E+00	SB125
433.53	4.	388.06	1.30	2.499E-02	433.94	90.480	PBC<MDA	AG108M
452.85	21.	82.95	1.32	2.412E-02	453.88	65.000	PBC<MDA	pm146
463.02	311.	9.71	1.38	2.374E-02	463.37	10.470	2.260E+02	SB125
					463.37	10.470	2.260E+02	SB125
478.41	38.	44.42	1.33	2.315E-02	477.60	10.520	HL>Cutoff	BE7
483.80	24.	64.30	1.34	2.298E-02	482.00	80.500	HL>Cutoff	HF181
					482.00	80.500	HL>Cutoff	HF181
510.69	402.	8.60	1.43	2.194E-02	511.86	20.000	3.966E+03	RH106
					511.86	20.000	3.966E+03	RH106
562.43	62.	26.57	1.39	2.025E-02	563.24	8.350	1.250E+02	CS134
					563.24	8.350	1.250E+02	CS134
570.04	23.	76.26	1.40	2.006E-02	569.70	97.740	PBC<MDA	BI207
					569.32	15.380	2.557E+01	CS134
					569.47	8.200	3.937E+00	PA234
583.09	1159.	3.63	1.49	1.968E-02	583.02	84.500	2.871E+02	TL208
603.29	18.	90.35	1.42	1.914E-02	602.73	98.260	HL>Cutoff	SB124
604.87	4.	424.81	1.42	1.909E-02	604.71	97.620	PBC<MDA	CS134
					604.71	97.620	7.434E-01	CS134
610.02	26.	64.82	1.42	1.897E-02	609.31	46.090	PBC<MDA	BI214
					610.30	5.750	HL>Cutoff	RU103
					610.30	5.750	HL>Cutoff	RU103
610.09	22.	79.31	1.42	1.895E-02	609.31	46.090	PBC<MDA	BI214
					610.30	5.750	HL>Cutoff	RU103
619.31	14.	115.55	1.43	1.875E-02	618.06	99.100	PBC<MDA	PM144
					621.92	9.930	3.323E+02	RH106
619.51	23.	58.00	1.43	1.865E-02	618.06	99.100	PBC<MDA	PM144
					621.92	9.930	5.366E+02	RH106
					621.92	9.930	5.366E+02	RH106
635.43	10.	159.14	1.44	1.831E-02	635.89	11.310	PBC<MDA	SB125
					635.89	11.310	8.507E+00	SB125
661.69	-14.	378.65	1.46	1.770E-02	661.66	85.210	PBC<MDA	CS137
692.56	7.	152.32	1.48	1.695E-02	696.54	99.000	PBC<MDA	PM144
719.23	22.	49.55	1.50	1.643E-02	722.79	10.810	HL>Cutoff	SB124
					724.20	44.150	HL>Cutoff	ZR95
720.25	6.	209.32	1.50	1.642E-02	722.94	90.840	PBC<MDA	AG108M
727.23	267.	7.28	1.50	1.634E-02	727.17	7.550	8.962E+02	BI212
729.96	23.	71.57	1.50	1.629E-02				
735.23	15.	90.22	1.51	1.618E-02	735.72	22.500	PBC<MDA	pm146
755.27	67.	21.45	1.52	1.579E-02	756.73	54.460	HL>Cutoff	ZR95
					756.73	54.460	HL>Cutoff	ZR95
763.29	56.	40.44	0.50	1.567E-02	763.94	22.280	8.414E+03	AG110M
765.54	8.	176.91	1.53	1.563E-02	765.79	99.790	HL>Cutoff	NB95
782.27	16.	72.65	1.54	1.529E-02	785.42	1.280	PBC<MDA	BI212
794.83	154.	10.38	1.54	1.512E-02	795.87	85.530	4.035E+01	CS134

				795.87	85.530	4.035E+01	CS134
802.65	9.	109.84	1.55 1.502E-02	801.95	8.690	PBC<MDA	CS134
				801.95	8.690	2.377E+01	CS134
816.24	8.	137.10	1.56 1.480E-02	815.77	23.280	HL>Cutoff	La140
				815.77	23.280	HL>Cutoff	La140
830.72	22.	42.35	1.57 1.450E-02	834.85	99.980	PBC<MDA	MN54
845.57	5.	154.64	1.58 1.432E-02	846.77	99.935	HL>Cutoff	Co56

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
860.19	165.	11.74	1.50	1.412E-02	860.56	12.420	3.898E+02	TL208
871.05	9.	87.38	1.59	1.397E-02	871.10	99.890	PBC<MDA	NB94
884.44	3.	254.91	1.60	1.379E-02	883.24	9.600	PBC<MDA	PA234
					884.68	72.680	1.766E+02	AG110M
					884.68	72.680	1.766E+02	AG110M
					883.24	9.600	7.031E-01	PA234
884.50	5.	160.87	1.60	1.381E-02	883.24	9.600	PBC<MDA	PA234
					884.68	72.680	2.618E+02	AG110M
889.03	3.	321.51	1.60	1.372E-02	889.28	99.984	HL>Cutoff	Sc46
898.44	2.	553.65	1.61	1.360E-02	898.04	93.700	HL>Cutoff	y88
911.16	1131.	3.12	1.58	1.343E-02	911.16	29.000	1.971E+02	AC228
964.69	185.	8.52	1.65	1.277E-02	964.11	14.605	4.038E+01	EU152
					964.11	14.605	4.038E+01	EU152
968.93	624.	4.10	1.65	1.272E-02	968.97	17.460	1.907E+02	AC228
995.49	5.	147.21	1.67	1.241E-02	996.33	10.600	PBC<MDA	EU154
1004.25	2.	474.92	1.67	1.231E-02	1004.77	18.010	PBC<MDA	EU154
1064.14	14.	68.99	1.71	1.170E-02	1063.66	74.500	PBC<MDA	BI207
1078.30	7.	106.17	1.72	1.156E-02	1077.40	3.300	HL>Cutoff	Ga68
1173.52	-5.	61.16	1.77	1.070E-02	1173.24	99.900	PBC<MDA	CO60
1188.79	2.	319.17	1.78	1.057E-02	1189.05	16.200	HL>Cutoff	Ta182
1238.38	4.	174.72	1.81	1.018E-02	1238.28	66.070	HL>Cutoff	Co56
1271.64	1.	441.06	1.83	9.917E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.979E-01	EU154
1271.64	2.	327.73	1.83	9.917E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	2.857E-01	EU154
1332.37	0.	61.61	1.86	9.516E-03	1332.50	99.980	PBC<MDA	CO60
1384.28	1.	456.07	1.88	9.184E-03	1384.30	24.290	PBC<MDA	AG110M
1408.30	2.	318.02	1.90	9.039E-03	1408.00	21.005	PBC<MDA	EU152
1458.98	5.	42.91	1.92	8.732E-03	1460.83	10.670	PBC<MDA	K40
1764.67	1.	734.84	2.07	7.293E-03	1764.49	15.400	PBC<MDA	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
146.78	36.74	341.	49.	5.253E+03	65.02	0.587	-	s
229.55	57.44	333.	35.	1.379E+03	76.39	0.456	-	sc
298.89	74.76	783.	850.	2.287E+04	5.78	1.034	-	D
308.40	77.13	581.	1350.	3.501E+04	3.71	1.036	-	D
348.45	87.11	584.	454.	1.041E+04	8.87	1.044	-	D
359.62	89.90	506.	505.	1.125E+04	7.72	1.046	-	D
516.40	129.14	554.	477.	9.038E+03	8.35	1.180	-	
580.47	145.23	312.	34.	6.471E+02	75.55	1.088	-	c
837.16	209.33	397.	575.	1.337E+04	6.43	0.961	-	M
1080.78	270.23	264.	389.	1.085E+04	7.78	1.046	-	
1311.64	327.94	462.	18.	5.703E+02	173.40	1.644	-	c
1362.98	340.77	390.	59.	1.973E+03	48.69	1.234	-	D
1851.98	463.02	387.	44.	1.867E+03	64.53	1.383	-	c
2042.66	510.69	474.	68.	3.109E+03	46.73	1.428	-	sM
2919.90	729.93	127.	23.	1.417E+03	72.13	1.502	-	sc

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
3053.14	763.29	93.	40.	2.570E+03	37.29	0.503 -	s
3858.76	964.69	68.	161.	1.261E+04	10.71	1.390 -	M

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

This section based on library: Client_Routine Long_Rev4.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.39	46.65	616.	30.	0.008	119.14	1.012s
TH-227	201.49	50.42	639.	-7.	-0.002	540.18	1.015s
TH-234	253.37	63.39	628.	91.	0.025	32.87	0.582s
BA-133	323.46	80.91	752.	43.	0.012	90.78	1.039
EU-155	345.98	86.54	826.	293.	0.081	14.33	1.043D
Cd-109	351.97	88.04	1162.	41.	0.011	118.73	1.044D
TH-234	370.17	92.59	943.	45.	0.013	30.77	1.048D
AC-228	373.21	93.35	614.	464.	0.129	8.77	1.049D
Gd-153	389.43	97.40	744.	-21.	-0.006	181.23	1.052s
Np-239	397.32	99.38	630.	121.	0.034	30.73	1.053
Np-239	418.00	104.55	759.	-6.	-0.002	614.09	1.057
EU-155	420.85	105.26	537.	232.	0.064	21.03	0.786s
Np-239	421.36	105.39	669.	134.	0.037	28.55	1.058
EU-152	480.55	120.18	430.	-9.	-0.003	324.60	1.071s
CO-57	488.47	122.16	613.	-20.	-0.006	174.80	1.071s
EU-154	493.70	123.47	576.	16.	0.004	214.01	1.072s
PA-234	521.62	130.45	887.	-78.	-0.022	54.84	1.078s
CE-144	536.24	134.11	665.	-56.	-0.016	66.18	1.080s
HF-181	541.83	135.50	519.	15.	0.004	215.22	1.082s
CO-57	547.43	136.90	586.	40.	0.011	87.73	1.082
Tc-99m	561.34	140.38	698.	15.	0.004	252.24	1.085s
U-235	574.97	143.79	371.	8.	0.002	132.27	1.087D
Ba-140	651.38	162.89	605.	-7.	-0.002	513.16	1.102s
CE-139	663.71	165.97	576.	10.	0.003	329.41	1.104s
U-235	823.28	205.86	244.	16.	0.005	121.84	0.621s
TH-229	845.80	211.49	640.	-20.	-0.006	175.93	1.138s
TH-227	930.47	232.66	96.	-528.	-0.147	5.08	1.157s
PB-212	954.38	238.63	273.	3708.	1.030	1.75	1.159D
RA-224	963.79	240.99	1197.	372.	0.103	14.14	1.161D
PB-214	969.73	242.47	1025.	-154.	-0.043	30.41	1.162s
EU-152	973.78	243.48	358.	-31.	-0.009	87.75	1.164s
TH-227	1023.91	256.01	322.	-7.	-0.002	369.17	1.172s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1109.57	277.43	300.	191.	0.053	21.53	1.238
I-131	1140.95	285.27	317.	-30.	-0.008	87.18	1.193s
PB-214	1176.07	294.05	261.	7.	0.002	307.28	1.201
Ir-192	1174.93	293.77	194.	-6.	-0.002	317.54	1.202
PB-212	1201.00	300.28	207.	238.	0.066	13.85	0.874s
PA-231	1200.63	300.19	302.	203.	0.056	14.01	1.205s
PA-233	1200.63	300.19	308.	201.	0.056	14.24	1.205
PA-231	1209.36	302.37	465.	-54.	-0.015	57.98	1.207s
BA-133	1209.21	302.34	461.	-62.	-0.017	50.83	1.207s
La-140	1311.80	327.98	230.	275.	0.077	9.84	1.226s
AC-228	1353.15	338.32	103.	1073.	0.298	3.31	1.233D
Cs-136	1361.41	340.39	429.	-10.	-0.003	291.51	1.234s
EU-152	1373.14	343.32	248.	-23.	-0.006	100.73	1.237s
HF-181	1381.42	345.39	216.	-7.	-0.002	291.21	1.238s
PB-214	1407.14	351.82	216.	22.	0.006	96.03	1.243s
BA-133	1424.92	356.26	216.	-14.	-0.004	152.44	1.245s
I-131	1464.47	366.15	160.	28.	0.008	67.73	1.252s
SN-113	1567.96	392.02	166.	23.	0.006	82.80	1.271s
SB-125	1711.50	427.90	153.	11.	0.003	163.69	1.297s
AG-108M	1734.00	433.53	133.	4.	0.001	388.06	1.301s
pm-146	1811.29	452.85	135.	21.	0.006	82.95	1.315s
SB-125	1851.67	462.94	160.	267.	0.074	9.08	1.322
Ir-192	1872.26	468.09	173.	-11.	-0.003	171.33	1.325
BE-7	1913.53	478.41	123.	38.	0.011	44.42	1.332s
HF-181	1935.10	483.80	104.	24.	0.007	64.30	1.335s
RU-103	1988.44	497.13	114.	-9.	-0.002	173.49	1.346s
RH-106	2042.53	510.66	164.	334.	0.093	7.70	1.356s
Nd-147	2125.31	531.35	154.	-18.	-0.005	100.53	1.369
Ba-140	2156.69	539.19	125.	-8.	-0.002	201.77	1.373s
CS-134	2249.65	562.43	106.	62.	0.017	26.57	1.391s
CS-134	2277.20	569.32	145.	-2.	-0.001	862.43	1.395s
PA-234	2290.34	572.61	133.	-21.	-0.006	79.28	1.395s
BI-207	2280.09	570.04	146.	23.	0.006	76.26	1.396s
TL-208	2332.30	583.09	114.	1152.	0.320	3.63	1.491
SB-125	2397.64	599.43	126.	-11.	-0.003	144.63	1.416s
SB-124	2413.08	603.29	121.	18.	0.005	90.35	1.418s
CS-134	2419.40	604.87	149.	4.	0.001	424.81	1.419s
BI-214	2440.02	610.02	129.	26.	0.007	64.82	1.422s
RU-103	2440.28	610.09	142.	22.	0.006	79.31	1.423s
AG-108M	2458.54	614.65	143.	-6.	-0.002	271.71	1.426s
PM-144	2477.19	619.31	128.	14.	0.004	115.55	1.428s
RH-106	2477.98	619.51	78.	23.	0.006	58.00	1.431s
SB-125	2541.64	635.43	116.	10.	0.003	159.14	1.440s
CS-137	2646.69	661.69	161.	-14.	-0.004	378.65	1.457s
PM-144	2770.18	692.56	57.	7.	0.002	152.32	1.480s
NB-94	2810.83	702.72	147.	-16.	-0.004	108.66	1.484s
SB-124	2876.86	719.23	49.	22.	0.006	49.55	1.497s
AG-108M	2880.97	720.25	81.	6.	0.002	209.32	1.497s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	2893.37	723.36	842.	-4.	-0.001	966.38	1.498s
ZR-95	2897.76	724.45	241.	-35.	-0.010	65.55	1.498s
BI-212	2908.63	727.17	55.	267.	0.074	7.28	1.500D
pm-146	2940.89	735.23	82.	15.	0.004	90.22	1.506s
ZR-95	3021.02	755.27	71.	67.	0.019	21.45	1.519s
AG-110M	3053.86	763.48	98.	15.	0.004	94.31	1.524s
NB-95	3062.14	765.54	108.	8.	0.002	176.91	1.525s
EU-152	3115.16	778.80	109.	-7.	-0.002	215.59	1.534s
BI-212	3129.02	782.27	62.	16.	0.005	72.65	1.538s
CS-134	3179.29	794.83	51.	154.	0.043	10.38	1.544s
CS-134	3210.55	802.65	46.	9.	0.003	109.84	1.548s
CO-58	3250.80	812.71	56.	-2.	-0.001	561.35	1.554s
La-140	3264.94	816.24	53.	8.	0.002	137.10	1.557s
MN-54	3322.83	830.72	31.	22.	0.006	42.35	1.569s
Co-56	3382.25	845.57	26.	5.	0.001	154.64	1.577s
TL-208	3440.73	860.19	30.	165.	0.046	11.74	1.501
NB-94	3484.16	871.05	30.	9.	0.003	87.38	1.592s
EU-154	3492.16	873.05	47.	-7.	-0.002	136.23	1.593s
PA-234	3517.35	879.34	41.	-5.	-0.001	187.57	1.598s
PA-234	3538.00	884.50	30.	5.	0.001	160.87	1.599s
AG-110M	3537.76	884.44	35.	3.	0.001	254.91	1.600s
Sc-46	3556.09	889.03	39.	3.	0.001	321.51	1.603s
y-88	3593.73	898.44	46.	2.	0.000	553.65	1.608s
AC-228	3644.62	911.16	22.	1126.	0.313	3.12	1.577
AG-110M	3743.91	935.98	28.	-1.	0.000	779.85	1.633s
PA-234	3782.99	945.75	40.	-3.	-0.001	356.20	1.638s
EU-152	3861.43	965.36	466.	7.	0.002	415.34	1.649s
AC-228	3875.73	968.93	41.	582.	0.162	4.66	1.430
EU-154	3981.95	995.49	24.	5.	0.001	147.21	1.668s
EU-154	4017.01	1004.25	29.	2.	0.000	474.92	1.673s
Co-56	4142.94	1035.73	39.	-7.	-0.002	131.88	1.693s
Cs-136	4194.25	1048.56	26.	-3.	-0.001	248.17	1.698s
RH-106	4201.58	1050.39	23.	-2.	-0.001	375.42	1.700s
BI-207	4256.56	1064.14	38.	14.	0.004	68.99	1.708s
Ga-68	4313.21	1078.30	28.	7.	0.002	106.17	1.715s
BI-214	4482.09	1120.52	39.	-6.	-0.002	151.64	1.740s
Sc-46	4481.40	1120.35	40.	-6.	-0.002	152.48	1.740s
Ta-182	4481.59	1120.39	37.	-6.	-0.002	153.62	1.741s
CO-60	4694.09	1173.52	40.	-5.	-0.001	61.16	1.770s
Ta-182	4755.20	1188.79	18.	2.	0.001	319.17	1.779s
Co-56	4953.58	1238.38	25.	4.	0.001	174.72	1.806s
NA-22	5086.61	1271.64	17.	1.	0.000	441.06	1.826s
EU-154	5086.62	1271.64	20.	2.	0.001	327.73	1.826s
FE-59	5169.43	1292.34	38.	-7.	-0.002	133.00	1.835s
AG-110M	5537.17	1384.28	23.	1.	0.000	456.07	1.884s
EU-152	5633.27	1408.30	16.	2.	0.001	318.02	1.896s
K-40	5836.00	1458.98	22.	5.	0.001	42.91	1.923s
La-140	6384.72	1596.16	24.	-4.	-0.001	191.25	1.990s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-124	6752.71	1688.15	25.	-6.	-0.002	121.75	2.034s
BI-214	7058.81	1764.67	16.	1.	0.000	734.84	2.067s
Co-56	7082.13	1770.50	18.	-4.	-0.001	143.09	2.070s
y-88	7349.85	1837.43	20.	-2.	-0.001	347.49	2.098s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	4.3262E+00					5.31E+01	
			477.60	4.326E+00	?(	6.202E+00	4.44E+01 1.05E+01	G
NA-22	C	2.7783E-01					9.50E+02	
			1274.53	2.778E-01	?(	4.513E+00	4.41E+02 9.99E+01	G
K-40	N	1.5163E+00					4.66E+11	
			1460.83	1.516E+00	?(P	7.261E+00	4.29E+01 1.07E+01	G
Sc-46	F	5.6765E-02					8.38E+01	
			889.28	5.676E-02	?(	6.458E-01	3.22E+02 1.00E+02	G
			1120.55	-1.510E-01	+	7.986E-01	1.52E+02 1.00E+02	G
CR-51	F	-7.6665E-02					2.77E+01	
			320.08	-7.666E-02	%(	5.718E+00	2.17E+03 9.94E+00	G
MN-54	C	1.7430E+02					3.12E+02	
			834.85	1.743E+02	?(	2.314E+02	4.23E+01 1.00E+02	G
FE-59	F	3.3269E-03					4.45E+01	
			1099.25	3.327E-03	&(	1.250E+00	1.03E+04 5.65E+01	G
			1291.60	-4.516E-01	+	2.074E+00	1.33E+02 4.32E+01	G
Co-56	C	1.2590E-01					7.73E+01	
			846.77	9.410E-02	&(	5.109E-01	1.55E+02 9.99E+01	G
			1238.28	1.740E-01	?(	1.074E+00	1.75E+02 6.61E+01	G
			1037.84	-1.155E+00	+	5.254E+00	1.32E+02 1.41E+01	G
			1771.35	-1.101E+00	+	5.566E+00	1.43E+02 1.55E+01	A
CO-57	C	1.0873E+02					2.72E+02	
			122.06	-1.289E+02	&(	7.534E+02	1.75E+02 8.56E+01	G
			136.47	2.013E+03	?(	5.861E+03	8.77E+01 1.07E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-58	C	-3.5568E-02					7.09E+01	
			810.78	-3.557E-02	&(	7.032E-01	5.61E+02	9.95E+01 G
CO-60	F	-1.1036E-02					1.93E+03	
			1332.50	-1.104E-02	%(P	2.251E+00	6.16E+01	1.00E+02 G
			1173.24	-3.413E-01	+ P	2.216E+00	6.12E+01	9.99E+01 G
ZN-65	F	7.3177E+01					2.44E+02	
			1115.55	7.318E+01	%(	2.935E+03	1.10E+03	5.06E+01 G
NB-94	I	-2.7319E-01					7.41E+06	
			702.63	-2.732E-01	?(	9.979E-01	1.09E+02	9.79E+01 G
			871.10	1.888E-01	+	5.585E-01	8.74E+01	9.99E+01 G
ZR-95	I	2.1748E+00					6.40E+01	
			756.73	2.175E+00	?(	1.353E+00	2.15E+01	5.45E+01 G
			724.20	-1.331E+00	-	2.880E+00	6.56E+01	4.42E+01 G
NB-95	I	1.5049E-01					6.40E+01	
			765.79	1.505E-01	&(	9.088E-01	1.77E+02	9.98E+01 G
RU-103	I	-1.2066E-01					3.93E+01	
			497.05	-1.207E-01	?(	7.136E-01	1.73E+02	9.09E+01 G
			610.30	5.616E+00	&	1.483E+01	7.93E+01	5.75E+00 GA
RH-106	I	5.3660E+02					3.74E+02	
			621.92	5.366E+02	?(	1.020E+03	5.80E+01	9.93E+00 G
			1050.36	-4.290E+02	-	5.837E+03	3.75E+02	1.56E+00 G
			511.86	3.293E+03	?	6.147E+02	7.70E+00	2.00E+01 GA
AG-108M	C	8.4814E-02					1.53E+05	
			433.94	5.273E-02	?(	7.027E-01	3.88E+02	9.05E+01 G
			722.94	1.168E-01	&(	8.415E-01	2.09E+02	9.08E+01 G
			614.28	-1.044E-01	+	9.693E-01	2.72E+02	8.98E+01 G
AG-110M	F	6.1406E+02					2.50E+02	
			884.68	1.766E+02	&(	1.591E+03	2.55E+02	7.27E+01 G
			657.76	-6.467E+01	&	2.330E+03	1.06E+03	9.46E+01 G
			937.49	-1.128E+02	+	3.192E+03	7.80E+02	3.44E+01 G
			1384.30	3.537E+02	?(	5.871E+03	4.56E+02	2.43E+01 G
			763.94	2.325E+03	?(	7.366E+03	9.43E+01	2.23E+01 G
SN-113	F	3.6501E-01					1.15E+02	
			391.69	3.650E-01	?(	1.007E+00	8.28E+01	6.40E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-124	F	5.7981E-01					6.02E+01	
			602.73	2.635E-01	&(	7.972E-01	9.03E+01	9.83E+01 G
			1690.98	-4.710E-01	+	1.990E+00	1.22E+02	4.78E+01 G
			722.79	3.454E+00	&(	5.518E+00	4.96E+01	1.08E+01 G
SB-125	I	4.2882E+01					1.01E+03	
			427.88	2.624E+00	&(	1.456E+01	1.64E+02	2.96E+01 G
			600.50	-5.906E+00	+	2.896E+01	1.45E+02	1.79E+01 G
			635.89	8.507E+00	(	4.606E+01	1.59E+02	1.13E+01 G
			463.37	1.938E+02	(	4.479E+01	9.08E+00	1.05E+01 G
I-131	I	3.2706E-01					8.02E+00	
			364.48	3.271E-01	?(	7.327E-01	6.77E+01	8.17E+01 G
			284.30	-3.870E+00	&	1.122E+01	8.72E+01	6.14E+00 G
			636.97	-9.754E-02	%	1.050E+01	3.09E+03	7.17E+00 G
Gd-153	F	-1.0230E+03					2.42E+02	
			97.50	-1.023E+03	&(	6.195E+03	1.81E+02	3.00E+01 G
			103.20	-1.903E+02	%	8.509E+03	1.33E+03	2.18E+01 G
Ga-68	C	7.2989E+00					4.71E-02	
			1077.40	7.299E+00	?(	2.661E+01	1.06E+02	3.30E+00 G
Tc-99m	I	9.3044E-02					2.51E-01	
			140.51	9.304E-02	&(	7.862E-01	2.52E+02	8.93E+01 G
BA-133	F	-3.4734E-01					3.85E+03	
			356.00	-3.473E-01	?(	1.785E+00	1.52E+02	6.20E+01 G
			302.85	-4.631E+00	+	7.713E+00	5.08E+01	1.83E+01 G
			383.84	0.000E+00	+	1.326E+01	1.00E+03	8.94E+00 GA
			80.99	1.418E+00	?	4.269E+00	9.08E+01	3.41E+01 GA
CS-134	I	2.3846E+01					7.54E+02	
			604.71	7.434E-01	&(	1.083E+01	4.25E+02	9.76E+01 G
			795.87	4.035E+01	?(	9.423E+00	1.04E+01	8.55E+01 G
			569.32	-2.171E+00	&	6.447E+01	8.62E+02	1.54E+01 G
			801.95	2.377E+01	&(	8.906E+01	1.10E+02	8.69E+00 G
			563.24	1.250E+02	&(	1.016E+02	2.66E+01	8.35E+00 G
CS-137	I	-3.1382E-01					1.10E+04	
			661.66	-3.138E-01	?(P	1.351E+00	3.79E+02	8.52E+01 G
CE-139	F	7.1267E-02					1.38E+02	
			165.85	7.127E-02	?(	7.888E-01	3.29E+02	7.99E+01 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
Ba-140	I	-4.3131E-01						1.28E+01	
			537.26	-4.313E-01	?(	2.970E+00	2.02E+02	2.44E+01	G
			162.66	-5.977E-01	&	1.032E+01	5.13E+02	6.22E+00	G
			304.85	3.221E-03	&	1.567E+01	1.43E+05	4.29E+00	G
La-140	I	1.7887E+00						1.28E+01	
			1596.21	-1.362E-01	?(	9.247E-01	1.91E+02	9.54E+01	G
			487.02	0.000E+00	+	1.610E+00	1.00E+03	4.55E+01	G
			328.76	1.217E+01	?(	3.240E+00	9.84E+00	2.03E+01	G
			815.77	6.264E-01	?(	2.950E+00	1.37E+02	2.33E+01	G
CE-141	I	-7.0982E-03						3.25E+01	
			145.44	-7.098E-03	%(	1.133E+00	4.72E+03	4.82E+01	G
CE-144	I	-1.9962E+03						2.85E+02	
			133.54	-1.996E+03	?(	4.360E+03	6.62E+01	1.11E+01	G
PM-144	C	2.9974E+01						3.63E+02	
			696.54	2.156E+01	?(	1.130E+02	1.52E+02	9.90E+01	G
			618.06	3.838E+01	&(	1.495E+02	1.16E+02	9.91E+01	G
			476.81	4.523E+00	%	2.962E+02	1.90E+03	4.20E+01	G
EU-152	F	-1.7608E-01						4.94E+03	
			344.29	-1.160E+00	?(	3.904E+00	1.01E+02	2.65E+01	G
			1112.07	0.000E+00	&	1.015E+01	1.00E+03	1.36E+01	G
			121.78	-2.468E-01	&	2.699E+00	3.25E+02	2.86E+01	G
			778.92	-1.419E+00	+	1.048E+01	2.16E+02	1.29E+01	G
			964.11	1.609E+00	?(	2.252E+01	4.15E+02	1.46E+01	G
			244.69	-4.340E+00	+	1.266E+01	8.78E+01	7.58E+00	G
			1408.00	3.892E-01	?	4.547E+00	3.18E+02	2.10E+01	GA
EU-154	I	-2.8988E-01						3.14E+03	
			873.23	-2.191E+00	?(	1.027E+01	1.36E+02	1.23E+01	G
			123.10	3.779E-01	+	2.710E+00	2.14E+02	4.08E+01	G
			1274.54	2.857E-01	+	3.405E+00	3.28E+02	3.52E+01	G
			723.36	-6.489E-01	&	2.105E+01	9.66E+02	2.02E+01	G
			1004.77	3.704E-01	+	6.336E+00	4.75E+02	1.80E+01	G
			996.33	1.911E+00	?(	9.870E+00	1.47E+02	1.06E+01	G
EU-155	I	1.7286E+01						1.81E+03	
			105.31	1.729E+01	(	8.248E+00	2.10E+01	2.12E+01	G
			86.54	1.729E+01	}	8.068E+00	1.43E+01	3.07E+01	G
HF-181	F	4.2307E-01						4.24E+01	
			482.00	3.553E-01	?(	7.539E-01	6.43E+01	8.05E+01	G
			133.02	1.860E-02	%	1.492E+00	2.38E+03	4.33E+01	G
			345.83	-4.451E-01	&	4.403E+00	2.91E+02	1.51E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			136.30	1.356E+00	?(	9.789E+00	2.15E+02	5.85E+00 G
Ta-182	F	-1.8548E-01					1.14E+02	
			1121.30	-4.173E-01	?(	2.228E+00	1.54E+02	3.49E+01 G
			1221.41	-1.290E-02	%	2.580E+00	5.44E+03	2.70E+01 G
			1189.05	3.139E-01	?(	3.656E+00	3.19E+02	1.62E+01 G
Hg-203	F	7.8913E-03					4.66E+01	
			279.20	7.891E-03	%(	7.871E-01	2.93E+03	8.15E+01 G
TL-208	N	2.8712E+02					6.98E+02	
			583.02	2.871E+02	(P	1.308E+01	3.63E+00	8.45E+01 G
			277.28	3.566E+02	+	1.558E+02	2.15E+01	6.31E+00 G
			860.56	3.898E+02	+	6.671E+01	1.17E+01	1.24E+01 G
pm-146	C	1.0274E+00					2.02E+03	
			747.16	0.000E+00	?(	7.717E+00	1.00E+03	3.40E+01 G
			735.72	2.872E+00	&(	8.702E+00	9.02E+01	2.25E+01 G
			453.88	9.262E-01	&(	2.563E+00	8.30E+01	6.50E+01 G
y-88	F	3.8149E-02					1.07E+02	
			898.04	3.815E-02	&(	7.485E-01	5.54E+02	9.37E+01 G
			1836.06	-7.447E-02	+	9.417E-01	3.47E+02	9.92E+01 G
Cd-109	F	4.3609E+02					4.53E+02	
			88.04	4.361E+02	(	1.720E+03	1.19E+02	3.79E+00 G
PB-210	N	1.4796E+01					8.14E+03	
			46.54	1.480E+01	(	5.874E+01	1.19E+02	4.25E+00 G
PB-212	N	9.0455E+02					6.98E+02	
			238.63	9.046E+02	(P	1.944E+01	1.75E+00	4.33E+01 G
			300.03	9.071E+02	P	2.655E+02	1.38E+01	3.28E+00 GA
PB-214	N	4.7896E-01					5.84E+05	
			351.93	5.595E-01	?(	1.795E+00	9.60E+01	3.76E+01 G
			295.09	3.220E-01	(	3.354E+00	3.07E+02	1.93E+01 G
			242.00	-1.491E+01	+	1.467E+01	3.04E+01	7.43E+00 GA
BI-207	C	4.4136E-01					1.18E+04	
			569.70	3.878E-01	&(	9.831E-01	7.63E+01	9.77E+01 G
			1063.66	5.116E-01	(	1.171E+00	6.90E+01	7.45E+01 G
BI-212	N	8.9631E+02					6.98E+02	
			727.17	8.963E+02	(	1.254E+02	7.28E+00	7.55E+00 G
			785.42	3.444E+02	-	8.325E+02	7.27E+01	1.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-214	N	8.2995E-01					5.84E+05	
			609.31	8.300E-01	&(	1.776E+00	6.48E+01	4.61E+01 G
			1120.29	-1.001E+00	-	5.267E+00	1.52E+02	1.51E+01 G
			1764.49	1.908E-01	-	5.237E+00	7.35E+02	1.54E+01 G
BI-210M	T	1.7695E-02					1.10E+09	
			265.83	1.769E-02	%(	1.196E+00	1.98E+03	5.00E+01 G
			304.90	2.201E-02	&	2.399E+00	3.20E+03	2.80E+01 G
RA-224	N	9.6504E+02					6.98E+02	
			240.99	9.650E+02	(	4.254E+02	1.41E+01	4.10E+00 G
AC-228	N	1.9818E+02					2.10E+03	
			911.16	1.971E+02	(P	4.295E+00	3.12E+00	2.90E+01 G
			968.97	1.788E+02	- P	9.947E+00	4.66E+00	1.75E+01 G
			338.32	2.009E+02	(P	9.373E+00	3.31E+00	1.20E+01 G
			93.35	1.233E+02	- P	3.135E+01	8.77E+00	5.56E+00 XA
TH-227	N	-3.8228E+01					7.95E+03	
			235.97	-3.823E+01	&(	3.504E+00	5.08E+00	1.23E+01 G
			50.14	-1.502E+00	&	2.728E+01	5.40E+02	8.00E+00 G
			256.24	-9.334E-01	+	1.166E+01	3.69E+02	7.00E+00 G
TH-229	N	1.2286E-01					2.68E+06	
			193.51	1.229E-01	%(	1.211E+01	2.90E+03	4.40E+00 G
			210.85	-4.449E+00	&	2.618E+01	1.76E+02	2.99E+00 G
TH-234	N	2.2459E+01					1.63E+12	
			63.29	2.246E+01	(P	2.950E+01	3.29E+01	3.81E+00 G
			92.59	4.886E+00	- P	1.580E+01	3.08E+01	5.58E+00 G
PA-231	N	-1.5835E+01					1.20E+07	
			302.65	-1.583E+01	?(	3.020E+01	5.80E+01	2.88E+00 G
			300.07	6.897E+01	+	2.847E+01	1.40E+01	2.46E+00 G
PA-233	C	3.9804E+00					7.82E+08	
			312.01	0.000E+00	?(	1.962E+00	1.00E+03	3.60E+01 G
			300.18	2.709E+01	(	1.141E+01	1.42E+01	6.20E+00 G
PA-234	N	-2.2931E+00					1.63E+12	
			131.29	-2.293E+00	?(	4.134E+00	5.48E+01	1.80E+01 G
			946.02	-4.073E-01	+	5.138E+00	3.56E+02	1.34E+01 G
			569.47	-3.609E+00	&	9.528E+00	7.93E+01	8.20E+00 G
			883.24	1.042E+00	+	5.874E+00	1.61E+02	9.60E+00 G
			880.53	-1.665E+00	+	1.090E+01	1.88E+02	6.00E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234M	N	-1.5147E+01					1.63E+12	
			1001.00	-1.515E+01	%(P	1.029E+02	1.00E+03	8.37E-01 G
			766.41	-1.714E+01	% P	3.616E+02	1.00E+03	2.94E-01 G
U-235	N	9.1332E-01					2.57E+11	
			143.79	3.886E-01	(P	4.459E+00	1.32E+02	1.10E+01 G
			205.33	2.061E+00	(P	9.589E+00	1.22E+02	5.01E+00 G
			163.38	-4.047E-01	% P	1.193E+01	3.93E+03	5.08E+00 G
AM-241	T	7.8937E-02					1.58E+05	
			59.54	7.894E-02	&(P	4.183E+00	1.50E+02	3.59E+01 G
Ir-192	F	-1.3636E-02					7.40E+01	
			316.49	-1.364E-02	%(	6.418E-01	1.37E+03	8.70E+01 G
			468.06	-2.518E-01	+	1.461E+00	1.71E+02	5.18E+01 G
			308.44	0.000E+00	+	2.162E+00	1.00E+03	3.18E+01 G
			295.95	-1.719E-01	+	1.858E+00	3.18E+02	3.02E+01 G
Cs-136	F	-7.2578E-03					1.30E+01	
			818.50	-7.258E-03	%(	7.313E-01	2.85E+03	1.00E+02 G
			1048.07	-8.793E-02	+	7.787E-01	2.48E+02	8.00E+01 G
			340.57	-1.985E-01	&	1.948E+00	2.92E+02	4.69E+01 G
Np-239	T	3.3115E+00					2.36E+00	
			103.70	-1.499E-01	-	3.091E+00	6.14E+02	2.40E+01 X
			106.13	3.312E+00	(	3.036E+00	2.85E+01	2.27E+01 G
			99.50	4.672E+00		4.624E+00	3.07E+01	1.50E+01 X
Nd-147		-1.8054E+00					1.11E+01	
			531.00	-1.805E+00	(	6.086E+00	1.01E+02	1.30E+01 G
			91.10	6.435E-02	%	3.356E+00	1.56E+03	2.83E+01 G

(- This peak used in the nuclide activity average.

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

P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

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

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

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
PB-210	46.65	616.	30.	0.008	119.14	1.480E+01
TH-227	50.42	639.	-7.	-0.002	540.18	-1.502E+00
BA-133	80.91	752.	43.	0.012	90.78	1.418E+00
Gd-153	97.40	744.	-21.	-0.006	181.23	-1.023E+03
EU-152	120.18	430.	-9.	-0.003	324.60	-2.468E-01
CO-57	122.16	613.	-20.	-0.006	174.80	-1.289E+02
EU-154	123.47	576.	16.	0.004	214.01	3.779E-01
PA-234	130.45	887.	-78.	-0.022	54.84	-2.293E+00
CE-144	134.11	665.	-56.	-0.016	66.18	-1.996E+03
HF-181	135.50	519.	15.	0.004	215.22	0.000E+00
CO-57	136.90	586.	40.	0.011	87.73	2.013E+03
Tc-99m	140.38	698.	15.	0.004	252.24	0.000E+00
Ba-140	162.89	605.	-7.	-0.002	513.16	0.000E+00
CE-139	165.97	576.	10.	0.003	329.41	0.000E+00
TH-229	211.49	640.	-20.	-0.006	175.93	-4.449E+00
TH-227	232.66	96.	-528.	-0.147	5.08	-3.823E+01
PB-214	242.47	1025.	-154.	-0.043	30.41	-1.491E+01
EU-152	243.48	358.	-31.	-0.009	87.75	-4.340E+00
TH-227	256.01	322.	-7.	-0.002	369.17	-9.334E-01
I-131	285.27	317.	-30.	-0.008	87.18	0.000E+00
PB-214	294.05	261.	7.	0.002	307.28	3.220E-01
Ir-192	293.77	194.	-6.	-0.002	317.54	0.000E+00
PA-231	300.19	302.	203.	0.056	14.01	6.897E+01
PA-231	302.37	465.	-54.	-0.015	57.98	-1.583E+01
BA-133	302.34	461.	-62.	-0.017	50.83	-4.631E+00
La-140	327.98	230.	275.	0.077	9.84	0.000E+00
Cs-136	340.39	429.	-10.	-0.003	291.51	0.000E+00
EU-152	343.32	248.	-23.	-0.006	100.73	-1.160E+00
HF-181	345.39	216.	-7.	-0.002	291.21	0.000E+00
PB-214	351.82	216.	22.	0.006	96.03	5.595E-01
BA-133	356.26	216.	-14.	-0.004	152.44	-3.473E-01
I-131	366.15	160.	28.	0.008	67.73	0.000E+00

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SN-113	392.02	166.	23.	0.006	82.80	0.000E+00	
SB-125	427.90	153.	11.	0.003	163.69	2.624E+00	
AG-108M	433.53	133.	4.	0.001	388.06	5.273E-02	
pm-146	452.85	135.	21.	0.006	82.95	9.262E-01	
SB-125	462.94	160.	267.	0.074	9.08	1.938E+02	
Ir-192	468.09	173.	-11.	-0.003	171.33	0.000E+00	
BE-7	478.41	123.	38.	0.011	44.42	0.000E+00	
HF-181	483.80	104.	24.	0.007	64.30	0.000E+00	
RU-103	497.13	114.	-9.	-0.002	173.49	0.000E+00	
RH-106	510.66	164.	334.	0.093	7.70	3.293E+03	
Nd-147	531.35	154.	-18.	-0.005	100.53	0.000E+00	
Ba-140	539.19	125.	-8.	-0.002	201.77	0.000E+00	
CS-134	562.43	106.	62.	0.017	26.57	1.250E+02	
CS-134	569.32	145.	-2.	-0.001	862.43	-2.171E+00	
PA-234	572.61	133.	-21.	-0.006	79.28	-3.609E+00	
BI-207	570.04	146.	23.	0.006	76.26	3.878E-01	
SB-125	599.43	126.	-11.	-0.003	144.63	-5.906E+00	
SB-124	603.29	121.	18.	0.005	90.35	0.000E+00	
CS-134	604.87	149.	4.	0.001	424.81	7.434E-01	
BI-214	610.02	129.	26.	0.007	64.82	8.300E-01	
RU-103	610.09	142.	22.	0.006	79.31	0.000E+00	
AG-108M	614.65	143.	-6.	-0.002	271.71	-1.044E-01	
PM-144	619.31	128.	14.	0.004	115.55	3.838E+01	
RH-106	619.51	78.	23.	0.006	58.00	5.366E+02	
SB-125	635.43	116.	10.	0.003	159.14	8.507E+00	
CS-137	661.69	161.	-14.	-0.004	378.65	-3.138E-01	P
PM-144	692.56	57.	7.	0.002	152.32	2.156E+01	
NB-94	702.72	147.	-16.	-0.004	108.66	-2.732E-01	
SB-124	719.23	49.	22.	0.006	49.55	0.000E+00	
AG-108M	720.25	81.	6.	0.002	209.32	1.168E-01	
EU-154	723.36	842.	-4.	-0.001	966.38	-6.489E-01	
ZR-95	724.45	241.	-35.	-0.010	65.55	0.000E+00	
pm-146	735.23	82.	15.	0.004	90.22	2.872E+00	
ZR-95	755.27	71.	67.	0.019	21.45	0.000E+00	
AG-110M	763.48	98.	15.	0.004	94.31	2.325E+03	
NB-95	765.54	108.	8.	0.002	176.91	0.000E+00	
EU-152	778.80	109.	-7.	-0.002	215.59	-1.419E+00	
CS-134	794.83	51.	154.	0.043	10.38	4.035E+01	
CS-134	802.65	46.	9.	0.003	109.84	2.377E+01	
CO-58	812.71	56.	-2.	-0.001	561.35	0.000E+00	
La-140	816.24	53.	8.	0.002	137.10	0.000E+00	
Co-56	845.57	26.	5.	0.001	154.64	0.000E+00	
NB-94	871.05	30.	9.	0.003	87.38	1.888E-01	
EU-154	873.05	47.	-7.	-0.002	136.23	-2.191E+00	
PA-234	879.34	41.	-5.	-0.001	187.57	-1.665E+00	
PA-234	884.50	30.	5.	0.001	160.87	1.042E+00	
AG-110M	884.44	35.	3.	0.001	254.91	1.766E+02	
Sc-46	889.03	39.	3.	0.001	321.51	0.000E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
y-88	898.44	46.	2.	0.000	553.65	0.000E+00		
AG-110M	935.98	28.	-1.	0.000	779.85	-1.128E+02		
PA-234	945.75	40.	-3.	-0.001	356.20	-4.073E-01		
EU-152	965.36	466.	7.	0.002	415.34	1.609E+00		
EU-154	995.49	24.	5.	0.001	147.21	1.911E+00		
EU-154	1004.25	29.	2.	0.000	474.92	3.704E-01		
Co-56	1035.73	39.	-7.	-0.002	131.88	0.000E+00		
Cs-136	1048.56	26.	-3.	-0.001	248.17	0.000E+00		
RH-106	1050.39	23.	-2.	-0.001	375.42	-4.290E+02		
BI-207	1064.14	38.	14.	0.004	68.99	5.116E-01		
Ga-68	1078.30	28.	7.	0.002	106.17	0.000E+00		
BI-214	1120.52	39.	-6.	-0.002	151.64	-1.001E+00		
Sc-46	1120.35	40.	-6.	-0.002	152.48	0.000E+00		
Ta-182	1120.39	37.	-6.	-0.002	153.62	0.000E+00		
CO-60	1173.52	40.	-5.	-0.001	61.16	-3.413E-01	P	
Ta-182	1188.79	18.	2.	0.001	319.17	0.000E+00		
Co-56	1238.38	25.	4.	0.001	174.72	0.000E+00		
NA-22	1271.64	17.	1.	0.000	441.06	2.778E-01		
EU-154	1271.64	20.	2.	0.001	327.73	2.857E-01		
FE-59	1292.34	38.	-7.	-0.002	133.00	0.000E+00		
AG-110M	1384.28	23.	1.	0.000	456.07	3.537E+02		
EU-152	1408.30	16.	2.	0.001	318.02	3.892E-01		
K-40	1458.98	22.	5.	0.001	42.91	1.516E+00	P	
La-140	1596.16	24.	-4.	-0.001	191.25	0.000E+00		
SB-124	1688.15	25.	-6.	-0.002	121.75	0.000E+00		
BI-214	1764.67	16.	1.	0.000	734.84	1.908E-01		
Co-56	1770.50	18.	-4.	-0.001	143.09	0.000E+00		
y-88	1837.43	20.	-2.	-0.001	347.49	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
BE-7	#A	4.3262E+00	>12 Halflives	4.4415E+01%	6.2025E+00	
NA-22	#A	3.8209E-02	2.7783E-01	4.411E+02%		4.51E+00
K-40	#A	1.5163E+00	1.5163E+00	1.225E+02%		7.26E+00
Sc-46	#A	5.6765E-02	>12 Halflives	3.2151E+02%	6.4577E-01	
CR-51	#A	-7.6665E-02	>12 Halflives	2.1714E+03%	5.7182E+00	
MN-54	#A	4.1626E-01	1.7430E+02	4.235E+01%		2.31E+02
FE-59	#A	3.3269E-03	>12 Halflives	1.0341E+04%	1.2502E+00	
Co-56	#A	1.2590E-01	>12 Halflives	1.1666E+02%	5.1093E-01	
CO-57	#A	1.0553E-01	1.0873E+02	8.773E+01%		7.53E+02
CO-58	#A	-3.5568E-02	>12 Halflives	5.6135E+02%	7.0325E-01	
CO-60	#A	-4.1446E-03	-1.1036E-02	5.179E+03%		2.25E+00
ZN-65	#A	3.2514E-02	7.3177E+01	1.100E+03%		2.93E+03

NB-94	#A	-2.7312E-01	-2.7319E-01	1.087E+02%		9.98E-01
ZR-95	#	2.1748E+00	>12 Halflives	2.1451E+01%	1.3526E+00	
NB-95	#A	1.5049E-01	>12 Halflives	1.7691E+02%	9.0878E-01	
RU-103	#A	-1.2066E-01	>12 Halflives	1.7349E+02%	7.1364E-01	
RH-106	#A	3.4503E+00	5.3660E+02	5.800E+01%		1.02E+03
AG-108M	#A	8.3773E-02	8.4814E-02	2.093E+02%		7.03E-01
AG-110M	#A	3.2339E-01	6.1406E+02	9.431E+01%		1.59E+03
SN-113	#A	3.6501E-01	>12 Halflives	8.2796E+01%	1.0068E+00	
SB-124	#A	5.7981E-01	>12 Halflives	4.9551E+01%	7.9721E-01	
SB-125	#C	6.5987E+00	4.2882E+01	9.080E+00%		1.46E+01
I-131	#A	3.2706E-01	>12 Halflives	6.7734E+01%	7.3268E-01	
Gd-153	#A	-4.1683E-01	-1.0230E+03	1.812E+02%		6.19E+03
Ga-68	#A	7.2989E+00	>12 Halflives	1.0617E+02%	2.6615E+01	
Tc-99m	#A	9.3044E-02	>12 Halflives	2.5224E+02%	7.8618E-01	
BA-133	#A	-2.1284E-01	-3.4734E-01	1.524E+02%		1.79E+00
CS-134	#C	1.9572E+00	2.3846E+01	1.038E+01%		1.08E+01
CS-137	#A	-2.6421E-01	-3.1382E-01	8.756E+02%		1.35E+00
CE-139	#A	7.1267E-02	>12 Halflives	3.2941E+02%	7.8876E-01	
Ba-140	#A	-4.3131E-01	>12 Halflives	2.0177E+02%	2.9696E+00	
La-140	#C	1.7887E+00	>12 Halflives	9.8428E+00%	9.2466E-01	
CE-141	#A	-7.0982E-03	>12 Halflives	4.7197E+03%	1.1333E+00	
CE-144	#A	-2.6675E+00	-1.9962E+03	6.618E+01%		4.36E+03
PM-144	#A	1.6635E-01	2.9974E+01	9.559E+01%		1.13E+02
EU-152	#A	-1.2025E-01	-1.7608E-01	1.007E+02%		3.90E+00
EU-154	#A	-1.5897E-01	-2.8988E-01	1.003E+02%		1.03E+01
EU-155	#	6.1053E+00	1.7286E+01	2.103E+01%		8.25E+00
HF-181	#A	4.2307E-01	>12 Halflives	6.4295E+01%	7.5392E-01	
Ta-182	#A	-1.8548E-01	>12 Halflives	1.5362E+02%	2.2278E+00	
Hg-203	#A	7.8913E-03	>12 Halflives	2.9275E+03%	7.8710E-01	
TL-208		1.9244E+01	2.8712E+02	3.649E+00%		1.31E+01
pm-146	#A	4.0396E-01	1.0274E+00	8.295E+01%		7.72E+00
y-88	#A	3.8149E-02	>12 Halflives	5.5365E+02%	7.4851E-01	
Cd-109	A	6.8143E+00	4.3609E+02	1.187E+02%		1.72E+03
PB-210	#A	1.1738E+01	1.4796E+01	1.191E+02%		5.87E+01
PB-212		6.0626E+01	9.0455E+02	1.756E+00%		1.94E+01
PB-214	#A	4.7741E-01	4.7896E-01	9.603E+01%		1.79E+00
BI-207	#A	3.7598E-01	4.4136E-01	5.142E+01%		9.83E-01
BI-212		6.0074E+01	8.9631E+02	7.279E+00%		1.25E+02
BI-214	#A	8.2728E-01	8.2995E-01	6.482E+01%		1.78E+00
BI-210M	#A	1.7695E-02	1.7695E-02	1.983E+03%		1.20E+00
RA-224		6.4681E+01	9.6504E+02	1.414E+01%		4.25E+02
AC-228		8.0754E+01	1.9818E+02	2.285E+00%		4.29E+00
TH-227	#A	-3.0158E+01	-3.8228E+01	5.082E+00%		3.50E+00
TH-229	#A	1.2277E-01	1.2286E-01	2.901E+03%		1.21E+01
TH-234	A	2.2459E+01	2.2459E+01	5.113E+01%		2.95E+01
PA-231	#A	-1.5832E+01	-1.5835E+01	5.798E+01%		3.02E+01
PA-233	C	3.9804E+00	3.9804E+00	1.424E+01%		1.96E+00
PA-234	#A	-2.2931E+00	-2.2931E+00	5.484E+01%		4.13E+00
PA-234M	#A	-1.5147E+01	-1.5147E+01	2.000E+03%		1.03E+02

U-235	A	9.1332E-01	9.1332E-01	1.627E+02%		4.46E+00
AM-241	#A	7.8001E-02	7.8937E-02	1.568E+03%		4.18E+00
Np-237	#A	0.0000E+00	0.0000E+00	0.000E+00%		6.98E+00
Ir-192	#A	-1.3636E-02	>12 Halflives	1.3706E+03%	6.4178E-01	
Cs-136	#A	-7.2578E-03	>12 Halflives	2.8491E+03%	7.3129E-01	
Np-239	C	3.3115E+00	>12 Halflives	2.8547E+01%	3.0361E+00	
Nd-147	#A	-1.8054E+00	>12 Halflives	1.0053E+02%	6.0861E+00	

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

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

Total Activity (763.3 to 2000.0 keV) 3.139E+02 Bq/Sample
Total Decayed Activity (763.3 to 2000.0 keV) 3.2909561E+03 Bq/Sample

M132730_NA_1.8__20130913.spc.
Counts
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Energy (keV)
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-212
Ra-224
Bi-210M27
Ir-192
Cr-51
Bi-214
Pb-214
Ac-228
La-140
I-131
Sn-113
Ag-108M25
pm-146
Sb-125
Rh-106
Ru-103
Ba-140
Nd-147
Cs-134
Pa-234
Tl-208
Ag-108
Sb-131
Cs-137
Ag-110M
Nb-94
Pm-144
Bi-212
Mn-54
Co-56
Sc-46
Y-88
Ac-228
Eu-154
Co-56
Rh-106
Bi-207
Ga-68
Fe-59
Zn-65
Bi-214
Co-60
Ta-182
Co-56
Eu-154
Fe-59
Co-60
Ag-110M
Eu-152
K-40
La-140
Sb-124
Co-56
Y-88

Test America St. Louis Spectrum ID: 7_NA_20131033

Sample Description: M132730_NA_2
Detector: Ge 7 SN/154
Batch ID: M132730
Work Order Number: NA
Lot Number: 2

Decay to Time: 2/3/2006 12:00 Live Time: 3600 sec
Acquisition Time: 7/16/2013 17:54:35 Real Time: 3673 sec
Analysis Time: 7/17/2013 08:39 Dead Time: 1.98 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Liquid_Marinelli 0.5L.Clb
Efficiency Cal Desc: 7_0.5LMarn_83925-334_050211
Efficiency Cal Date: 5/2/2011 10:46
Energy Cal Date: 2/23/2012 08:40
Library: Client_Routine Long_Rev4.lib
Bkgd Correction File: 7_2013-07-06_0324.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
NA-22	-2.383E-01	545.5	1.300E+00	1.300E+00	4.790E+00
K-40	-3.523E+00	556.2	1.959E+01	1.959E+01	9.752E+00
MN-54	1.965E+00	5955.0	1.170E+02	1.170E+02	4.075E+02
CO-57	-5.725E+01	293.1	1.678E+02	1.678E+02	5.638E+02
CO-60	-3.465E-01	180.3	6.247E-01	6.250E-01	2.202E+00
ZN-65	0.000E+00	1000.0	3.214E+02	3.214E+02	5.839E+03
NB-94	-1.519E-01	170.7	2.593E-01	2.594E-01	8.840E-01
RH-106	1.667E+02	92.2	1.537E+02	1.539E+02	1.265E+03
AG-108M	6.220E-02	210.8	1.311E-01	1.312E-01	6.168E-01
AG-110M	2.694E+02	168.7	4.545E+02	4.546E+02	1.856E+03
SB-125	5.809E+01	8.4	4.875E+00	5.622E+00	1.276E+01
Gd-153	0.000E+00	1000.0	7.768E+02	7.768E+02	4.408E+03
BA-133	-9.468E-02	424.8	4.022E-01	4.022E-01	1.381E+00
CS-134	2.272E+01	10.8	2.459E+00	2.696E+00	9.800E+00
CS-137	2.096E-01	166.4	3.487E-01	3.488E-01	1.186E+00
CE-144	7.745E+01	1303.0	1.009E+03	1.009E+03	3.401E+03
PM-144	2.555E+01	121.8	3.112E+01	3.114E+01	1.331E+02
EU-152	-2.170E-01	171.5	3.722E-01	3.723E-01	3.665E+00
EU-154	1.946E+00	163.6	3.184E+00	3.185E+00	1.100E+01
EU-155	1.394E+01	16.9	2.361E+00	2.473E+00	5.613E+00
TL-208	2.643E+02	3.9	1.038E+01	1.652E+01	1.419E+01
pm-146	9.464E-01	203.8	1.929E+00	1.930E+00	6.606E+00
Cd-109	7.491E+02	44.6	3.339E+02	3.362E+02	1.093E+03
PB-210	7.975E+00	66.3	5.283E+00	5.308E+00	1.438E+01
PB-212	8.556E+02	1.7	1.474E+01	4.833E+01	1.751E+01
PB-214	3.882E-01	96.4	3.743E-01	3.748E-01	1.578E+00
BI-207	4.132E-01	56.3	2.328E-01	2.336E-01	7.618E-01
BI-212	1.092E+03	9.1	9.948E+01	1.128E+02	1.530E+02
BI-214	-4.349E-01	112.2	4.881E-01	4.885E-01	1.647E+00
BI-210M	2.163E-02	1482.0	3.205E-01	3.205E-01	1.093E+00
RA-224	7.709E+02	12.0	9.272E+01	1.015E+02	2.773E+02
AC-228	1.898E+02	2.4	4.583E+00	1.024E+01	4.022E+00
TH-227	-2.253E+00	379.2	8.544E+00	8.545E+00	2.830E+01
TH-229	9.293E-01	345.7	3.213E+00	3.213E+00	1.031E+01
TH-234	-1.342E+00	809.6	1.087E+01	1.087E+01	1.862E+01
PA-231	2.776E+01	11.7	3.233E+00	3.513E+00	2.746E+01
PA-233	4.477E+00	11.7	5.214E-01	5.660E-01	1.550E+00

PA-234	-2.591E+00	40.3	1.044E+00	1.052E+00	3.405E+00
PA-234M	6.285E+00	321.1	2.018E+01	2.019E+01	7.255E+01
U-235	-1.559E+00	94.4	1.471E+00	1.473E+00	4.887E+00
AM-241	1.639E-01	346.1	5.673E-01	5.673E-01	1.898E+00
Np-237	0.000E+00	0.0	1.468E+00	1.468E+00	4.921E+00
Total	4.609E+03				

Analyst: Micha Korrinhizer

TestAmerica Spectrum name: 7_NA_20131033.An1

Sample description
M132730_NA_2

Spectrum Filename: C:\User\SPC\Det7\7_NA_20131033.An1

Acquisition information

Start time:	7/16/2013 5:54:35 PM
Live time:	3600
Real time:	3673
Dead time:	1.98 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Liquid_Marinelli 0.5L.Clb
7_0.5LMarn_83925-334_050211

Energy Calibration

Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration

Created:	5/2/2011 10:46:17 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 1.05 %
Log(Eff):	3.617098E-01 + (-4.516868E-01*Log(E)) + (-3.479132E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 0.63 %
Log(Eff):	-1.406192E+01 + (5.002862E+00*Log(E)) + (-5.499353E-01*Log(E)^2)

Library Files

Main analysis library:	Client_Routine Long_Rev4.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	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

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	2/3/2006 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2013-07-06_0324.PBC 7/6/2013 3:24:27 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 49 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 334.3665

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.44	50.	40.45	0.48	5.183E-02	46.54	4.250	PBC<MDA	PB210
59.48	13.	346.08	0.85	6.073E-02	59.54	35.900	PBC<MDA	AM241
63.70	-12.	199.97	0.85	6.252E-02	63.29	3.810	PBC<MDA	TH234
					63.29	3.810	PBC<MDA	TH234
74.84	1359.	4.05	0.87	6.628E-02				
77.16	2207.	2.64	0.87	6.677E-02				
84.33	149.	23.83	0.88	6.781E-02				
86.54	370.	17.11	0.88	6.800E-02	86.49	13.100	1.155E+01	Np237
					86.54	30.700	1.394E+01	EU155
87.22	693.	6.14	0.88	6.805E-02				
88.02	109.	44.57	0.88	6.811E-02	88.04	3.790	PBC<MDA	Cd109
89.98	622.	6.40	0.88	6.820E-02				
93.30	858.	6.85	0.90	6.829E-02	92.59	5.584	5.917E+01	TH234
					93.35	5.561	1.540E+02	AC228
					92.59	5.584	5.917E+01	TH234
99.51	188.	20.51	1.09	6.819E-02	99.50	15.000	HL>Cutoff	Np239
105.17	248.	16.65	1.25	6.787E-02	105.31	21.200	1.358E+01	EU155
					106.13	22.700	HL>Cutoff	Np239
116.99	23.	77.65	0.29	6.660E-02				
129.01	481.	9.50	0.92	6.475E-02				
131.96	30.	104.25	0.93	6.404E-02	133.02	43.300	HL>Cutoff	HF181
145.79	48.	72.01	0.94	6.166E-02	145.44	48.200	HL>Cutoff	CE141
165.98	4.	856.17	0.96	5.751E-02	165.85	79.900	HL>Cutoff	CE139
191.41	6.	406.70	0.99	5.074E-02	193.51	4.400	PBC<MDA	TH229
209.26	555.	8.10	0.95	4.758E-02				
210.86	6.	559.18	1.01	4.728E-02	210.85	2.990	PBC<MDA	TH229
238.69	3832.	1.71	1.04	4.267E-02	238.63	43.300	8.557E+02	PB212
241.13	323.	12.15	1.04	4.231E-02	240.99	4.100	7.709E+02	RA224

					242.00	7.430	2.870E+01 PB214
270.38	465.	9.07	0.89	3.844E-02			
277.80	228.	15.55	1.10	3.757E-02	277.28	6.310	3.971E+02 TL208
					279.20	81.460	HL>Cutoff Hg203
294.59	39.	55.86	0.55	3.576E-02	295.09	19.300	1.564E+00 PB214
					295.09	19.300	1.564E+00 PB214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
295.05	3.	729.92	1.10	3.562E-02	295.09	19.300	PBC<MDA	PB214
					295.95	30.160	HL>Cutoff	Ir192
					295.95	30.160	HL>Cutoff	Ir192
300.30	249.	14.98	1.05	3.518E-02	300.03	3.280	8.950E+02	PB212
					300.07	2.460	7.999E+01	PA231
					300.18	6.200	3.174E+01	PA233
					300.07	2.460	7.999E+01	PA231
					300.18	6.200	3.174E+01	PA233
307.99	9.	241.66	1.11	3.439E-02	308.44	31.750	HL>Cutoff	Ir192
					308.44	31.750	HL>Cutoff	Ir192
310.86	5.	382.35	1.12	3.405E-02	312.01	36.000	PBC<MDA	PA233
					312.01	36.000	1.190E-01	PA233
317.14	18.	123.28	1.12	3.364E-02	316.49	87.040	HL>Cutoff	Ir192
					316.49	87.040	HL>Cutoff	Ir192
328.05	305.	10.27	1.32	3.263E-02	328.76	20.300	HL>Cutoff	La140
					328.76	20.300	HL>Cutoff	La140
338.40	1094.	3.61	1.25	3.177E-02	338.32	12.010	1.955E+02	AC228
346.84	25.	78.38	1.15	3.118E-02	345.83	15.070	HL>Cutoff	HF181
352.25	20.	96.43	1.16	3.072E-02	351.93	37.600	PBC<MDA	PB214
					351.93	37.600	4.893E-01	PB214
391.36	14.	142.08	1.20	2.801E-02	391.69	64.000	HL>Cutoff	SN113
409.44	186.	16.20	1.09	2.695E-02				
427.22	21.	78.20	1.23	2.594E-02	427.88	29.600	PBC<MDA	SB125
					427.88	29.600	4.901E+00	SB125
436.81	7.	210.81	1.24	2.562E-02	433.94	90.480	PBC<MDA	AG108M
					433.94	90.480	8.543E-02	AG108M
463.00	317.	10.32	1.23	2.420E-02	463.37	10.470	2.261E+02	SB125
					463.37	10.470	2.261E+02	SB125
467.24	19.	83.85	1.27	2.397E-02	468.06	51.750	HL>Cutoff	Ir192
					468.06	51.750	HL>Cutoff	Ir192
477.60	2.	945.21	1.28	2.355E-02	477.60	10.520	HL>Cutoff	BE7
					476.81	42.000	9.195E+00	PM144
498.47	9.	170.93	1.30	2.274E-02	497.05	90.900	HL>Cutoff	RU103
510.76	422.	8.35	1.65	2.220E-02	511.86	20.000	4.111E+03	RH106
					511.86	20.000	4.111E+03	RH106
562.46	54.	33.98	1.36	2.035E-02	563.24	8.350	PBC<MDA	CS134
					563.24	8.350	1.081E+02	CS134
572.34	25.	56.33	1.37	2.014E-02	569.47	8.200	4.194E+00	PA234
					569.70	97.740	4.132E-01	BI207
					569.32	15.380	2.724E+01	CS134
					569.47	8.200	4.194E+00	PA234
583.17	1063.	3.93	1.35	1.972E-02	583.02	84.500	2.643E+02	TL208
601.72	18.	81.51	1.40	1.915E-02	602.73	98.260	HL>Cutoff	SB124
604.90	8.	197.08	1.40	1.909E-02	604.71	97.620	PBC<MDA	CS134
					604.71	97.620	1.457E+00	CS134
614.38	2.	734.69	1.41	1.883E-02	614.28	89.850	PBC<MDA	AG108M
					614.28	89.850	3.880E-02	AG108M
617.84	13.	121.82	1.42	1.872E-02	618.06	99.100	PBC<MDA	PM144
					618.06	99.100	3.521E+01	PM144
636.51	19.	75.00	1.43	1.822E-02	636.97	7.170	HL>Cutoff	I131
					635.89	11.310	1.670E+01	SB125
661.67	10.	166.38	1.46	1.761E-02	661.66	85.210	PBC<MDA	CS137
693.08	5.	242.73	1.49	1.681E-02	696.54	99.000	PBC<MDA	PM144
					696.54	99.000	1.587E+01	PM144
727.18	322.	9.11	1.59	1.616E-02	727.17	7.550	1.092E+03	BI212
749.20	7.	203.84	1.53	1.577E-02	747.16	34.000	PBC<MDA	pm146
					747.16	34.000	9.464E-01	pm146

778.41	3.	403.30	1.56	1.518E-02	778.92	12.940	PBC<MDA EU152
783.39	26.	49.66	1.57	1.506E-02	785.42	1.280	PBC<MDA BI212
794.77	145.	10.83	1.58	1.488E-02	795.87	85.530	3.864E+01 CS134
					795.87	85.530	3.864E+01 CS134
819.57	11.	103.80	1.60	1.451E-02	818.50	100.000	HL>Cutoff Cs136
860.45	134.	11.32	1.42	1.385E-02	860.56	12.420	3.229E+02 TL208
871.74	2.	501.64	1.64	1.370E-02	871.10	99.890	PBC<MDA NB94
873.54	6.	163.57	1.64	1.367E-02	873.23	12.270	PBC<MDA EU154
880.60	4.	231.86	1.65	1.356E-02	880.53	6.000	PBC<MDA PA234
					880.53	6.000	1.429E+00 PA234
883.97	2.	567.15	1.65	1.352E-02	883.24	9.600	PBC<MDA PA234
911.22	1076.	3.22	1.67	1.314E-02	911.16	29.000	1.925E+02 AC228
969.02	576.	5.40	1.75	1.241E-02	968.97	17.460	1.812E+02 AC228
1000.31	2.	321.14	1.75	1.204E-02	1001.00	0.837	PBC<MDA PA234M
1051.35	8.	92.22	1.79	1.151E-02	1050.36	1.560	PBC<MDA RH106
					1050.36	1.560	1.822E+03 RH106
1078.34	11.	75.38	1.81	1.124E-02	1077.40	3.300	HL>Cutoff Ga68
1120.51	8.	95.10	1.85	1.083E-02	1120.55	99.987	HL>Cutoff Sc46
					1121.30	34.900	HL>Cutoff Ta182

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1120.58	9.	82.48	1.85	1.083E-02	1120.55	99.987	HL>Cutoff	Sc46
					1121.30	34.900	HL>Cutoff	Ta182
1220.46	4.	157.52	1.92	9.987E-03	1221.41	27.000	HL>Cutoff	Ta182
1292.14	2.	435.55	1.98	9.472E-03	1291.60	43.200	HL>Cutoff	FE59
1383.46	4.	168.71	2.04	8.867E-03	1384.30	24.290	PBC<MDA	AG110M

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.95	74.85	1206.	1142.	1.722E+04	6.29	0.865	-	
308.22	77.16	959.	1970.	2.950E+04	3.17	0.859	-	
336.85	84.34	555.	148.	2.185E+03	23.94	0.877	-	D
348.39	87.23	614.	636.	9.344E+03	6.79	0.880	-	D
359.44	89.99	480.	623.	9.132E+03	6.39	0.883	-	D
397.63	99.51	560.	40.	5.880E+02	84.94	1.094	-	c
467.55	116.99	148.	23.	3.453E+02	77.65	0.294	-	c
515.64	129.01	331.	587.	9.061E+03	6.02	0.915	-	sM
836.70	209.26	290.	529.	1.111E+04	6.30	1.011	-	D
1081.17	270.38	254.	465.	1.209E+04	6.71	0.888	-	s
1177.98	294.59	133.	34.	9.492E+02	51.04	0.554	-	s
1311.86	328.05	410.	52.	1.588E+03	56.99	1.322	-	
1637.43	409.44	130.	186.	6.883E+03	16.20	1.087	-	sM
1851.70	463.00	438.	25.	1.024E+03	121.11	1.226	-	sc
2042.74	510.76	467.	103.	4.652E+03	31.19	1.651	-	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_Routine Long_Rev4.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.31	46.44	355.	50.	0.014	40.45	0.477s
AM-241	237.49	59.48	961.	13.	0.004	346.08	0.850s
TH-234	254.36	63.70	1135.	-12.	-0.003	199.97	0.854s
EU-155	345.74	86.54	802.	370.	0.103	17.11	0.880D
Cd-109	351.73	88.04	1120.	109.	0.030	44.57	0.881D
Nd-147	355.40	88.96	760.	-41.	-0.012	95.31	0.885s
TH-234	371.77	93.05	1314.	-76.	-0.021	166.02	0.886s
AC-228	372.78	93.30	648.	858.	0.238	6.85	0.902s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-239	397.04	99.37	649.	148.	0.041	25.65	0.894
Gd-153	412.68	103.28	858.	-65.	-0.018	65.38	0.898s
EU-155	420.28	105.17	460.	255.	0.071	16.94	1.280s
Np-239	420.83	105.31	578.	163.	0.045	22.23	0.901
EU-152	496.34	124.19	320.	-6.	-0.002	461.21	0.918s
CO-57	488.11	122.13	541.	-11.	-0.003	293.10	0.918s
EU-154	491.10	122.88	543.	-8.	-0.002	394.29	0.919s
PA-234	521.26	130.42	893.	-108.	-0.030	40.29	0.928s
HF-181	527.41	131.96	462.	30.	0.008	104.25	0.930
CO-57	547.39	136.95	616.	-8.	-0.002	424.90	0.934s
Tc-99m	560.21	140.16	572.	-23.	-0.007	145.44	0.938s
U-235	575.14	143.89	628.	-38.	-0.011	94.36	0.941s
CE-141	582.77	145.79	567.	48.	0.013	72.01	0.943s
U-235	646.44	161.71	380.	-8.	-0.002	340.80	0.962s
CE-139	663.53	165.98	479.	4.	0.001	856.17	0.965s
TH-229	765.24	191.41	295.	6.	0.002	406.70	0.994s
U-235	822.14	205.63	485.	-18.	-0.005	170.91	1.007s
TH-229	843.02	210.85	576.	6.	0.002	559.18	1.012D
TH-227	943.50	235.97	8248.	-34.	-0.009	379.19	1.039s
PB-212	954.15	238.63	261.	3815.	1.060	1.72	1.041D
RA-224	963.57	240.99	592.	323.	0.090	12.03	1.044D
PB-214	969.50	242.47	866.	-130.	-0.036	33.16	1.045s
EU-152	979.31	244.92	318.	-8.	-0.002	308.47	1.048s
TH-227	1022.75	255.78	283.	-21.	-0.006	112.87	1.060s
TL-208	1110.74	277.78	235.	227.	0.063	16.00	1.103s
Hg-203	1109.82	277.55	203.	160.	0.044	14.87	1.083
I-131	1139.88	285.06	295.	-8.	-0.002	292.50	1.089
PB-214	1178.99	294.84	225.	5.	0.001	450.58	1.100s
Ir-192	1179.84	295.05	202.	3.	0.001	729.92	1.100s
PB-212	1200.84	300.30	246.	249.	0.069	14.98	1.049
PA-231	1200.53	300.22	254.	234.	0.065	11.65	1.105
PA-233	1200.53	300.22	254.	234.	0.065	11.65	1.105
PA-231	1209.25	302.40	431.	-46.	-0.013	65.86	1.107s
BA-133	1206.80	301.79	428.	-57.	-0.016	53.21	1.108s
Ir-192	1231.61	307.99	214.	9.	0.002	241.66	1.113s
PA-233	1243.09	310.86	199.	5.	0.001	382.35	1.117s
Ir-192	1268.19	317.14	226.	18.	0.005	123.28	1.121s
CR-51	1276.24	319.15	252.	-22.	-0.006	101.99	1.125s
La-140	1312.12	328.12	215.	254.	0.070	10.32	1.134s
AC-228	1353.24	338.40	132.	1094.	0.304	3.61	1.253
Cs-136	1360.53	340.22	745.	-132.	-0.037	30.55	1.146s
EU-152	1380.57	345.23	239.	-13.	-0.004	171.54	1.150s
HF-181	1387.00	346.84	183.	25.	0.007	78.38	1.151
PB-214	1408.65	352.25	181.	20.	0.006	96.43	1.157s
BA-133	1432.21	358.14	138.	-4.	-0.001	424.80	1.161s
I-131	1456.37	364.18	195.	-16.	-0.004	129.17	1.170
BA-133	1535.81	384.04	203.	-8.	-0.002	244.46	1.189s
SN-113	1565.12	391.36	194.	14.	0.004	142.08	1.197s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	1708.56	427.22	122.	21.	0.006	78.20	1.233s
AG-108M	1746.92	436.81	107.	7.	0.002	210.81	1.239s
SB-125	1852.11	463.11	155.	292.	0.081	8.39	1.268
Ir-192	1868.63	467.24	115.	19.	0.005	83.85	1.272
BE-7	1910.07	477.60	147.	2.	0.001	945.21	1.282
HF-181	1925.22	481.38	142.	-4.	-0.001	465.48	1.286
La-140	1951.64	487.99	147.	-18.	-0.005	100.43	1.291s
RU-103	1993.56	498.47	122.	9.	0.003	170.93	1.300
RH-106	2042.93	510.81	177.	318.	0.088	8.15	1.315s
Nd-147	2134.36	533.66	88.	-3.	-0.001	411.42	1.333s
CS-134	2249.54	562.46	143.	54.	0.015	33.98	1.364s
CS-134	2272.15	568.11	144.	-14.	-0.004	120.79	1.369s
BI-207	2289.09	572.34	86.	25.	0.007	56.33	1.370s
TL-208	2332.37	583.17	136.	1063.	0.295	3.93	1.352
SB-125	2399.21	599.87	149.	-15.	-0.004	116.08	1.399s
SB-124	2406.58	601.72	95.	18.	0.005	81.51	1.401s
CS-134	2419.33	604.90	121.	8.	0.002	197.08	1.403s
BI-214	2427.34	606.91	110.	-14.	-0.004	112.24	1.407s
RU-103	2449.85	612.53	131.	-4.	-0.001	436.41	1.408
AG-108M	2457.23	614.38	146.	2.	0.001	734.69	1.412s
PM-144	2471.06	617.84	120.	13.	0.004	121.82	1.415s
RH-106	2487.60	621.97	122.	-4.	-0.001	393.50	1.419s
SB-125	2537.71	634.50	131.	-22.	-0.006	77.47	1.432s
I-131	2545.75	636.51	93.	19.	0.005	75.00	1.433
AG-110M	2632.62	658.22	142.	-11.	-0.003	153.83	1.452s
CS-137	2646.39	661.67	121.	10.	0.003	166.38	1.455s
PM-144	2772.03	693.08	79.	5.	0.001	242.73	1.487s
NB-94	2810.42	702.67	112.	-9.	-0.002	170.70	1.493s
SB-124	2893.96	723.56	242.	-36.	-0.010	63.48	1.511s
AG-108M	2893.96	723.56	242.	-36.	-0.010	63.47	1.511s
EU-154	2894.40	723.67	276.	-43.	-0.012	57.39	1.511s
BI-212	2908.47	727.18	82.	322.	0.089	9.11	1.591s
pm-146	2941.78	735.51	105.	-10.	-0.003	146.43	1.523s
pm-146	2996.53	749.20	104.	7.	0.002	203.84	1.533s
ZR-95	3027.33	756.90	139.	-9.	-0.002	192.94	1.541
NB-95	3061.39	765.41	104.	-4.	-0.001	346.40	1.549s
EU-152	3113.38	778.41	75.	3.	0.001	403.30	1.561
BI-212	3133.29	783.39	71.	26.	0.007	49.66	1.567s
CS-134	3178.83	794.77	51.	145.	0.040	10.83	1.576s
CO-58	3244.95	811.30	57.	-1.	0.000	869.03	1.589s
La-140	3257.45	814.43	54.	-4.	-0.001	288.17	1.593s
Cs-136	3278.00	819.57	57.	11.	0.003	103.80	1.596s
TL-208	3441.54	860.45	24.	134.	0.037	11.32	1.421
NB-94	3486.70	871.74	55.	2.	0.001	501.64	1.641s
EU-154	3493.92	873.54	52.	6.	0.002	163.57	1.643s
PA-234	3522.16	880.60	45.	4.	0.001	231.86	1.649s
PA-234	3535.60	883.97	43.	2.	0.000	567.15	1.651s
y-88	3585.20	896.36	56.	-12.	-0.003	91.50	1.664s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	3644.61	911.22	18.	1076.	0.299	3.22	1.672
PA-234	3784.01	946.07	38.	-5.	-0.001	185.74	1.704s
AC-228	3875.82	969.02	65.	576.	0.160	5.40	1.754
PA-234M	4000.98	1000.31	26.	2.	0.001	321.14	1.750s
Cs-136	4186.60	1046.71	26.	-6.	-0.002	134.83	1.788s
RH-106	4205.13	1051.35	21.	8.	0.002	92.22	1.790s
Ga-68	4313.11	1078.34	29.	11.	0.003	75.38	1.812s
FE-59	4398.96	1099.81	33.	-5.	-0.001	171.96	1.829s
BI-214	4466.56	1116.70	24.	-3.	-0.001	265.05	1.845s
Sc-46	4481.78	1120.51	25.	8.	0.002	95.10	1.845s
Ta-182	4482.06	1120.58	21.	9.	0.002	82.48	1.846s
CO-60	4694.51	1173.69	39.	-9.	-0.002	106.53	1.887s
Ta-182	4881.58	1220.46	21.	4.	0.001	157.52	1.923s
Co-56	4953.63	1238.48	35.	-5.	-0.001	177.93	1.936s
NA-22	5110.04	1277.58	18.	-1.	0.000	545.52	1.963s
EU-154	5109.02	1277.33	19.	-1.	0.000	551.76	1.963s
FE-59	5168.30	1292.14	26.	2.	0.000	435.55	1.975s
CO-60	5324.87	1331.29	28.	-4.	-0.001	180.31	2.005s
AG-110M	5533.54	1383.46	23.	4.	0.001	168.71	2.042s
K-40	5850.15	1462.61	38.	-11.	-0.003	312.46	2.095s
La-140	6383.49	1595.96	44.	-7.	-0.002	138.14	2.185s
SB-124	6767.76	1692.03	19.	-1.	0.000	661.83	2.245s
BI-214	7049.61	1762.50	22.	-1.	0.000	462.82	2.290s
Co-56	7085.14	1771.39	24.	-4.	-0.001	187.75	2.294s
y-88	7334.87	1833.82	25.	-6.	-0.002	130.99	2.332s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	2.0395E-01					5.31E+01	
			477.60	2.040E-01	(	6.637E+00	9.45E+02 1.05E+01	G
NA-22	C	-2.3827E-01					9.50E+02	
			1274.53	-2.383E-01	?(	4.790E+00	5.46E+02 9.99E+01	G
K-40	N	-3.5225E+00					4.66E+11	
			1460.83	-3.522E+00	?(P	9.752E+00	3.12E+02 1.07E+01	G
Sc-46	F	1.0256E-01					8.38E+01	
			889.28	0.000E+00	?(	8.896E-01	1.00E+03 1.00E+02	G
			1120.55	2.051E-01	?(	6.662E-01	9.51E+01 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	-1.8862E+00					2.77E+01	
			320.08	-1.886E+00	&(	6.429E+00	1.02E+02	9.94E+00 G
MN-54	C	1.9647E+00					3.12E+02	
			834.85	1.965E+00	%(	4.075E+02	5.96E+03	1.00E+02 G
FE-59	F	-7.3611E-02					4.45E+01	
			1099.25	-2.173E-01	?(	1.309E+00	1.72E+02	5.65E+01 G
			1291.60	1.143E-01	?(	1.799E+00	4.36E+02	4.32E+01 G
CO-57	C	-5.7248E+01					2.72E+02	
			122.06	-5.725E+01	&(	5.638E+02	2.93E+02	8.56E+01 G
			136.47	-3.503E+02	&	5.003E+03	4.25E+02	1.07E+01 G
CO-58	C	-2.3539E-02					7.09E+01	
			810.78	-2.354E-02	?(	7.222E-01	8.69E+02	9.95E+01 G
CO-60	F	-3.4648E-01					1.93E+03	
			1332.50	-3.465E-01	?(	2.202E+00	1.80E+02	1.00E+02 G
			1173.24	-6.266E-01	+	2.280E+00	1.07E+02	9.99E+01 G
NB-94	I	-1.5191E-01					7.41E+06	
			702.63	-1.519E-01	?(	8.840E-01	1.71E+02	9.79E+01 G
			871.10	4.280E-02	+	7.557E-01	5.02E+02	9.99E+01 G
ZR-95	I	-2.8731E-01					6.40E+01	
			756.73	-2.873E-01	(	1.887E+00	1.93E+02	5.45E+01 G
			724.20	-1.020E-02	%	2.942E+00	8.45E+03	4.42E+01 G
NB-95	I	-7.5970E-02					6.40E+01	
			765.79	-7.597E-02	?(	9.074E-01	3.46E+02	9.98E+01 G
RU-103	I	1.2537E-01					3.93E+01	
			497.05	1.254E-01	(	7.295E-01	1.71E+02	9.09E+01 G
			610.30	-9.537E-01	+	1.431E+01	4.36E+02	5.75E+00 GA
RH-106	I	1.6669E+02					3.74E+02	
			621.92	-9.342E+01	?(	1.265E+03	3.94E+02	9.93E+00 G
			1050.36	1.822E+03	?(	5.742E+03	9.22E+01	1.56E+00 G
			511.86	3.104E+03	?	6.316E+02	8.15E+00	2.00E+01 GA
AG-108M	C	6.2199E-02					1.53E+05	
			433.94	8.543E-02	&(	6.168E-01	2.11E+02	9.05E+01 G
			722.94	-6.851E-01	&	1.434E+00	6.35E+01	9.08E+01 G
			614.28	3.880E-02	?(	9.807E-01	7.35E+02	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	2.6937E+02					2.50E+02	
			884.68	1.420E+01	%(	1.856E+03	3.66E+03	7.27E+01 G
			657.76	-3.515E+02	+	1.833E+03	1.54E+02	9.46E+01 G
			937.49	0.000E+00	-	4.687E+03	1.00E+03	3.44E+01 G
			1384.30	1.033E+03	?(	6.162E+03	1.69E+02	2.43E+01 G
			763.94	3.890E+01	&	5.421E+03	3.91E+03	2.23E+01 G
SN-113	F	2.1886E-01					1.15E+02	
			391.69	2.189E-01	?(	1.048E+00	1.42E+02	6.40E+01 G
SB-124	F	2.6042E-01					6.02E+01	
			602.73	2.604E-01	?(	7.089E-01	8.15E+01	9.83E+01 G
			1690.98	-7.574E-02	-	1.847E+00	6.62E+02	4.78E+01 G
			722.79	-5.684E+00	&	1.190E+01	6.35E+01	1.08E+01 G
SB-125	I	5.8085E+01					1.01E+03	
			427.88	4.901E+00	&(	1.276E+01	7.82E+01	2.96E+01 G
			600.50	-8.016E+00	-	3.133E+01	1.16E+02	1.79E+01 G
			635.89	-1.905E+01	&	4.910E+01	7.75E+01	1.13E+01 G
			463.37	2.084E+02	(	4.328E+01	8.39E+00	1.05E+01 G
I-131	I	1.6395E-01					8.02E+00	
			364.48	-1.779E-01	(	7.735E-01	1.29E+02	8.17E+01 G
			284.30	-1.027E+00	+	1.017E+01	2.92E+02	6.14E+00 G
			636.97	4.059E+00	(	1.013E+01	7.50E+01	7.17E+00 G
Ga-68	C	1.1087E+01					4.71E-02	
			1077.40	1.109E+01	&(	2.797E+01	7.54E+01	3.30E+00 G
Tc-99m	I	-1.2368E-01					2.51E-01	
			140.51	-1.237E-01	?(	6.010E-01	1.45E+02	8.93E+01 G
BA-133	F	-9.4678E-02					3.85E+03	
			356.00	-9.468E-02	?(	1.381E+00	4.25E+02	6.20E+01 G
			302.85	-4.019E+00	+	7.017E+00	5.32E+01	1.83E+01 G
			383.84	-1.482E+00	+	1.230E+01	2.44E+02	8.94E+00 GA
			80.99	-2.449E-02	%	2.591E+00	3.15E+03	3.41E+01 GA
CS-134	I	2.2716E+01					7.54E+02	
			604.71	1.457E+00	&(	9.800E+00	1.97E+02	9.76E+01 G
			795.87	3.864E+01	?(	9.576E+00	1.08E+01	8.55E+01 G
			569.32	-1.574E+01	+	6.411E+01	1.21E+02	1.54E+01 G
			801.95	0.000E+00	-	1.254E+02	1.00E+03	8.69E+00 G
			563.24	1.081E+02	(	1.164E+02	3.40E+01	8.35E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak MDA	Comments
CS-137	I	2.0956E-01				1.10E+04	
			661.66	2.096E-01	&(	1.186E+00 1.66E+02 8.52E+01	G
CE-139	F	2.1897E-02				1.38E+02	
			165.85	2.190E-02	?(	6.330E-01 8.56E+02 7.99E+01	G
Ba-140	I	-8.1972E-02				1.28E+01	
			537.26	-8.197E-02	&(	2.938E+00 1.04E+03 2.44E+01	G
			162.66	6.951E-02	&	7.697E+00 3.27E+03 6.22E+00	G
			304.85	-4.497E-03	&	1.082E+01 6.96E+04 4.29E+00	G
La-140	I	1.6500E+00				1.28E+01	
			1596.21	-2.654E-01	?(	1.265E+00 1.38E+02 9.54E+01	G
			487.02	-4.639E-01	+	1.563E+00 1.00E+02 4.55E+01	G
			328.76	1.065E+01	?(	2.987E+00 1.03E+01 2.03E+01	G
			815.77	-2.999E-01	-	3.022E+00 2.88E+02 2.33E+01	G
CE-141	I	4.4612E-01				3.25E+01	
			145.44	4.461E-01	(	1.062E+00 7.20E+01 4.82E+01	G
CE-144	I	7.7445E+01				2.85E+02	
			133.54	7.745E+01	%(	3.401E+03 1.30E+03 1.11E+01	G
PM-144	C	2.5545E+01				3.63E+02	
			696.54	1.587E+01	?(	1.331E+02 2.43E+02 9.90E+01	G
			618.06	3.521E+01	&(	1.449E+02 1.22E+02 9.91E+01	G
			476.81	-5.869E+00	%	2.577E+02 1.27E+03 4.20E+01	G
EU-152	F	-2.1697E-01				4.94E+03	
			344.29	-6.332E-01	&(	3.665E+00 1.72E+02 2.65E+01	G
			1112.07	0.000E+00	+	9.651E+00 1.00E+03 1.36E+01	G
			121.78	-1.190E-01	&	1.859E+00 4.61E+02 2.86E+01	G
			778.92	6.355E-01	(	8.922E+00 4.03E+02 1.29E+01	G
			964.11	-4.768E-01	%	2.096E+01 1.30E+03 1.46E+01	G
			244.69	-1.057E+00	&	1.102E+01 3.08E+02 7.58E+00	G
			1408.00	0.000E+00	+	9.388E+00 1.00E+03 2.10E+01	GA
EU-154	I	1.9463E+00				3.14E+03	
			873.23	1.946E+00	?(	1.100E+01 1.64E+02 1.23E+01	G
			123.10	-1.585E-01	-	2.102E+00 3.94E+02 4.08E+01	G
			1274.54	-1.712E-01	-	3.473E+00 5.52E+02 3.52E+01	G
			723.36	-6.556E+00	+	1.236E+01 5.74E+01 2.02E+01	G
			1004.77	4.239E-02	%	6.072E+00 3.90E+03 1.80E+01	G
			996.33	0.000E+00	-	1.722E+01 1.00E+03 1.06E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	1.3943E+01					1.81E+03	
			105.31	1.394E+01	*(	5.613E+00	1.69E+01	2.12E+01 G
			86.54	1.394E+01	}	5.075E+00	1.71E+01	3.07E+01 G
HF-181	F	2.2314E-01					4.24E+01	
			482.00-5.374E-02		(	8.591E-01	4.65E+02	8.05E+01 G
			133.02	2.967E-01	(	1.030E+00	1.04E+02	4.33E+01 G
			345.83	1.491E+00	(	3.884E+00	7.84E+01	1.51E+01 G
			136.30-1.139E-01		%	8.820E+00	2.30E+03	5.85E+00 G
Ta-182	F	5.5384E-01					1.14E+02	
			1121.30	6.345E-01	?(	1.770E+00	8.25E+01	3.49E+01 G
			1221.41	4.495E-01	?(	2.502E+00	1.58E+02	2.70E+01 G
			1189.05-7.109E-02		%	4.220E+00	1.62E+03	1.62E+01 G
Hg-203	F	1.4574E+00					4.66E+01	
			279.20	1.457E+00	(	6.293E-01	1.49E+01	8.15E+01 G
TL-208	N	2.6430E+02					6.98E+02	
			583.02	2.643E+02	(	1.419E+01	3.93E+00	8.45E+01 G
			277.28	3.968E+02	+	1.293E+02	1.60E+01	6.31E+00 G
			860.56	3.229E+02	+	6.153E+01	1.13E+01	1.24E+01 G
pm-146	C	9.4639E-01					2.02E+03	
			747.16	9.464E-01	?(	6.606E+00	2.04E+02	3.40E+01 G
			735.72-1.990E+00		+	9.910E+00	1.46E+02	2.25E+01 G
			453.88	0.000E+00	-	2.919E+00	1.00E+03	6.50E+01 G
y-88	F	-2.7098E-01					1.07E+02	
			898.04-2.710E-01		?(	8.362E-01	9.15E+01	9.37E+01 G
			1836.06-2.374E-01		+	1.084E+00	1.31E+02	9.92E+01 G
Cd-109	F	7.4907E+02					4.53E+02	
			88.04	7.491E+02	(	1.093E+03	4.46E+01	3.79E+00 G
PB-210	N	7.9745E+00					8.14E+03	
			46.54	7.974E+00	*(P	1.438E+01	4.04E+01	4.25E+00 G
PB-212	N	8.5564E+02					6.98E+02	
			238.63	8.556E+02	(P	1.751E+01	1.72E+00	4.33E+01 G
			300.03	8.950E+02	+	2.719E+02	1.50E+01	3.28E+00 GA
PB-214	N	3.8821E-01					5.84E+05	
			351.93	4.893E-01	@(	1.578E+00	9.64E+01	3.76E+01 G
			295.09	1.912E-01	?(	2.934E+00	4.51E+02	1.93E+01 G
			242.00-1.157E+01		+	1.243E+01	3.32E+01	7.43E+00 GA

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
BI-207	C	4.1319E-01						1.18E+04	
			569.70	4.132E-01	?(	7.618E-01	5.63E+01	9.77E+01	G
			1063.66	-2.972E-02	%	1.127E+00	1.05E+03	7.45E+01	G
BI-212	N	1.0921E+03						6.98E+02	
			727.17	1.092E+03	@(	1.530E+02	9.11E+00	7.55E+00	G
			785.42	5.613E+02	-	9.024E+02	4.97E+01	1.28E+00	GA
BI-214	N	-4.3485E-01						5.84E+05	
			609.31	-4.349E-01	(	1.647E+00	1.12E+02	4.61E+01	G
			1120.29	-4.604E-01	+	4.375E+00	2.65E+02	1.51E+01	G
			1764.49	-3.745E-01	&	6.318E+00	4.63E+02	1.54E+01	G
BI-210M	T	2.1629E-02						1.10E+09	
			265.83	2.163E-02	&(	1.093E+00	1.48E+03	5.00E+01	G
			304.90	1.417E-02	%	1.658E+00	3.39E+03	2.80E+01	G
RA-224	N	7.7093E+02						6.98E+02	
			240.99	7.709E+02	(	2.773E+02	1.20E+01	4.10E+00	G
AC-228	N	1.8975E+02						2.10E+03	
			911.16	1.925E+02	(	4.022E+00	3.22E+00	2.90E+01	G
			968.97	1.812E+02	(	1.267E+01	5.40E+00	1.75E+01	G
			338.32	1.955E+02	(	1.007E+01	3.61E+00	1.20E+01	G
			93.35	1.540E+02	-	2.178E+01	6.85E+00	5.56E+00	XA
TH-227	N	-2.2532E+00						7.95E+03	
			235.97	-2.253E+00	?(	2.830E+01	3.79E+02	1.23E+01	G
			50.14	-1.286E-01	&	9.088E+00	2.09E+03	8.00E+00	G
			256.24	-2.685E+00	&	1.014E+01	1.13E+02	7.00E+00	G
TH-229	N	9.2929E-01						2.68E+06	
			193.51	7.477E-01	&(	1.031E+01	4.07E+02	4.40E+00	G
			210.85	1.196E+00	(	2.252E+01	5.59E+02	2.99E+00	G
TH-234	N	-1.3421E+00						1.63E+12	
			63.29	-1.342E+00	?(P	1.862E+01	2.00E+02	3.81E+00	G
			92.59	-5.565E+00	+ P	1.250E+01	1.66E+02	5.58E+00	G
PA-231	N	2.7758E+01						1.20E+07	
			302.65	-1.263E+01	?(	2.746E+01	6.59E+01	2.88E+00	G
			300.07	7.505E+01	(	2.470E+01	1.16E+01	2.46E+00	G
PA-233	C	4.4771E+00						7.82E+08	
			312.01	1.190E-01	&(	1.550E+00	3.82E+02	3.60E+01	G
			300.18	2.978E+01	(	9.802E+00	1.16E+01	6.20E+00	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
							1.63E+12	
PA-234	N	-2.5908E+00	131.29	-2.591E+00	?(	3.405E+00	4.03E+01	1.80E+01 G
			946.02	-7.926E-01	+	5.147E+00	1.86E+02	1.34E+01 G
			569.47	2.953E-02	%	8.908E+00	8.69E+03	8.20E+00 G
			883.24	3.543E-01	&	7.139E+00	5.67E+02	9.60E+00 G
			880.53	1.429E+00	+	1.160E+01	2.32E+02	6.00E+00 GA
							1.63E+12	
PA-234M	N	6.2850E+00	1001.00	6.285E+00	?(	7.255E+01	3.21E+02	8.37E-01 G
			766.41	0.000E+00	-	3.146E+02	1.00E+03	2.94E-01 G
							2.57E+11	
U-235	N	-1.5591E+00	143.79	-1.559E+00	?(	4.887E+00	9.44E+01	1.10E+01 G
			205.33	-2.111E+00	+	1.209E+01	1.71E+02	5.01E+00 G
			163.38	-7.681E-01	&	8.836E+00	3.41E+02	5.08E+00 G
							1.58E+05	
AM-241	T	1.6392E-01	59.54	1.639E-01	&(	1.898E+00	3.46E+02	3.59E+01 G
							7.40E+01	
Ir-192	F	2.5372E-01	316.49	1.668E-01	(	6.904E-01	1.23E+02	8.70E+01 G
			468.06	4.208E-01	?(	1.178E+00	8.38E+01	5.18E+01 G
			308.44	2.198E-01	?(	1.802E+00	2.42E+02	3.18E+01 G
			295.95	7.144E-02	-	1.782E+00	7.30E+02	3.02E+01 G
							1.30E+01	
Cs-136	F	2.0690E-01	818.50	2.069E-01	&(	7.285E-01	1.04E+02	1.00E+02 G
			1048.07	-1.710E-01	-	8.037E-01	1.35E+02	8.00E+01 G
			340.57	-2.471E+00	+	2.434E+00	3.05E+01	4.69E+01 G
							2.36E+00	
Np-239	T	2.9685E+00	103.70	-5.754E-02	%	2.275E+00	1.18E+03	2.40E+01 X
			106.13	2.968E+00	(	2.085E+00	2.22E+01	2.27E+01 G
			99.50	4.051E+00		3.318E+00	2.57E+01	1.50E+01 X
							1.11E+01	
Nd-147		-3.2343E-01	531.00	-3.234E-01	?(	4.615E+00	4.11E+02	1.30E+01 G
			91.10	-5.964E-01	+	1.887E+00	9.53E+01	2.83E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.

$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

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

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

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	59.48	961.	13.	0.004	346.08	1.639E-01	
TH-234	63.70	1135.	-12.	-0.003	199.97	-1.342E+00	P
Nd-147	88.96	760.	-41.	-0.012	95.31	0.000E+00	
TH-234	93.05	1314.	-76.	-0.021	166.02	-5.565E+00	P
Gd-153	103.28	858.	-65.	-0.018	65.38	-2.969E+03	
CO-57	122.13	541.	-11.	-0.003	293.10	-5.725E+01	
EU-154	122.88	543.	-8.	-0.002	394.29	-1.585E-01	
PA-234	130.42	893.	-108.	-0.030	40.29	-2.591E+00	
CO-57	136.95	616.	-8.	-0.002	424.90	-3.503E+02	
Tc-99m	140.16	572.	-23.	-0.007	145.44	0.000E+00	
U-235	143.89	628.	-38.	-0.011	94.36	-1.559E+00	
CE-141	145.79	567.	48.	0.013	72.01	0.000E+00	
U-235	161.71	380.	-8.	-0.002	340.80	-7.681E-01	
CE-139	165.98	479.	4.	0.001	856.17	0.000E+00	
U-235	205.63	485.	-18.	-0.005	170.91	-2.111E+00	
TH-227	235.97	8248.	-34.	-0.009	379.19	-2.253E+00	
PB-214	242.47	866.	-130.	-0.036	33.16	-1.157E+01	
TH-227	255.78	283.	-21.	-0.006	112.87	-2.685E+00	
PB-214	294.84	225.	5.	0.001	450.58	1.912E-01	
Ir-192	295.05	202.	3.	0.001	729.92	0.000E+00	
PA-231	300.22	254.	234.	0.065	11.65	7.505E+01	
PA-233	300.22	254.	234.	0.065	11.65	2.978E+01	
PA-231	302.40	431.	-46.	-0.013	65.86	-1.263E+01	
BA-133	301.79	428.	-57.	-0.016	53.21	-4.019E+00	
Ir-192	307.99	214.	9.	0.002	241.66	0.000E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-233	310.86	199.	5.	0.001	382.35	1.190E-01	
Ir-192	317.14	226.	18.	0.005	123.28	0.000E+00	
CR-51	319.15	252.	-22.	-0.006	101.99	0.000E+00	
La-140	328.12	215.	254.	0.070	10.32	0.000E+00	
Cs-136	340.22	745.	-132.	-0.037	30.55	0.000E+00	
PB-214	352.25	181.	20.	0.006	96.43	4.893E-01	
BA-133	358.14	138.	-4.	-0.001	424.80	-9.468E-02	
BA-133	384.04	203.	-8.	-0.002	244.46	-1.482E+00	
SN-113	391.36	194.	14.	0.004	142.08	0.000E+00	
SB-125	427.22	122.	21.	0.006	78.20	4.901E+00	
AG-108M	436.81	107.	7.	0.002	210.81	8.543E-02	
SB-125	463.11	155.	292.	0.081	8.39	2.084E+02	
Ir-192	467.24	115.	19.	0.005	83.85	0.000E+00	
La-140	487.99	147.	-18.	-0.005	100.43	0.000E+00	
RH-106	510.81	177.	318.	0.088	8.15	3.104E+03	
Nd-147	533.66	88.	-3.	-0.001	411.42	0.000E+00	
CS-134	562.46	143.	54.	0.015	33.98	1.081E+02	
CS-134	568.11	144.	-14.	-0.004	120.79	-1.574E+01	
BI-207	572.34	86.	25.	0.007	56.33	4.132E-01	
SB-125	599.87	149.	-15.	-0.004	116.08	-8.016E+00	
SB-124	601.72	95.	18.	0.005	81.51	0.000E+00	
CS-134	604.90	121.	8.	0.002	197.08	1.457E+00	
BI-214	606.91	110.	-14.	-0.004	112.24	-4.349E-01	
AG-108M	614.38	146.	2.	0.001	734.69	3.880E-02	
PM-144	617.84	120.	13.	0.004	121.82	3.521E+01	
RH-106	621.97	122.	-4.	-0.001	393.50	-9.342E+01	
SB-125	634.50	131.	-22.	-0.006	77.47	-1.905E+01	
AG-110M	658.22	142.	-11.	-0.003	153.83	-3.515E+02	
CS-137	661.67	121.	10.	0.003	166.38	2.096E-01	
PM-144	693.08	79.	5.	0.001	242.73	1.587E+01	
NB-94	702.67	112.	-9.	-0.002	170.70	-1.519E-01	
SB-124	723.56	242.	-36.	-0.010	63.48	0.000E+00	
AG-108M	723.56	242.	-36.	-0.010	63.47	-6.851E-01	
EU-154	723.67	276.	-43.	-0.012	57.39	-6.556E+00	
pm-146	735.51	105.	-10.	-0.003	146.43	-1.990E+00	
pm-146	749.20	104.	7.	0.002	203.84	9.464E-01	
ZR-95	756.90	139.	-9.	-0.002	192.94	0.000E+00	
NB-95	765.41	104.	-4.	-0.001	346.40	0.000E+00	
CS-134	794.77	51.	145.	0.040	10.83	3.864E+01	
CO-58	811.30	57.	-1.	0.000	869.03	0.000E+00	
La-140	814.43	54.	-4.	-0.001	288.17	0.000E+00	
Cs-136	819.57	57.	11.	0.003	103.80	0.000E+00	
NB-94	871.74	55.	2.	0.001	501.64	4.280E-02	
EU-154	873.54	52.	6.	0.002	163.57	1.946E+00	
PA-234	880.60	45.	4.	0.001	231.86	1.429E+00	
PA-234	883.97	43.	2.	0.000	567.15	3.543E-01	
y-88	896.36	56.	-12.	-0.003	91.50	0.000E+00	
PA-234	946.07	38.	-5.	-0.001	185.74	-7.926E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PA-234M	1000.31	26.	2.	0.001	321.14	6.285E+00		
Cs-136	1046.71	26.	-6.	-0.002	134.83	0.000E+00		
RH-106	1051.35	21.	8.	0.002	92.22	1.822E+03		
Ga-68	1078.34	29.	11.	0.003	75.38	0.000E+00		
FE-59	1099.81	33.	-5.	-0.001	171.96	0.000E+00		
BI-214	1116.70	24.	-3.	-0.001	265.05	-4.604E-01		
Sc-46	1120.51	25.	8.	0.002	95.10	0.000E+00		
Ta-182	1120.58	21.	9.	0.002	82.48	0.000E+00		
CO-60	1173.69	39.	-9.	-0.002	106.53	-6.266E-01		
Ta-182	1220.46	21.	4.	0.001	157.52	0.000E+00		
Co-56	1238.48	35.	-5.	-0.001	177.93	0.000E+00		
NA-22	1277.58	18.	-1.	0.000	545.52	-2.383E-01		
EU-154	1277.33	19.	-1.	0.000	551.76	-1.712E-01		
FE-59	1292.14	26.	2.	0.000	435.55	0.000E+00		
CO-60	1331.29	28.	-4.	-0.001	180.31	-3.465E-01		
AG-110M	1383.46	23.	4.	0.001	168.71	1.033E+03		
K-40	1462.61	38.	-11.	-0.003	312.46	-3.522E+00	P	
La-140	1595.96	44.	-7.	-0.002	138.14	0.000E+00		
SB-124	1692.03	19.	-1.	0.000	661.83	0.000E+00		
BI-214	1762.50	22.	-1.	0.000	462.82	-3.745E-01		
Co-56	1771.39	24.	-4.	-0.001	187.75	0.000E+00		
y-88	1833.82	25.	-6.	-0.002	130.99	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
BE-7	A	2.0395E-01	>12 Halflives	9.4521E+02%	6.6366E+00	
NA-22	#A	-3.2765E-02	-2.3827E-01	5.455E+02%		4.79E+00
K-40	#A	-3.5225E+00	-3.5225E+00	5.562E+02%		9.75E+00
Sc-46	#A	1.0256E-01	>12 Halflives	9.5098E+01%	8.8964E-01	
CR-51	#A	-1.8862E+00	>12 Halflives	1.0199E+02%	6.4294E+00	
MN-54	#A	4.6904E-03	1.9647E+00	5.955E+03%		4.07E+02
FE-59	#A	-7.3611E-02	>12 Halflives	1.7196E+02%	1.3086E+00	
Co-56	#A	0.0000E+00	>12 Halflives	1.0000E+03%	9.7025E-01	
CO-57	#A	-5.5544E-02	-5.7248E+01	2.931E+02%		5.64E+02
CO-58	#A	-2.3539E-02	>12 Halflives	8.6903E+02%	7.2216E-01	
CO-60	#A	-1.3011E-01	-3.4648E-01	1.803E+02%		2.20E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%		5.84E+03
NB-94	#A	-1.5187E-01	-1.5191E-01	1.707E+02%		8.84E-01
ZR-95	#A	-2.8731E-01	>12 Halflives	1.9294E+02%	1.8871E+00	
NB-95	#A	-7.5970E-02	>12 Halflives	3.4640E+02%	9.0743E-01	
RU-103	A	1.2537E-01	>12 Halflives	1.7093E+02%	7.2949E-01	
RH-106	#A	1.0715E+00	1.6669E+02	9.222E+01%		1.26E+03
AG-108M	#A	6.1436E-02	6.2199E-02	2.108E+02%		6.17E-01

AG-110M#A	1.4181E-01	2.6937E+02	1.687E+02%		1.86E+03
SN-113 #A	2.1886E-01	>12 Halflives	1.4208E+02%	1.0485E+00	
SB-124 #A	2.6042E-01	>12 Halflives	8.1505E+01%	7.0890E-01	
SB-125 #C	8.9374E+00	5.8085E+01	8.393E+00%		1.28E+01
I-131 A	1.6395E-01	>12 Halflives	7.4684E+01%	7.7351E-01	
Gd-153 #A	0.0000E+00	0.0000E+00	1.000E+03%		4.41E+03
Ga-68 #A	1.1087E+01	>12 Halflives	7.5377E+01%	2.7970E+01	
Tc-99m #A	-1.2368E-01	>12 Halflives	1.4544E+02%	6.0100E-01	
BA-133 #A	-5.8014E-02	-9.4678E-02	4.248E+02%		1.38E+00
CS-134 #C	1.8643E+00	2.2716E+01	1.083E+01%		9.80E+00
CS-137 #A	1.7643E-01	2.0956E-01	1.664E+02%		1.19E+00
CE-139 #A	2.1897E-02	>12 Halflives	8.5617E+02%	6.3298E-01	
Ba-140 #A	-8.1972E-02	>12 Halflives	1.0371E+03%	2.9382E+00	
La-140 #C	1.6500E+00	>12 Halflives	1.0317E+01%	1.2646E+00	
CE-141 #A	4.4612E-01	>12 Halflives	7.2011E+01%	1.0623E+00	
CE-144 #A	1.0345E-01	7.7445E+01	1.303E+03%		3.40E+03
PM-144 #A	1.4173E-01	2.5545E+01	1.218E+02%		1.33E+02
EU-152 A	-1.4817E-01	-2.1697E-01	1.715E+02%		3.66E+00
EU-154 #A	1.0673E+00	1.9463E+00	1.636E+02%		1.10E+01
EU-155 #	4.9241E+00	1.3943E+01	1.694E+01%		5.61E+00
HF-181 A	2.2314E-01	>12 Halflives	7.8378E+01%	8.5909E-01	
Ta-182 #A	5.5384E-01	>12 Halflives	8.2480E+01%	1.7700E+00	
Hg-203	1.4574E+00	>12 Halflives	1.4867E+01%	6.2927E-01	
TL-208	1.7712E+01	2.6430E+02	3.927E+00%		1.42E+01
pm-146 #A	3.7208E-01	9.4639E-01	2.038E+02%		6.61E+00
y-88 #A	-2.7098E-01	>12 Halflives	9.1500E+01%	8.3622E-01	
Cd-109 A	1.1702E+01	7.4907E+02	4.457E+01%		1.09E+03
PB-210 #A	6.3265E+00	7.9745E+00	6.625E+01%		1.44E+01
PB-212	5.7340E+01	8.5564E+02	1.723E+00%		1.75E+01
PB-214 #A	3.8696E-01	3.8821E-01	9.643E+01%		1.58E+00
BI-207 #A	3.5198E-01	4.1319E-01	5.633E+01%		7.62E-01
BI-212 #	7.3185E+01	1.0921E+03	9.110E+00%		1.53E+02
BI-214 #A	-4.3345E-01	-4.3485E-01	1.122E+02%		1.65E+00
BI-210M#A	2.1629E-02	2.1629E-02	1.482E+03%		1.09E+00
RA-224	5.1663E+01	7.7093E+02	1.203E+01%		2.77E+02
AC-228	7.7317E+01	1.8975E+02	2.415E+00%		4.02E+00
TH-227 #A	-1.7775E+00	-2.2532E+00	3.792E+02%		2.83E+01
TH-229 A	9.2864E-01	9.2929E-01	3.457E+02%		1.03E+01
TH-234 #A	-1.3421E+00	-1.3421E+00	8.096E+02%		1.86E+01
PA-231 #C	2.7754E+01	2.7758E+01	1.165E+01%		2.75E+01
PA-233 #C	4.4770E+00	4.4771E+00	1.165E+01%		1.55E+00
PA-234 #A	-2.5908E+00	-2.5908E+00	4.029E+01%		3.40E+00
PA-234M#A	6.2850E+00	6.2850E+00	3.211E+02%		7.25E+01
U-235 #A	-1.5591E+00	-1.5591E+00	9.436E+01%		4.89E+00
AM-241 #A	1.6197E-01	1.6392E-01	3.461E+02%		1.90E+00
Np-237 #A	0.0000E+00	0.0000E+00	0.000E+00%		4.92E+00
Ir-192 #A	2.5372E-01	>12 Halflives	8.3846E+01%	6.9041E-01	
Cs-136 #A	2.0690E-01	>12 Halflives	1.0380E+02%	7.2845E-01	
Np-239 C	2.9685E+00	>12 Halflives	2.2231E+01%	2.0847E+00	

Nd-147 #A -3.2343E-01 >12 Halflives 4.1142E+02% 4.6147E+00

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

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

Total Activity (244.6 to 2000.1 keV) 3.002E+02 Bq/Sample
Total Decayed Activity (244.6 to 2000.1 keV) 3.9436992E+03 Bq/Sample

M132730_NA_2. 7_NA_20131033.spc.
Counts
Energy (keV)
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Th-229
Th-229 35
Ce-139 140
U-235 Ce-141
Np-239
Th-227 Am Th-234
Ac-228
Th-227 Bi-210M
Ra-224
Pb-212
Pb-214
Ac-228
La-140
Cs-136
I-131
Sn-113 Ba-133
Ag-108M
Sb-125
Rh-106
La-140
Ba-140
Cs-134
Tl-208
Sb-125
I-131
Ag-110M Cs-137
Nb-94
Pm-146
Bi-212
Cs-134
Co-58
Cs-136 La-140
Mn-54
Tl-208
Eu-154
Ac-228
Pa-234
Eu-152
Ac-228
Eu-154
Cs-136
Rh-106
Bi-207
Ga-68
Fe-59
Bi-214
Ta-182
Co-56
Ta-182
Ta-182
Co-56
Na-22
Fe-59
Co-60
Ag-110M
K-40
La-140
Sb-124
Co-56
Y-88

Test America St. Louis Spectrum ID: 11_NA_20130864

Sample Description: M132730_NA_3
Detector: Ge11 S/N09363993
Batch ID: M132730
Work Order Number: NA
Lot Number: 3

Decay to Time: 2/3/2006 12:00 Live Time: 3600 sec
Acquisition Time: 7/16/2013 19:01:05 Real Time: 3611 sec
Analysis Time: 7/17/2013 08:40 Dead Time: 0.31 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 11_Liquid_Marinelli 0.5L.Clb
Efficiency Cal Desc: 11_0.5L Marn_83925-334_112211
Efficiency Cal Date: 11/23/2011 08:59
Energy Cal Date: 2/28/2012 13:09
Library: Client_Routine Long_Rev4.lib
Bkgd Correction File: 11_2013-07-06_0324.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
NA-22	8.201E-02	1224.0	1.004E+00	1.004E+00	3.651E+00
K-40	4.355E+00	45.5	1.980E+00	1.991E+00	7.011E+00
MN-54	-2.594E+02	41.7	1.082E+02	1.089E+02	3.493E+02
CO-57	3.124E+02	37.6	1.174E+02	1.185E+02	3.796E+02
CO-60	-2.557E-01	168.8	4.315E-01	4.317E-01	1.509E+00
ZN-65	-5.218E+02	157.7	8.229E+02	8.233E+02	2.831E+03
NB-94	8.779E-02	117.2	1.029E-01	1.030E-01	7.258E-01
RH-106	9.717E+01	232.3	2.258E+02	2.258E+02	8.154E+02
AG-108M	2.623E-01	41.9	1.099E-01	1.107E-01	5.922E-01
AG-110M	1.059E+03	49.3	5.222E+02	5.247E+02	1.169E+03
SB-125	9.090E+00	39.0	3.548E+00	3.577E+00	8.933E+00
Gd-153	-1.971E+03	57.6	1.136E+03	1.141E+03	3.737E+03
BA-133	4.150E-01	88.5	3.673E-01	3.680E-01	1.224E+00
CS-134	2.250E+01	8.5	1.903E+00	2.196E+00	5.878E+00
CS-137	2.508E-01	105.3	2.642E-01	2.644E-01	8.870E-01
CE-144	3.555E+01	2433.0	8.648E+02	8.648E+02	2.911E+03
PM-144	4.063E+00	311.1	1.264E+01	1.264E+01	1.338E+02
EU-152	-6.397E-01	129.1	8.259E-01	8.266E-01	2.771E+00
EU-154	1.274E+00	78.3	9.977E-01	9.997E-01	8.360E+00
EU-155	1.843E+01	11.9	2.200E+00	2.405E+00	4.898E+00
TL-208	2.800E+02	3.0	8.391E+00	1.600E+01	1.037E+01
pm-146	2.330E+00	56.8	1.323E+00	1.328E+00	4.892E+00
Cd-109	5.761E+02	53.7	3.094E+02	3.108E+02	1.017E+03
PB-210	2.654E+00	170.0	4.511E+00	4.514E+00	1.537E+01
PB-212	8.807E+02	1.4	1.276E+01	6.790E+01	1.396E+01
PB-214	8.065E-01	44.5	3.591E-01	3.618E-01	9.602E-01
BI-207	7.502E-03	2283.0	1.713E-01	1.713E-01	5.940E-01
BI-212	9.248E+02	8.8	8.119E+01	9.287E+01	1.289E+02
BI-214	2.303E-01	190.3	4.383E-01	4.385E-01	1.510E+00
BI-210M	-1.191E-01	250.2	2.979E-01	2.980E-01	1.003E+00
RA-224	8.274E+02	10.6	8.748E+01	1.072E+02	2.640E+02
AC-228	1.989E+02	2.1	4.099E+00	1.050E+01	2.772E+00
TH-227	-2.113E+00	330.2	6.977E+00	6.979E+00	2.310E+01
TH-229	-1.881E+00	178.0	3.348E+00	3.353E+00	1.120E+01
TH-234	2.364E+01	7.1	1.669E+00	2.030E+00	1.694E+01
PA-231	-1.999E+01	36.3	7.253E+00	7.354E+00	2.352E+01
PA-233	4.436E+00	9.5	4.212E-01	4.963E-01	1.323E+00
PA-234	-2.560E+00	36.0	9.212E-01	9.301E-01	2.999E+00
PA-234M	-3.125E-01	6075.0	1.899E+01	1.899E+01	6.731E+01

U-235	-4.872E-02	2633.0	1.283E+00	1.283E+00	3.280E+00
AM-241	3.003E-01	176.0	5.286E-01	5.288E-01	1.760E+00
Np-237	0.000E+00	0.0	1.404E+00	1.404E+00	4.695E+00
Total	5.287E+03				

Analyst: Micha Korrinhizer

TestAmerica, Inc Spectrum name: 11_NA_20130864.An1

Sample description
M132730_NA_3

Spectrum Filename: C:\User\SPC\Det11\11_NA_20130864.An1

Acquisition information

Start time:	7/16/2013 7:01:05 PM
Live time:	3600
Real time:	3611
Dead time:	0.31 %
Detector ID:	11

Detector system
Ge11 S/N09363993

Calibration
Filename: 11_Liquid_Marinelli 0.5L.Clb
11_0.5L Marn_83925-334_112211

Energy Calibration

Created:	2/28/2012 1:09:34 PM
Zero offset:	0.055 keV
Gain:	0.250 keV/channel
Quadratic:	-2.946E-08 keV/channel^2

Efficiency Calibration

Created:	11/23/2011 8:59:14 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 0.86 %
Log(Eff):	-3.435442E-01 + (-2.043896E-01*Log(E)) + (-4.656259E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 0.69 %
Log(Eff):	-1.197907E+01 + (4.174114E+00*Log(E)) + (-4.577295E-01*Log(E)^2)

Library Files

Main analysis library:	Client_Routine Long_Rev4.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.58keV)
Stop channel:	8000 (1999.47keV)
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

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	2/3/2006 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	11_2013-07-06_0324.PBC 7/6/2013 3:24:55 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 52 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 144.9118

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
39.97	193.	22.02	0.97	6.017E-02				
46.56	90.	38.78	0.67	6.724E-02	46.54	4.250	PBC<MDA	PB210
59.90	29.	176.05	0.91	7.689E-02	59.54	35.900	PBC<MDA	AM241
74.86	1750.	3.54	0.93	8.289E-02				
77.12	2764.	2.47	0.93	8.341E-02				
84.36	290.	13.41	0.94	8.458E-02				
87.20	931.	5.06	0.94	8.486E-02	86.54	30.700	2.813E+01	EU155
88.06	104.	53.70	0.94	8.492E-02	88.04	3.790	PBC<MDA	Cd109
89.98	822.	5.51	0.94	8.504E-02				
93.38	869.	5.10	0.94	8.516E-02	92.59	5.584	4.733E+01	TH234
					93.35	5.561	1.251E+02	AC228
					92.59	5.584	4.733E+01	TH234
99.55	280.	16.94	0.70	8.512E-02	99.50	15.000	HL>Cutoff	Np239
105.37	421.	11.93	1.24	8.481E-02	105.31	21.200	1.843E+01	EU155
					106.13	22.700	HL>Cutoff	Np239
115.28	133.	27.59	0.94	8.382E-02				
124.49	77.	37.58	0.97	8.288E-02	121.78	28.580	1.328E+00	EU152
129.06	518.	13.14	1.15	8.173E-02				
134.88	6.	524.52	0.98	8.102E-02	136.30	5.850	HL>Cutoff	HF181
					136.47	10.680	2.150E+02	CO57
140.52	22.	169.77	0.99	7.958E-02	140.51	89.300	HL>Cutoff	Tc99m
141.88	-2.	329.00	0.99	7.891E-02	143.79	10.960	PBC<MDA	U235
145.26	25.	147.31	0.99	7.857E-02	145.44	48.200	HL>Cutoff	CE141
154.19	175.	21.39	1.23	7.670E-02				
162.35	31.	112.03	1.01	7.483E-02	162.66	6.220	HL>Cutoff	Ba140
209.35	771.	6.80	0.96	6.294E-02				
238.60	5299.	1.44	1.08	5.738E-02	238.63	43.300	8.783E+02	PB212
241.02	448.	11.04	1.08	5.696E-02	240.99	4.100	7.954E+02	RA224
241.96	14.	165.78	1.08	5.680E-02	242.00	7.430	PBC<MDA	PB214
270.19	613.	8.02	1.12	5.246E-02				

277.53	270.	14.68	0.86	5.145E-02	277.28	6.310	3.407E+02 TL208
278.61	4.	739.39	1.11	5.122E-02	279.20	81.460	HL>Cutoff Hg203
294.97	30.	58.54	1.13	4.919E-02	295.09	19.300	PBC<MDA PB214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
299.99	348.	10.39	1.02	4.860E-02	300.03	3.280	8.992E+02	PB212
					300.07	2.460	8.088E+01	PA231
					300.18	6.200	3.210E+01	PA233
					300.07	2.460	8.088E+01	PA231
					300.18	6.200	3.210E+01	PA233
307.62	31.	73.64	1.14	4.761E-02	308.44	31.750	HL>Cutoff	Ir192
321.27	29.	80.65	1.15	4.633E-02	320.08	9.940	HL>Cutoff	CR51
328.00	496.	8.54	1.23	4.549E-02	328.76	20.300	HL>Cutoff	La140
					328.76	20.300	HL>Cutoff	La140
338.18	1547.	3.28	1.16	4.447E-02	338.32	12.010	1.976E+02	AC228
345.61	3.	722.06	1.17	4.373E-02	345.83	15.070	HL>Cutoff	HF181
351.60	45.	30.58	0.60	4.316E-02	351.93	37.600	PBC<MDA	PB214
354.83	24.	88.52	1.18	4.279E-02	356.00	62.050	PBC<MDA	BA133
					356.00	62.050	4.150E-01	BA133
383.60	14.	171.33	1.21	4.043E-02	383.84	8.940	PBC<MDA	BA133
					383.84	8.940	1.721E+00	BA133
390.15	17.	117.33	1.21	3.981E-02	391.69	64.000	HL>Cutoff	SN113
394.71	32.	55.43	0.57	3.958E-02				
409.33	254.	14.31	1.22	3.849E-02				
427.85	61.	39.03	0.76	3.721E-02	427.88	29.600	1.008E+01	SB125
433.71	16.	133.37	1.25	3.681E-02	433.94	90.480	PBC<MDA	AG108M
463.06	427.	8.62	1.39	3.501E-02	463.37	10.470	2.104E+02	SB125
477.91	12.	175.38	1.29	3.418E-02	477.60	10.520	HL>Cutoff	BE7
481.97	19.	112.13	1.29	3.393E-02	482.00	80.500	HL>Cutoff	HF181
486.58	13.	148.86	1.30	3.366E-02	487.02	45.500	HL>Cutoff	La140
					487.02	45.500	HL>Cutoff	La140
510.85	599.	6.85	1.52	3.242E-02	511.86	20.000	3.996E+03	RH106
					511.86	20.000	3.996E+03	RH106
530.69	26.	60.10	0.50	3.147E-02				
562.86	99.	28.55	0.46	3.003E-02	563.24	8.350	1.337E+02	CS134
					563.24	8.350	1.337E+02	CS134
583.25	1678.	2.98	1.35	2.919E-02	583.02	84.500	2.800E+02	TL208
600.50	21.	86.60	1.40	2.852E-02	600.50	17.860	PBC<MDA	SB125
					604.71	97.620	2.569E+00	CS134
606.05	35.	38.99	1.40	2.844E-02				
609.47	31.	61.53	1.41	2.816E-02	609.31	46.090	PBC<MDA	BI214
					610.30	5.750	HL>Cutoff	RU103
609.47	9.	67.76	1.41	2.819E-02	609.31	46.090	PBC<MDA	BI214
					610.30	5.750	HL>Cutoff	RU103
618.56	3.	554.97	1.42	2.773E-02	618.06	99.100	PBC<MDA	PM144
					621.92	9.930	4.252E+01	RH106
					621.92	9.930	4.252E+01	RH106
618.72	6.	311.13	1.41	2.787E-02	618.06	99.100	PBC<MDA	PM144
					621.92	9.930	9.922E+01	RH106
636.69	13.	155.46	1.43	2.720E-02				
637.60	4.	414.76	1.43	2.724E-02	635.89	11.310	PBC<MDA	SB125
661.94	17.	105.34	1.45	2.638E-02	661.66	85.210	PBC<MDA	CS137
704.50	5.	402.23	1.49	2.513E-02	702.63	97.900	PBC<MDA	NB94
719.72	31.	41.90	1.50	2.455E-02	722.94	90.840	PBC<MDA	AG108M
					724.20	44.150	HL>Cutoff	ZR95
					723.36	20.220	3.175E+00	EU154
722.79	11.	467.26	1.50	2.455E-02	723.36	20.220	PBC<MDA	EU154
723.36	11.	481.41	1.50	2.454E-02	723.36	20.220	PBC<MDA	EU154
727.26	412.	8.78	1.40	2.443E-02	727.17	7.550	9.248E+02	BI212
736.86	30.	56.78	1.51	2.420E-02	735.72	22.500	PBC<MDA	pm146
747.29	14.	115.59	1.52	2.389E-02	747.16	34.000	PBC<MDA	pm146
755.38	95.	28.77	0.65	2.368E-02				
762.48	33.	49.33	1.54	2.346E-02	763.94	22.280	PBC<MDA	AG110M
784.82	104.	22.94	1.30	2.293E-02	785.42	1.280	1.476E+03	BI212

794.92	252.	8.46	1.57	2.268E-02	795.87	85.530	4.398E+01 CS134
					795.87	85.530	4.398E+01 CS134
818.04	13.	86.05	1.58	2.216E-02	818.50	100.000	HL>Cutoff Cs136
					818.50	100.000	HL>Cutoff Cs136
818.89	3.	415.52	1.58	2.222E-02	815.77	23.280	HL>Cutoff La140
860.90	233.	8.49	1.48	2.126E-02	860.56	12.420	3.658E+02 TL208
872.61	5.	242.64	1.63	2.100E-02	871.10	99.890	PBC<MDA NB94
					873.23	12.270	9.959E-01 EU154
					873.23	12.270	9.959E-01 EU154
873.08	9.	117.19	1.63	2.104E-02	871.10	99.890	PBC<MDA NB94

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					873.23	12.270	1.815E+00	EU154
883.86	10.	99.00	1.64	2.077E-02	883.24	9.600	1.384E+00	PA234
					884.68	72.680	3.477E+02	AG110M
					883.24	9.600	1.384E+00	PA234
883.90	9.	108.02	1.64	2.080E-02	883.24	9.600	PBC<MDA	PA234
					884.68	72.680	3.273E+02	AG110M
911.24	1719.	2.50	1.62	2.027E-02	911.16	29.000	1.994E+02	AC228
964.79	300.	6.12	1.71	1.931E-02	964.11	14.605	4.326E+01	EU152
968.99	928.	3.38	1.71	1.924E-02	968.97	17.460	1.883E+02	AC228
995.76	5.	233.54	1.73	1.880E-02	996.33	10.600	PBC<MDA	EU154
					996.33	10.600	1.149E+00	EU154
1004.96	12.	78.33	1.74	1.866E-02	1004.77	18.010	PBC<MDA	EU154
					1004.77	18.010	1.743E+00	EU154
1046.62	3.	232.33	1.78	1.797E-02	1050.36	1.560	PBC<MDA	RH106
					1050.36	1.560	4.450E+02	RH106
1048.01	1.	849.41	1.78	1.800E-02	1048.07	80.000	HL>Cutoff	Cs136
1073.52	3.	244.51	1.80	1.759E-02	1077.40	3.300	HL>Cutoff	Ga68
1102.71	11.	64.05	1.82	1.729E-02	1099.25	56.500	HL>Cutoff	FE59
					1099.25	56.500	HL>Cutoff	FE59
1120.39	3.	69.60	1.83	1.701E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	HL>Cutoff	Sc46
1120.50	14.	70.25	1.83	1.700E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	HL>Cutoff	Sc46
					1121.30	34.900	HL>Cutoff	Ta182
1121.41	14.	69.79	1.84	1.699E-02	1120.55	99.987	HL>Cutoff	Sc46
					1121.30	34.900	HL>Cutoff	Ta182
1189.19	2.	302.15	1.89	1.616E-02	1189.05	16.200	HL>Cutoff	Ta182
1238.60	4.	205.87	1.93	1.560E-02	1238.28	66.070	HL>Cutoff	Co56
					1238.28	66.070	HL>Cutoff	Co56
1291.90	3.	279.42	1.97	1.504E-02	1291.60	43.200	HL>Cutoff	FE59
					1291.60	43.200	HL>Cutoff	FE59
1459.54	23.	23.33	2.10	1.350E-02	1460.83	10.670	PBC<MDA	K40
1688.45	1.	789.53	2.28	1.185E-02	1690.98	47.790	HL>Cutoff	SB124

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
159.56	39.97	440.	193.	3.207E+03	22.02	0.973	-	s
299.05	74.86	1040.	1750.	2.112E+04	3.54	0.927	-	D
308.06	77.12	946.	2764.	3.314E+04	2.47	0.929	-	D
337.02	84.34	622.	281.	3.324E+03	13.89	0.936	-	D
348.36	87.18	748.	829.	9.767E+03	5.82	0.938	-	D
359.50	89.97	654.	782.	9.195E+03	5.85	0.941	-	D
397.75	99.55	786.	33.	3.842E+02	122.52	0.704	-	c
460.63	115.28	381.	133.	1.583E+03	27.59	0.939	-	s
515.71	129.06	716.	653.	7.988E+03	6.99	1.153	-	
616.19	154.19	366.	175.	2.277E+03	21.39	1.232	-	s
836.73	209.35	399.	829.	1.318E+04	4.86	0.958	-	
1079.96	270.19	338.	613.	1.169E+04	5.86	1.120	-	M
1311.13	328.00	690.	74.	1.621E+03	51.71	1.233	-	s
1577.89	394.71	101.	32.	8.127E+02	55.43	0.572	-	sM
1636.36	409.33	199.	254.	6.590E+03	14.31	1.225	-	s
1851.23	463.06	570.	36.	1.024E+03	95.70	1.391	-	sc
2042.36	510.85	647.	143.	4.423E+03	26.43	1.525	-	sM
2121.70	530.69	76.	27.	8.543E+02	49.79	0.499	-	sM

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
2250.37	562.86	195.	44.	1.477E+03	46.95	0.465 -	s
3020.40	755.38	113.	103.	4.331E+03	17.70	0.654 -	sM
3858.33	964.81	18.	301.	1.560E+04	6.09	1.707 -	D

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_Routine Long_Rev4.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	186.22	46.64	694.	22.	0.006	48.28	0.901
AM-241	239.22	59.90	1332.	29.	0.008	176.05	0.913s
BA-133	328.49	82.23	957.	-60.	-0.017	73.85	0.933s
EU-155	345.74	86.54	759.	610.	0.169	12.18	0.938D
Cd-109	351.72	88.04	1516.	104.	0.029	53.70	0.939D
Nd-147	367.40	91.96	1664.	-176.	-0.049	33.69	0.942
TH-234	373.11	93.39	1007.	735.	0.204	6.53	0.943s
AC-228	373.00	93.36	798.	902.	0.251	7.21	1.018s
Gd-153	390.90	97.84	868.	-74.	-0.021	57.61	0.948s
Np-239	397.57	99.51	657.	248.	0.069	15.96	0.950
Gd-153	414.55	103.75	1067.	-62.	-0.017	75.55	0.953s
Np-239	413.66	103.53	999.	-88.	-0.025	51.62	0.954
EU-155	421.00	105.37	550.	421.	0.117	11.93	1.241s
Np-239	421.75	105.55	681.	287.	0.080	14.16	0.956
EU-152	491.49	123.00	657.	-40.	-0.011	90.94	0.970s
CO-57	497.45	124.49	384.	77.	0.021	37.58	0.970s
EU-154	491.62	123.03	678.	-36.	-0.010	105.04	0.971s
PA-234	521.30	130.46	1111.	-135.	-0.037	35.99	0.979s
HF-181	538.97	134.88	568.	6.	0.002	524.52	0.980s
CO-57	540.05	135.15	605.	-4.	-0.001	902.09	0.984s
Tc-99m	561.52	140.52	715.	22.	0.006	169.77	0.987s
CE-141	580.47	145.26	663.	25.	0.007	147.31	0.992s
Ba-140	648.82	162.35	598.	31.	0.009	112.03	1.008s
U-235	655.39	164.00	669.	-19.	-0.005	194.38	1.008s
TH-229	774.52	193.79	611.	-20.	-0.005	178.03	1.036s
U-235	821.55	205.56	601.	-16.	-0.004	222.29	1.047s
TH-229	845.76	211.61	743.	-62.	-0.017	63.65	1.052s
TH-227	943.15	235.97	9910.	-43.	-0.012	330.24	1.074s
PB-212	953.79	238.63	302.	5277.	1.466	1.44	1.077D
RA-224	963.21	240.99	982.	466.	0.130	10.57	1.079D
PB-214	967.25	242.00	696.	14.	0.004	165.78	1.080D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	974.37	243.78	431.	-41.	-0.011	73.13	1.082s
TH-227	1024.28	256.26	385.	-8.	-0.002	334.35	1.093s
BI-210M	1064.00	266.19	399.	-11.	-0.003	250.20	1.101s
TL-208	1109.33	277.53	294.	267.	0.074	14.68	0.862s
Hg-203	1113.63	278.61	430.	4.	0.001	739.39	1.113s
PB-214	1179.08	294.97	332.	30.	0.008	58.54	1.128s
Ir-192	1184.51	296.33	379.	-16.	-0.004	175.36	1.129s
PB-212	1199.11	299.99	242.	346.	0.096	10.39	1.024
PA-231	1199.17	300.00	318.	332.	0.092	9.38	1.132
PA-233	1199.17	300.00	324.	329.	0.091	9.50	1.132
PA-231	1206.58	301.85	609.	-100.	-0.028	36.28	1.135s
BA-133	1206.63	301.87	577.	-103.	-0.029	34.26	1.135s
Ba-140	1220.09	305.23	337.	-31.	-0.009	85.79	1.137s
BI-210M	1220.08	305.23	337.	-31.	-0.009	85.72	1.137s
Ir-192	1229.63	307.62	238.	31.	0.008	73.64	1.140s
Ir-192	1265.33	316.55	305.	-17.	-0.005	146.20	1.147s
CR-51	1284.23	321.27	258.	29.	0.008	80.65	1.150s
La-140	1310.93	327.95	297.	422.	0.117	7.55	1.158s
AC-228	1351.83	338.18	237.	1547.	0.430	3.28	1.165
Cs-136	1359.15	340.01	975.	-155.	-0.043	29.60	1.169
EU-152	1373.20	343.52	270.	-18.	-0.005	129.10	1.172s
HF-181	1381.54	345.61	229.	3.	0.001	722.06	1.173s
PB-214	1405.51	351.60	130.	45.	0.012	30.58	0.604s
BA-133	1418.41	354.83	219.	24.	0.007	88.52	1.182s
I-131	1457.62	364.63	299.	-21.	-0.006	121.03	1.190
BA-133	1533.45	383.60	269.	14.	0.004	171.33	1.207s
SN-113	1559.66	390.15	198.	17.	0.005	117.33	1.214
SB-125	1710.43	427.85	124.	61.	0.017	39.03	0.761s
AG-108M	1733.84	433.71	209.	16.	0.004	133.37	1.252s
pm-146	1823.71	456.18	183.	-21.	-0.006	93.73	1.269s
SB-125	1851.13	463.04	191.	391.	0.109	7.11	1.278
PM-144	1904.81	476.46	210.	-10.	-0.003	205.75	1.290s
BE-7	1910.60	477.91	198.	12.	0.003	175.38	1.290s
HF-181	1926.83	481.97	210.	19.	0.005	112.13	1.294s
La-140	1945.28	486.58	184.	13.	0.004	148.86	1.299s
RU-103	1977.95	494.75	152.	-6.	-0.002	302.37	1.307s
RH-106	2042.18	510.81	258.	455.	0.126	6.85	1.320s
Nd-147	2129.75	532.71	190.	-3.	-0.001	644.13	1.337
Ba-140	2149.21	537.57	203.	-15.	-0.004	135.00	1.343s
CS-134	2249.62	562.68	186.	55.	0.015	37.77	1.365s
PA-234	2272.56	568.41	206.	-36.	-0.010	59.19	1.371s
TL-208	2331.91	583.25	160.	1667.	0.463	2.98	1.354
SB-125	2400.89	600.50	155.	21.	0.006	86.60	1.398s
SB-124	2423.11	606.05	77.	35.	0.010	38.99	1.400s
CS-134	2401.20	600.58	95.	-6.	-0.002	240.64	1.401s
BI-214	2436.79	609.47	211.	9.	0.003	67.76	1.405s
RU-103	2436.78	609.47	170.	31.	0.009	61.53	1.406s
AG-108M	2453.51	613.65	189.	-14.	-0.004	142.63	1.410s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-144	2473.79	618.72	190.	6.	0.002	311.13	1.413
RH-106	2473.13	618.56	112.	3.	0.001	554.97	1.416s
SB-125	2549.30	637.60	169.	4.	0.001	414.76	1.428s
I-131	2545.65	636.69	187.	13.	0.004	155.46	1.429
CS-137	2646.66	661.94	153.	17.	0.005	105.34	1.451s
NB-94	2816.90	704.50	174.	5.	0.001	402.23	1.486
SB-124	2890.03	722.79	1237.	11.	0.003	467.26	1.503
AG-108M	2877.75	719.72	69.	31.	0.009	41.90	1.503
EU-154	2892.31	723.36	1314.	11.	0.003	481.41	1.503
BI-212	2907.93	727.26	138.	412.	0.114	8.78	1.400
pm-146	2946.31	736.86	134.	30.	0.008	56.78	1.514s
pm-146	2988.06	747.29	132.	14.	0.004	115.59	1.524s
ZR-95	3026.05	756.79	188.	-8.	-0.002	247.93	1.532s
AG-110M	3048.80	762.48	119.	33.	0.009	49.33	1.538
NB-95	3063.18	766.07	175.	-12.	-0.003	161.45	1.540s
PA-234M	3062.46	765.89	187.	-17.	-0.005	116.22	1.540s
EU-152	3115.55	779.16	138.	-20.	-0.006	86.37	1.551s
BI-212	3138.18	784.82	86.	104.	0.029	22.94	1.303s
CS-134	3178.57	794.92	101.	252.	0.070	8.46	1.565s
CS-134	3204.79	801.47	115.	-10.	-0.003	149.73	1.570s
CO-58	3240.21	810.32	76.	-8.	-0.002	167.38	1.578s
La-140	3274.49	818.89	59.	3.	0.001	415.52	1.582s
Cs-136	3271.07	818.04	59.	13.	0.004	86.05	1.584s
MN-54	3330.26	832.83	181.	-49.	-0.013	41.72	1.598s
Co-56	3385.29	846.59	76.	-9.	-0.002	144.64	1.608s
TL-208	3442.53	860.90	28.	233.	0.065	8.49	1.479
NB-94	3491.26	873.08	54.	9.	0.003	117.19	1.629
EU-154	3489.39	872.61	73.	5.	0.001	242.64	1.630s
PA-234	3519.23	880.07	62.	-8.	-0.002	140.33	1.637s
PA-234	3534.57	883.90	46.	9.	0.003	108.02	1.639s
AG-110M	3534.41	883.86	44.	10.	0.003	99.00	1.640s
Sc-46	3552.46	888.37	72.	-9.	-0.003	134.24	1.644s
y-88	3590.21	897.81	82.	-4.	-0.001	369.74	1.651s
AC-228	3643.93	911.24	21.	1719.	0.478	2.50	1.622
PA-234	3783.45	946.11	47.	-7.	-0.002	147.18	1.691s
EU-152	3866.16	966.78	364.	-76.	-0.021	37.15	1.706s
AC-228	3874.92	968.97	29.	928.	0.258	3.38	1.710D
EU-154	3982.10	995.76	53.	5.	0.001	233.54	1.733s
EU-154	4018.93	1004.96	35.	12.	0.003	78.33	1.740s
Co-56	4151.11	1038.00	57.	-6.	-0.002	175.13	1.767s
Cs-136	4191.17	1048.01	37.	1.	0.000	849.41	1.776s
RH-106	4185.61	1046.62	21.	3.	0.001	232.33	1.777s
Ga-68	4293.26	1073.52	33.	3.	0.001	244.51	1.799s
FE-59	4410.03	1102.71	17.	11.	0.003	64.05	1.817s
EU-152	4451.86	1113.16	52.	-1.	0.000	698.78	1.828s
ZN-65	4462.46	1115.81	61.	-7.	-0.002	157.72	1.831s
BI-214	4480.80	1120.39	50.	3.	0.001	69.60	1.834s
Sc-46	4481.24	1120.50	39.	14.	0.004	70.25	1.835s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	4484.87	1121.41	39.	14.	0.004	69.79	1.835s
CO-60	4691.49	1173.04	53.	-7.	-0.002	159.50	1.877s
Ta-182	4756.13	1189.19	27.	2.	0.001	302.15	1.890s
Ta-182	4876.85	1219.36	35.	-2.	-0.001	411.92	1.916s
Co-56	4953.84	1238.60	38.	4.	0.001	205.87	1.929s
FE-59	5167.15	1291.90	36.	3.	0.001	279.42	1.972s
CO-60	5333.94	1333.57	34.	-5.	-0.001	168.76	2.004s
AG-110M	5535.86	1384.01	38.	-2.	0.000	535.62	2.045s
EU-152	5644.17	1411.07	29.	-1.	0.000	544.30	2.064s
K-40	5838.15	1459.54	52.	23.	0.006	23.33	2.105s
La-140	6381.55	1595.28	72.	-10.	-0.003	119.40	2.209s
SB-124	6754.57	1688.45	22.	1.	0.000	789.53	2.281s

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	8.8854E-01				5.31E+01		
			477.60	8.885E-01	&(	5.271E+00	1.75E+02 1.05E+01	G
NA-22	C	8.2007E-02				9.50E+02		
			1274.53	8.201E-02	&(	3.651E+00	1.22E+03 9.99E+01	G
K-40	N	4.3548E+00				4.66E+11		
			1460.83	4.355E+00	?(P	7.011E+00	2.33E+01 1.07E+01	G
Sc-46	F	4.9696E-02				8.38E+01		
			889.28	-1.235E-01	?(	5.658E-01	1.34E+02 1.00E+02	G
			1120.55	2.229E-01	*(	5.203E-01	7.03E+01 1.00E+02	G
CR-51	F	1.7470E+00				2.77E+01		
			320.08	1.747E+00	&(	4.681E+00	8.06E+01 9.94E+00	G
MN-54	C	-2.5939E+02				3.12E+02		
			834.85	-2.594E+02	?(	3.493E+02	4.17E+01 1.00E+02	G
FE-59	F	2.2688E-01				4.45E+01		
			1099.25	2.996E-01	?(	6.314E-01	6.41E+01 5.65E+01	G
			1291.60	1.318E-01	?(	1.304E+00	2.79E+02 4.32E+01	G
Co-56	C	-2.1725E-02				7.73E+01		
			846.77	-1.133E-01	?(	5.600E-01	1.45E+02 9.99E+01	G
			1238.28	1.168E-01	?(	8.433E-01	2.06E+02 6.61E+01	G

Nuclide		Ave activity	Energy			Activity	Code	Peak	MDA	Comments
			1037.84	-6.778E-01	+	4.102E+00		1.75E+02	1.41E+01	G
			1771.35	6.236E-02	&	4.279E+00		1.88E+03	1.55E+01	A
CO-57	C	3.1239E+02						2.72E+02		
			122.06	3.124E+02	?(	3.796E+02		3.76E+01	8.56E+01	G
			136.47	-1.288E+02	&	3.913E+03		9.02E+02	1.07E+01	G
CO-58	C	-9.4548E-02						7.09E+01		
			810.78	-9.455E-02	?(	5.429E-01		1.67E+02	9.95E+01	G
CO-60	F	-2.5572E-01						1.93E+03		
			1332.50	-2.557E-01	?(	1.509E+00		1.69E+02	1.00E+02	G
			1173.24	-3.006E-01	+	1.655E+00		1.60E+02	9.99E+01	G
ZN-65	F	-5.2175E+02						2.44E+02		
			1115.55	-5.218E+02	?(	2.831E+03		1.58E+02	5.06E+01	G
NB-94	I	8.7785E-02						7.41E+06		
			702.63	5.280E-02	(	7.258E-01		4.02E+02	9.79E+01	G
			871.10	1.221E-01	(	4.882E-01		1.17E+02	9.99E+01	G
ZR-95	I	-1.7049E-01						6.40E+01		
			756.73	-1.705E-01	&(	1.437E+00		2.48E+02	5.45E+01	G
			724.20	0.000E+00	&	2.601E+00		1.00E+03	4.42E+01	G
NB-95	I	-1.4011E-01						6.40E+01		
			765.79	-1.401E-01	?(	7.654E-01		1.61E+02	9.98E+01	G
RU-103	I	-5.3761E-02						3.93E+01		
			497.05	-5.376E-02	&(	5.556E-01		3.02E+02	9.09E+01	G
			610.30	5.378E+00	&	1.090E+01		6.15E+01	5.75E+00	GA
RH-106	I	9.7172E+01						3.74E+02		
			621.92	4.252E+01	?(	8.154E+02		5.55E+02	9.93E+00	G
			1050.36	4.450E+02	?(	3.714E+03		2.32E+02	1.56E+00	G
			511.86	3.039E+03	?	5.179E+02		6.85E+00	2.00E+01	GA
AG-108M	C	2.6232E-01						1.53E+05		
			433.94	1.319E-01	?(	5.922E-01		1.33E+02	9.05E+01	G
			722.94	3.922E-01	?(	5.236E-01		4.19E+01	9.08E+01	G
			614.28	-1.551E-01	-	7.460E-01		1.43E+02	8.98E+01	G
AG-110M	F	1.0586E+03						2.50E+02		
			884.68	3.477E+02	?(	1.169E+03		9.90E+01	7.27E+01	G
			657.76	6.110E+00	%	1.426E+03		6.80E+03	9.46E+01	G
			937.49	-2.391E+01	%	2.288E+03		2.64E+03	3.44E+01	G
			1384.30	-2.539E+02	-	4.849E+03		5.36E+02	2.43E+01	G
			763.94	3.378E+03	(	5.416E+03		4.93E+01	2.23E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	1.8886E-01					1.15E+02	
			391.69	1.889E-01	(	7.443E-01	1.17E+02	6.40E+01 G
SB-124	F	4.2715E-01					6.02E+01	
			602.73	3.513E-01	?(	4.341E-01	3.90E+01	9.83E+01 G
			1690.98	4.136E-02	&	1.199E+00	7.90E+02	4.78E+01 G
			722.79	1.116E+00	?(	1.744E+01	4.67E+02	1.08E+01 G
SB-125	I	9.0902E+00					1.01E+03	
			427.88	1.008E+01	(	8.933E+00	3.90E+01	2.96E+01 G
			600.50	7.448E+00	&(	2.153E+01	8.66E+01	1.79E+01 G
			635.89	2.615E+00	&	3.710E+01	4.15E+02	1.13E+01 G
			463.37	1.927E+02	+	3.310E+01	7.11E+00	1.05E+01 G
I-131	I	-7.4029E-03					8.02E+00	
			364.48	-1.662E-01	(	6.738E-01	1.21E+02	8.17E+01 G
			284.30	-1.933E-02	%	6.926E+00	1.05E+04	6.14E+00 G
			636.97	1.803E+00	(	9.468E+00	1.55E+02	7.17E+00 G
Gd-153	F	-1.9713E+03					2.42E+02	
			97.50	-1.971E+03	?(	3.737E+03	5.76E+01	3.00E+01 G
			103.20	-2.284E+03	&	5.706E+03	7.56E+01	2.18E+01 G
Ga-68	C	2.1843E+00					4.71E-02	
			1077.40	2.184E+00	&(	1.890E+01	2.45E+02	3.30E+00 G
Tc-99m	I	9.2939E-02					2.51E-01	
			140.51	9.294E-02	?(	5.271E-01	1.70E+02	8.93E+01 G
BA-133	F	4.1497E-01					3.85E+03	
			356.00	4.150E-01	@(	1.224E+00	8.85E+01	6.20E+01 G
			302.85	-5.303E+00	+	5.875E+00	3.43E+01	1.83E+01 G
			383.84	1.721E+00	*	9.935E+00	1.71E+02	8.94E+00 GA
			80.99	-9.520E-01	+	2.324E+00	7.39E+01	3.41E+01 GA
CS-134	I	2.2498E+01					7.54E+02	
			604.71	-7.101E-01	?(	5.878E+00	2.41E+02	9.76E+01 G
			795.87	4.398E+01	?(	8.657E+00	8.46E+00	8.55E+01 G
			569.32	-1.438E+00	%	5.870E+01	1.20E+03	1.54E+01 G
			801.95	-1.789E+01	+	9.103E+01	1.50E+02	8.69E+00 G
			563.24	7.380E+01	?(	8.941E+01	3.78E+01	8.35E+00 G
CS-137	I	2.5076E-01					1.10E+04	
			661.66	2.508E-01	?(	8.870E-01	1.05E+02	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	-8.2397E-03					1.38E+02	
			165.85-8.240E-03		&(	4.925E-01	1.77E+03	7.99E+01 G
Ba-140	I	-6.3261E-02					1.28E+01	
			537.26-5.553E-01		?(	2.524E+00	1.35E+02	2.44E+01 G
			162.66 1.866E+00		(	6.962E+00	1.12E+02	6.22E+00 G
			304.85-4.172E+00		+	1.190E+01	8.58E+01	4.29E+00 G
La-140	I	1.5237E+00					1.28E+01	
			1596.21-2.437E-01		?(	9.891E-01	1.19E+02	9.54E+01 G
			487.02 2.376E-01		(	1.194E+00	1.49E+02	4.55E+01 G
			328.76 1.271E+01		?(	2.501E+00	7.55E+00	2.03E+01 G
			815.77 1.420E-01		-	2.068E+00	4.16E+02	2.33E+01 G
CE-141	I	1.8297E-01					3.25E+01	
			145.44 1.830E-01		(	8.998E-01	1.47E+02	4.82E+01 G
CE-144	I	3.5551E+01					2.85E+02	
			133.54 3.555E+01		%(	2.911E+03	2.43E+03	1.11E+01 G
PM-144	C	4.0630E+00					3.63E+02	
			696.54-3.344E+00		%(	1.338E+02	1.17E+03	9.90E+01 G
			618.06 1.146E+01		(	1.215E+02	3.11E+02	9.91E+01 G
			476.81-3.515E+01		+	2.450E+02	2.06E+02	4.20E+01 G
EU-152	F	-6.3974E-01					4.94E+03	
			344.29-6.397E-01		?(	2.771E+00	1.29E+02	2.65E+01 G
			1112.07-2.554E-01		+	6.311E+00	6.99E+02	1.36E+01 G
			121.78-6.945E-01		+	2.096E+00	9.09E+01	2.86E+01 G
			778.92-2.707E+00		+	7.808E+00	8.64E+01	1.29E+01 G
			964.11-1.100E+01		+	1.320E+01	3.72E+01	1.46E+01 G
			244.69-3.913E+00		+	9.471E+00	7.31E+01	7.58E+00 G
			1408.00-1.972E-01		+	3.871E+00	5.44E+02	2.10E+01 GA
EU-154	I	1.2738E+00					3.14E+03	
			873.23 9.959E-01		?(	8.360E+00	2.43E+02	1.23E+01 G
			123.10-5.331E-01		+	1.862E+00	1.05E+02	4.08E+01 G
			1274.54 3.956E-02		&	2.886E+00	2.02E+03	3.52E+01 G
			723.36 1.089E+00		&(	1.752E+01	4.81E+02	2.02E+01 G
			1004.77 1.743E+00		(	4.579E+00	7.83E+01	1.80E+01 G
			996.33 1.149E+00		?(	9.352E+00	2.34E+02	1.06E+01 G
EU-155	I	1.8431E+01					1.81E+03	
			105.31 1.843E+01		*(	4.898E+00	1.19E+01	2.12E+01 G
			86.54 1.843E+01		}	3.960E+00	1.22E+01	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	1.7963E-01					4.24E+01	
			482.00	1.898E-01	(	7.137E-01	1.12E+02	8.05E+01 G
			133.02	5.104E-02	-	9.011E-01	5.25E+02	4.33E+01 G
			345.83	1.254E-01	?(	3.089E+00	7.22E+02	1.51E+01 G
			136.30	-9.968E-02	&	6.721E+00	2.00E+03	5.85E+00 G
Ta-182	F	6.4360E-01					1.14E+02	
			1121.30	6.436E-01	*(	1.492E+00	6.98E+01	3.49E+01 G
			1221.41	-1.340E-01	-	1.969E+00	4.12E+02	2.70E+01 G
			1189.05	2.650E-01	-	2.867E+00	3.02E+02	1.62E+01 G
Hg-203	F	2.6453E-02					4.66E+01	
			279.20	2.645E-02	?(	6.610E-01	7.39E+02	8.15E+01 G
TL-208	N	2.7996E+02					6.98E+02	
			583.02	2.800E+02	(P	1.037E+01	2.98E+00	8.45E+01 G
			277.28	3.407E+02	+ P	1.054E+02	1.47E+01	6.31E+00 G
			860.56	3.658E+02	+	4.297E+01	8.49E+00	1.24E+01 G
pm-146	C	2.3304E+00					2.02E+03	
			747.16	1.255E+00	&(	4.892E+00	1.16E+02	3.40E+01 G
			735.72	3.955E+00	&(	7.365E+00	5.68E+01	2.25E+01 G
			453.88	-6.410E-01	&	2.008E+00	9.37E+01	6.50E+01 G
y-88	F	-5.0727E-02					1.07E+02	
			898.04	-5.073E-02	?(	6.507E-01	3.70E+02	9.37E+01 G
			1836.06	-8.177E-03	&	5.837E-01	1.92E+03	9.92E+01 G
Cd-109	F	5.7611E+02					4.53E+02	
			88.04	5.761E+02	(	1.017E+03	5.37E+01	3.79E+00 G
PB-210	N	2.6538E+00					8.14E+03	
			46.54	2.654E+00	?(P	1.537E+01	4.83E+01	4.25E+00 G
PB-212	N	8.8066E+02					6.98E+02	
			238.63	8.807E+02	(P	1.396E+01	1.44E+00	4.33E+01 G
			300.03	8.992E+02	P	1.957E+02	1.04E+01	3.28E+00 GA
PB-214	N	8.0649E-01					5.84E+05	
			351.93	7.665E-01	(P	9.602E-01	3.06E+01	3.76E+01 G
			295.09	8.844E-01	?(P	2.570E+00	5.85E+01	1.93E+01 G
			242.00	8.920E-01	P	8.300E+00	1.66E+02	7.43E+00 GA
BI-207	C	7.5020E-03					1.18E+04	
			569.70	7.502E-03	&(	5.940E-01	2.28E+03	9.77E+01 G
			1063.66	-1.471E-02	%	9.056E-01	1.74E+03	7.45E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-212	N	9.2477E+02					6.98E+02	
			727.17	9.248E+02	(	1.289E+02	8.78E+00	7.55E+00 G
			785.42	1.476E+03	+	6.468E+02	2.29E+01	1.28E+00 GA
BI-214	N	2.3028E-01					5.84E+05	
			609.31	1.955E-01	?(P	1.510E+00	6.78E+01	4.61E+01 G
			1120.29	3.364E-01	*(P	3.859E+00	6.96E+01	1.51E+01 G
			1764.49	-1.481E+00	% P	4.744E+00	1.00E+03	1.54E+01 G
BI-210M	T	-1.1905E-01					1.10E+09	
			265.83	-1.190E-01	?(	1.003E+00	2.50E+02	5.00E+01 G
			304.90	-6.398E-01	+	1.823E+00	8.57E+01	2.80E+01 G
RA-224	N	8.2740E+02					6.98E+02	
			240.99	8.274E+02	(	2.640E+02	1.06E+01	4.10E+00 G
AC-228	N	1.9889E+02					2.10E+03	
			911.16	1.994E+02	(	2.772E+00	2.50E+00	2.90E+01 G
			968.97	1.883E+02	-	5.641E+00	3.38E+00	1.75E+01 G
			338.32	1.976E+02	(	9.500E+00	3.28E+00	1.20E+01 G
			93.35	1.298E+02	-	1.934E+01	7.21E+00	5.56E+00 XA
TH-227	N	-2.1126E+00					7.95E+03	
			235.97	-2.113E+00	?(	2.310E+01	3.30E+02	1.23E+01 G
			50.14	-1.345E-02	%	7.977E+00	1.76E+04	8.00E+00 G
			256.24	-7.697E-01	&	8.685E+00	3.34E+02	7.00E+00 G
TH-229	N	-1.8808E+00					2.68E+06	
			193.51	-1.881E+00	?(	1.120E+01	1.78E+02	4.40E+00 G
			210.85	-9.173E+00	&	1.925E+01	6.37E+01	2.99E+00 G
TH-234	N	2.3642E+01					1.63E+12	
			63.29	-4.631E+00	%(P	1.694E+01	5.73E+03	3.81E+00 G
			92.59	4.293E+01	?(P	8.798E+00	6.53E+00	5.58E+00 G
PA-231	N	-1.9992E+01					1.20E+07	
			302.65	-1.999E+01	&(	2.352E+01	3.63E+01	2.88E+00 G
			300.07	7.710E+01	+	1.995E+01	9.38E+00	2.46E+00 G
PA-233	C	4.4357E+00					7.82E+08	
			312.01	-3.185E-02	%(	1.323E+00	1.22E+03	3.60E+01 G
			300.18	3.038E+01	(	7.992E+00	9.50E+00	6.20E+00 G
PA-234	N	-2.5595E+00					1.63E+12	
			131.29	-2.559E+00	?(	2.999E+00	3.60E+01	1.80E+01 G
			946.02	-7.206E-01	+	3.661E+00	1.47E+02	1.34E+01 G
			569.47	-4.068E+00	&	7.919E+00	5.92E+01	8.20E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		883.24	1.303E+00	+	4.796E+00	1.08E+02	9.60E+00 G
		880.53-1.821E+00		+	8.756E+00	1.40E+02	6.00E+00 GA
PA-234M	N -3.1254E-01					1.63E+12	
		1001.00-3.125E-01		%(	6.731E+01	6.07E+03	8.37E-01 G
		766.41-6.861E+01		&	2.679E+02	1.16E+02	2.94E-01 G
U-235	N -4.8722E-02					2.57E+11	
		143.79-4.872E-02		&(P	3.280E+00	3.29E+02	1.10E+01 G
		205.33-1.365E+00		+	1.017E+01	2.22E+02	5.01E+00 G
		163.38-1.387E+00		+	9.023E+00	1.94E+02	5.08E+00 G
AM-241	T 3.0026E-01					1.58E+05	
		59.54	3.003E-01	?(	1.760E+00	1.76E+02	3.59E+01 G
Ir-192	F 6.4320E-02					7.40E+01	
		316.49-1.170E-01		?(	5.745E-01	1.46E+02	8.70E+01 G
		468.06-1.215E-02		%	1.043E+00	2.50E+03	5.18E+01 G
		308.44	5.614E-01	?(	1.370E+00	7.36E+01	3.18E+01 G
		295.95-2.978E-01		&	1.754E+00	1.75E+02	3.02E+01 G
Cs-136	F 1.6639E-01					1.30E+01	
		818.50	1.664E-01	&(	4.811E-01	8.60E+01	1.00E+02 G
		1048.07	1.977E-02	-	6.019E-01	8.49E+02	8.00E+01 G
		340.57-2.075E+00		+	1.985E+00	2.96E+01	4.69E+01 G
Np-239	T 4.1666E+00					2.36E+00	
		103.70-1.213E+00		-	2.057E+00	5.16E+01	2.40E+01 X
		106.13	4.167E+00	(	1.806E+00	1.42E+01	2.27E+01 G
		99.50	5.421E+00		2.675E+00	1.60E+01	1.50E+01 X
Nd-147	-2.0664E-01					1.11E+01	
		531.00-2.066E-01		(	4.553E+00	6.44E+02	1.30E+01 G
		91.10-2.026E+00		+	2.224E+00	3.37E+01	2.83E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.

& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

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

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

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	59.90	1332.	29.	0.008	176.05	3.003E-01	
BA-133	82.23	957.	-60.	-0.017	73.85	-9.520E-01	
Nd-147	91.96	1664.	-176.	-0.049	33.69	0.000E+00	
TH-234	93.39	1007.	735.	0.204	6.53	4.293E+01	P
Gd-153	97.84	868.	-74.	-0.021	57.61	-1.971E+03	
Gd-153	103.75	1067.	-62.	-0.017	75.55	-2.284E+03	
EU-152	123.00	657.	-40.	-0.011	90.94	-6.945E-01	
CO-57	124.49	384.	77.	0.021	37.58	3.124E+02	
EU-154	123.03	678.	-36.	-0.010	105.04	-5.331E-01	
PA-234	130.46	1111.	-135.	-0.037	35.99	-2.559E+00	
HF-181	134.88	568.	6.	0.002	524.52	0.000E+00	
CO-57	135.15	605.	-4.	-0.001	902.09	-1.288E+02	
Tc-99m	140.52	715.	22.	0.006	169.77	0.000E+00	
CE-141	145.26	663.	25.	0.007	147.31	0.000E+00	
Ba-140	162.35	598.	31.	0.009	112.03	0.000E+00	
U-235	164.00	669.	-19.	-0.005	194.38	-1.387E+00	
TH-229	193.79	611.	-20.	-0.005	178.03	-1.881E+00	
U-235	205.56	601.	-16.	-0.004	222.29	-1.365E+00	
TH-229	211.61	743.	-62.	-0.017	63.65	-9.173E+00	
TH-227	235.97	9910.	-43.	-0.012	330.24	-2.113E+00	
EU-152	243.78	431.	-41.	-0.011	73.13	-3.913E+00	
TH-227	256.26	385.	-8.	-0.002	334.35	-7.697E-01	
BI-210M	266.19	399.	-11.	-0.003	250.20	-1.190E-01	
Hg-203	278.61	430.	4.	0.001	739.39	0.000E+00	
Ir-192	296.33	379.	-16.	-0.004	175.36	0.000E+00	
PA-231	300.00	318.	332.	0.092	9.38	7.710E+01	
PA-233	300.00	324.	329.	0.091	9.50	3.038E+01	
PA-231	301.85	609.	-100.	-0.028	36.28	-1.999E+01	
BA-133	301.87	577.	-103.	-0.029	34.26	-5.303E+00	
Ba-140	305.23	337.	-31.	-0.009	85.79	0.000E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	305.23	337.	-31.	-0.009	85.72	-6.398E-01	
Ir-192	307.62	238.	31.	0.008	73.64	0.000E+00	
Ir-192	316.55	305.	-17.	-0.005	146.20	0.000E+00	
CR-51	321.27	258.	29.	0.008	80.65	0.000E+00	
La-140	327.95	297.	422.	0.117	7.55	0.000E+00	
Cs-136	340.01	975.	-155.	-0.043	29.60	0.000E+00	
EU-152	343.52	270.	-18.	-0.005	129.10	-6.397E-01	
HF-181	345.61	229.	3.	0.001	722.06	0.000E+00	
BA-133	354.83	219.	24.	0.007	88.52	4.150E-01	
BA-133	383.60	269.	14.	0.004	171.33	1.721E+00	
AG-108M	433.71	209.	16.	0.004	133.37	1.319E-01	
pm-146	456.18	183.	-21.	-0.006	93.73	-6.410E-01	
BE-7	477.91	198.	12.	0.003	175.38	0.000E+00	
HF-181	481.97	210.	19.	0.005	112.13	0.000E+00	
La-140	486.58	184.	13.	0.004	148.86	0.000E+00	
RU-103	494.75	152.	-6.	-0.002	302.37	0.000E+00	
RH-106	510.81	258.	455.	0.126	6.85	3.039E+03	
Nd-147	532.71	190.	-3.	-0.001	644.13	0.000E+00	
Ba-140	537.57	203.	-15.	-0.004	135.00	0.000E+00	
CS-134	562.68	186.	55.	0.015	37.77	7.380E+01	
PA-234	568.41	206.	-36.	-0.010	59.19	-4.068E+00	
SB-124	606.05	77.	35.	0.010	38.99	0.000E+00	
CS-134	600.58	95.	-6.	-0.002	240.64	-7.101E-01	
BI-214	609.47	211.	9.	0.003	67.76	1.955E-01	P
RU-103	609.47	170.	31.	0.009	61.53	0.000E+00	
AG-108M	613.65	189.	-14.	-0.004	142.63	-1.551E-01	
RH-106	618.56	112.	3.	0.001	554.97	4.252E+01	
CS-137	661.94	153.	17.	0.005	105.34	2.508E-01	
SB-124	722.79	1237.	11.	0.003	467.26	0.000E+00	
AG-108M	719.72	69.	31.	0.009	41.90	3.922E-01	
EU-154	723.36	1314.	11.	0.003	481.41	1.089E+00	
pm-146	736.86	134.	30.	0.008	56.78	3.955E+00	
pm-146	747.29	132.	14.	0.004	115.59	1.255E+00	
ZR-95	756.79	188.	-8.	-0.002	247.93	0.000E+00	
NB-95	766.07	175.	-12.	-0.003	161.45	0.000E+00	
PA-234M	765.89	187.	-17.	-0.005	116.22	-6.861E+01	
EU-152	779.16	138.	-20.	-0.006	86.37	-2.707E+00	
CS-134	794.92	101.	252.	0.070	8.46	4.398E+01	
CS-134	801.47	115.	-10.	-0.003	149.73	-1.789E+01	
CO-58	810.32	76.	-8.	-0.002	167.38	0.000E+00	
La-140	818.89	59.	3.	0.001	415.52	0.000E+00	
Cs-136	818.04	59.	13.	0.004	86.05	0.000E+00	
MN-54	832.83	181.	-49.	-0.013	41.72	-2.594E+02	
Co-56	846.59	76.	-9.	-0.002	144.64	0.000E+00	
EU-154	872.61	73.	5.	0.001	242.64	9.959E-01	
PA-234	880.07	62.	-8.	-0.002	140.33	-1.821E+00	
PA-234	883.90	46.	9.	0.003	108.02	1.303E+00	
Sc-46	888.37	72.	-9.	-0.003	134.24	0.000E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
y-88	897.81	82.	-4.	-0.001	369.74	0.000E+00		
PA-234	946.11	47.	-7.	-0.002	147.18	-7.206E-01		
EU-152	966.78	364.	-76.	-0.021	37.15	-1.100E+01		
EU-154	995.76	53.	5.	0.001	233.54	1.149E+00		
EU-154	1004.96	35.	12.	0.003	78.33	1.743E+00		
Co-56	1038.00	57.	-6.	-0.002	175.13	0.000E+00		
Cs-136	1048.01	37.	1.	0.000	849.41	0.000E+00		
RH-106	1046.62	21.	3.	0.001	232.33	4.450E+02		
Ga-68	1073.52	33.	3.	0.001	244.51	0.000E+00		
FE-59	1102.71	17.	11.	0.003	64.05	0.000E+00		
EU-152	1113.16	52.	-1.	0.000	698.78	-2.554E-01		
ZN-65	1115.81	61.	-7.	-0.002	157.72	-5.218E+02		
BI-214	1120.39	50.	3.	0.001	69.60	3.364E-01	P	
Sc-46	1120.50	39.	14.	0.004	70.25	0.000E+00		
Ta-182	1121.41	39.	14.	0.004	69.79	0.000E+00		
CO-60	1173.04	53.	-7.	-0.002	159.50	-3.006E-01		
Ta-182	1189.19	27.	2.	0.001	302.15	0.000E+00		
Ta-182	1219.36	35.	-2.	-0.001	411.92	0.000E+00		
Co-56	1238.60	38.	4.	0.001	205.87	0.000E+00		
FE-59	1291.90	36.	3.	0.001	279.42	0.000E+00		
CO-60	1333.57	34.	-5.	-0.001	168.76	-2.557E-01		
EU-152	1411.07	29.	-1.	0.000	544.30	-1.972E-01		
La-140	1595.28	72.	-10.	-0.003	119.40	0.000E+00		
SB-124	1688.45	22.	1.	0.000	789.53	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
BE-7	#A	8.8854E-01	>12 Halflives	1.7538E+02%	5.2712E+00	
NA-22	#A	1.1277E-02	8.2007E-02	1.224E+03%		3.65E+00
K-40	#A	4.3548E+00	4.3548E+00	4.547E+01%		7.01E+00
Sc-46	#A	4.9696E-02	>12 Halflives	7.0252E+01%	5.6579E-01	
CR-51	#A	1.7470E+00	>12 Halflives	8.0650E+01%	4.6811E+00	
MN-54	#A	-6.1919E-01	-2.5939E+02	4.172E+01%		3.49E+02
FE-59	#A	2.2688E-01	>12 Halflives	6.4054E+01%	6.3144E-01	
Co-56	#A	-2.1725E-02	>12 Halflives	1.2580E+02%	5.6000E-01	
CO-57	#A	3.0306E-01	3.1239E+02	3.758E+01%		3.80E+02
CO-58	#A	-9.4548E-02	>12 Halflives	1.6738E+02%	5.4290E-01	
CO-60	#A	-9.6028E-02	-2.5572E-01	1.688E+02%		1.51E+00
ZN-65	#A	-2.3170E-01	-5.2175E+02	1.577E+02%		2.83E+03
NB-94	A	8.7763E-02	8.7785E-02	1.172E+02%		7.26E-01
ZR-95	#A	-1.7049E-01	>12 Halflives	2.4793E+02%	1.4369E+00	
NB-95	#A	-1.4011E-01	>12 Halflives	1.6145E+02%	7.6538E-01	
RU-103	#A	-5.3761E-02	>12 Halflives	3.0237E+02%	5.5560E-01	

RH-106 #A	6.2459E-01	9.7172E+01	2.323E+02%		8.15E+02
AG-108M#A	2.5910E-01	2.6232E-01	4.190E+01%		5.92E-01
AG-110M A	5.5722E-01	1.0586E+03	4.933E+01%		1.17E+03
SN-113 A	1.8886E-01	>12 Halflives	1.1733E+02%	7.4425E-01	
SB-124 #A	4.2715E-01	>12 Halflives	3.8988E+01%	4.3412E-01	
SB-125	1.3986E+00	9.0902E+00	3.903E+01%		8.93E+00
I-131 A	-7.4029E-03	>12 Halflives	9.8510E+01%	6.7378E-01	
Gd-153 #A	-8.0284E-01	-1.9713E+03	5.761E+01%		3.74E+03
Ga-68 #A	2.1843E+00	>12 Halflives	2.4451E+02%	1.8899E+01	
Tc-99m #A	9.2939E-02	>12 Halflives	1.6977E+02%	5.2710E-01	
BA-133 #A	2.5427E-01	4.1497E-01	8.852E+01%		1.22E+00
CS-134 #C	1.8463E+00	2.2498E+01	8.460E+00%		5.88E+00
CS-137 #A	2.1112E-01	2.5076E-01	1.053E+02%		8.87E-01
CE-139 #A	-8.2397E-03	>12 Halflives	1.7685E+03%	4.9246E-01	
Ba-140 #A	-6.3261E-02	>12 Halflives	8.7716E+01%	2.5243E+00	
La-140 #C	1.5237E+00	>12 Halflives	7.5535E+00%	9.8914E-01	
CE-141 #A	1.8297E-01	>12 Halflives	1.4731E+02%	8.9977E-01	
CE-144 #A	4.7484E-02	3.5551E+01	2.433E+03%		2.91E+03
PM-144 A	2.2540E-02	4.0630E+00	3.111E+02%		1.34E+02
EU-152 #A	-4.3690E-01	-6.3974E-01	1.291E+02%		2.77E+00
EU-154 #A	6.9852E-01	1.2738E+00	7.833E+01%		8.36E+00
EU-155 #	6.5091E+00	1.8431E+01	1.193E+01%		4.90E+00
HF-181 #A	1.7963E-01	>12 Halflives	1.1213E+02%	7.1366E-01	
Ta-182 #A	6.4360E-01	>12 Halflives	6.9786E+01%	1.4919E+00	
Hg-203 #A	2.6453E-02	>12 Halflives	7.3939E+02%	6.6105E-01	
TL-208	1.8760E+01	2.7996E+02	2.997E+00%		1.04E+01
pm-146 #A	9.1622E-01	2.3304E+00	5.678E+01%		4.89E+00
y-88 #A	-5.0727E-02	>12 Halflives	3.6974E+02%	6.5071E-01	
Cd-109 A	8.9996E+00	5.7611E+02	5.370E+01%		1.02E+03
PB-210 #A	2.1053E+00	2.6538E+00	1.700E+02%		1.54E+01
PB-212	5.9014E+01	8.8066E+02	1.449E+00%		1.40E+01
PB-214 A	8.0389E-01	8.0649E-01	4.452E+01%		9.60E-01
BI-207 #A	6.3907E-03	7.5020E-03	2.283E+03%		5.94E-01
BI-212	6.1970E+01	9.2477E+02	8.780E+00%		1.29E+02
BI-214 #A	2.2954E-01	2.3028E-01	1.903E+02%		1.51E+00
BI-210M#A	-1.1905E-01	-1.1905E-01	2.502E+02%		1.00E+00
RA-224	5.5445E+01	8.2740E+02	1.057E+01%		2.64E+02
AC-228	8.1039E+01	1.9889E+02	2.061E+00%		2.77E+00
TH-227 #A	-1.6666E+00	-2.1126E+00	3.302E+02%		2.31E+01
TH-229 #A	-1.8795E+00	-1.8808E+00	1.780E+02%		1.12E+01
TH-234 #C	2.3642E+01	2.3642E+01	7.058E+00%		1.69E+01
PA-231 #A	-1.9989E+01	-1.9992E+01	3.628E+01%		2.35E+01
PA-233 #C	4.4357E+00	4.4357E+00	9.497E+00%		1.32E+00
PA-234 #A	-2.5595E+00	-2.5595E+00	3.599E+01%		3.00E+00
PA-234M#A	-3.1254E-01	-3.1254E-01	6.075E+03%		6.73E+01
U-235 #A	-4.8722E-02	-4.8722E-02	2.633E+03%		3.28E+00
AM-241 #A	2.9670E-01	3.0026E-01	1.760E+02%		1.76E+00
Np-237 #A	0.0000E+00	0.0000E+00	0.000E+00%		4.69E+00
Ir-192 #A	6.4320E-02	>12 Halflives	7.3642E+01%	5.7446E-01	

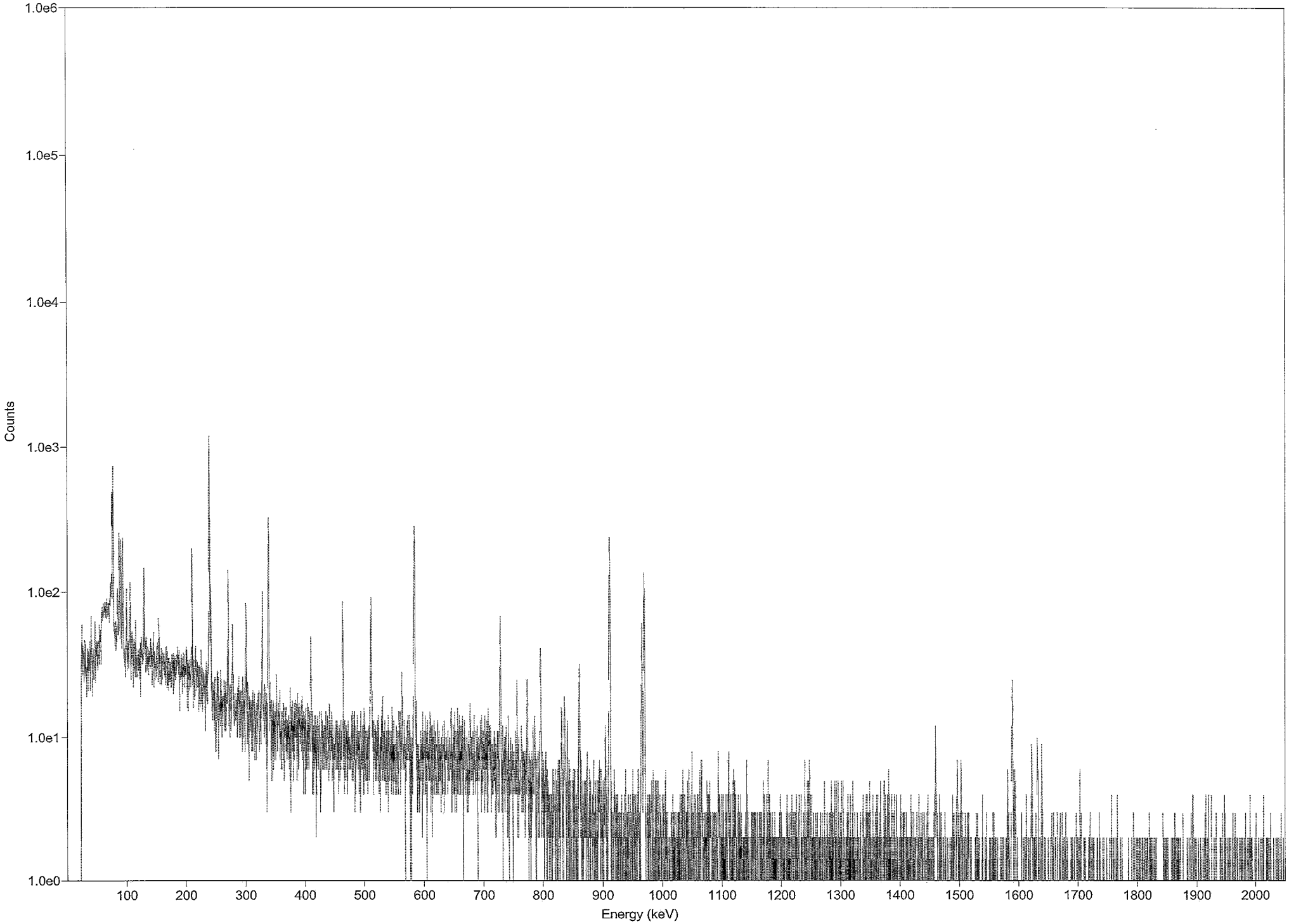
Cs-136	#A	1.6639E-01	>12 Halflives	8.6047E+01%	4.8111E-01
Np-239	C	4.1666E+00	>12 Halflives	1.4159E+01%	1.8062E+00
Nd-147	#A	-2.0664E-01	>12 Halflives	6.4413E+02%	4.5526E+00

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

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

Total Activity (1384.1 to 1999.5 keV) 2.939E+02 Bq/Sample
Total Decayed Activity (1384.1 to 1999.5 keV) 3.7161255E+03 Bq/Sample

M132730_NA_3. 11_NA_20130864.spc.

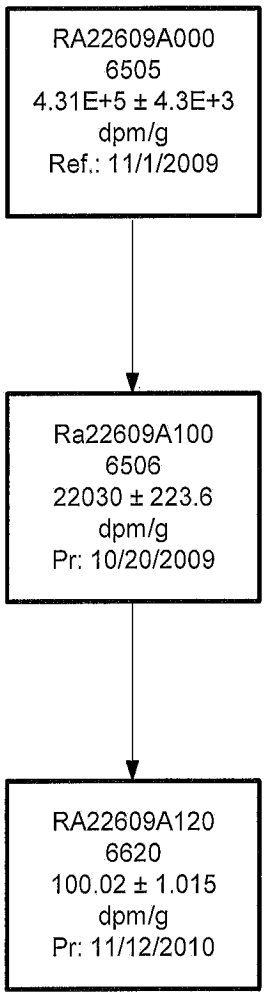


Reagent

RA22609A120_00003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Ra22609A



TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ISOTOPE DILUTION RECORD

1) Prepared by	drm		2) Date Prepared	11/12/2010
3) Source Identification Number / Ref. Number			***RA22609A100***	***6506***
4) Source Activity (dpm ± dpm/g)			2.2030E+04 ±	2.236E+02
5) Percent error of Source Activity			1.015 %	
6) Weight of Source Material used (g)			4.5672	
7) (% Error) of Weight of Source Material used			0.0066 %	
8) Diluent		S-09-00265	1M HNO3	
9) Total Weight of the Dilution (g)			1006	
10) (% Error) of Total Weight of the Dilution			0.0172 %	
11) Specific Activity of Diluted Solution dpm/g			***1.0002E+02*** ±	***1.015E+00***
12) Total Uncertainty			1.015 %	
13) Dilution Identification Number / Ref. Number			***RA22609A120***	***6620***
14) Calibration Reference Date			11/1/2009	
15) Isotope Inventory File update by/date			drm	11/12/2010
16) Reviewed by/date			tda	11/29/2010
17) Location	QCLB		18) Exhausted	

****

CALCULATIONS

5) **Cert value at 99.7% (K=3) level / 3 OR Cert Value 95% (K=2) level/2 = 1 sigma uncertainty for propagation**

*7) % error of wt. used = (0.0003 / weight of source material used * 100)*

wt uncert (4 place balance) = Sqrt($0.0002^2 + 0.0002^2 + 0.00001^2$) = 0.0003 g

*10) % error of dilution wt. = (0.173 / total weight of dilution * 100)*

wt uncert (0.1 place balance) = Sqrt($0.1^2 + 0.1^2 + 0.1^2$) = 0.173 g

*11) Specific Activity = Source Activity * Wt. of Source Material used / Total Wt. of the Dilution*

12) % Total Uncertainty = $\sqrt{(\%\ \text{error of Source Activity}^2 + \%\ \text{error of Wt. Used}^2 + \%\ \text{error of Dilution Wt.}^2)}$

CC-006, 6/16/09, Rev 6

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ISOTOPE DILUTION RECORD

1) Prepared by	DRM	2) Date Prepared	10/20/2009
3) Source Identification Number / Ref. Number	***RA22609A000***		***6505***
4) Source Activity (dpm ± dpm/g)	4.3068E+05	±	4.307E+03
5) Percent error of Source Activity	1 %		
6) Weight of Source Material used (g)	5.1219		
7) (% Error) of Weight of Source Material used	0.0059 %		
8) Diluent	1M HNO3		
9) Total Weight of the Dilution (g)	100.1319		
10) (% Error) of Total Weight of the Dilution	0.1728 %		
11) Specific Activity of Diluted Solution dpm/g	***2.2030E+04***	***±***	***2.236E+02***
12) Total Uncertainty	1.015 %		
13) Dilution Identification Number / Ref. Number	***RA22609A100***		***6506***
14) Callbration Reference Date	11/1/2009		
15) Isotope Inventory File update by/date	DRM		10/20/2009
16) Reviewed by/date	tda		1/26/2010
17) Location	QCLB	18) Exhausted	

****

CALCULATIONS

5) **Cert value at 99.7% (K=3) level / 3 OR Cert Value 95% (K=2) level/2 = 1 sigma uncertainty for propagation**

*7) % error of wt. used = (0.0003 / weight of source material used * 100)*

wt uncert (4 place balance) = Sqrt(0.0002^2 + 0.0002^2 + 0.00001^2) = 0.0003 g

*10) % error of dilution wt. = (0.173 / total weight of dilution * 100)*

wt uncert (0.1 place balance) = Sqrt(0.1^2 + 0.1^2 + 0.1^2) = 0.173 g

*11) Specific Activity = Source Activity * Wt. of Source Material used / Total Wt. of the Dilution*

12) % Total Uncertainty = $\sqrt{(\%\ \text{error of Source Activity}^2 + \%\ \text{error of Wt. Used}^2 + \%\ \text{error of Dilution Wt.}^2)}$

CC-006, 6/16/09, Rev 6

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ISOTOPE RECORD FORM

1) Isotope: RA-226
2) Reference Number: 6505
3) Half Life: 1600 ± 7 years
4) Storage Location: Standards Lab 134A
5) Source Identification Number: RA22609A000-6505

****

CALIBRATION DATA

6) Activity as Received Units: 0.1940 uCi/g or 7.178 kBq/g
7) Overall Uncertainty Percent: 3.0% @ 99% = 1.0%
8) Reference Date / Time: November 1, 2009
9) Activity dpm/g: 4.3068E+5 ± 4.3068E+3 dpm/g
10) Volume or Mass (ml/g): 5.15872
11) Calibrated by: Isotope Products
12) Certificate Solution Number: 1388-74

****

SURVEY DATA

13) Date Received: 10/20/2009
14) Surveyed by: DRM
15) Survey Reading (Beta/Gamma) cpm: ~15,000
16) Survey Reading (Alpha) cpm: BKGD

****

17) Activity Conversion: 0.1940 uCi/g * 2220000 uCi/dpm =

4.3068E+5 ± 4.3068E+3 dpm/g

18) Remarks: Used entire ampoule for first dilution drm 10/20/2009

19) Isotope File Updated by: drm 10/20/2009
20) QC Approved: tda 1/26/10

Eckert & Ziegler
Isotope Products

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661•309•1010
Fax 661•257•8303

RA22609A000
6505
Rec: 10/20/2009

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	Ra-226	**Customer:**	TEST AMERICA
Half-life:	1600 ± 7 years	**P.O. No.:**	2328217
Catalog No.:	7226	**Reference Date:**	1-Nov-09 12:00 PST
Source No.:	1388-74	**Contained Radioactivity: (Ra-226 only)**	1.001 µCi 37.04 kBq

Physical Description:

A.	Mass of solution:	5.15872 g in 5 mL flame-sealed ampoule
B.	Chemical form:	$Ra(NO_3)_2$ in 1M HNO_3
C.	Carrier content:	10 µg Ba/mL of solution
D.	Density:	1.0318 g/mL @ 20°C

Radioimpurities:

None detected (daughters not in equilibrium as of 14-Oct-09)

Radionuclide Concentration: 0.1940 µCi/g, 7.178 kBq/g

Method of Calibration:

This source was prepared from a weighed aliquot of solution whose activity in µCi/g was determined using gamma ray spectrometry.

Peak energy used for integration:	186.0 keV
Branching ratio used:	0.0351 gammas per decay

Uncertainty of Measurement:

A.	Type A (random) uncertainty:	± 0.5 %
B.	Type B (systematic) uncertainty:	± 3.0 %
C.	Uncertainty in aliquot weighing:	± 0.0 %
D.	Total uncertainty at the 99% confidence level:	± 3.0 %

Notes:

- See reverse side for leak test(s) performed on this source.
- EZIP participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (as in NRC Regulatory Guide 4.15).
- Nuclear data was taken from NCRP Report No. 58, 1985.
- This solution has a working life of 5 years.

Daniel James Van Dalsem
Quality Control

15-OCT-09
Date

EZIP Ref. No.: 1388-74

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Standard Re-verification Check

Source I.D.:	Ra22609A120	*Date:*	5/16/2013
Check Source:	Analyzed with 3 other sources	*Initials:*	drm
Procedure:	Direct De-em		
Batch #:	T130136		

Sample I.D.	*Found*	*2 σ TPU*	*Expected*	*Chem Yield %*	*RadChem Yield %*
DVF6991	104	23.8	103.39		100.59%
DVF6992	98.3	19.66	103.05		95.39%
DVF6993	100	21	103.06		97.03%
		AVERAGE (95%-105%)			97.67%
		STANDARD DEVIATION			2.17%
		RSD<10% (2 sigma / average)			4.44%

Chemical Yield 20 - 115%
RadChem Yield 75 - 125%
Expected within 2 σ TPU of Found

Evaluation: *Data accepted 5/16/2013 drm*

The original NIST Certificate is located in Document Control Department.

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: for
W. Mao, Radiochemist

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

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source C_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

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

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

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
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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: _____ for
W. Mao, Radiochemist

QA Approved: _____ 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."

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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
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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: _____ for
W. Mao, Radiochemist

QA Approved: _____ 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: for
W. Mao, Radiochemist

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

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source F_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83725-334

5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

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: MTaskaeva
M. I. Taskaeva, Radiochemist

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

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: for
W. Mao, Radiochemist

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

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
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Eckert & Ziegler
Analytics

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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: M I Taskaeva
M. I. Taskaeva, Radiochemist

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

Reagent

Source H_00002

Eckert & Ziegler
Analytics

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Atlanta, Georgia 30318
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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: M I Taskaeva
M. I. Taskaeva, Radiochemist

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

Reagent

Sr-90_00001

Eckert & Ziegler
Analytics

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CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

80573-334
5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis
P.O. No.: 2324797, Item 1

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting. Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 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.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty*, % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Sr-90	10515.5	3.782E+04	0.1	0.9	1.8	09/17/2009

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

Comments:
Impurities: γ-impurities <0.1%. 5.04317 grams 0.1M HCl solution with approximately 30 microg/g each of Sr and Y carriers. NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta emission rate for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 9-22-09
D. M. Montgomery, QA Manager

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Corporate Office
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Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia 30318

Reagent

Sr-90_00017

Eckert & Ziegler
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Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

92352

Sr-90 5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2502682, Item 1 Product Code: 8090-5FSA-37kBq

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Sr-90	1.052E+04	3.749E+04	0.1	0.9	1.8	11/29/2012

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

Comments:
Impurities: γ-impurities<0.1%.
5.02357 g 0.1M HCl solution with approximately 30 µg/g each Sr and Y carriers.

NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total activity for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 26 Nov 12
J.D. McCorvey, Counting Room Manager

RAD12-0042
Sr-90
hursts
None
Prep/Opened: 11/28/2012
Exp(1): 11/29/2062
Exp(2): 11/29/2062

51511
ID Sr-90_00017
Sr-90 Ampoule

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Sr-90_00018

TestAmerica St. Louis

Standards Preparation Logbook Record

Nov-28-2012

Logbook: \\Qstlmo01\Stdslog\RAD_STD.std

RAD12-0042, Sr-90 Sr-90_00017 #51511 Analyst: hursts

Vendor: Analytics Lot No.: 92352
Solvent: None
Date Prep./Opened: 11-28-2012
Date Expires(1): 11-29-2062 (50 Years)
Date Expires(2): 11-29-2062 (50 Years)
Cert: 92352 Activity: 37490Bq Mass: 5.02357 Ref. Date: 11/29/12

Component	Initial Conc (dpm/g)	Final Conc (dpm/g)
Sr-90	447,769	447,769

RAD12-0043, Sr-90 Calibration STD Sr-90_00018 #51512 Analyst: hursts

Solvent: None Volume (ml): 100.00
Date Prep./Opened: 11-28-2012
Date Expires(1): 11-29-2062 (50 Years)
Date Expires(2): 11-29-2062 (50 Years)

Parent Std No.: RAD12-0042, Sr-90 Aliquot Amount (g): 4.9997
Parent Date Expires(1): 11-29-2062 Parent Date Expires(2): 11-29-2062

Component	Initial Conc (dpm/g)	Final Conc (dpm/mL)
Sr-90	447,769	22,387

Reviewed By: SRO

Page 1 of 1

St. Louis Radiological Standard Reverification Form

Standard ID Number: Rad12-0043
True Value = 2016.7 pCi/L or g
Date Analyzed: 11/30/2012

Radionuclide: Sr90

	Replicates	
#1	1964	pCi/L or g
#2	1958	pCi/L or g
#3	2015	pCi/L or g

Mean = 1979

1 sigma = 31.32092 1.96 sigma = 61.389

True Value minus 5% = 1915.865 (True Value - 5%)
True Value plus 5% = 2117.535 (True Value + 5%)

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

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

Standard Reverification Acceptable? **Yes**

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

Reviewed By/Date: 11/30/12

SOP Reference: STL-QA-0002, Current Revision

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gross Alpha/Beta

Batch: M122629 **Operator:** 63903

Sample ID	WRKNO	Aliquot		Mass		Instr ID	CountTime		Ts	Tb	Dilution	Sigma	
	Analyte	Cs	Cb	XT		CPMs	CPMb	Eff	Activity	UncTot	UncCnt	MDA	DLC
verification-1b	NA	1.000E+000	sample	0.0536	g	Purple16	11/30/12 10:42		8.00	1000.00	1.00	1.00	
	Gross Alpha	123	175	0.00	1.538E+001	1.750E-001	0.4314	**1.587E+001**	pCi/sample	1.707E+000	1.448E+000	8.638E-001	3.593E-001
	Gross Beta	14954	485	0.00	1.869E+003	4.850E-001	0.4285	**1.964E+003**	pCi/sample	9.953E+001	1.607E+001	1.211E+000	6.021E-001
verification-2b	NA	1.000E+000	sample	0.0529	g	Purple17	11/30/12 10:43		8.00	1000.00	1.00	1.00	
	Gross Alpha	53	87	0.00	6.625E+000	8.700E-002	0.1306	**2.254E+001**	pCi/sample	3.391E+000	3.138E+000	2.356E+000	8.365E-001
	Gross Beta	15152	362	0.00	1.894E+003	3.620E-001	0.4356	**1.958E+003**	pCi/sample	9.919E+001	1.591E+001	1.077E+000	5.117E-001
verification-3b	NA	1.000E+000	sample	0.0528	g	Purple18	11/30/12 10:43		8.00	1000.00	1.00	1.00	
	Gross Alpha	85	62	0.00	1.063E+001	6.200E-002	0.1313	**3.624E+001**	pCi/sample	4.462E+000	3.954E+000	2.160E+000	7.027E-001
	Gross Beta	15378	395	0.00	1.922E+003	3.950E-001	0.4296	**2.015E+003**	pCi/sample	1.020E+002	1.625E+001	1.125E+000	5.420E-001

Laboratory Control Sample Information

SampID	WRKNO	Analyte	Activity	StdAdded	Recovery	LCL	UCL	ZFactor
					%			

Sample Duplicate Information

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

Matrix Spike Information

SampID	SampMSID	Analyte	Sample Activity	MS Activity	StdAdded	MSRecovery	ZFactor
						%	

Blanks Information

SampID	WRKNO	Analyte	Activity	UncTotal	ZFactor

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Prep Report for Gross Alpha/Beta

Batch: M122629 **Prep Analyst:** 250

SampID	WRKNO	Aliquot		purple Gross	Tare	Mass	Dilution
verification-1b	NA	1.000E+000	sample	8.7067 g	8.6531 g	0.0536 g	1.00
verification-2b	NA	1.000E+000	sample	8.6615 g	8.6086 g	0.0529 g	1.00
verification-3b	NA	1.000E+000	sample	8.6935 g	8.6407 g	0.0528 g	1.00

16
17
18

Spike Information

Sample ID	Standard ID	Analyte	Std Conc	Aliquot	Ref Date	StdAdded
	Rad12-0043	SR-90	22.387 dpm/mL	0.1 mL	11-29-12	

MS — Spiked By

LM — Spike Verified By

11-28-12 — Spike Date

Standard Operating Procedures

SOPNumber	Title	Revision
☐		

Reviewed By — 11/30/12 Review Date

MS — Analyst/Relenquished By — 11/28/12 Release Date

Received By — 11/28/12 Receipt Date

MS 11-30-12 ~~112~~ 112343897/MS/11-28-12

Balance ID / Initials / Date

Reagent

Th-229_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

82832-334

5 mL Liquid in Flame Sealed Vial

Customer: Test America/Earth City, MO
P.O. No.: 2370431, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 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.

			Uncertainty*, % Type			
Isotope	Half-Life, Days	Activity (Bq)	u_A	u_B	U	Reference Date (12:00 PM EST)
Th-229	2.681E+06	3.813E+03	0.3	1.0	2.1	07/14/2010

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

Comments:
Impurities: Th-228 - 1.25 Bq, Th-230 - 23.7 Bq, Th-232 - 1.5 Bq. 5.11380 grams 0.5M HNO3 solution.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 7/21/10
J. D. McCorvey, QA Manager Alternate

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Th-229_00012

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Th-229-00012

Reagent ID: Th-229_00012

Description:	Th-229 Tracer	Expiration Date:	12/26/2014
No. of Bottles:	1	Laboratory:	TestAmerica St. Louis
Storage Location:	RAD Actinide STDs	Prepared By:	Bramblett, Megan L
Reagent Volume:	500.000 mL	Solvent:	0.1M HNO3
Creation Date:	12/23/2013	Solvent Lot:	L0022
Container(s):	282329		
Comment:			

282329
ID: Th-229_00012
Exp: 12/26/14 Prpd: MLM Crt: 12/23/13
Th-229 Tracer

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
Th-229	Th-229_00004	07/14/2060	2264.31000	dpm/mL	67.92931	dpm/mL

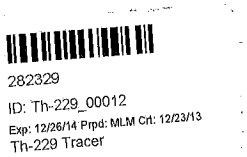
Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
Th-229_00004	Th-229 Parent		07/14/60				15.00000	mL

St. Louis Radiological Standard Reverification Form

Standard ID Number: Th-229_00012
True Value = 67.90686 DPM/L or g
Date Analyzed: 12/26/2013

Radionuclide: Th-229



Replicates		
#1	69.113	DPM/L or g
#2	66.755	DPM/L or g
#3	68.034	DPM/L or g

Mean = 67.96733

1 sigma = 1.180413

1.96 sigma = 2.313609

True Value minus 5% = 64.51152 (True Value - 5%)
True Value plus 5% = 71.3022 (True Value + 5%)

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

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

Standard Reverification Acceptable? Yes

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

Reviewed By/Date: RTM 12/30/2013

SOP Reference: STL-QA-0002, Current Revision

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:30:35AM 12/30/2013

Sample

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

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

Batch

Batch Name: Th-229_0012
AnalysisID: 592567

Analyst: 60040

Tracer

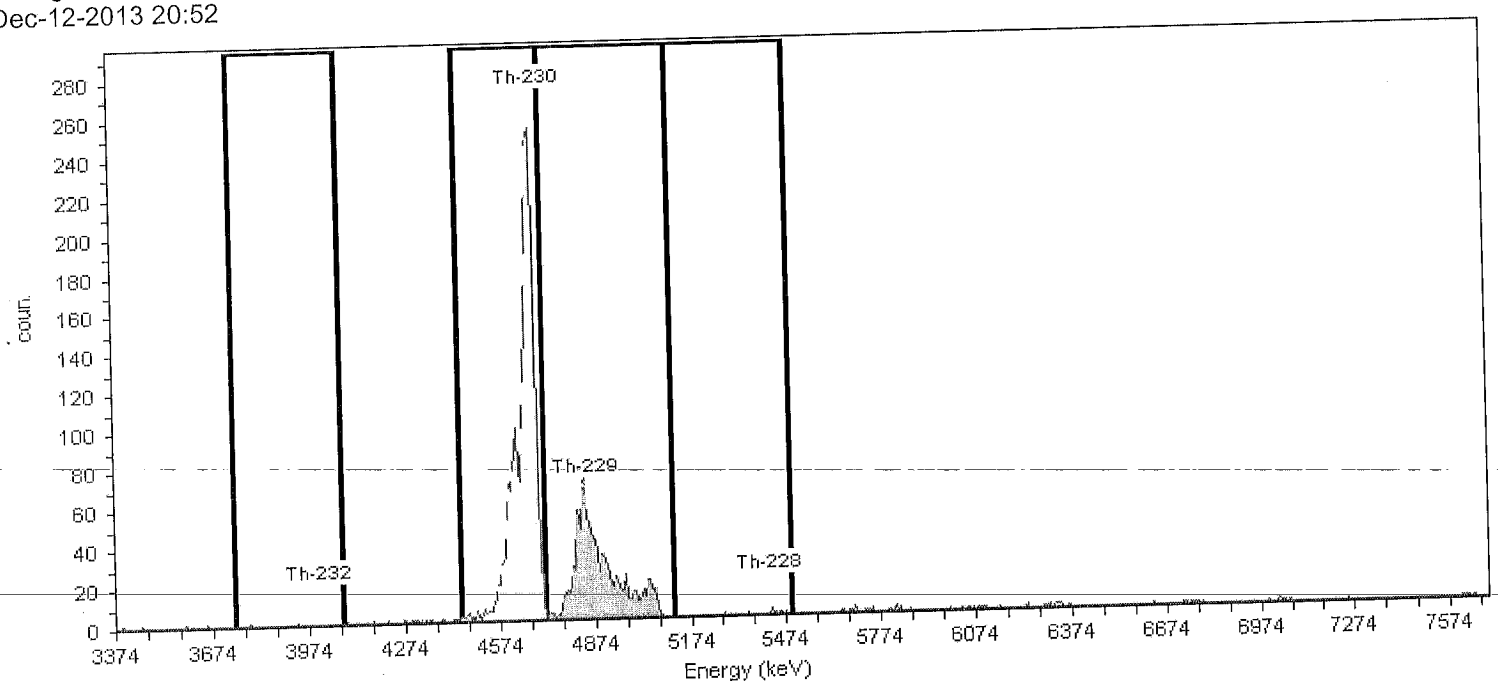
Tracer Name: Th-230_00017
Tracer Activity: 47.94 DPM/mL x (Vol.)0.30 mL = 14.38 DPM
Tracer Ref. Date: 4/11/2011 11:00:10AM

Tracer Nuclide: Th-230
Tracer Recovery: 90.73%

Acquisition

Detector: AV44
Serial Number: 50-051JJ1
Acquisition Start Date: 12/26/2013 4:26:11PM
Live Time: 600.00 min.
Real Time: 600.01 min.
Background Date: 12/12/2013 8:52:36PM
Background Info: Sample: ICB;AV44; Det: AV44; Spectrum #1; Dec-12-2013 20:52

Calibration Name: IC-9795;AV44-20130515
Calibration Date: 5/15/2013 9:25:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.64% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 12/26/2013 4:24:41PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	61.6	100.2	2	0.6250	1.38	0.095	DPM/mL
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	31.6	99.7	2079	0.0000	2079.38	130.481	DPM/mL
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	84.3	99.8	1004	3.7500	1000.25	69.113	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	36.0	99.8	8	7.5000	0.50	0.035	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:31:26AM 12/30/2013

Sample

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

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

Batch

Batch Name: Th-229_0012
AnalysisID: 592570

Analyst: 60040

Tracer

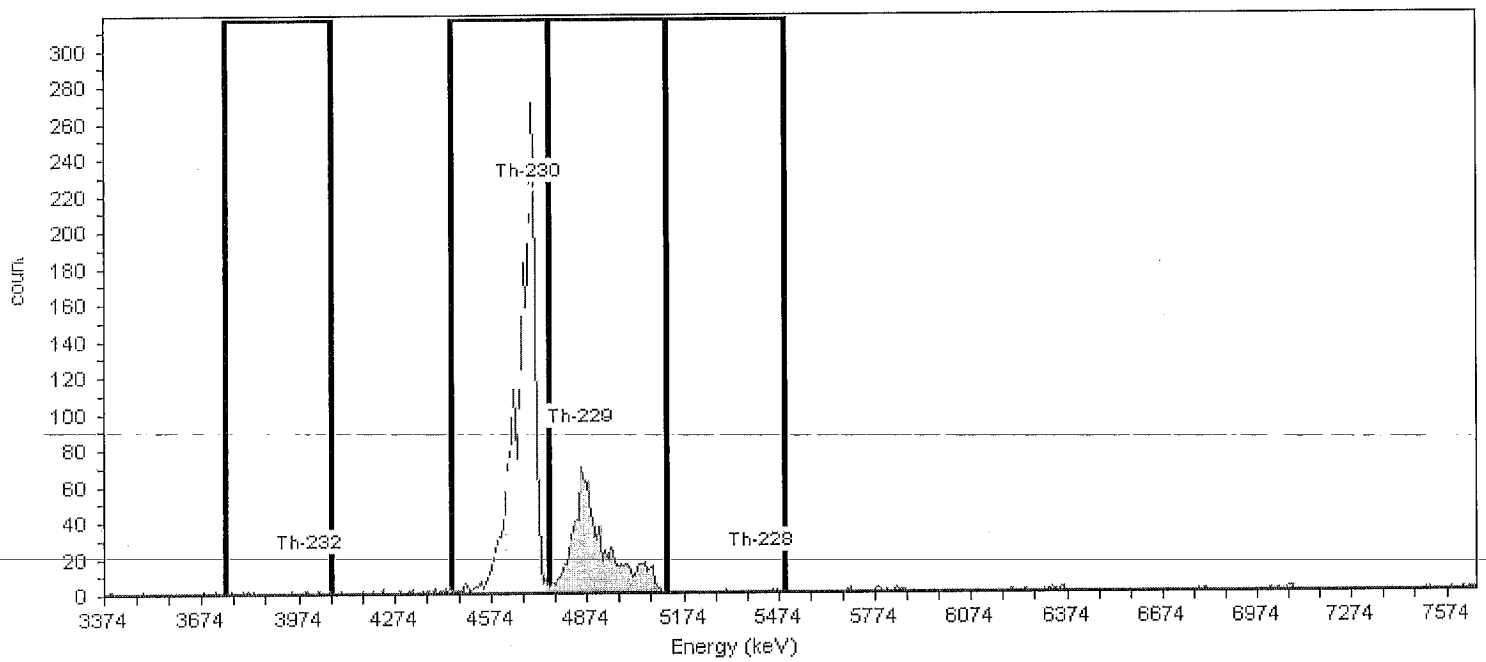
Tracer Name: Th-230_00017
Tracer Activity: 47.94 DPM/mL x (Vol.)0.30 mL = 14.38 DPM
Tracer Ref. Date: 4/11/2011 11:00:10AM

Tracer Nuclide: Th-230
Tracer Recovery: 95.22%

Acquisition

Detector: AV45
Serial Number: 48-158FF2
Acquisition Start Date: 12/26/2013 4:26:13PM
Live Time: 600.00 min.
Real Time: 600.01 min.
Background Date: 12/12/2013 8:52:38PM
Background Info: Sample: ICB;AV45; Det: AV45; Spectrum #1; Dec-12-2013 20:52

Calibration Name: IC-9817;AV45-20130515
Calibration Date: 5/15/2013 9:25:55PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.68% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 12/26/2013 4:24:41PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	37.3	100.2	7	0.0000	7.46	0.488	DPM/mL
Th-230	4688.0	4,687.5	0.5	4448.3	4754.1	64.3	99.7	2186	0.6250	2185.38	136.944	DPM/mL
Th-229	4848.0	4,845.3	2.7	4754.1	5119.5	79.8	99.8	1016	0.6250	1015.38	66.755	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	24.9	99.8	3	5.6250	-2.63	-0.173	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:32:04AM 12/30/2013

Sample

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

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

Batch

Batch Name: Th-229_0012
AnalysisID: 592571

Analyst: 60040

Tracer

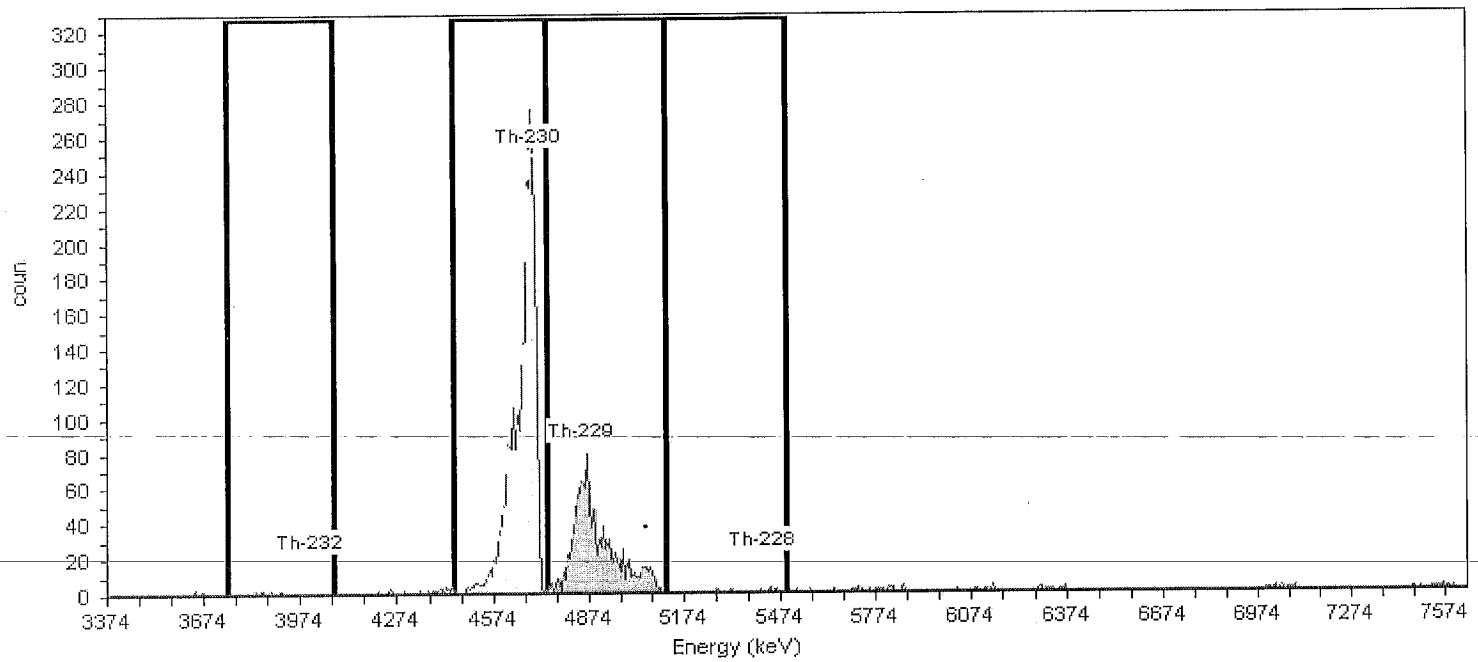
Tracer Name: Th-230_00017
Tracer Activity: 47.94 DPM/mL x (Vol.)0.30 mL = 14.38 DPM
Tracer Ref. Date: 4/11/2011 11:00:10AM

Tracer Nuclide: Th-230
Tracer Recovery: 93.94%

Acquisition

Detector: AV46
Serial Number: 49-202GG2
Acquisition Start Date: 12/26/2013 4:26:15PM
Live Time: 600.00 min.
Real Time: 600.01 min.
Background Date: 12/12/2013 8:52:40PM
Background Info: Sample: ICB;AV46; Det: AV46; Spectrum #1; Dec-12-2013 20:52

Calibration Name: IC-9884;AV46-20130515a
Calibration Date: 5/16/2013 12:12:59AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.46% +/- 0.39% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 12/26/2013 4:24:41PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	95.0	100.2	5	0.6250	4.38	0.282	DPM/mL
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	36.4	99.7	2219	0.0000	2219.00	135.103	DPM/mL
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	78.0	99.8	1052	1.2500	1050.75	68.034	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	15.7	99.8	7	4.3750	2.63	0.170	DPM/mL

Decay Correction

Thorium-229								
Initial Activity:	67.929	dpm						
Reference Date:	7/14/2010							
Current Date:	12/26/2013		(or date at which you wish to determine activity)					
Elapsed Time:	1261	days						
Half Life:	2680935	days	64342440					
Exponential Term:	0.999674026							
Corrected Activity:	67.90685689	dpm	30.58867427	pCi				

Lm 12/30/13

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Actinide Prep

Batch No. : —

Balance ID : —

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

No.	Sample Number	Aliquot (g / mL)	MS	Initials
44 1	Verification 1	0.1		
45 2	1-3	1		
46 3	1-3	1		
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

Tracer ☐ N/A

Initials / Date

Isotope : Th-230

Std Sol'n No. : Th-230.0007

Vol (mL) : 0.3

Ref Activity (dpm/mL) : 47.94 dpm/mL

Act Ref Date : 4-11-11

Samples Spiked and Traced By: MB 12/23/13 (Initials / Date)

Verification Signature & Date: [signature] 12/23/13 (Initials / Date)

LCS Standard ☐ N/A

Initials / Date

Isotope : Th-229

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

Vol (mL) : 0.1

Ref Activity (dpm/mL) : 47.929 dpm/mL — corrected activity 67.9086

Act Ref Date : 7-14-10

SOP's applied in preparing these samples. Mark box to left for all that apply:

☐	ST-RC-0003 Rev.	☐	ST-RC-0040 Rev.	☐	ST-RC-0110 Rev.
☐	ST-RC-0004 Rev.	☐	ST-RC-0041 Rev.	☐	ST-RC-0120 Rev.
☐	ST-RC-0014 Rev.	☐	ST-RC-0050 Rev.	☐	ST-RC-0232 Rev.
☐	ST-RC-0020 Rev.	☐	ST-RC-0090 Rev.	☐	ST-RC-0238 Rev.
☐	ST-RC-0021 Rev.	☑	ST-RC-0100 Rev.	☐	ST-RC-0240 Rev.
				☐	ST-RC-0241 Rev.
				☑	ST-RC-0242 Rev.
				☐	ST-RC-5016 Rev.
				☐	
				☐	

Isotope(s)

αβ ☐	Iso Pu ☐	Tc-99 ☐	Iso Cm ☐
Iso Am ☐	Ra ☐	Iso Th ☑	Pu-241 ☐
KPA ☐	Sr ☐	Iso U ☐	Th-229 ☐
Np ☐	TAR ☐	C-14 ☑	Cl-36 ☐

Count Time		Matrix	
Long Count	☐	Soil	☐
Short Count	☐	H_2O	☐

Prepared By : MB

Date : 12/23/13

Reviewed by: _____

Date: _____

\\SIsvr01\RAD\MasterForms\RAD-0045 Rev(3)

Sequential Thorium, Plutonium and Uranium via TEVA/UTEVA ST-RC-0242

Batch: Th229 Verification

All rinses should flow at 1 mL/minute (only 3M HNO_3 may be done at 3 mL/minute)

*only necessary when analyzing for *Pu*

TEVA lot: TE512BM

UTEVA lot: _____

11.5.2 Stack TEVA on top of UTEVA cartridge

11.5.3 5mL 3M HNO_3 — COMPLETED ☐

*11.5.4 To samples, add 1mL ascorbic acid solution Place in hot water bath for 5 minutes — COMPLETED ☐

*11.5.5 To samples, add 1mL $NaNO_2$ solution Place in hot water bath for 5 minutes — COMPLETED ☐

*11.5.6 Cold water bath until samples reach room temperature

11.5.7 Load sample

11.5.8 20mL 3M HNO_3 — COMPLETED ☐

11.59 Split cartridges: TEVA / UTEVA

TEVA:

11.5.10-11.5.11 Elute *Th* into clean tube using 20mL 9M HCl — COMPLETED ☐

11.5.12 5mL 6M HCl into *Th* tube — COMPLETED ☐

11.5.16 Elute *Pu* into clean tube with 20mL 1M HCl + 0.250 mL $TiCl_3$ — COMPLETED ☐ — COMPLETED ☐

UTEVA:

11.5.19 5mL 3M HNO_3 — COMPLETED ☐

11.5.20 5mL 9M HCl — COMPLETED ☐

11.5.21 20mL 5M HCl / 0.05M oxalic — COMPLETED ☐

11.5.22-11.5.23 Elute *U* into clean tube with 15mL 1M HCl — COMPLETED ☐

Reagent

Th-230 Ra226_00001



ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

65090-334

Th-230 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Th-230
ACTIVITY (dps):	7.654 E3
HALF-LIFE:	7.538 E4 Years
CALIBRATION DATE:	December 19, 2002 12:00 EST
TOTAL UNCERTAINTY*:	3.5%
SYSTEMATIC:	2.6%
RANDOM:	0.9%

*99% Confidence Level

Impurities: γ-impurities <0.1%, α-impurities <0.05%

5.17738 grams 0.5M HNO_3 solution.

P O NUMBER 1614557-000 OP, Item 3

SOURCE PREPARED BY: M. Taskaeva, Radiochemist

Q A APPROVED: 12-19-02

Reagent

Th-230_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

84460-334
5 mL Liquid in Flame Sealed Vial

Customer: Test America/Earth City, MO
P.O. No.: 2414204, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 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.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty*, % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Th-230	2.753E+07	4.016E+03	0.1	0.9	1.8	04/11/2011

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

Comments:
Impurities: γ-impurities < 0.1 %, α-impurities < 0.01 %. 5.11451 grams 0.5M HNO3 solution.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 4/11/11
J. D. McCorvey, QA Manager Alternate

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1958

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Th-230_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

84460-334
5 mL Liquid in Flame Sealed Vial

Customer: Test America/Earth City, MO
P.O. No.: 2414204, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 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.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Th-230	2.753E+07	4.016E+03	0.1	0.9	1.8	04/11/2011

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

Comments:
Impurities: γ-impurities < 0.1 %, α-impurities < 0.01 %. 5.11451 grams 0.5M HNO3 solution.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 4/11/11
J. D. McCorvey, QA Manager Alternate

ACCREDITED SOURCE CALIBRATION LABORATORY · HEALTH PHYSICS SOCIETY · FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts · Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd · Atlanta, Georgia 30318

Reagent

Th-230_00015

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

92523
Th-230 5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2502650, Item 2 Product Code: 8230-5FSA-4kBq

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty*, % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Th-230	2.753E+07	3.979E+03	0.1	0.9	1.8	11/29/2012

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

Comments:
Impurities: α-impurities 1.5915 Bq; γ-impurities (other than decay products)<0.1%.
5.07636 g 0.5M HNO3 solution. Carrier free.

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

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

Date: 27 Nov 12

51464
ID Th-230_00015
Th-230 Ampoule

RAD12-0040
Th-230 Ampoule
hursts
None
Prep/Opened: 11/28/2012
Exp(1): 11/28/2062
Exp(2): 11/28/2062

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Single Isotope Certificate Rev 3, 23 August 2012

Reagent

Th-230_00016

TestAmerica St. Louis

Standards Preparation Logbook Record

Nov-28-2012

Logbook: \\Qstlmo01\Stdslog\RAD_STD.std

RAD12-0040, Th-230 Ampoule Th-230_00015 # 51464 Analyst: hursts

Vendor: Analytics Lot No.: 92523
Solvent: None
Date Prep./Opened: 11-28-2012 Date Consumed: 11-28-2012
Date Expires(1): 11-28-2062 (50 Years)
Date Expires(2): 11-28-2062 (50 Years)
Cert: 92523 Activity: 3979Bq Reference Date: 11/29/12 Mass: 5.07636

Component	Initial Conc (dpm/g)	Final Conc (dpm/g)
Th-230	47,030	47,030

RAD12-0041, Th-230 Calibration Standard Th-230_00016 # 51465 Analyst: hursts

Solvent: 0.5M HNO3 Volume (ml): 100.00
Date Prep./Opened: 11-28-2012
Date Expires(1): 11-29-2062 (50 Years)
Date Expires(2): 11-29-2062 (50 Years)

Parent Std No.: RAD12-0040, Th-230 Ampoule Aliquot Amount (g): 5.0489
Parent Date Expires(1): 11-28-2062 Parent Date Expires(2): 11-28-2062

Component	Initial Conc (dpm/g)	Final Conc (dpm/mL)
Th-230	47,030	2,374.5

Reviewed By: SH

Page 1 of 1

St. Louis Radiological Standard Reverification Form

Standard ID Number: Rad12-0041
True Value = 1069.59 pCi/mL
Date Analyzed: 11/30/2012

Radionuclide: Th-230 Gross Alpha

	Replicates	
#1	1071	pCi/mL
#2	1027	pCi/mL
#3	1085	pCi/mL

Mean = 1061

1 sigma = 30.26549 1.96 sigma = 59.32036

True Value minus 5% = 1016.111 (True Value - 5%)
True Value plus 5% = 1123.07 (True Value + 5%)

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

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

Standard Reverification Acceptable? Yes

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

Reviewed By/Date: JL 11/30/12

SOP Reference: STL-QA-0002, Current Revision

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gross Alpha/Beta

Batch: M122628 **Operator:** 63903

Sample ID	WRKNO	*Aliquot*		*Mass*	*Instr ID*	*CountTime*		*Ts*	*Tb*	*Dilution*	*Sigma*	
	Analyte	Cs	Cb	XT	CPMs	CPMb	Eff	Activity	UncTot	UncCnt	MDA	DLC
verification 1a	NA	*1.000E+000mL*		*0.0546 g*	*Purple16*		*11/30/12 13:03*	*8.00*	*1000.00*	*1.00*	*1.00*	
	Gross Alpha	2528	175	0.00	3.160E+002	1.750E-001	0.1328	**1.071E+006**pCi/L	6.469E+004	2.132E+004	2.807E+003	1.167E+003
	Gross Beta	792	485	0.00	9.900E+001	4.850E-001	0.4280	**1.037E+005**pCi/L	6.370E+003	3.702E+003	1.212E+003	6.028E+002
verification 2a	NA	*1.000E+000mL*		*0.0536 g*	*Purple17*		*11/30/12 13:03*	*8.00*	*1000.00*	*1.00*	*1.00*	
	Gross Alpha	2364	87	0.00	2.955E+002	8.700E-002	0.1295	**1.027E+006**pCi/L	6.225E+004	2.113E+004	2.376E+003	8.436E+002
	Gross Beta	764	362	0.00	9.550E+001	3.620E-001	0.4353	**9.846E+004**pCi/L	6.084E+003	3.576E+003	1.078E+003	5.121E+002
verification 3a	NA	*1.000E+000mL*		*0.0531 g*	*Purple18*		*11/30/12 13:04*	*8.00*	*1000.00*	*1.00*	*1.00*	
	Gross Alpha	2521	62	0.00	3.151E+002	6.200E-002	0.1308	**1.085E+006**pCi/L	6.551E+004	2.161E+004	2.168E+003	7.052E+002
	Gross Beta	788	395	0.00	9.850E+001	3.950E-001	0.4295	**1.029E+005**pCi/L	6.325E+003	3.680E+003	1.125E+003	5.421E+002

Laboratory Control Sample Information

SampID	WRKNO	Analyte	Activity	StdAdded	Recovery %	LCL	UCL	ZFactor

Sample Duplicate Information

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

Matrix Spike Information

SampID	SampMSID	Analyte	Sample Activity	MS Activity	StdAdded	MSRecovery %	ZFactor

Blanks Information

SampID	WRKNO	Analyte	Activity	UncTotal	ZFactor

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Prep Report for Gross Alpha/Beta

Batch: M122628 **Prep Analyst:** 250

SampID	WRKNO	Aliquot	Gross	Tare	Mass	Dilution
verification 1a	NA	6.500E-001 mL	8.6982 g	8.6436 g	0.0546 g	1.00
		Orange 5	protean 14		16	
verification 2a	NA	6.500E-001 mL	8.6698 g	8.6162 g	0.0536 g	1.00
		7	15		17	
verification 3a	NA	6.500E-001 mL	8.6466 g	8.5935 g	0.0531 g	1.00
		8			18	

Spike Information

Sample ID	Standard ID	Analyte	Std Conc	Aliquot	Ref Date	StdAdded
	Rad12-0041	Th-230	2374.5 dpm/mL	1.00 mL	11-29-12	

MS — Spiked By

LM per MS — Spike Verified By

11-28-12 — Spike Date

Standard Operating Procedures

SOPNumber	Title	Revision
☐		

JN — Reviewed By

11/30/12 — Review Date

MS — Analyst/Relenquished By

11-28-12 — Release Date

Unn — Received By

11/28/12 — Receipt Date

1123433897/MS/11-28-12

Balance ID / Initials / Date

Reagent

Th-230_00023

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Th - 230_ 00023

Reagent ID: Th-230_00023

		Expiration Date:	01/28/2015
Description:	Th-230 Spike	Laboratory:	TestAmerica St. Louis
No. of Bottles:	1	Prepared By:	Bernsen, Sarah C
Storage Location:	RAD Actinide STDs	Solvent:	1M HNO3
Reagent Volume:	200.000 mL	Solvent Lot:	0
Creation Date:	02/04/2013		
Container(s):	304693		
Comment:	Rad13-0003 Re-certified from Th-230_00017		

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
Th-230	Th-230_00006	04/11/2061	2397.01400	dpm/mL	47.94028	dpm/mL

Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
Th-230_00006	Th-230 Parent		04/11/61				4.00000	mL

St. Louis Radiological Standard Reverification Form

Standard ID Number: Th-230_00017
True Value = 47.94 DPM/L or g
Date Analyzed: 1/28/2014

Radionuclide: Th-230

	Replicates	
#1	49.462	DPM/L or g
#2	48.579	DPM/L or g
#3	49.802	DPM/L or g

Mean = 49.281

1 sigma = 0.631271

1.96 sigma = 1.237291

True Value minus 5% = 45.543 (True Value - 5%)
True Value plus 5% = 50.337 (True Value + 5%)

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

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

Standard Reverification Acceptable? **Yes**

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

Reviewed By/Date: RTM 1/29/2014

SOP Reference: STL-QA-0002, Current Revision

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Th-230 Verification

Aliquot Only

Batch No. : ~~~

Balance ID : ~~~

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

No.	Sample Number	Aliquot (g / mL)	Crucible ID	Dilution
1	verification-1	0.3	112	
2	1 2	1	113	
3	1 3	1	114	
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

Tracer ☐ N/A

	Initials / Date
Isotope :	Th-229
Std Sol'n No. :	Th-229-00012
Vol (mL) :	0.1
Ref Activity (dpm/mL) :	67.929
Act Ref Date :	07-14-2010

Samples Spiked and Traced By: SUB 1/28/14 (Initials / Date)

Verification Signature & Date: MB 1/28/14 (Initials / Date)

LCS Standard ☐ N/A

	Initials / Date
Isotope :	Th-230
Std Sol'n ID. :	Th-230-00017
Vol (mL) :	0.3
Ref Activity (dpm/mL) :	47.94
Act Ref Date :	04-11-2011

SOP's applied in preparing these samples. Mark box to left for all that apply:

☐ ST-RC-0003 Rev.	☐ ST-RC-0040 Rev.	☐ ST-RC-0110 Rev.
☐ ST-RC-0004 Rev.	☐ ST-RC-0041 Rev.	☐ ST-RC-0120 Rev.
☐ ST-RC-0014 Rev.	☐ ST-RC-0050 Rev.	☐ ST-RC-0232 Rev.
☐ ST-RC-0020 Rev.	☐ ST-RC-0090 Rev.	☐ ST-RC-0238 Rev.
☐ ST-RC-0021 Rev.	☑ ST-RC-0100 Rev.	☐ ST-RC-0240 Rev.
		☐ ST-RC-0241 Rev.
		☑ ST-RC-0242 Rev.
		☐ ST-RC-5016 Rev.

Isotope(s)

αβ ☐	Iso Pu ☐	Tc-99 ☐	Iso Cm ☐
Iso Am ☐	Ra ☐	Iso Th ☑	Pu-241 ☐
KPA ☐	Sr ☐	Iso U ☐	Th-229 ☐
Np ☐	TAR ☐	C-14 ☐	Cl-36 ☐

Count Time	Matrix
Long Count ☐	Soil ☐
Short Count ☐	H_2O ☐

Prepared By : SUB

Date : 1/28/14

Reviewed by: ~~~

Date: ~~~

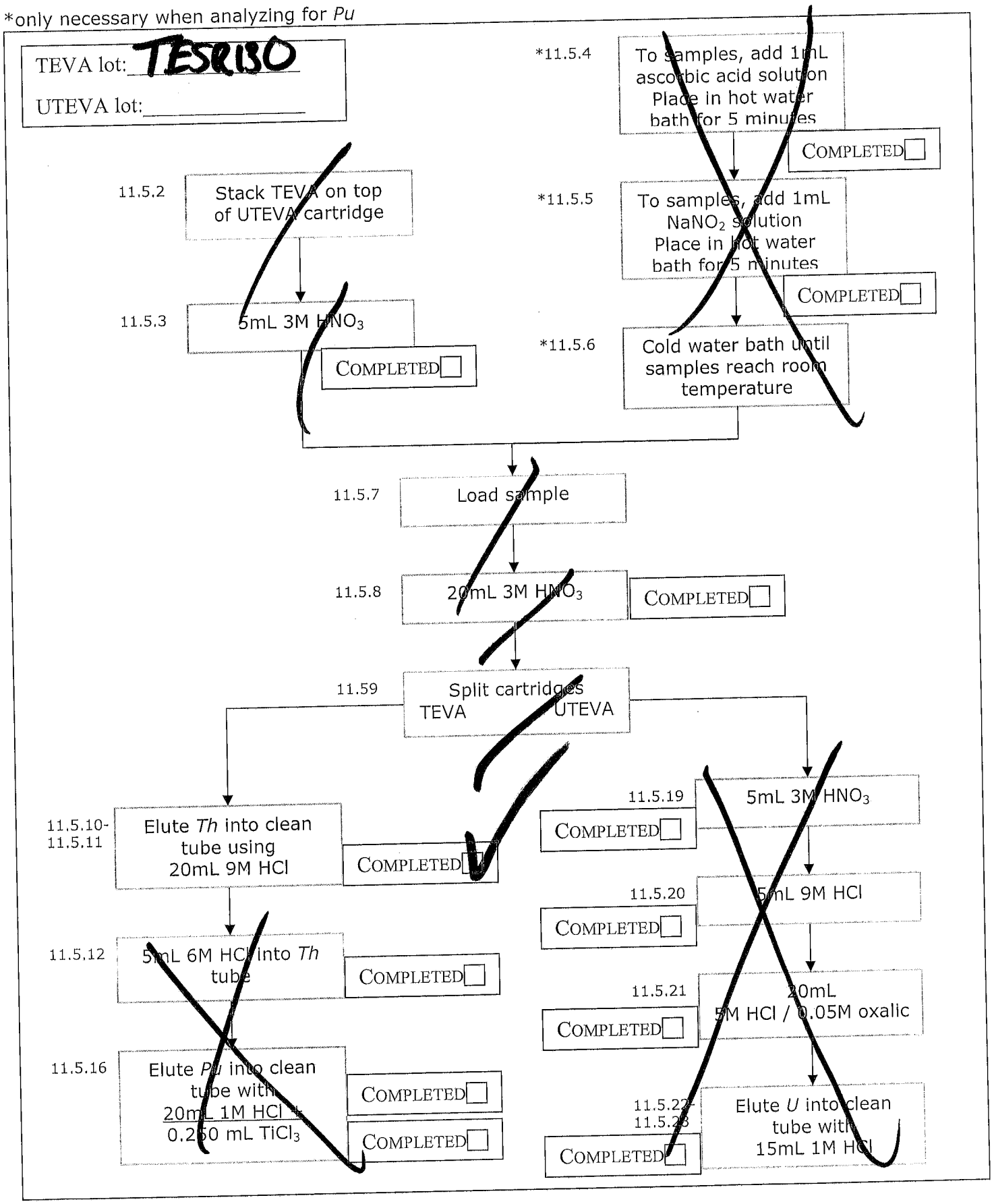
\\Slsvr01\RAD\MasterForms\RAD-0045 Rev(3)

Sequential Thorium, Plutonium and Uranium via TEVA/UTEVA ST-RC-0242

Batch:_____

All rinses should flow at 1 mL/minute (only 3M HNO_3 may be done at 3 mL/minute)

*only necessary when analyzing for *Pu*



Form: RAD-0063, Revised 09/18/13

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:19:33PM 1/29/2014

Sample

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

Spectrum #1 Analysis #1
Sample Volume : 0.3000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-230_00017_Re-Verify
AnalysisID: 597024

Analyst: 60040

Tracer

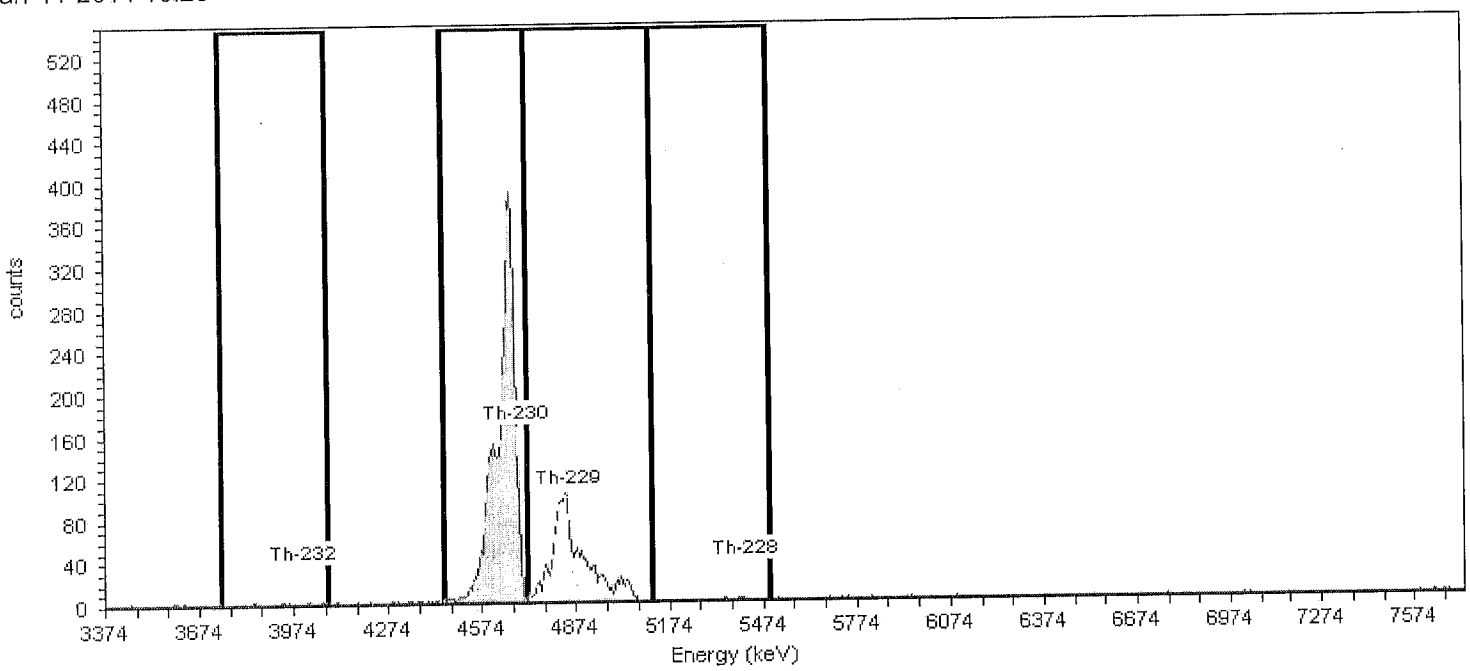
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.10 mL = 6.79 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 88.83%

Acquisition

Detector: AV112
Serial Number: 49-037G7
Acquisition Start Date: 1/28/2014 7:31:48PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Background Date: 1/11/2014 4:25:27PM
Background Info: Sample: ICB;AV112; Det: AV112; Spectrum #1; Jan-11-2014 16:25

Calibration Name: IC-8876;AV112-20130514
Calibration Date: 5/14/2013 8:47:13PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.87% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 1/28/2014 7:30:15PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	.0	100.2	6	0.0000	6.46	0.094	DPM/mL
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	20.4	99.7	3391	2.0000	3389.32	49.462	DPM/mL
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	74.0	99.6	1552	2.0000	1550.25	20.113	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	44.4	99.8	4	2.0000	2.00	0.029	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:19:42PM 1/29/2014

Sample

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

Spectrum #1 Analysis #1
Sample Volume : 0.3000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-230_00017_Re-Verify
AnalysisID: 597025

Analyst: 60040

Tracer

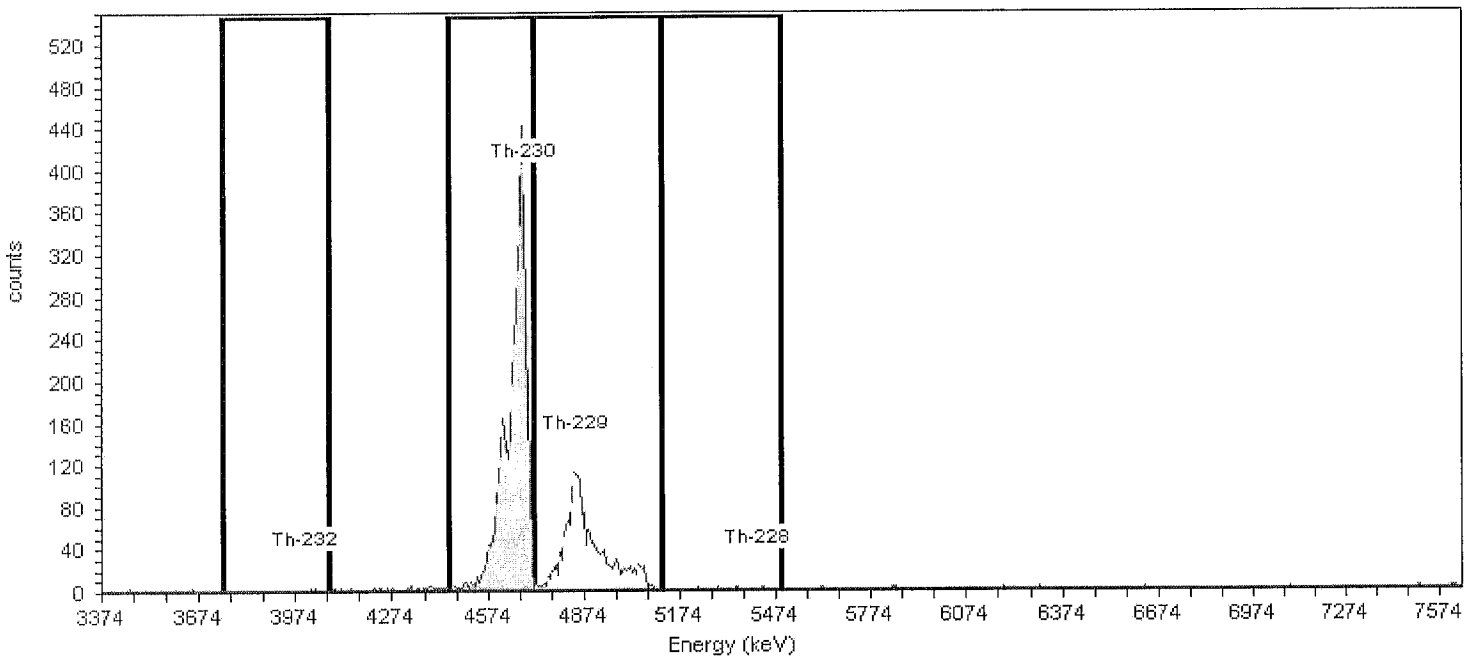
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.10 mL = 6.79 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 92.22%

Acquisition

Detector: AV113
Serial Number: 49-037X5
Acquisition Start Date: 1/28/2014 7:31:50PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Background Date: 1/11/2014 4:25:29PM
Background Info: Sample: ICB;AV113; Det: AV113; Spectrum #1; Jan-11-2014 16:25

Calibration Name: IC-8877;AV113-20130514
Calibration Date: 5/14/2013 8:47:28PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.66% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 1/28/2014 7:30:15PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	10.5	100.2	2	2.0000	0.00	0.000	DPM/mL
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	30.5	99.7	3429	0.0000	3429.40	48.579	DPM/mL
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	72.2	99.6	1598	1.0000	1597.09	20.881	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	163.8	99.8	4	3.0000	1.00	0.014	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:19:51PM 1/29/2014

Sample

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

Spectrum #1 Analysis #1
Sample Volume : 0.3000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-230_00017_Re-Verify
AnalysisID: 597026

Analyst: 60040

Tracer

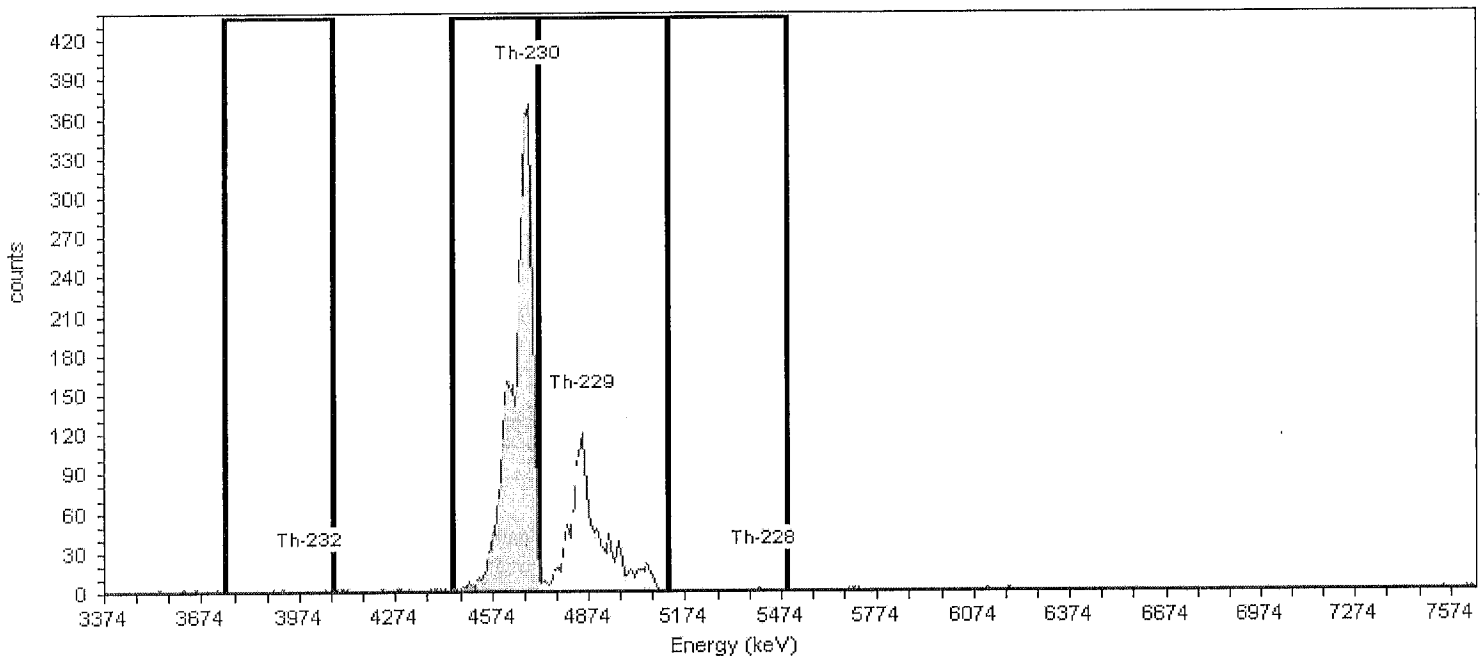
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.10 mL = 6.79 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 92.05%

Acquisition

Detector: AV114
Serial Number: 49-037E7
Acquisition Start Date: 1/28/2014 7:31:52PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Background Date: 1/11/2014 4:25:31PM
Background Info: Sample: ICB;AV114; Det: AV114; Spectrum #1; Jan-11-2014 16:25

Calibration Name: IC-9520;AV114-20130514
Calibration Date: 5/14/2013 8:47:43PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.73% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 1/28/2014 7:30:15PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	10.7	100.2	3	0.4250	2.57	0.036	DPM/mL
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	33.9	99.7	3518	0.0000	3517.66	49.802	DPM/mL
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	72.2	99.6	1598	0.0000	1597.97	20.842	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	44.5	99.8	1	1.0000	0.00	0.000	DPM/mL

Reagent

TRM-2_00001

Perry, Doug E

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

Pam, Doug
FYI

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

Doug:

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

PEM-1:

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

TRM-2

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

NBHD

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

Reagent

Tuna Can LCS_00002

Rec'd : 12-26-06

ANALYTICS
An Isotope Products Laboratories Company

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

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

74139-334
1.0 Liter Sand in 1 Liter Wide Mouth HDPE "S" Bottle

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

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

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

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

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

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

Source Prepared by: M. I. Taskaeva, Radiochemist

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

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Gamma LCS per Geometry

Geometry: Tuna Can
Reference date 10/1/2006
Calibration Standard: 74139-334
Standard volume g / vial 1550
volume transferred in g / geometry 341.9

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	dpm/g
Am-241	2034.3	449	0.359	219.35
Cs-137	1811.3	400	0.851	82.39
Co-60	3523	777	0.999856	136.39

Reviewed By: Chris Hough

Date: 3/15/2013

Reagent

Tuna Can LCS_00003

Rec'd : 12-26-06

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CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

74139-334
1.0 Liter Sand in 1 Liter Wide Mouth HDPE "S" Bottle

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

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

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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

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ANALYSIS OF UNCERTAINTY FOR MIXED GAMMA STANDARDS
BATCH 127
CALIBRATION DATE: October 1, 2006 12:00 EST

Isotope	Energy (keV)	Calibration Method[1]	Statistics[2]	Calibration[2]	Peak Fitting[2]	Geometry[2]	Impurities[2]	Weighing	Combined Standard Uncertainty	Relative Expanded Uncertinty (k=2)
Cd-109	88	HPGe	0.16	1.1	0.88	0.8	0	0.2	1.64	3.3
Co-57	122	HPGe	0.23	1.1	0.71	0.7	0	0.2	1.52	3.0
Ce-139	166	HPGe	0.17	1.0	0.58	0.7	0	0.2	1.38	2.8
Hg-203	279	HPGe	0.11	1.1	0.34	0.7	0	0.2	1.37	2.7
Sn-113	392	HPGe	0.21	1.0	0.35	0.7	0	0.2	1.30	2.6
Cs-137	662	HPGe	0.36	1.1	0.60	0.7	0	0.2	1.49	3.0
Y-88	898	HPGe	0.19	1.0	0.33	0.7	0	0.2	1.29	2.6
Co-60	1173	HPGe	0.31	.97	0.45	0.7	0	0.2	1.33	2.7
Co-60	1332	HPGe	0.33	.93	0.48	0.7	0	0.2	1.32	2.6
Y-88	1836	HPGe	0.24	1.0	0.35	0.7	0	0.2	1.31	2.6

Optional Additional Isotopes

Pb-210	46.5	4π LS	0.33	1.1	0	0.9	0.30	0.2	1.50	3.0
Am-241	59.5	4π LS	0.33	1.1	0	0.9	0.30	0.2	1.50	3.0
Sr-85	514	IC	0.30	1.1	0	0.7	0.17	0.2	1.36	2.7
Cs-134	605	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7
Cs-134	796	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7
Mn-54	835	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7
Zn-65	1116	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7

[1]Calibration Methods:

4π LS (4 pi Liquid Scintillation Counting)
HPGe (High Purity Germanium Gamma Ray Spectrometer)
IC (Gamma Ray Ionization Chamber)

[2]As Percent (%)from counting data

No interfering gamma emitting impurities were detected during calibration. Depending on the resolution and energy dispersion (keV/channel) of the measuring system, the following spectral conflicts may occur: (1) between the 88 keV gamma-ray and the X-rays emitted in the decay of Hg-203, (2) between the 1333 keV gamma-ray and the 1325 keV single escape peak from the 1836 keV gamma-ray.

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00003 (259586)
True Value = 1249.94 Bq/Sample
Date Analyzed: 10/31/2013

Radionuclide: Am-241

	Replicates	
#1	1215	Bq/Sample
#2	1264	Bq/Sample
#3	1267	Bq/Sample

Mean = 1248.667

1 sigma = 29.19475

1.96 sigma = 57.22171

True Value minus 5% = 1187.443 (True Value - 5%)
True Value plus 5% = 1312.437 (True Value + 5%)

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

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

Standard Reverification Acceptable? **Yes**

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

Reviewed By/Date: Jody Watson 12/1/13

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00003 (259586)
True Value = 469.49 Bq/Sample
Date Analyzed: 10/31/2013

Radionuclide: Cs-137

	Replicates	
#1	451.6	Bq/Sample
#2	477.4	Bq/Sample
#3	455.6	Bq/Sample

Mean = 461.5333

1 sigma = 13.88572

1.96 sigma = 27.21602

True Value minus 5% = 446.0155 (True Value - 5%)
True Value plus 5% = 492.9645 (True Value + 5%)

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

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

Standard Reverification Acceptable? Yes

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

Reviewed By/Date: Jody Watson 12/1/14

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00003 (259586)
True Value = 777 Bq/Sample
Date Analyzed: 10/31/2013

Radionuclide: Co-60

	Replicates	
#1	724.3	Bq/Sample
#2	774.1	Bq/Sample
#3	770	Bq/Sample

Mean = 756.1333

1 sigma = 27.64459

1.96 sigma = 54.1834

True Value minus 5% = 738.15 (True Value - 5%)
True Value plus 5% = 815.85 (True Value + 5%)

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

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

Standard Reverification Acceptable? Yes

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

Reviewed By/Date: Jody Watson 12/1/14

SOP Reference: STL-QA-0002, Current Revision

Gamma LCS per Geometry - Tuna Can

Reagent ID: Tuna Can LCS_00003
Container: 259586
Reference date 10/1/2006
Calibration Standard: 74139-334
Standard volume: 1550 g/vial
Standard volume transferred: 341.9 g/geometry

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	dpm/g	Bq/sample
Am-241	2034.3	448.7	0.359	219.35	1249.94
Cs-137	1811.3	399.5	0.851	82.39	469.49
Co-60	3522	776.9	0.999856	136.36	777.00

Reviewed By: Jody Watson

Date: 12/1/2013

SOP Reference: ST-RD-0102, Current Rev **Form:** RAD-0080 **Revised:** 11/27/2013

Test America St. Louis Spectrum ID: 9_Gamma_20130915

Sample Description: 77739_Gamma_LCS 160-77739~2-A
Detector: Ge9 S/N100228730
Batch ID: 77739
Work Order Number: Gamma
Lot Number: LCS 160-77739~2-A

Decay to Time: 10/1/2006 12:00 Live Time: 1800 sec
Acquisition Time: 10/31/2013 08:28:21 Real Time: 1810 sec
Analysis Time: 11/11/2013 19:50 Dead Time: 0.57 %
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_Routine Short Rev1.lib
Bkgd Correction File: 9_2013-10-05_0100.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
K-40	5.305E-01	769.5	4.082E+00	4.082E+00	1.578E+01
CO-60	7.243E+02	1.0	7.254E+00	3.708E+01	3.977E+00
CS-134	7.235E+00	93.6	6.774E+00	6.784E+00	2.680E+01
CS-137	4.516E+02	1.0	4.733E+00	2.396E+01	3.540E+00
EU-152	6.293E+00	42.6	2.678E+00	2.698E+00	1.271E+01
EU-154	4.025E+00	75.0	3.020E+00	3.027E+00	5.177E+01
EU-155	5.881E+00	110.2	6.478E+00	6.486E+00	2.150E+01
TL-208	3.059E+01	64.6	1.977E+01	1.984E+01	3.918E+01
PB-210	1.442E+04	0.9	1.325E+02	8.572E+02	2.204E+02
PB-212	5.630E+01	36.7	2.065E+01	2.097E+01	6.722E+01
PB-214	5.714E+00	34.9	1.996E+00	2.018E+00	6.384E+00
BI-212	9.580E+01	152.1	1.457E+02	1.458E+02	4.895E+02
BI-214	7.078E+00	34.4	2.432E+00	2.460E+00	4.992E+00
AC-228	1.477E+01	57.1	8.428E+00	8.462E+00	3.552E+01
Pa-234	5.684E+00	65.7	3.737E+00	3.748E+00	9.406E+00
TH-234	-2.970E+02	9.4	2.787E+01	3.191E+01	8.608E+01
PA-234M	9.991E+01	80.0	7.990E+01	8.006E+01	4.336E+02
U-235	-4.791E+00	104.0	4.982E+00	4.988E+00	1.653E+01
AM-241	1.215E+03	0.8	9.198E+00	6.370E+01	1.316E+01
Total	1.715E+04				

Analyst: Jody Watson

TestAmerica, Inc Spectrum name: 9_Gamma_20130915.An1

Sample description
77739_Gamma_LCS 160-77739~2-A

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20130915.An1

Acquisition information
Start time: 10/31/2013 8:28:21 AM
Live time: 1800
Real time: 1810
Dead time: 0.57 %
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_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.59keV)
Stop channel: 8000 (1999.34keV)
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

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

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2013-10-05_0100.PBC 10/5/2013 1:00:21 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 35 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 134.9778

***** 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
36.60	401.	16.10	1.13	1.639E-02				
46.55	22813.	0.92	0.93	2.578E-02	46.54	4.250	1.442E+04	PB210
59.57	28391.	0.76	0.93	3.661E-02	59.54	35.900	1.215E+03	AM241
77.08	140.	39.21	0.98	4.675E-02				
88.08	1206.	7.29	1.06	5.052E-02				
93.88	58.	87.63	1.04	5.171E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.069E+01	U235
					92.59	5.584	1.115E+01	TH234
					93.35	5.810	1.069E+01	U235
					93.35	5.561	2.622E+01	AC228
93.88	58.	87.63	1.04	5.171E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.069E+01	U235
105.44	44.	110.15	1.05	5.318E-02	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	5.881E+00	EU155
122.44	45.	108.81	1.07	5.305E-02	121.78	28.580	PBC<MDA	EU152
					121.78	28.580	2.352E+00	EU152
131.16	35.	137.33	1.08	5.216E-02	131.29	18.000	PBC<MDA	Pa234
161.84	5.	850.44	1.11	4.676E-02	163.38	5.080	PBC<MDA	U235
					163.38	5.080	1.068E+00	U235
191.89	75.	47.73	0.55	4.310E-02				
199.99	66.	64.08	0.38	4.195E-02				
238.40	138.	27.30	0.91	3.734E-02	238.63	43.300	6.216E+01	PB212
242.14	11.	403.77	1.18	3.697E-02	242.00	7.430	PBC<MDA	PB214
276.94	34.	114.35	1.21	3.372E-02	277.28	6.310	PBC<MDA	TL208
283.56	5.	702.33	1.22	3.315E-02	284.30	6.140	HL>Cutoff	I131
294.85	92.	54.23	0.49	3.232E-02	295.09	19.300	PBC<MDA	PB214
300.38	48.	84.68	1.24	3.195E-02	300.03	3.280	PBC<MDA	PB212
338.25	45.	84.62	1.27	2.940E-02	338.32	12.010	PBC<MDA	AC228

					338.32	12.010	1.661E+01 AC228
344.89	28.	130.46	1.27	2.905E-02	344.29	26.500	PBC<MDA EU152
					344.29	26.500	2.923E+00 EU152
351.72	86.	44.07	1.28	2.860E-02	351.93	37.600	PBC<MDA PB214
367.42	39.	64.82	0.53	2.775E-02			
519.92	99.	37.67	0.41	2.164E-02			
562.86	22.	127.02	1.47	2.040E-02	563.24	8.350	PBC<MDA CS134
570.13	20.	136.61	1.47	2.024E-02	569.32	15.380	PBC<MDA CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					569.47	8.200	6.589E+00	Pa234
570.13	20.	136.24	1.47	2.024E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.607E+00	Pa234
583.13	40.	60.64	1.48	1.989E-02	583.02	84.500	PBC<MDA	TL208
609.58	105.	31.70	0.98	1.925E-02	609.31	46.090	6.578E+00	BI214
661.61	10643.	1.05	1.45	1.810E-02	661.66	85.210	4.516E+02	CS137
712.89	39.	39.12	0.70	1.711E-02				
727.11	17.	152.13	1.60	1.686E-02	727.17	7.550	PBC<MDA	BI212
766.71	33.	79.97	1.63	1.620E-02	766.41	0.294	PBC<MDA	PA234M
					766.41	0.294	3.867E+02	PA234M
779.17	59.	42.55	1.64	1.600E-02	778.92	12.940	PBC<MDA	EU152
					778.92	12.940	2.273E+01	EU152
797.04	6.	290.73	1.66	1.565E-02	801.95	8.690	PBC<MDA	CS134
860.47	19.	137.44	1.71	1.482E-02	860.56	12.420	PBC<MDA	TL208
883.68	19.	133.89	1.72	1.456E-02	880.53	6.000	PBC<MDA	Pa234
					883.24	9.600	7.529E+00	Pa234
910.66	44.	76.62	1.75	1.418E-02	911.07	29.000	PBC<MDA	AC228
					911.07	29.000	1.400E+01	AC228
943.80	24.	117.47	1.77	1.377E-02	946.02	13.400	PBC<MDA	Pa234
964.12	14.	228.97	1.79	1.357E-02	964.11	14.605	PBC<MDA	EU152
					964.11	14.605	5.560E+00	EU152
996.48	16.	177.62	1.81	1.323E-02	996.33	10.600	PBC<MDA	EU154
					996.33	10.600	1.149E+01	EU154
1121.05	28.	81.71	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
1173.15	5976.	1.44	1.98	1.163E-02	1173.24	99.900	7.254E+02	CO60
1272.28	11.	75.03	2.01	1.088E-02	1274.54	35.190	PBC<MDA	EU154
					1274.54	35.190	2.924E+00	EU154
1332.36	5385.	1.39	2.00	1.050E-02	1332.50	99.980	7.231E+02	CO60
1460.86	1.	76.97	2.13	9.749E-03	1460.83	10.670	PBC<MDA	K40
1764.37	7.	64.03	2.31	8.350E-03	1764.49	15.400	PBC<MDA	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
146.03	36.60	1187.	401.	2.444E+04	16.10	1.125	-	
307.92	77.08	958.	140.	2.995E+03	39.21	0.976	-	s
351.89	88.08	1452.	1215.	2.405E+04	5.28	1.055	-	
767.05	191.89	448.	75.	1.732E+03	47.73	0.547	-	s
799.44	199.99	552.	66.	1.585E+03	64.08	0.381	-	s
1469.05	367.42	225.	39.	1.407E+03	56.65	0.534	-	sM
2079.05	519.92	287.	99.	4.576E+03	37.67	0.415	-	sM
2850.97	712.89	70.	39.	2.299E+03	39.12	0.697	-	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_Routine Short Rev1.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	46.55	5511.	22813.	12.674	0.92	0.933
AM-241	237.89	59.57	4281.	28391.	15.773	0.76	0.933
TH-234	245.32	61.42	2410.	-799.	-0.444	9.38	1.014s
TH-234	365.80	91.55	1239.	-50.	-0.028	101.12	1.042s
AC-228	372.98	93.35	1253.	58.	0.032	87.63	1.043D
U-235	372.98	93.35	1253.	58.	0.032	87.63	1.043D
EU-155	421.32	105.44	1171.	44.	0.025	110.15	1.054s
EU-152	489.29	122.44	1159.	45.	0.025	108.81	1.070s
Pa-234	524.18	131.16	1124.	35.	0.019	137.33	1.079s
U-235	574.13	143.65	1203.	-48.	-0.026	103.98	1.091s
U-235	646.89	161.84	752.	5.	0.003	850.44	1.109s
U-235	821.22	205.44	1091.	-13.	-0.007	349.16	1.148s
PB-212	953.27	238.46	993.	125.	0.070	36.68	1.179
PB-214	968.00	242.14	1005.	11.	0.006	403.77	1.182
TL-208	1107.16	276.94	791.	34.	0.019	114.35	1.214
I-131	1133.66	283.56	738.	5.	0.003	702.33	1.221
PB-214	1178.79	294.85	573.	92.	0.051	54.23	0.490s
PB-212	1200.93	300.38	789.	48.	0.026	84.68	1.235
AC-228	1352.39	338.25	701.	45.	0.025	84.62	1.270s
EU-152	1378.94	344.89	662.	28.	0.016	130.46	1.275s
PB-214	1406.26	351.72	669.	86.	0.048	44.07	1.282
I-131	1455.88	364.13	713.	-34.	-0.019	113.88	1.293
BE-7	1909.01	477.42	744.	-6.	-0.003	644.25	1.392s
CS-134	2250.78	562.86	388.	22.	0.012	127.02	1.466s
CS-134	2279.86	570.13	352.	20.	0.011	136.61	1.471s
Pa-234	2279.88	570.13	352.	20.	0.011	136.24	1.471
TL-208	2331.87	583.13	356.	40.	0.022	60.64	1.482s
CS-134	2410.14	602.69	309.	-17.	-0.010	144.66	1.500s
BI-214	2437.68	609.58	271.	105.	0.058	31.70	0.982s
CS-137	2645.82	661.61	300.	10643.	5.913	1.05	1.452
BI-212	2907.87	727.11	318.	17.	0.009	152.13	1.601s
PA-234M	3066.30	766.71	335.	33.	0.018	79.97	1.633s
EU-152	3116.13	779.17	285.	59.	0.033	42.55	1.643s
CS-134	3187.66	797.04	169.	6.	0.004	290.73	1.661s
TL-208	3441.43	860.47	347.	19.	0.011	137.44	1.707
Pa-234	3534.30	883.68	311.	19.	0.010	133.89	1.722
AC-228	3642.26	910.66	550.	44.	0.025	76.62	1.746s
Pa-234	3774.84	943.80	378.	24.	0.013	117.47	1.772
EU-152	3856.15	964.12	492.	14.	0.008	228.97	1.786s
AC-228	3874.97	968.82	503.	-12.	-0.007	261.56	1.790s
EU-154	3985.65	996.48	415.	16.	0.009	177.62	1.810s
BI-214	4484.12	1121.05	307.	28.	0.016	81.71	1.901
CO-60	4692.63	1173.15	172.	5976.	3.320	1.44	1.975
EU-154	5089.34	1272.28	31.	11.	0.006	75.03	2.008s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	5329.81	1332.36	33.	5385.	2.991	1.39	1.997
K-40	5844.14	1460.86	33.	1.	0.001	76.97	2.131
BI-214	7059.18	1764.37	18.	7.	0.004	64.03	2.314s

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	Peak MDA Value Bq/Sample	Peak		COMMENTS
BE-7	C	-1.3766E+00					5.31E+01		
			477.60	-1.377E+00	&(	2.979E+01	6.44E+02	1.05E+01	G
K-40	N	5.3052E-01					4.66E+11		
			1460.83	5.305E-01	(P	1.578E+01	7.70E+01	1.07E+01	G
CO-60	F	7.2427E+02					1.93E+03		
			1332.50	7.231E+02	(	3.977E+00	1.39E+00	1.00E+02	G
			1173.24	7.254E+02	(	7.748E+00	1.44E+00	9.99E+01	G
I-131	I	-6.5562E-01					8.02E+00		
			364.48	-8.173E-01	(	3.098E+00	1.14E+02	8.17E+01	G
			284.30	1.496E+00	(	3.530E+01	7.02E+02	6.14E+00	G
			636.97	-6.785E-01	%	3.837E+01	1.67E+03	7.17E+00	G
CS-134	I	7.2349E+00					7.54E+02		
			604.71	-5.518E+00	?(	2.680E+01	1.45E+02	9.76E+01	G
			795.87	5.593E-02	%	3.854E+01	2.03E+04	8.55E+01	G
			569.32	3.786E+01	?(	1.733E+02	1.37E+02	1.54E+01	G
			801.95	2.811E+01	&(	2.787E+02	2.91E+02	8.69E+00	G
			563.24	7.820E+01	?(	3.322E+02	1.27E+02	8.35E+00	G
CS-137	I	4.5157E+02					1.10E+04		
			661.66	4.516E+02	(	3.540E+00	1.05E+00	8.52E+01	G
EU-152	F	6.2931E+00					4.94E+03		
			344.29	2.923E+00	(	1.271E+01	1.30E+02	2.65E+01	G
			121.78	2.352E+00	&(	8.497E+00	1.09E+02	2.86E+01	G
			778.92	2.273E+01	(	3.138E+01	4.25E+01	1.29E+01	G
			964.11	5.560E+00	?(	4.275E+01	2.29E+02	1.46E+01	G
			1112.07	3.764E-02	&	4.286E+01	3.35E+04	1.36E+01	G
			1408.00	2.382E-01	%	9.762E+00	1.12E+03	2.10E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	4.0247E+00					3.14E+03	
			873.23	7.271E-01	&(	5.177E+01	2.10E+03	1.23E+01 G
			123.10	6.921E-02	&	7.391E+00	3.19E+03	4.08E+01 G
			1274.54	2.924E+00	?(	7.338E+00	7.50E+01	3.52E+01 G
			723.36	4.766E-01	%	2.324E+01	1.43E+03	2.02E+01 G
			1004.77	4.567E-01	%	3.539E+01	2.28E+03	1.80E+01 G
			996.33	1.149E+01	(	6.852E+01	1.78E+02	1.06E+01 G
EU-155	I	5.8806E+00					1.81E+03	
			105.31	5.881E+00	(	2.150E+01	1.10E+02	2.12E+01 G
			86.54	-3.761E-01	%	1.959E+01	1.56E+03	3.07E+01 G
TL-208	N	3.0591E+01					6.98E+02	
			583.02	1.750E+01	?(P	3.918E+01	6.06E+01	8.45E+01 G
			277.28	1.153E+02	(P	4.564E+02	1.14E+02	6.31E+00 G
			860.56	7.666E+01	(	3.531E+02	1.37E+02	1.24E+01 G
PB-210	N	1.4424E+04					8.14E+03	
			46.54	1.442E+04	(	2.204E+02	9.19E-01	4.25E+00 G
PB-212	N	5.6299E+01					6.98E+02	
			238.63	5.630E+01	?(	6.722E+01	3.67E+01	4.33E+01 G
			300.03	3.298E+02	+	9.255E+02	8.47E+01	3.28E+00 G
PB-214	N	5.7137E+00					5.84E+05	
			351.93	4.435E+00	?(	6.384E+00	4.41E+01	3.76E+01 G
			295.09	8.205E+00	(	1.021E+01	5.42E+01	1.93E+01 G
			242.00	2.259E+00	-	3.053E+01	4.04E+02	7.43E+00 G
BI-212	N	9.5804E+01					6.98E+02	
			727.17	9.580E+01	&(	4.895E+02	1.52E+02	7.55E+00 G
			785.42	5.436E+01	&	2.991E+03	1.62E+03	1.28E+00 G
BI-214	N	7.0777E+00					5.84E+05	
			609.31	6.578E+00	(P	4.992E+00	3.17E+01	4.61E+01 G
			1120.29	8.602E+00	(P	2.581E+01	8.17E+01	1.51E+01 G
			1764.49	3.099E+00	- P	9.807E+00	6.40E+01	1.54E+01 G
AC-228	N	1.4766E+01					2.10E+03	
			911.07	1.400E+01	?(	3.552E+01	7.66E+01	2.90E+01 G
			968.97	-6.746E+00	-	5.930E+01	2.62E+02	1.75E+01 G
			338.32	1.661E+01	(	4.660E+01	8.46E+01	1.20E+01 G
								Energy duplication
			93.35	2.622E+01	&	7.608E+01	8.76E+01	5.56E+00 XA
Pa-234	N	5.6844E+00					1.63E+12	
			131.29	2.059E+00	?(	9.406E+00	1.37E+02	1.80E+01 G
			569.47	6.607E+00	(	3.016E+01	1.36E+02	8.20E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		946.02	7.154E+00	(	2.808E+01	1.17E+02	1.34E+01 G
		883.24	0.000E+00	-	4.308E+01	1.00E+03	9.60E+00 G
		880.53	1.202E+01	(	5.396E+01	1.34E+02	6.00E+00 G
TH-234 N	-2.9703E+02					1.63E+12	
		63.29-2.970E+02		(	8.608E+01	9.38E+00	3.81E+00 G
		92.59-9.593E+00		&	3.217E+01	1.01E+02	5.58E+00 G
PA-234M N	9.9914E+01					1.63E+12	
		1001.00-8.049E-01		%(	4.336E+02	1.58E+04	8.37E-01 G
		766.41	3.867E+02	&(	1.026E+03	8.00E+01	2.94E-01 G
U-235 N	-4.7913E+00					2.57E+11	
		143.79-4.791E+00		?(	1.653E+01	1.04E+02	1.10E+01 G
		205.33-3.609E+00		&	4.212E+01	3.49E+02	5.01E+00 G
		163.38	1.068E+00	+	3.053E+01	8.50E+02	5.08E+00 G
							Energy duplication
		93.35	1.069E+01	&	3.101E+01	8.76E+01	5.81E+00 X
AM-241 T	1.2145E+03					1.58E+05	
		59.54	1.215E+03	(	1.316E+01	7.57E-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:
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

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
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-234	61.42	2410.	-799.	-0.444	9.38	-2.970E+02
TH-234	91.55	1239.	-50.	-0.028	101.12	-9.593E+00
AC-228	93.35	1253.	58.	0.032	87.63	2.622E+01
U-235	93.35	1253.	58.	0.032	87.63	1.069E+01
EU-155	105.44	1171.	44.	0.025	110.15	5.881E+00
EU-152	122.44	1159.	45.	0.025	108.81	2.352E+00
U-235	143.65	1203.	-48.	-0.026	103.98	-4.791E+00
U-235	161.84	752.	5.	0.003	850.44	1.068E+00
U-235	205.44	1091.	-13.	-0.007	349.16	-3.609E+00
AC-228	338.25	701.	45.	0.025	84.62	1.661E+01
EU-152	344.89	662.	28.	0.016	130.46	2.923E+00
BE-7	477.42	744.	-6.	-0.003	644.25	0.000E+00
CS-134	562.86	388.	22.	0.012	127.02	7.820E+01
CS-134	570.13	352.	20.	0.011	136.61	3.786E+01
CS-134	602.69	309.	-17.	-0.010	144.66	-5.518E+00
PA-234M	766.71	335.	33.	0.018	79.97	3.867E+02
EU-152	779.17	285.	59.	0.033	42.55	2.273E+01
CS-134	797.04	169.	6.	0.004	290.73	2.811E+01
AC-228	910.66	550.	44.	0.025	76.62	1.400E+01
EU-152	964.12	492.	14.	0.008	228.97	5.560E+00
AC-228	968.82	503.	-12.	-0.007	261.56	-6.746E+00
EU-154	996.48	415.	16.	0.009	177.62	1.149E+01
EU-154	1272.28	31.	11.	0.006	75.03	2.924E+00

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
BE-7	#A	-1.3766E+00	>12 Halflives	6.4425E+02%	2.9788E+01	
K-40	A	5.3052E-01	5.3052E-01	7.695E+02%		1.58E+01
CO-60		2.8537E+02	7.2427E+02	1.001E+00%		3.98E+00
I-131	A	-6.5562E-01	>12 Halflives	1.1388E+02%	3.0977E+00	
CS-134	#A	6.7120E-01	7.2349E+00	9.362E+01%		2.68E+01
CS-137		3.8340E+02	4.5157E+02	1.048E+00%		3.54E+00
EU-152	#A	4.3789E+00	6.2931E+00	4.255E+01%		1.27E+01
EU-154	#A	2.2731E+00	4.0247E+00	7.503E+01%		5.18E+01
EU-155	#A	2.1856E+00	5.8806E+00	1.102E+02%		2.15E+01
TL-208	A	2.3406E+00	3.0591E+01	6.464E+01%		3.92E+01
PB-210		1.1574E+04	1.4424E+04	9.188E-01%		2.20E+02
PB-212	A	4.3076E+00	5.6299E+01	3.668E+01%		6.72E+01

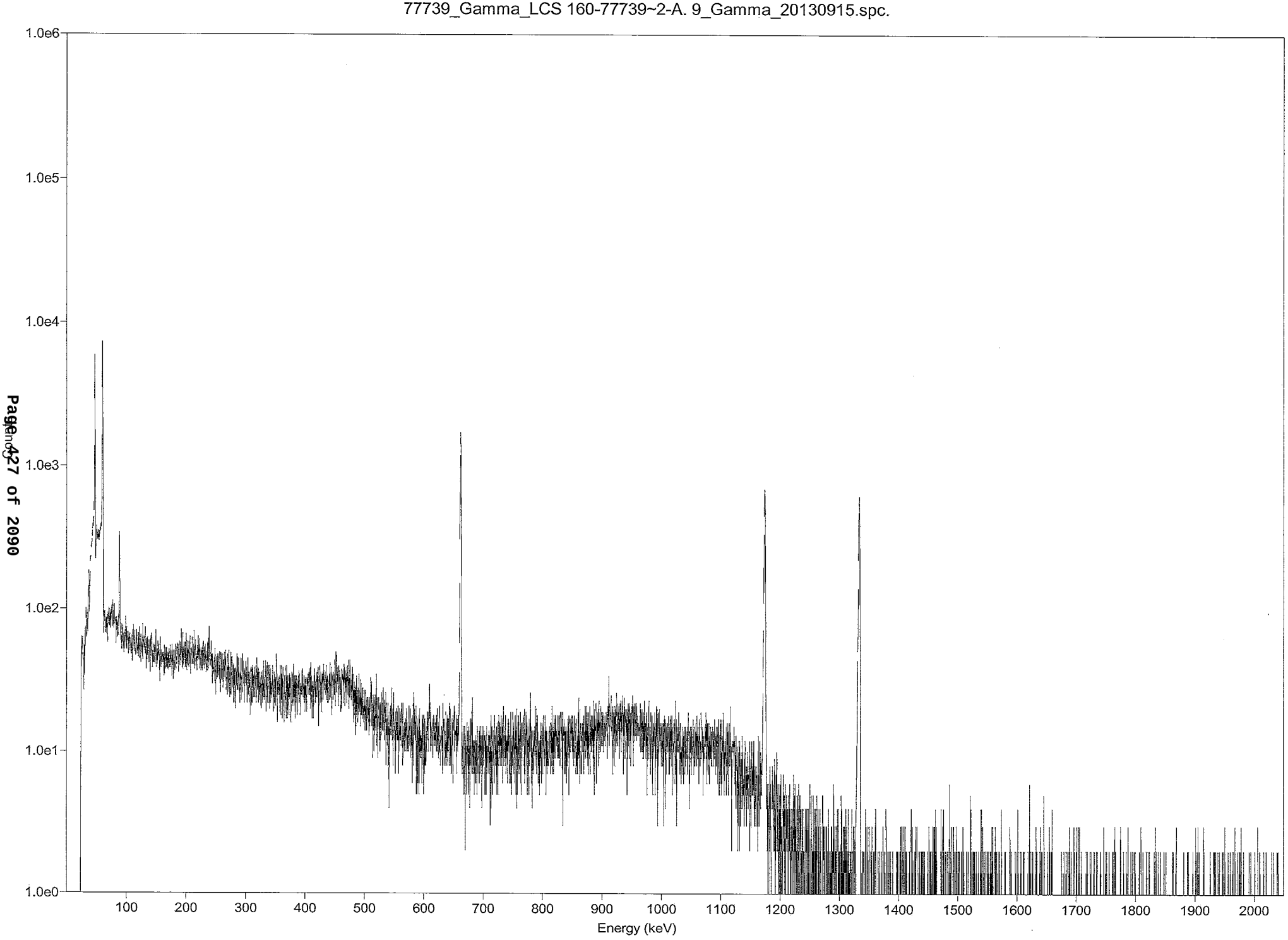
PB-214	A	5.6962E+00	5.7137E+00	3.494E+01%	6.38E+00
BI-212	#A	7.3301E+00	9.5804E+01	1.521E+02%	4.89E+02
BI-214		7.0561E+00	7.0777E+00	3.436E+01%	4.99E+00
AC-228	#A	6.2874E+00	1.4766E+01	5.708E+01%	3.55E+01
Pa-234	A	5.6844E+00	5.6844E+00	6.574E+01%	9.41E+00
TH-234	#A	-2.9703E+02	-2.9703E+02	9.384E+00%	8.61E+01
PA-234M	#A	9.9914E+01	9.9914E+01	7.997E+01%	4.34E+02
U-235	#A	-4.7913E+00	-4.7913E+00	1.040E+02%	1.65E+01
AM-241		1.2008E+03	1.2145E+03	7.573E-01%	1.32E+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 1999.3 keV) 1.346E+04 Bq/Sample
Total Decayed Activity (37.6 to 1999.3 keV) 1.6883195E+04 Bq/Sample

The library has energies which are not separable.


77739_Gamma_LCS 160-77739~2-A. 9_Gamma_20130915.spc.
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Sample Description: 77739_Gamma_LCS 160-77739~2-A
Detector: Ge11 S/N09363993
Batch ID: 77739
Work Order Number: Gamma
Lot Number: LCS 160-77739~2-A

Decay to Time: 10/1/2006 12:00 Live Time: 1800 sec
Acquisition Time: 10/31/2013 09:57:50 Real Time: 1893 sec
Analysis Time: 11/11/2013 19:53 Dead Time: 4.93 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 11_Soil_TunaCan.Clb
Efficiency Cal Desc: Ge11_TunaCanCal_90099_032912
Efficiency Cal Date: 4/2/2012 17:29
Energy Cal Date: 2/28/2012 13:09
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 11_2013-10-05_0101.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
K-40	-3.130E+00	551.4	1.726E+01	1.726E+01	1.982E+01
CO-60	7.741E+02	1.0	7.995E+00	3.968E+01	3.551E+00
CS-134	5.627E+00	57.9	3.259E+00	3.273E+00	3.600E+01
CS-137	4.774E+02	1.1	5.441E+00	2.542E+01	4.209E+00
EU-152	2.514E+00	70.6	1.774E+00	1.779E+00	1.482E+01
EU-154	2.899E+00	99.0	2.868E+00	2.872E+00	6.079E+01
EU-155	-4.263E-01	1708.0	7.281E+00	7.281E+00	2.440E+01
TL-208	4.864E+01	31.0	1.507E+01	1.528E+01	3.485E+01
PB-210	1.502E+04	1.0	1.504E+02	8.949E+02	2.572E+02
PB-212	9.754E+01	22.9	2.231E+01	2.319E+01	5.738E+01
PB-214	8.604E+00	23.5	2.021E+00	2.070E+00	5.061E+00
BI-212	3.977E+02	48.0	1.908E+02	1.919E+02	5.097E+02
BI-214	2.554E+00	72.7	1.857E+00	1.862E+00	6.709E+00
AC-228	2.142E+01	41.5	8.893E+00	8.960E+00	3.627E+01
Pa-234	3.857E+00	167.3	6.451E+00	6.454E+00	7.418E+00
TH-234	-8.093E+01	34.3	2.773E+01	2.805E+01	7.226E+01
PA-234M	2.658E+01	103.4	2.749E+01	2.752E+01	5.227E+02
U-235	4.288E+00	110.2	4.726E+00	4.731E+00	1.716E+01
AM-241	1.264E+03	0.8	1.065E+01	6.644E+01	1.590E+01
Total	1.816E+04				

Analyst: Jody Watson

TestAmerica, Inc Spectrum name: 11_Gamma_20131574.An1

Sample description
77739_Gamma_LCS 160-77739~2-A

Spectrum Filename: C:\User\SPC\Det11\11_Gamma_20131574.An1

Acquisition information
Start time: 10/31/2013 9:57:50 AM
Live time: 1800
Real time: 1893
Dead time: 4.93 %
Detector ID: 11

Detector system
Ge11 S/N09363993

Calibration
Filename: 11_Soil_TunaCan.Clb
Ge11_TunaCanCal_90099_032912

Energy Calibration
Created: 2/28/2012 1:09:34 PM
Zero offset: 0.055 keV
Gain: 0.250 keV/channel
Quadratic: -2.946E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 5:29:36 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.14 %
Log(Eff): -6.858644E-01 + (-3.337421E-01*Log(E)) + (-3.199860E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.72 %
Log(Eff): -2.393599E+01 + (8.833910E+00*Log(E)) + (-9.364157E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.47keV)
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

TestAmerica, Inc Spectrum name: 11_Gamma_20131574.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	10/1/2006 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	11_2013-10-05_0101.PBC 10/5/2013 1:01:56 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

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

Energy Calibration

Normalized diff: 46.5155

***** 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
36.68	379.	16.28	1.05	1.405E-02				
40.49	133.	55.66	1.66	1.711E-02				
46.62	19658.	0.86	0.90	2.193E-02	46.54	4.250	1.460E+04	PB210
49.77	415.	28.03	0.60	2.434E-02				
55.95	145.	50.29	0.62	2.870E-02				
59.56	25028.	0.84	0.88	3.101E-02	59.54	35.900	1.264E+03	AM241
77.07	147.	27.49	0.93	3.947E-02				
79.28	92.	44.04	0.93	4.022E-02				
88.07	1082.	8.02	0.97	4.263E-02				
93.79	56.	88.49	0.94	4.362E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.224E+01	U235
					93.35	5.561	3.003E+01	AC228
93.79	56.	88.49	0.94	4.362E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.224E+01	U235
122.18	61.	70.58	0.97	4.466E-02	121.78	28.580	PBC<MDA	EU152
143.95	39.	110.20	0.99	4.238E-02	143.79	10.960	PBC<MDA	U235
205.37	11.	379.21	1.05	3.439E-02	205.33	5.010	PBC<MDA	U235
238.51	197.	20.94	0.80	3.106E-02	238.63	43.300	9.754E+01	PB212
					242.00	7.430	4.711E+01	PB214
276.63	35.	99.46	1.11	2.800E-02	277.28	6.310	PBC<MDA	TL208
283.85	38.	97.31	1.12	2.752E-02	284.30	6.140	HL>Cutoff	I131
295.03	118.	34.12	0.33	2.681E-02	295.09	19.300	1.273E+01	PB214
338.09	43.	83.18	1.17	2.436E-02	338.32	12.010	PBC<MDA	AC228
					338.32	12.010	1.900E+01	AC228
351.83	104.	27.31	1.27	2.369E-02	351.93	37.600	6.484E+00	PB214
430.82	38.	58.13	0.50	2.050E-02				
582.88	93.	29.40	0.81	1.643E-02	583.02	84.500	4.864E+01	TL208
609.24	36.	53.14	1.4[illegible]	[illegible]	609.31	46.090	PBC<MDA	BI214

					609.31	46.090	PBC<MDA BI214
661.78	9292.	1.14	1.38	1.495E-02	661.66	85.210	4.774E+02 CS137
727.09	28.	78.07	1.51	1.392E-02	727.17	7.550	PBC<MDA BI212
766.55	21.	103.43	1.54	1.338E-02	766.41	0.294	PBC<MDA PA234M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
777.51	11.	209.97	1.55	1.322E-02	778.92	12.940	PBC<MDA	EU152
783.74	37.	55.82	1.56	1.313E-02	785.42	1.280	PBC<MDA	BI212
794.26	21.	97.99	1.57	1.300E-02	795.87	85.530	PBC<MDA	CS134
					795.87	85.530	1.118E+01	CS134
803.02	24.	97.75	1.57	1.293E-02	801.95	8.690	PBC<MDA	CS134
					801.95	8.690	1.296E+02	CS134
809.12	83.	35.39	0.57	1.284E-02				
881.76	16.	167.27	1.64	1.203E-02	880.53	6.000	PBC<MDA	Pa234
					880.53	6.000	1.263E+01	Pa234
911.09	50.	56.96	1.66	1.172E-02	911.07	29.000	PBC<MDA	AC228
					911.07	29.000	1.937E+01	AC228
946.06	15.	197.34	1.69	1.139E-02	946.02	13.400	PBC<MDA	Pa234
					946.02	13.400	5.589E+00	Pa234
964.47	6.	552.78	1.71	1.122E-02	964.11	14.605	PBC<MDA	EU152
969.64	40.	73.12	1.71	1.118E-02	968.97	17.460	PBC<MDA	AC228
					968.97	17.460	2.650E+01	AC228
995.59	5.	472.23	1.73	1.094E-02	996.33	10.600	PBC<MDA	EU154
					996.33	10.600	4.659E+00	EU154
1005.86	25.	98.95	1.74	1.087E-02	1004.77	18.010	PBC<MDA	EU154
					1004.77	18.010	1.238E+01	EU154
1111.78	13.	217.05	1.83	1.004E-02	1112.07	13.644	PBC<MDA	EU152
1120.17	-3.	815.86	1.83	9.985E-03	1120.29	15.100	PBC<MDA	BI214
					1120.29	15.100	PBC<MDA	BI214
1173.37	5261.	1.46	1.87	9.629E-03	1173.24	99.900	7.711E+02	CO60
1332.61	4798.	1.46	2.01	8.708E-03	1332.50	99.980	7.771E+02	CO60
1408.05	2.	375.29	2.06	8.334E-03	1408.00	21.005	PBC<MDA	EU152
1461.51	-5.	196.71	2.10	8.093E-03	1460.83	10.670	PBC<MDA	K40
1764.74	4.	76.03	2.34	6.950E-03	1764.49	15.400	PBC<MDA	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
146.42	36.68	1142.	379.	2.697E+04	16.28	1.053	-	s
161.64	40.49	2139.	133.	7.772E+03	55.66	1.663	-	s
198.72	49.77	3929.	415.	1.703E+04	28.03	0.596	-	sM
223.43	55.95	2399.	145.	5.063E+03	50.29	0.624	-	sM
307.85	76.98	749.	144.	3.650E+03	28.13	0.929	-	D
316.66	79.18	776.	92.	2.284E+03	44.14	0.931	-	D
351.83	88.07	1541.	1188.	2.786E+04	5.50	0.967	-	M
1722.30	430.82	189.	38.	1.838E+03	58.13	0.499	-	sM
3235.39	809.12	156.	83.	6.465E+03	35.39	0.565	-	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_Routine Short Rev1.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	185.97	46.58	5420.	20194.	11.219	1.00	0.891
AM-241	237.87	59.56	4487.	25028.	13.905	0.84	0.879
TH-234	245.79	61.54	1206.	-184.	-0.102	30.79	0.916s
EU-155	344.35	86.20	1723.	-110.	-0.061	54.41	0.938s
TH-234	380.25	95.17	736.	-49.	-0.027	217.31	0.943s
AC-228	372.95	93.35	1192.	56.	0.031	88.49	0.944D
U-235	372.95	93.35	1192.	56.	0.031	88.49	0.944D
EU-152	488.19	122.18	902.	61.	0.034	70.58	0.970
Pa-234	515.00	128.88	487.	-5.	-0.003	614.61	0.979s
U-235	575.24	143.95	913.	39.	0.022	110.20	0.990
U-235	653.29	163.47	852.	-24.	-0.013	174.70	1.008s
U-235	820.79	205.37	802.	11.	0.006	379.21	1.047s
PB-212	953.29	238.51	493.	181.	0.100	20.94	0.805s
TL-208	1105.71	276.63	601.	35.	0.020	99.46	1.112
I-131	1134.60	283.85	649.	38.	0.021	97.31	1.118s
PB-214	1179.31	295.03	449.	118.	0.066	34.12	0.326s
AC-228	1351.48	338.09	606.	43.	0.024	83.18	1.167s
EU-152	1375.50	344.10	616.	-11.	-0.006	332.03	1.172s
PB-214	1406.43	351.83	281.	104.	0.058	27.31	1.272
I-131	1459.85	365.19	588.	-9.	-0.005	397.04	1.190s
CS-134	2276.28	569.34	325.	-6.	-0.003	443.16	1.371s
TL-208	2330.42	582.88	188.	93.	0.052	29.40	0.812s
CS-134	2420.48	605.39	382.	-27.	-0.015	105.10	1.401s
BI-214	2435.87	609.24	337.	36.	0.020	53.14	1.405
I-131	2546.22	636.83	346.	-21.	-0.011	129.62	1.429s
CS-137	2645.99	661.78	289.	9292.	5.162	1.14	1.383
BI-212	2907.26	727.09	233.	28.	0.016	78.07	1.507s
PA-234M	3065.10	766.55	231.	21.	0.012	103.43	1.540s
EU-152	3108.94	777.51	242.	11.	0.006	209.97	1.551
BI-212	3133.87	783.74	191.	37.	0.020	55.82	1.556s
CS-134	3175.96	794.26	196.	21.	0.012	97.99	1.565s
CS-134	3210.97	803.02	270.	24.	0.014	97.75	1.570s
EU-154	3489.14	872.55	366.	-19.	-0.011	144.57	1.630s
Pa-234	3525.99	881.76	369.	16.	0.009	167.27	1.637s
AC-228	3643.32	911.09	388.	50.	0.028	56.96	1.662s
Pa-234	3783.25	946.06	451.	15.	0.009	197.34	1.691s
EU-152	3856.91	964.47	471.	6.	0.003	552.78	1.706
AC-228	3877.61	969.64	400.	40.	0.022	73.12	1.710s
EU-154	3981.42	995.59	334.	5.	0.003	472.23	1.733s
PA-234M	3998.45	999.85	318.	-11.	-0.006	222.98	1.737s
EU-154	4022.53	1005.86	285.	25.	0.014	98.95	1.740s
EU-152	4446.33	1111.78	362.	13.	0.007	217.05	1.828
CO-60	4692.81	1173.37	99.	5261.	2.923	1.46	1.869
EU-154	5088.59	1272.27	32.	-3.	-0.002	240.74	1.958s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	5330.12	1332.61	17.	4798.	2.666	1.46	2.011
EU-152	5632.05	1408.05	23.	2.	0.001	375.29	2.064s
K-40	5846.05	1461.51	36.	-5.	-0.003	196.71	2.105s
BI-214	7060.05	1764.74	19.	4.	0.002	76.03	2.336s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample		Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	5.0838E-01					5.31E+01		
			477.60	5.084E-01	%(		3.156E+01	1.84E+03	1.05E+01 G
K-40	N	-3.1300E+00					4.66E+11		
			1460.83	-3.130E+00	?(P		1.982E+01	1.97E+02	1.07E+01 G
CO-60	F	7.7409E+02					1.93E+03		
			1332.50	7.771E+02	(		3.551E+00	1.46E+00	1.00E+02 G
			1173.24	7.711E+02	(		7.193E+00	1.46E+00	9.99E+01 G
I-131	I	6.2628E-01					8.02E+00		
			364.48	-2.551E-01	?(		3.405E+00	3.97E+02	8.17E+01 G
			284.30	1.235E+01	&(		3.994E+01	9.73E+01	6.14E+00 G
			636.97	-1.037E+01	+		4.501E+01	1.30E+02	7.17E+00 G
CS-134	I	5.6266E+00					7.54E+02		
			604.71	-1.027E+01	?(		3.600E+01	1.05E+02	9.76E+01 G
			795.87	1.118E+01	&(		3.663E+01	9.80E+01	8.55E+01 G
			569.32	-1.345E+01	+		2.019E+02	4.43E+02	1.54E+01 G
			801.95	1.296E+02	(		4.227E+02	9.78E+01	8.69E+00 G
			563.24	8.247E+00	&		3.713E+02	1.33E+03	8.35E+00 G
CS-137	I	4.7736E+02					1.10E+04		
			661.66	4.774E+02	(		4.209E+00	1.14E+00	8.52E+01 G
EU-152	F	2.5135E+00					4.94E+03		
			344.29	-1.329E+00	?(		1.482E+01	3.32E+02	2.65E+01 G
			121.78	3.826E+00	(		8.921E+00	7.06E+01	2.86E+01 G
			778.92	4.945E+00	(		3.511E+01	2.10E+02	1.29E+01 G
			964.11	2.713E+00	(		5.060E+01	5.53E+02	1.46E+01 G
			1112.07	7.290E+00	(		5.327E+01	2.17E+02	1.36E+01 G
			1408.00	8.363E-01	&(		1.138E+01	3.75E+02	2.10E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	2.8987E+00					3.14E+03	
			873.23	-1.254E+01	?(	6.079E+01	1.45E+02	1.23E+01 G
			123.10	-1.484E-01	&	7.938E+00	1.59E+03	4.08E+01 G
			1274.54	-1.049E+00	+	8.950E+00	2.41E+02	3.52E+01 G
			723.36	0.000E+00	+	3.157E+01	1.00E+03	2.02E+01 G
			1004.77	1.238E+01	?(	4.090E+01	9.90E+01	1.80E+01 G
			996.33	4.659E+00	?(	7.449E+01	4.72E+02	1.06E+01 G
EU-155	I	-4.2626E-01					1.81E+03	
			105.31	-4.263E-01	%(	2.440E+01	1.71E+03	2.12E+01 G
			86.54	-1.262E+01	+	2.258E+01	5.44E+01	3.07E+01 G
TL-208	N	4.8643E+01					6.98E+02	
			583.02	4.864E+01	(P	3.485E+01	2.94E+01	8.45E+01 G
			277.28	1.453E+02	+	4.806E+02	9.95E+01	6.31E+00 G
			860.56	1.003E+01	%	4.122E+02	1.21E+03	1.24E+01 G
PB-210	N	1.5023E+04					8.14E+03	
			46.54	1.502E+04	(P	2.572E+02	1.00E+00	4.25E+00 G
PB-212	N	9.7541E+01					6.98E+02	
			238.63	9.754E+01	(P	5.738E+01	2.09E+01	4.33E+01 G
			300.03	-3.442E+00	%	9.786E+02	8.43E+03	3.28E+00 G
PB-214	N	8.6039E+00					5.84E+05	
			351.93	6.484E+00	(P	5.061E+00	2.73E+01	3.76E+01 G
			295.09	1.273E+01	(P	1.092E+01	3.41E+01	1.93E+01 G
			242.00	-1.846E-01	& P	2.604E+01	9.18E+02	7.43E+00 G
BI-212	N	3.9766E+02					6.98E+02	
			727.17	1.966E+02	?(	5.097E+02	7.81E+01	7.55E+00 G
			785.42	1.584E+03	&(	2.899E+03	5.58E+01	1.28E+00 G
BI-214	N	2.5543E+00					5.84E+05	
			609.31	2.760E+00	(P	6.709E+00	5.31E+01	4.61E+01 G
			1120.29	-9.480E-01	% P	2.996E+01	8.16E+02	1.51E+01 G
			1764.49	1.937E+00	&(P	1.185E+01	7.60E+01	1.54E+01 G
AC-228	N	2.1423E+01					2.10E+03	
			911.07	1.937E+01	?(	3.627E+01	5.70E+01	2.90E+01 G
			968.97	2.650E+01	&(	6.414E+01	7.31E+01	1.75E+01 G
			338.32	1.900E+01	(	5.238E+01	8.32E+01	1.20E+01 G
							Energy duplication	
			93.35	3.003E+01	*	8.802E+01	8.85E+01	5.56E+00 XA
Pa-234	N	3.8567E+00					1.63E+12	
			131.29	-3.578E-01	&(	7.418E+00	6.15E+02	1.80E+01 G
			569.47	4.218E-01	%	3.150E+01	2.19E+03	8.20E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		946.02	5.589E+00	&(	3.703E+01	1.97E+02	1.34E+01 G
		883.24	1.525E-01	%	4.471E+01	8.64E+03	9.60E+00 G
		880.53	1.263E+01	&(	7.094E+01	1.67E+02	6.00E+00 G
TH-234	N -8.0934E+01					1.63E+12	
		63.29-8.093E+01		?(P	7.226E+01	3.08E+01	3.81E+00 G
		92.59-1.124E+01		& P	2.953E+01	2.17E+02	5.58E+00 G
PA-234M	N 2.6576E+01					1.63E+12	
		1001.00-6.951E+01		&(	5.227E+02	2.23E+02	8.37E-01 G
		766.41	3.001E+02	&(	1.038E+03	1.03E+02	2.94E-01 G
U-235	N 4.2884E+00					2.57E+11	
		143.79	4.687E+00	?(	1.716E+01	1.10E+02	1.10E+01 G
		205.33	3.417E+00	?(	4.342E+01	3.79E+02	5.01E+00 G
		163.38-6.618E+00		+	3.859E+01	1.75E+02	5.08E+00 G
						Energy duplication	
		93.35	1.224E+01	*	3.587E+01	8.85E+01	5.81E+00 X
AM-241	T 1.2637E+03					1.58E+05	
		59.54	1.264E+03	(	1.590E+01	8.43E-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:
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

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
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-234	61.54	1206.	-184.	-0.102	30.79	-8.093E+01	P
EU-155	86.20	1723.	-110.	-0.061	54.41	-1.262E+01	
TH-234	95.17	736.	-49.	-0.027	217.31	-1.124E+01	P
AC-228	93.35	1192.	56.	0.031	88.49	3.003E+01	
U-235	93.35	1192.	56.	0.031	88.49	1.224E+01	
Pa-234	128.88	487.	-5.	-0.003	614.61	-3.578E-01	
U-235	143.95	913.	39.	0.022	110.20	4.687E+00	
U-235	163.47	852.	-24.	-0.013	174.70	-6.618E+00	
U-235	205.37	802.	11.	0.006	379.21	3.417E+00	
I-131	283.85	649.	38.	0.021	97.31	0.000E+00	
AC-228	338.09	606.	43.	0.024	83.18	1.900E+01	
I-131	365.19	588.	-9.	-0.005	397.04	0.000E+00	
CS-134	569.34	325.	-6.	-0.003	443.16	-1.345E+01	
CS-134	605.39	382.	-27.	-0.015	105.10	-1.027E+01	
BI-214	609.24	337.	36.	0.020	53.14	2.760E+00	P
I-131	636.83	346.	-21.	-0.011	129.62	0.000E+00	
BI-212	727.09	233.	28.	0.016	78.07	1.966E+02	
PA-234M	766.55	231.	21.	0.012	103.43	3.001E+02	
BI-212	783.74	191.	37.	0.020	55.82	1.584E+03	
CS-134	794.26	196.	21.	0.012	97.99	1.118E+01	
CS-134	803.02	270.	24.	0.014	97.75	1.296E+02	
EU-154	872.55	366.	-19.	-0.011	144.57	-1.254E+01	
Pa-234	881.76	369.	16.	0.009	167.27	1.263E+01	
AC-228	911.09	388.	50.	0.028	56.96	1.937E+01	
Pa-234	946.06	451.	15.	0.009	197.34	5.589E+00	
AC-228	969.64	400.	40.	0.022	73.12	2.650E+01	
EU-154	995.59	334.	5.	0.003	472.23	4.659E+00	
PA-234M	999.85	318.	-11.	-0.006	222.98	-6.951E+01	
EU-154	1005.86	285.	25.	0.014	98.95	1.238E+01	
EU-154	1272.27	32.	-3.	-0.002	240.74	-1.049E+00	
K-40	1461.51	36.	-5.	-0.003	196.71	-3.130E+00	P
BI-214	1764.74	19.	4.	0.002	76.03	1.937E+00	P

P - Peakbackground subtraction

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

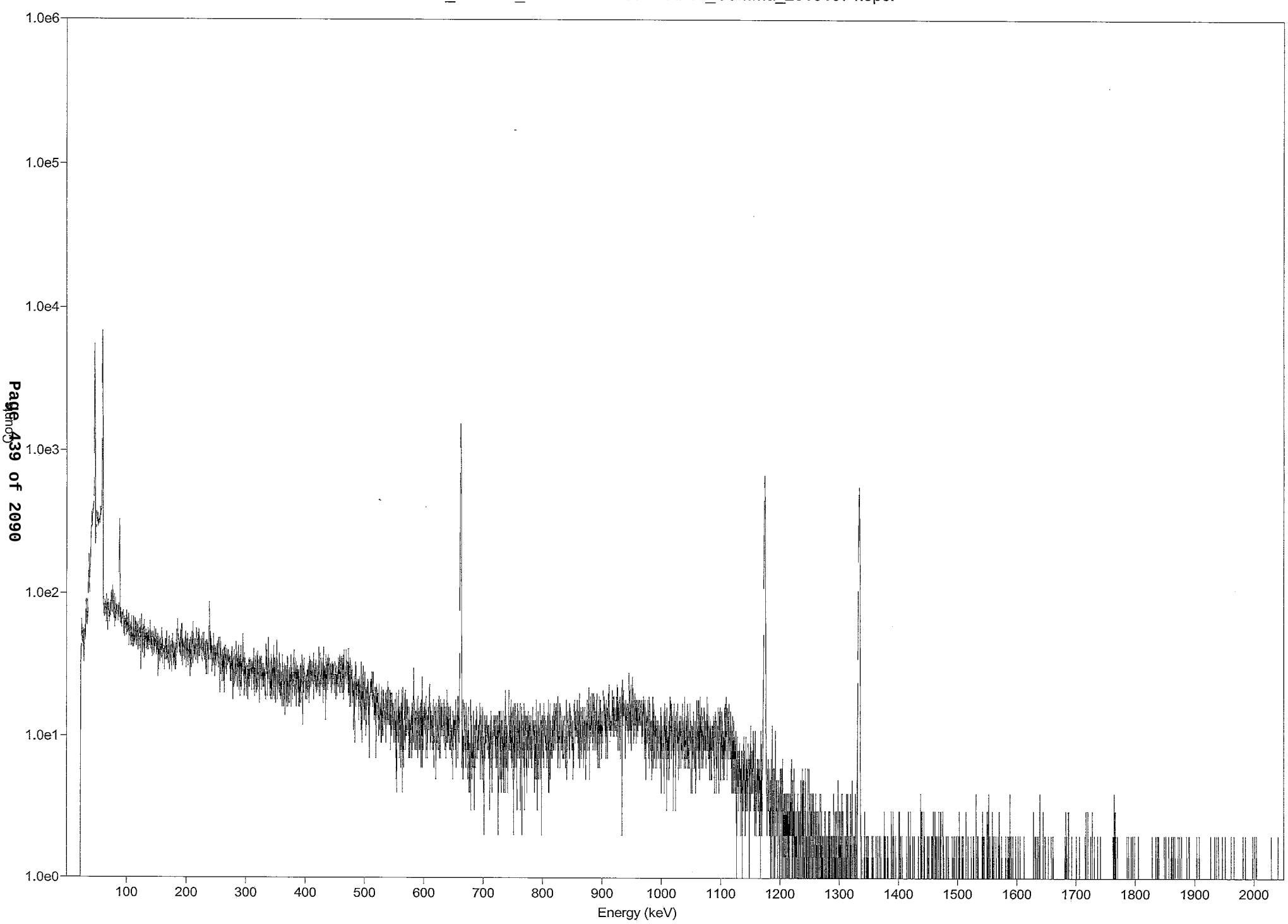
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
BE-7	A	5.0838E-01	>12 Halflives	1.8406E+03%	3.1560E+01	
K-40	#A	-3.1300E+00	-3.1300E+00	5.514E+02%		1.98E+01
CO-60		3.0499E+02	7.7409E+02	1.033E+00%		3.55E+00
I-131	#A	6.2628E-01	>12 Halflives	9.7311E+01%	3.4047E+00	
CS-134	#A	5.2196E-01	5.6266E+00	5.793E+01%		3.60E+01
CS-137		4.0529E+02	4.7736E+02	1.140E+00%		4.21E+00
EU-152	A	1.7489E+00	2.5135E+00	7.058E+01%		1.48E+01
EU-154	#A	1.6371E+00	2.8987E+00	9.895E+01%		6.08E+01
EU-155	#A	-1.5842E-01	-4.2626E-01	1.708E+03%		2.44E+01
TL-208		3.7216E+00	4.8643E+01	3.099E+01%		3.48E+01
PB-210		1.2054E+04	1.5023E+04	1.001E+00%		2.57E+02
PB-212		7.4625E+00	9.7541E+01	2.288E+01%		5.74E+01
PB-214		8.5775E+00	8.6039E+00	2.349E+01%		5.06E+00
BI-212	#A	3.0424E+01	3.9766E+02	4.799E+01%		5.10E+02
BI-214	#A	2.5465E+00	2.5543E+00	7.270E+01%		6.71E+00
AC-228	#A	9.1217E+00	2.1423E+01	4.151E+01%		3.63E+01
Pa-234	#A	3.8567E+00	3.8567E+00	1.673E+02%		7.42E+00
TH-234	#A	-8.0934E+01	-8.0934E+01	3.426E+01%		7.23E+01
PA-234M	#A	2.6576E+01	2.6576E+01	1.034E+02%		5.23E+02
U-235	#A	4.2884E+00	4.2884E+00	1.102E+02%		1.72E+01
AM-241		1.2494E+03	1.2637E+03	8.426E-01%		1.59E+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 (87.9 to 1999.5 keV) 1.403E+04 Bq/Sample
Total Decayed Activity (87.9 to 1999.5 keV) 1.7692848E+04 Bq/Sample

The library has energies which are not separable.


77739_Gamma_LCS 160-77739~2-A. 11_Gamma_20131574.spc.
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 15_Gamma_20131338

Sample Description: 77739_Gamma_LCS 160-77739~2-A
Detector: Ge15 SN/11012216
Batch ID: 77739
Work Order Number: Gamma
Lot Number: LCS 160-77739~2-A

Decay to Time: 10/1/2006 12:00 Live Time: 1800 sec
Acquisition Time: 10/31/2013 10:54:41 Real Time: 1807 sec
Analysis Time: 11/11/2013 12:28 Dead Time: 0.38 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 15_Soil_TunaCan.Clb
Efficiency Cal Desc: 15_TunaCan_90099_032212
Efficiency Cal Date: 3/22/2012 13:03
Energy Cal Date: 2/28/2012 16:29
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 15_2013-10-05_0052.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
K-40	3.365E+00	147.9	4.978E+00	4.980E+00	1.890E+01
CO-60	7.700E+02	1.2	9.559E+00	3.982E+01	5.695E+00
CS-134	5.179E+00	73.9	3.829E+00	3.839E+00	3.939E+01
CS-137	4.556E+02	1.3	6.088E+00	2.447E+01	5.061E+00
EU-152	4.086E+00	106.8	4.362E+00	4.367E+00	1.678E+01
EU-154	1.345E+01	155.0	2.084E+01	2.085E+01	7.011E+01
EU-155	1.419E+00	123.9	1.757E+00	1.759E+00	2.813E+01
TL-208	4.567E+01	43.4	1.980E+01	1.994E+01	5.254E+01
PB-210	1.493E+04	1.1	1.619E+02	8.917E+02	2.762E+02
PB-212	1.324E+02	21.1	2.790E+01	2.919E+01	6.645E+01
PB-214	6.175E+00	39.3	2.429E+00	2.450E+00	8.077E+00
BI-212	4.218E+02	59.0	2.489E+02	2.499E+02	5.958E+02
BI-214	6.688E+00	33.6	2.247E+00	2.274E+00	5.883E+00
AC-228	1.495E+01	55.3	8.263E+00	8.298E+00	4.572E+01
Pa-234	3.895E+00	85.0	3.312E+00	3.318E+00	1.110E+01
TH-234	-3.768E+02	9.8	3.708E+01	4.199E+01	1.088E+02
PA-234M	1.072E+02	159.5	1.710E+02	1.710E+02	5.770E+02
U-235	5.110E+00	111.1	5.678E+00	5.684E+00	1.888E+01
AM-241	1.267E+03	0.9	1.133E+01	6.673E+01	1.689E+01
Total	1.820E+04				

Analyst: Jody Watson

TestAmerica, Inc. Spectrum name: 15_Gamma_20131338.An1

Sample description
77739_Gamma_LCS 160-77739~2-A

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20131338.An1

Acquisition information

Start time:	10/31/2013 10:54:41 AM
Live time:	1800
Real time:	1807
Dead time:	0.38 %
Detector ID:	15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_Soil_TunaCan.Clb
15_TunaCan_90099_032212

Energy Calibration

Created:	2/28/2012 4:29:17 PM
Zero offset:	0.044 keV
Gain:	0.250 keV/channel
Quadratic:	-3.267E-08 keV/channel^2

Efficiency Calibration

Created:	3/22/2012 1:03:01 PM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 1.00 %
Log(Eff):	-6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.13 %
Log(Eff):	-2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-01*Log(E)^2)

Library Files

Main analysis library:	Client_Routine Short Rev1.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.57keV)
Stop channel:	8000 (1999.52keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

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

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2013-10-05_0052.PBC 10/5/2013 12:52:55 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 22 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0729

***** 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
40.83	107.	69.92	0.27	1.564E-02				
46.57	16947.	0.93	0.95	1.956E-02	46.54	4.250	1.409E+04	PB210
49.39	13.	607.24	0.95	2.141E-02				
59.56	22159.	0.89	0.99	2.738E-02	59.54	35.900	1.267E+03	AM241
77.46	120.	41.83	0.82	3.462E-02				
84.09	32.	123.88	0.98	3.679E-02	86.54	30.700	PBC<MDA	EU155
88.11	901.	7.82	1.12	3.707E-02				
92.79	98.	44.60	0.51	3.778E-02	92.59	5.584	PBC<MDA	TH234
					92.59	5.584	1.948E+01	TH234
93.24	5.	773.45	0.99	3.785E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.178E+00	U235
112.41	97.	39.62	0.77	3.882E-02				
121.38	35.	121.43	1.02	3.848E-02	121.78	28.580	PBC<MDA	EU152
					121.78	28.580	2.539E+00	EU152
124.36	78.	43.12	0.45	3.831E-02				
131.26	48.	85.04	1.02	3.775E-02	131.29	18.000	PBC<MDA	Pa234
					131.29	18.000	3.938E+00	Pa234
143.74	37.	111.11	1.04	3.639E-02	143.79	10.960	PBC<MDA	U235
					143.79	10.960	5.110E+00	U235
181.54	53.	54.86	0.41	3.176E-02				
185.96	61.	51.19	0.62	3.120E-02				
228.17	43.	62.64	0.30	2.681E-02				
233.55	23.	89.52	0.49	2.634E-02				
238.59	205.	19.87	1.43	2.592E-02	238.63	43.300	1.324E+02	PB212
243.73	4.	848.75	1.12	2.565E-02	242.00	7.430	PBC<MDA	PB214
					242.00	7.430	1.143E+00	PB214
246.53	44.	71.15	0.34	2.529E-02				
277.43	21.	164.07	1.15	2.513E-02	277.28	6.310	PBC<MDA	TL208

					277.28	6.310	PBC<MDA	TL208
289.99	45.	62.18	0.31	2.235E-02				
295.38	45.	74.52	1.17	2.205E-02	295.09	19.300	PBC<MDA	PB214
					295.09	19.300	5.882E+00	PB214
338.60	50.	55.28	0.30	1.983E-02	338.32	12.010	PBC<MDA	AC228
344.74	4.	742.34	1.21	1.956E-02	344.29	26.500	PBC<MDA	EU152
					344.29	26.500	6.704E-01	EU152
351.99	82.	39.34	1.22	1.923E-02	351.93	37.600	PBC<MDA	PB214
					351.93	37.600	6.325E+00	PB214
362.41	3.	994.26	1.23	1.871E-02	364.48	81.700	HL>Cutoff	I131
					364.48	81.700	HL>Cutoff	I131
434.37	25.	69.79	0.47	1.628E-02				
540.45	22.	51.83	0.32	1.364E-02				
563.18	29.	73.94	1.39	1.319E-02	563.24	8.350	PBC<MDA	CS134
					563.24	8.350	1.594E+02	CS134
583.36	55.	38.89	1.41	1.282E-02	583.02	84.500	PBC<MDA	TL208
					583.02	84.500	PBC<MDA	TL208
609.27	82.	30.58	0.70	1.236E-02	609.31	46.090	7.344E+00	BI214
637.24	36.	60.77	1.45	1.192E-02	636.97	7.170	HL>Cutoff	I131
					636.97	7.170	HL>Cutoff	I131
661.74	6850.	1.34	1.48	1.154E-02	661.66	85.210	4.556E+02	CS137

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
726.85	34.	59.01	1.52	1.067E-02	727.17	7.550	PBC<MDA	BI212
775.52	2.	756.00	1.56	1.007E-02	778.92	12.940	PBC<MDA	EU152
					778.92	12.940	1.462E+00	EU152
785.23	19.	107.79	1.57	9.998E-03	785.42	1.280	PBC<MDA	BI212
860.96	12.	207.24	1.62	9.252E-03	860.56	12.420	PBC<MDA	TL208
					860.56	12.420	7.432E+01	TL208
872.69	15.	154.96	1.63	9.137E-03	873.23	12.270	PBC<MDA	EU154
					873.23	12.270	1.345E+01	EU154
880.64	6.	446.96	1.64	9.072E-03	880.53	6.000	PBC<MDA	Pa234
					883.24	9.600	3.612E+00	Pa234
					880.53	6.000	5.764E+00	Pa234
881.05	4.	542.69	1.64	9.048E-03	880.53	6.000	PBC<MDA	Pa234
					883.24	9.600	2.646E+00	Pa234
					883.24	9.600	2.646E+00	Pa234
910.94	42.	55.81	0.50	8.812E-03	911.07	29.000	2.145E+01	AC228
969.54	11.	233.14	1.70	8.357E-03	968.97	17.460	PBC<MDA	AC228
998.60	13.	159.52	1.72	8.125E-03	1001.00	0.837	PBC<MDA	PA234M
1043.81	22.	49.44	0.50	7.836E-03				
1113.40	21.	106.75	1.80	7.416E-03	1112.07	13.644	PBC<MDA	EU152
					1112.07	13.644	1.645E+01	EU152
1120.71	3.	324.01	1.80	7.368E-03	1120.29	15.100	PBC<MDA	BI214
1173.35	3847.	1.77	1.69	7.076E-03	1173.24	99.900	7.674E+02	CO60
1274.60	4.	168.52	1.90	6.579E-03	1274.54	35.190	PBC<MDA	EU154
					1274.54	35.190	1.833E+00	EU154
1332.66	3465.	1.74	1.93	6.324E-03	1332.50	99.980	7.726E+02	CO60
1461.86	4.	71.29	2.02	5.828E-03	1460.83	10.670	PBC<MDA	K40
1764.84	6.	62.35	2.18	4.916E-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
163.02	40.83	2072.	107.	6.861E+03	69.92	0.275	-	s
197.05	49.34	2432.	256.	1.197E+04	32.03	0.813	-	M
309.42	77.46	800.	120.	3.466E+03	41.83	0.818	-	s
352.00	88.11	1017.	901.	2.430E+04	6.01	1.125	-	s
370.26	92.79	564.	97.	2.580E+03	35.89	0.989	-	D
449.15	112.41	460.	97.	2.499E+03	39.62	0.767	-	
496.92	124.36	413.	96.	2.498E+03	31.71	0.446	-	s
725.46	181.54	293.	53.	1.658E+03	54.86	0.413	-	s
743.15	185.96	347.	61.	1.966E+03	51.19	0.620	-	s
911.90	228.17	273.	43.	1.604E+03	62.64	0.301	-	s
933.42	233.55	188.	23.	8.795E+02	89.52	0.493	-	sc
985.29	246.53	312.	44.	1.740E+03	71.15	0.344	-	sM
1159.03	289.99	246.	45.	2.014E+03	62.18	0.308	-	sM
1736.34	434.37	127.	25.	1.526E+03	69.79	0.469	-	sc
2160.53	540.45	54.	22.	1.613E+03	51.83	0.320	-	s
4174.07	1043.81	40.	22.	2.871E+03	49.44	0.500	-	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_Routine Short Rev1.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.77	46.52	4987.	17937.	9.965	1.08	0.948
AM-241	237.90	59.56	3943.	22159.	12.310	0.89	0.989
TH-234	245.27	61.41	2137.	-756.	-0.420	9.58	0.962s
EU-155	335.93	84.09	763.	32.	0.018	123.88	0.983s
TH-234	370.20	92.66	1149.	52.	0.029	63.10	0.989s
AC-228	372.95	93.35	648.	5.	0.003	773.45	0.989D
U-235	372.95	93.35	981.	89.	0.049	50.97	0.989D
EU-155	421.17	105.41	1063.	-14.	-0.008	319.41	1.000s
EU-152	485.01	121.38	884.	35.	0.019	121.43	1.015s
EU-154	491.96	123.12	1007.	-29.	-0.016	154.75	1.017s
Pa-234	524.49	131.26	815.	48.	0.027	85.04	1.024s
U-235	574.37	143.74	812.	37.	0.020	111.11	1.036s
U-235	652.91	163.39	727.	-19.	-0.010	203.98	1.053s
PB-212	953.55	238.59	460.	205.	0.114	19.87	1.430s
PB-214	974.11	243.73	548.	4.	0.002	848.75	1.123s
TL-208	1108.85	277.43	600.	21.	0.012	164.07	1.154s
I-131	1131.84	283.18	485.	-11.	-0.006	281.74	1.160s
PB-214	1180.60	295.38	538.	45.	0.025	74.52	1.170
AC-228	1353.39	338.60	238.	50.	0.028	55.28	0.297s
EU-152	1377.94	344.74	520.	4.	0.002	742.34	1.212s
PB-214	1406.93	351.99	480.	82.	0.046	39.34	1.219
I-131	1448.61	362.41	377.	3.	0.002	994.26	1.229s
BE-7	1908.87	477.52	536.	-7.	-0.004	497.88	1.324s
CS-134	2251.43	563.18	220.	29.	0.016	73.94	1.394s
CS-134	2276.67	569.49	238.	-18.	-0.010	122.24	1.399s
Pa-234	2276.53	569.45	236.	-17.	-0.010	127.24	1.399s
TL-208	2332.17	583.36	264.	55.	0.031	38.89	1.410
CS-134	2417.07	604.59	274.	-16.	-0.009	146.27	1.427s
BI-214	2435.76	609.27	152.	75.	0.042	30.58	0.701s
I-131	2547.65	637.24	223.	36.	0.020	60.77	1.452s
CS-137	2645.63	661.74	248.	6850.	3.806	1.34	1.481
EU-154	2890.98	723.08	251.	-25.	-0.014	92.05	1.519s
BI-212	2906.06	726.85	185.	34.	0.019	59.01	1.522s
EU-152	3100.71	775.52	162.	2.	0.001	756.00	1.561s
BI-212	3139.57	785.23	208.	19.	0.011	107.79	1.566s
TL-208	3442.52	860.96	291.	12.	0.007	207.24	1.622s
EU-154	3489.45	872.69	274.	15.	0.009	154.96	1.631s
Pa-234	3521.25	880.64	316.	6.	0.003	446.96	1.636s
Pa-234	3522.88	881.05	250.	4.	0.002	542.69	1.638s
AC-228	3643.08	911.09	347.	25.	0.014	106.08	1.658s
Pa-234	3767.65	942.23	214.	-2.	-0.001	998.44	1.683s
AC-228	3876.90	969.54	319.	11.	0.006	233.14	1.699
EU-154	3986.82	997.01	298.	-15.	-0.008	169.19	1.718s
PA-234M	3993.17	998.60	212.	13.	0.007	159.52	1.722s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	4452.54	1113.40	237.	21.	0.012	106.75	1.797s
BI-214	4481.79	1120.71	179.	3.	0.002	324.01	1.803
CO-60	4692.45	1173.35	117.	3847.	2.137	1.77	1.694
EU-154	5097.64	1274.60	24.	4.	0.002	168.52	1.902s
CO-60	5330.02	1332.66	24.	3465.	1.925	1.74	1.926
K-40	5847.16	1461.86	16.	4.	0.002	71.29	2.015s
BI-214	7060.16	1764.84	15.	6.	0.004	62.35	2.180s

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	Peak MDA Value Bq/Sample		COMMENTS
BE-7	C	-2.3099E+00				5.31E+01		
			477.60	-2.310E+00	&(	3.873E+01	4.98E+02 1.05E+01 G	
K-40	N	3.3645E+00				4.66E+11		
			1460.83	3.365E+00	&(P	1.890E+01	7.13E+01 1.07E+01 G	
CO-60	F	7.7002E+02				1.93E+03		
			1332.50	7.726E+02	(	5.695E+00	1.74E+00 1.00E+02 G	
			1173.24	7.674E+02	(	1.058E+01	1.77E+00 9.99E+01 G	
I-131	I	1.9868E+00				8.02E+00		
			364.48	1.005E-01	&(	3.386E+00	9.94E+02 8.17E+01 G	
			284.30	-4.432E+00	+	4.199E+01	2.82E+02 6.14E+00 G	
			636.97	2.348E+01	(	4.698E+01	6.08E+01 7.17E+00 G	
CS-134	I	5.1785E+00				7.54E+02		
			604.71	-8.013E+00	?(	3.939E+01	1.46E+02 9.76E+01 G	
			795.87	2.035E-01	%	5.332E+01	7.67E+03 8.55E+01 G	
			569.32	-5.420E+01	+	2.223E+02	1.22E+02 1.54E+01 G	
			801.95	-5.550E+00	&	5.174E+02	2.73E+03 8.69E+00 G	
			563.24	1.594E+02	&(	3.908E+02	7.39E+01 8.35E+00 G	
CS-137	I	4.5561E+02				1.10E+04		
			661.66	4.556E+02	(	5.061E+00	1.34E+00 8.52E+01 G	
EU-152	F	4.0858E+00				4.94E+03		
			344.29	6.704E-01	&(	1.678E+01	7.42E+02 2.65E+01 G	
			121.78	2.539E+00	*(	1.026E+01	1.21E+02 2.86E+01 G	
			778.92	1.462E+00	?(	3.795E+01	7.56E+02 1.29E+01 G	
			964.11	1.838E-01	&	5.194E+01	8.29E+03 1.46E+01 G	
			1112.07	1.645E+01	&(	5.876E+01	1.07E+02 1.36E+01 G	

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1408.00	-9.699E-03 %		1.274E+01	3.45E+04	2.10E+01 G
EU-154	I	1.3449E+01					3.14E+03	
			873.23	1.345E+01 &(		7.011E+01	1.55E+02	1.23E+01 G
			123.10	-1.835E+00 -		9.460E+00	1.55E+02	4.08E+01 G
			1274.54	1.833E+00 -		1.090E+01	1.69E+02	3.52E+01 G
			723.36	-1.133E+01 +		3.476E+01	9.20E+01	2.02E+01 G
			1004.77	-4.802E-01 &		5.487E+01	3.35E+03	1.80E+01 G
			996.33	-1.660E+01 &		9.452E+01	1.69E+02	1.06E+01 G
EU-155	I	1.4186E+00					1.81E+03	
			105.31	-2.635E+00 ?(		2.813E+01	3.19E+02	2.12E+01 G
			86.54	4.218E+00 ?(		1.740E+01	1.24E+02	3.07E+01 G
TL-208	N	4.5666E+01					6.98E+02	
			583.02	3.712E+01 ?(P		5.254E+01	3.89E+01	8.45E+01 G
			277.28	1.037E+02 &(P		5.816E+02	1.64E+02	6.31E+00 G
			860.56	7.432E+01 ?(		5.196E+02	2.07E+02	1.24E+01 G
PB-210	N	1.4933E+04					8.14E+03	
			46.54	1.493E+04 (P		2.762E+02	1.08E+00	4.25E+00 G
PB-212	N	1.3244E+02					6.98E+02	
			238.63	1.324E+02 (P		6.645E+01	1.99E+01	4.33E+01 G
			300.03	-5.919E+00 %		1.025E+03	5.11E+03	3.28E+00 G
PB-214	N	6.1745E+00					5.84E+05	
			351.93	6.325E+00 (		8.077E+00	3.93E+01	3.76E+01 G
			295.09	5.882E+00 ?(		1.450E+01	7.45E+01	1.93E+01 G
			242.00	1.143E+00 -		3.269E+01	8.49E+02	7.43E+00 G
BI-212	N	4.2178E+02					6.98E+02	
			727.17	3.071E+02 (		5.958E+02	5.90E+01	7.55E+00 G
			785.42	1.098E+03 (		3.967E+03	1.08E+02	1.28E+00 G
BI-214	N	6.6878E+00					5.84E+05	
			609.31	7.344E+00 (P		5.883E+00	3.06E+01	4.61E+01 G
			1120.29	1.624E+00 - P		3.260E+01	3.24E+02	1.51E+01 G
			1764.49	4.725E+00 ?(P		1.524E+01	6.23E+01	1.54E+01 G
AC-228	N	1.4948E+01					2.10E+03	
			911.07	1.291E+01 ?(		4.572E+01	1.06E+02	2.90E+01 G
			968.97	9.765E+00 (		7.681E+01	2.33E+02	1.75E+01 G
			338.32	2.739E+01 (		4.087E+01	5.53E+01	1.20E+01 G
								Energy duplication
			93.35	2.891E+00 -		7.523E+01	7.73E+02	5.56E+00 XA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Pa-234	N 3.8949E+00					1.63E+12	
		131.29	3.938E+00	&(	1.110E+01	8.50E+01	1.80E+01 G
		569.47	-9.005E+00	+	3.848E+01	1.27E+02	8.20E+00 G
		946.02	-1.010E+00	-	3.446E+01	9.98E+02	1.34E+01 G
		883.24	2.646E+00	?(	4.886E+01	5.43E+02	9.60E+00 G
		880.53	5.764E+00	&(	8.727E+01	4.47E+02	6.00E+00 G
TH-234	N -3.7684E+02					1.63E+12	
		63.29	-3.768E+02	?(P	1.088E+02	9.58E+00	3.81E+00 G
		92.59	1.379E+01	+ P	4.233E+01	6.31E+01	5.58E+00 G
PA-234M	N 1.0717E+02					1.63E+12	
		1001.00	1.072E+02	?(	5.770E+02	1.60E+02	8.37E-01 G
		766.41	1.437E+01	%	1.209E+03	2.45E+03	2.94E-01 G
U-235	N 5.1103E+00					2.57E+11	
		143.79	5.110E+00	(	1.888E+01	1.11E+02	1.10E+01 G
		205.33	1.168E+00	&	5.126E+01	1.31E+03	5.01E+00 G
		163.38	-6.110E+00	+	4.168E+01	2.04E+02	5.08E+00 G
							Energy duplication
		93.35	2.244E+01	&	3.756E+01	5.10E+01	5.81E+00 X
AM-241	T 1.2671E+03					1.58E+05	
		59.54	1.267E+03	(	1.689E+01	8.94E-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:
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

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

- - - -

***** 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 *****

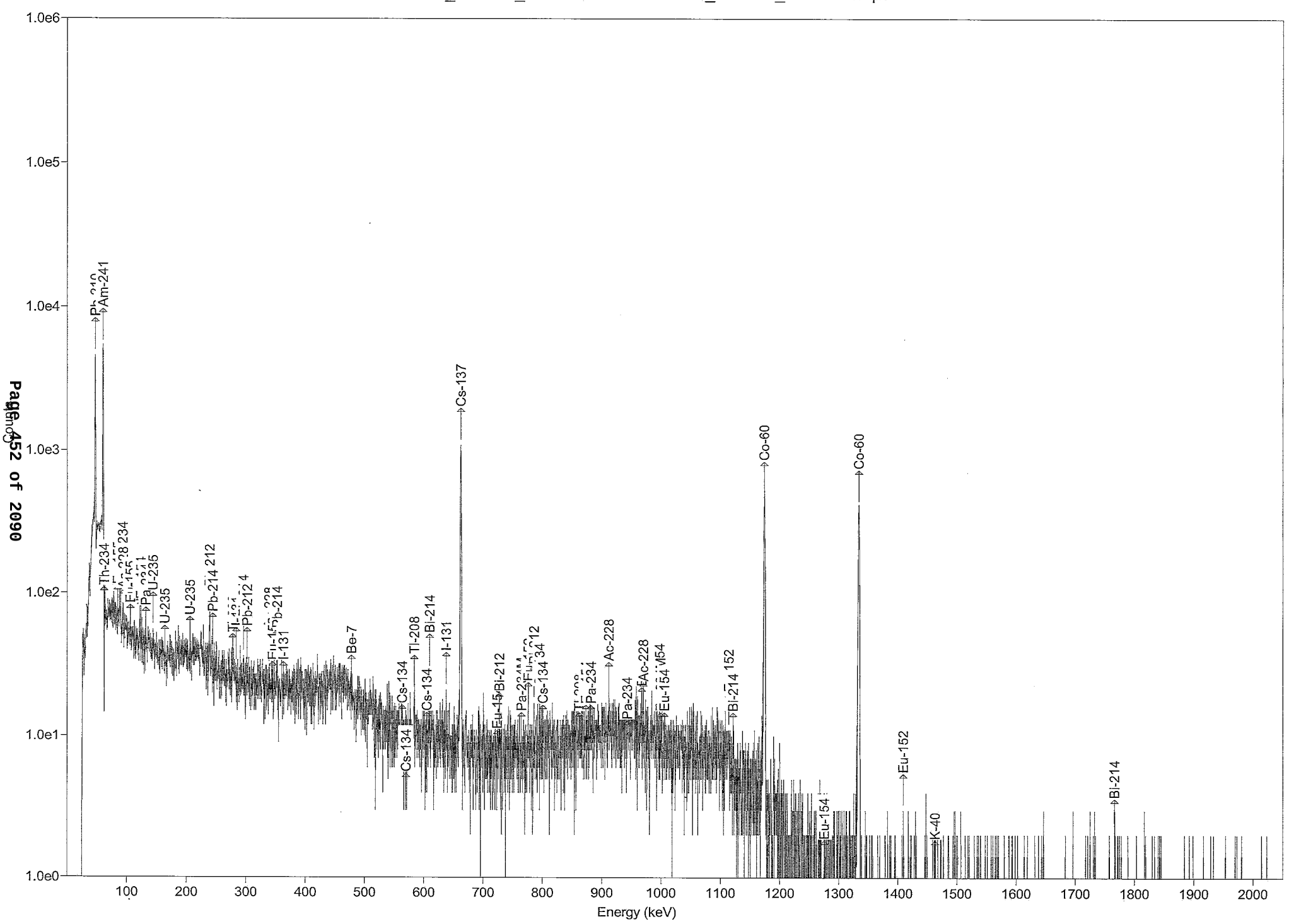
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
BE-7	#A	-2.3099E+00	>12 Halflives	4.9788E+02%	3.8727E+01	
K-40	#A	3.3645E+00	3.3645E+00	1.479E+02%		1.89E+01
CO-60		3.0338E+02	7.7002E+02	1.241E+00%		5.69E+00
I-131	#A	1.9868E+00	>12 Halflives	6.0769E+01%	3.3861E+00	
CS-134	#A	4.8037E-01	5.1785E+00	7.394E+01%		3.94E+01
CS-137		3.8683E+02	4.5561E+02	1.336E+00%		5.06E+00
EU-152	#A	2.8429E+00	4.0858E+00	1.068E+02%		1.68E+01
EU-154	#A	7.5957E+00	1.3449E+01	1.550E+02%		7.01E+01
EU-155	#A	5.2723E-01	1.4186E+00	1.239E+02%		2.81E+01
TL-208	#A	3.4936E+00	4.5666E+01	4.336E+01%		5.25E+01
PB-210		1.1982E+04	1.4933E+04	1.084E+00%		2.76E+02
PB-212	#	1.0132E+01	1.3244E+02	2.107E+01%		6.64E+01
PB-214	#A	6.1556E+00	6.1745E+00	3.934E+01%		8.08E+00
BI-212	#A	3.2268E+01	4.2178E+02	5.901E+01%		5.96E+02
BI-214		6.6673E+00	6.6878E+00	3.360E+01%		5.88E+00
AC-228	A	6.3644E+00	1.4948E+01	5.528E+01%		4.57E+01
Pa-234	#A	3.8949E+00	3.8949E+00	8.504E+01%		1.11E+01
TH-234	#A	-3.7684E+02	-3.7684E+02	9.841E+00%		1.09E+02
PA-234M	#A	1.0717E+02	1.0717E+02	1.595E+02%		5.77E+02
U-235	#A	5.1103E+00	5.1103E+00	1.111E+02%		1.89E+01
AM-241		1.2528E+03	1.2671E+03	8.940E-01%		1.69E+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 (112.4 to 1999.5 keV) 1.394E+04 Bq/Sample
Total Decayed Activity (112.4 to 1999.5 keV) 1.7565109E+04 Bq/Sample

The library has energies which are not separable.


77739_Gamma_LCS 160-77739~2-A. 15_Gamma_20131338.spc.
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Energy (keV)
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Am-241
Th-234
U-235
U-235
Pb-214
Pb-214
I-131
Be-7
Cs-134
Cs-134
Tl-208
Bi-214
Cs-137
I-131
Bi-212
Cs-134
Ac-228
Pa-234
Ac-228
Co-60
Co-60
Bi-214
Eu-152
K-40
Bi-214

Reagent

Tuna Can_00002

Rec'd 2/3/10

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

81427-334

1.0 Liter Sand in 1 Liter HDPE Silgan Jar

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd Atlanta, Georgia 30318

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

Source Prepared by: _____
W. Mao, Radiochemist

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

Reagent

Tuna Can_00003

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

90099
1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

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

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

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

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

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

(Certificate continued on reverse side)

Corporate Office

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)

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

Reagent

U-232_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

85539-334

5 mL Liquid in Flame Sealed Vial

Customer: Test America/Earth City, MO
P.O. No.: 2434448, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 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.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty*, % Type u_A	u_B	U	Reference Date (12:00 PM EST)
U-232	2.517E+04	1.725E+04	0.5	2.4	4.9	08/25/2011

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

Comments:
Impurities: U-232 daughters, γ-impurities (other than decay products) < 0.1 %.

Source Prepared by: M. I. Taskaeva, Radiochemist

QA Approved: J. D. McCorvey, QA Manager Alternate Date: 8/25/11

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

U-232_00025

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

U - 232 - 00025

Reagent ID: U-232_00025

		Expiration Date:	05/11/2015
Description:	U-232 Clean Tracer	Laboratory:	TestAmerica St. Louis
No. of Bottles:	1	Prepared By:	Bernsen, Sarah C
Storage Location:	RAD Actinide STDs	Solvent:	DI Water
Reagent Volume:	250.000 mL	Solvent Lot:	0
Creation Date:	05/07/2014		
Container(s):	356776		

356776
ID: U-232_00025
Exp: 05/11/15 Prpd: SCB Crl: 05/07/14
U-232 Clean Tracer

Comment: Prepared according to SOP ST-RC-0244, Rev.16 section 7.28 to different volume. 2 mL of parent to ~100 mL, 3g potassium sulfate, pH adjusted with 2M sulfuric acid. 25 mL of 1% lead nitrate. pH checked. Final volume 250 mL (instead of 100 mL).

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
U-232	U-232_00009	08/25/2061	10280.70700	dpm/mL	82.24566	dpm/mL

Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
U-232_00009	U-232 Parent		08/25/61				2.00000	mL

St. Louis Radiological Standard Reverification Form

Standard ID Number: U-232_00025
True Value = 36.05162 DPM/L or g
Date Analyzed: 5/11/2014

Radionuclide: U-232

	Replicates	
#1	36.21	DPM/L or g
#2	34.41	DPM/L or g
#3	35.61	DPM/L or g

Mean = 35.41

1 sigma = 0.916515 1.96 sigma = 1.79637

True Value minus 5% = 34.24904 (True Value - 5%)
True Value plus 5% = 37.8542 (True Value + 5%)

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

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

Standard Reverification Acceptable? **Yes**

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

Reviewed By/Date: Micha Korrinhizer 5/12/2014

SOP Reference: STL-QA-0002, Current Revision

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

960mins. U-232 clean verification

Actinide Prep

Batch No. : —

Balance ID : —

5/8/14 MLE

Th 229 U 232 157 158 159 241

No.	Sample Number	Aliquot (g / mL)	Crucible ID	Dilution
1	xVerification-1	0.1	243	247
2	RC=212 12	1	245	248
3	13	1	246	249
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

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

Tracer ☐ N/A

Initials / Date

Isotope : UNAT

Std Sol'n No. : UNAT SPIKE -08001

Vol (mL) : 0.1

Ref Activity (dpm/mL) : 234 - 0.691, 235 - 3.370

Act Ref Date : 238 - 12-2004

03-30-08

Samples Spiked and Traced By: SUB 5/7/14 (Initials / Date)

Verification Signature & Date: MB 5/7/14 (Initials / Date)

LCS Standard ☐ N/A

Initials / Date

Isotope : U-232 clean

Std Sol'n ID. : U-232-00025

Vol (mL) : 0.1

Ref Activity (dpm/mL) : 82.247

Act Ref Date : 08-25-11

SOP's applied in preparing these samples. Mark box to left for all that apply:

☐ ST-RC-0003 Rev.	☐ ST-RC-0040 Rev.	☐ ST-RC-0110 Rev.
☐ ST-RC-0004 Rev.	☐ ST-RC-0041 Rev.	☐ ST-RC-0120 Rev.
☐ ST-RC-0014 Rev.	☐ ST-RC-0050 Rev.	☐ ST-RC-0232 Rev.
☐ ST-RC-0020 Rev.	☐ ST-RC-0090 Rev.	☐ ST-RC-0238 Rev.
☐ ST-RC-0021 Rev.	☐ ST-RC-0100 Rev.	☐ ST-RC-0240 Rev.
		☐ ST-RC-0241 Rev.
		☐ ST-RC-0242 Rev.
		☐ ST-RC-5016 Rev.
		☐
		☐

Isotope(s)

αβ ☐	Iso Pu ☐	Tc-99 ☐	Iso Cm ☐
Iso Am ☐	Ra ☐	Iso Th ☐	Pu-241 ☐
KPA ☐	Sr ☐	Iso U ☑	Th-229 ☐
Np ☐	TAR ☐	C-14 ☐	Cl-36 ☐

Count Time	Matrix
Long Count ☐	Soil ☐
Short Count ☐	H_2O ☐

Prepared By : SUB

Date : 5/7/14

Reviewed by: _____

Date: _____

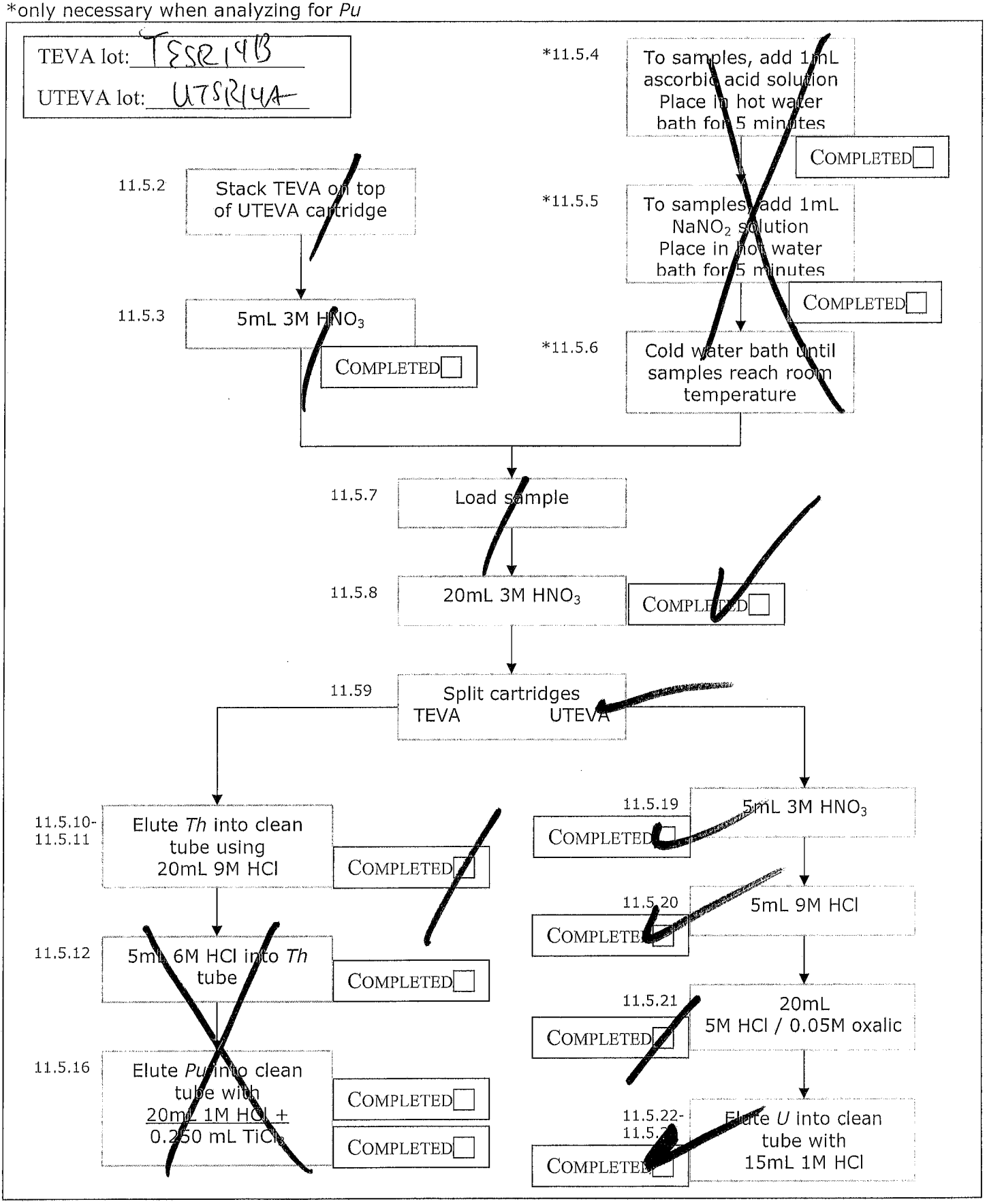
Sequential Thorium, Plutonium and Uranium via TEVA/UTEVA ST-RC-0242

Batch: U Vent

NMN 5/8/14

All rinses should flow at 1 mL/minute (only 3M HNO_3 may be done at 3 mL/minute)

*only necessary when analyzing for *Pu*



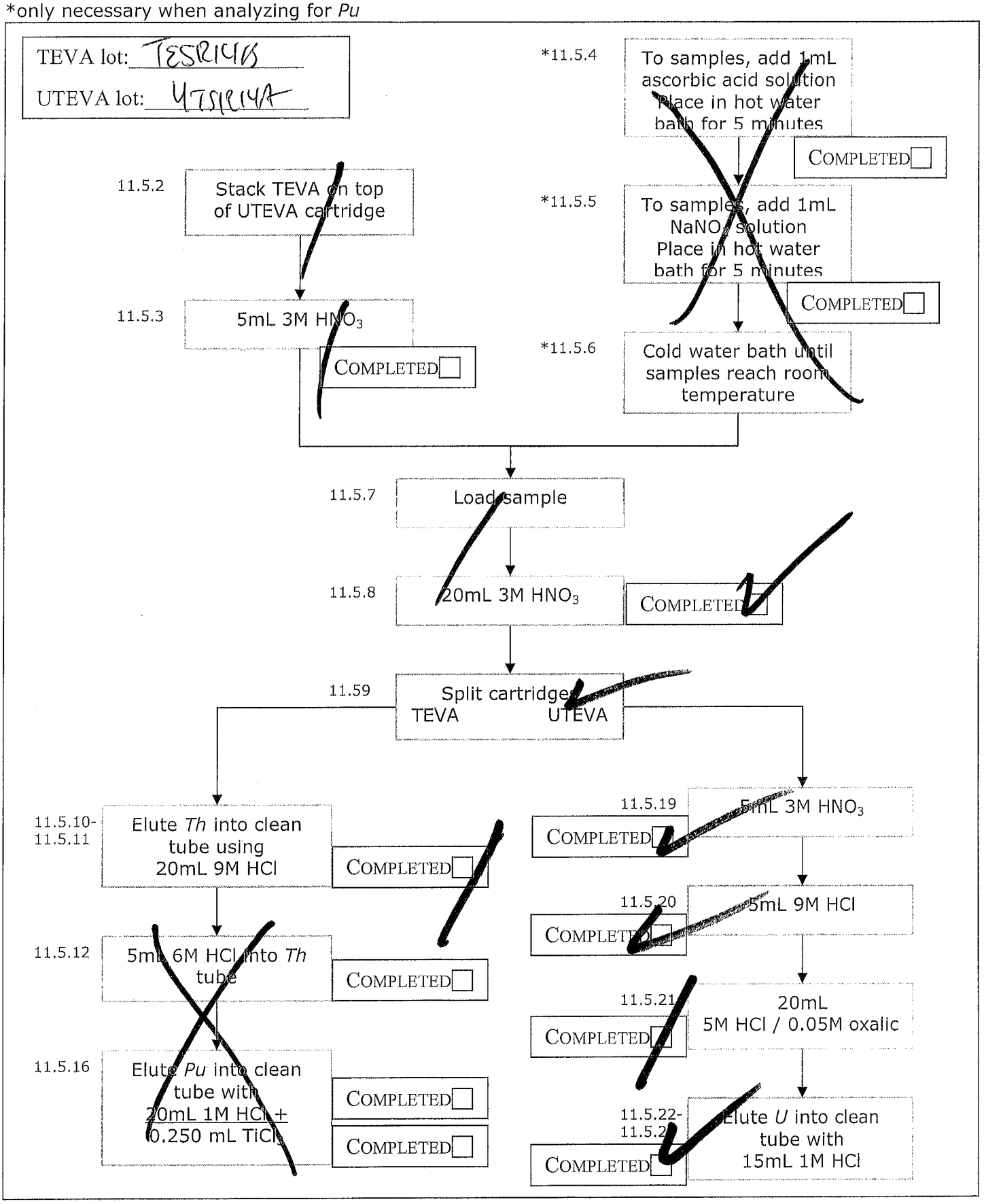
Sequential Thorium, Plutonium and Uranium via TEVA/UTEVA ST-RC-0242

Batch: U Vent

5/8/14

All rinses should flow at 1 mL/minute (only 3M HNO_3 may be done at 3 mL/minute)

*only necessary when analyzing for *Pu*



Uranium-232						
Initial Activity:	82.247	dpm				
Reference Date:	8/25/2011					
Current Date:	5/11/2014		(or date at which you wish to determine activity)			
Elapsed Time:	990	days				
Half Life:	25165.725	days	603977.4			
Exponential Term:	0.973100543					
Corrected Activity:	80.03460032	dpm	36.05162177	pCi		

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:29:44PM 5/12/2014

Sample

Sample Name: Verifcation 1 Type: Sample
Spectrum #4 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 0.10 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: U-232_00025
:
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

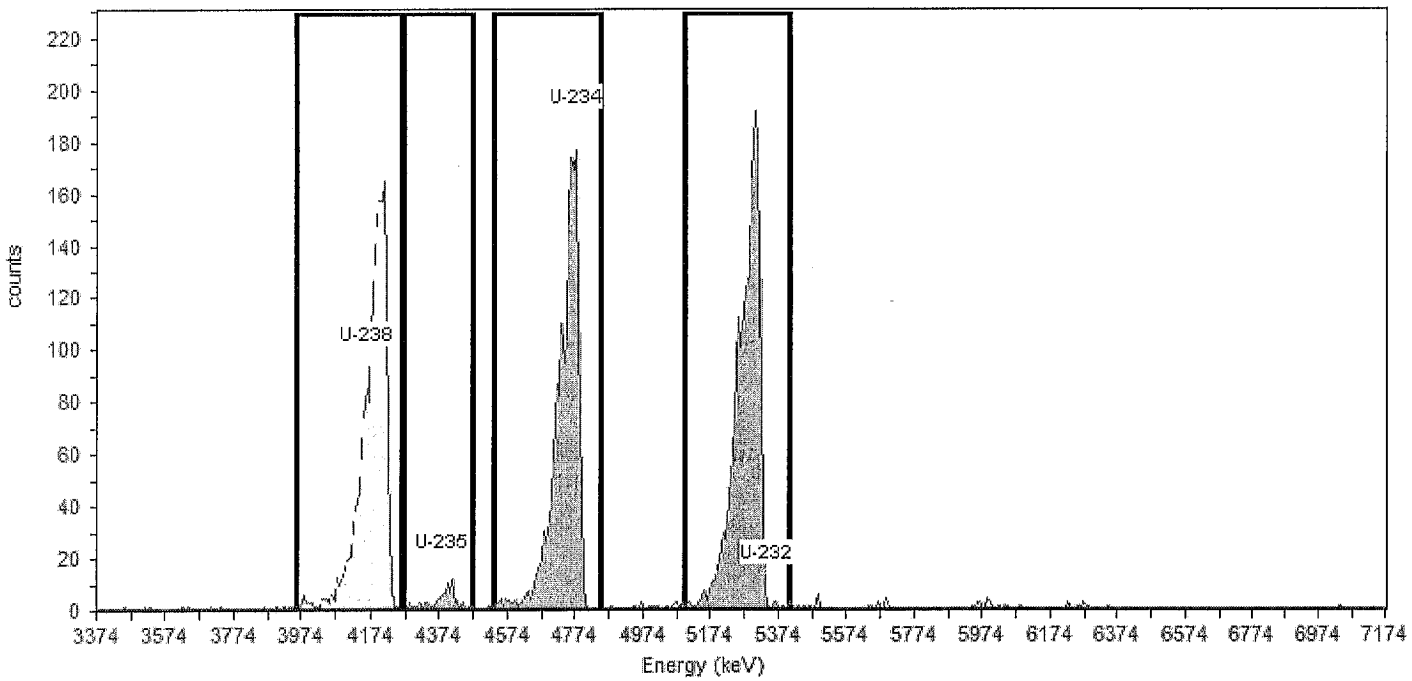
Tracer Name: UNAT Spike_00001
Tracer Activity: 72.26 DPM / mL x (Vol.) 0.10 mL = 7.23 DPM
Tracer Ref. Date: 3/30/2008 5:52:22PM

Tracer Nuclide: U-238
Tracer Recovery: 85.03%

Acquisition

Detector: AV243 SN: 51-005P6
Acquisition Start Date: 5/11/2014 7:17:31PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Background Date: 4/13/2014 7:09:45PM
Bkgd Info: Sample: ICB;AV243; Det: AV243; Spectrum #1; 4/13/2014 7:09:45 PM

Energy Calibration: IC-9886;AV243-20130620
Efficiency Calibration:IC-9886;AV243-20130620
Calibration Date: 6/20/2013 11:02:42PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.99% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:5/5/2014 2:07:10AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	72.2	100.0	1595	3.0000	1592.00	2.768E+001	pCi/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	38.1	80.2	68	0.0000	68.00	1.734E+000	pCi/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	66.3	99.8	1597	5.0000	1592.00	3.262E+001	pCi/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	77.9	100.1	1775	3.0000	1772.00	3.621E+001	pCi/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:29:40PM 5/12/2014

Sample

Sample Name: Verifcation 2 Type: Sample
Spectrum #5 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 0.10 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: U-232_00025
:
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

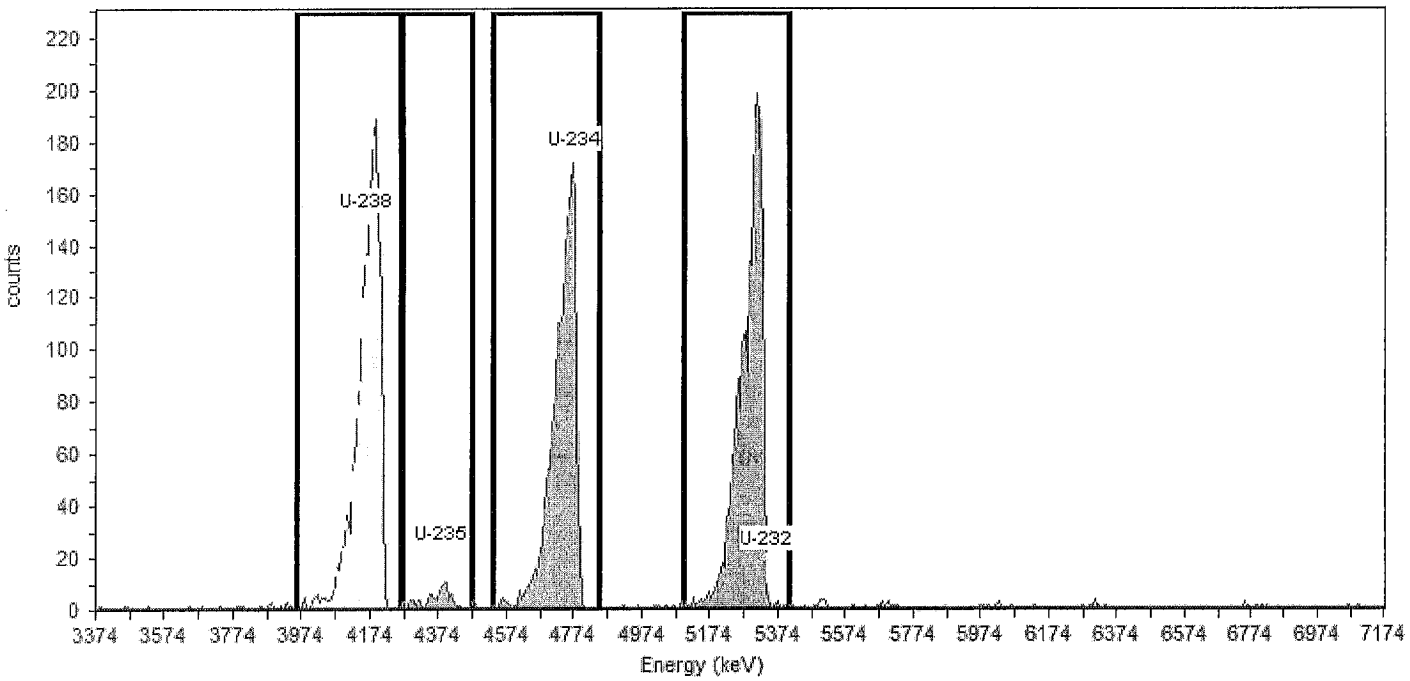
Tracer Name: UNAT Spike_00001
Tracer Activity: 72.26 DPM / mL x (Vol.) 0.10 mL = 7.23 DPM
Tracer Ref. Date: 3/30/2008 5:52:22PM

Tracer Nuclide: U-238
Tracer Recovery: 89.78%

Acquisition

Detector: AV245 SN: 51-005EE2
Acquisition Start Date: 5/11/2014 7:17:31PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Background Date: 4/13/2014 7:09:46PM
Bkgd Info: Sample: ICB;AV245; Det: AV245; Spectrum #1; 4/13/2014 7:09:46 PM

Energy Calibration: IC-8874;AV245-20130620
Efficiency Calibration:IC-8874;AV245-20130620
Calibration Date: 6/20/2013 11:02:50PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.49% +/- 0.39% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:5/5/2014 2:07:10AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	66.2	100.0	1714	2.0000	1712.00	2.923E+001	pCi/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	33.9	80.2	79	0.0000	79.00	1.873E+000	pCi/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	72.0	99.8	1629	2.0000	1627.00	3.100E+001	pCi/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	70.7	100.1	1811	0.0000	1811.00	3.441E+001	pCi/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:29:35PM 5/12/2014

Sample

Sample Name: Verifcation 3 Type: Sample
Spectrum #4 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 0.10 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: U-232_00025
:
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

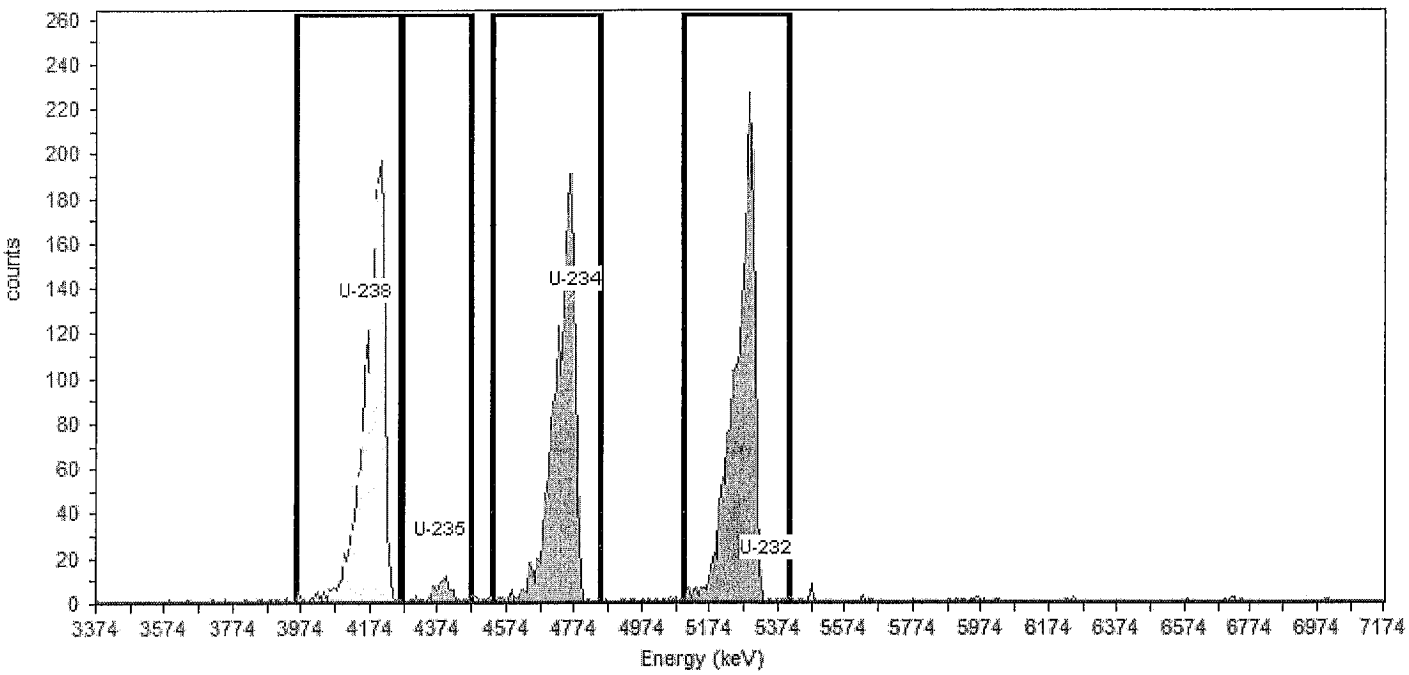
Tracer Name: UNAT Spike_00001
Tracer Activity: 72.26 DPM / mL x (Vol.) 0.10 mL = 7.23 DPM
Tracer Ref. Date: 3/30/2008 5:52:22PM

Tracer Nuclide: U-238
Tracer Recovery: 89.65%

Acquisition

Detector: AV246 SN: 51-005Q2
Acquisition Start Date: 5/11/2014 7:17:31PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Background Date: 4/13/2014 7:09:46PM
Bkgd Info: Sample: ICB;AV246; Det: AV246; Spectrum #1; 4/13/2014 7:09:46 PM

Energy Calibration: IC-8875;AV246-20130620
Efficiency Calibration:IC-8875;AV246-20130620
Calibration Date: 6/20/2013 11:02:53PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 28.59% +/- 0.39% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:5/5/2014 2:07:10AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	71.2	100.0	1779	1.0000	1778.00	2.918E+001	pCi/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	50.1	80.2	82	1.0000	81.00	1.849E+000	pCi/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	72.4	99.8	1706	0.0000	1706.00	3.130E+001	pCi/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	69.4	100.1	1947	1.0000	1946.00	3.561E+001	pCi/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:40:18PM 5/12/2014

Sample

Sample Name: Verification 1 Type: Sample
Spectrum #4 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 0.10 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: U-232_00025_Th
:
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

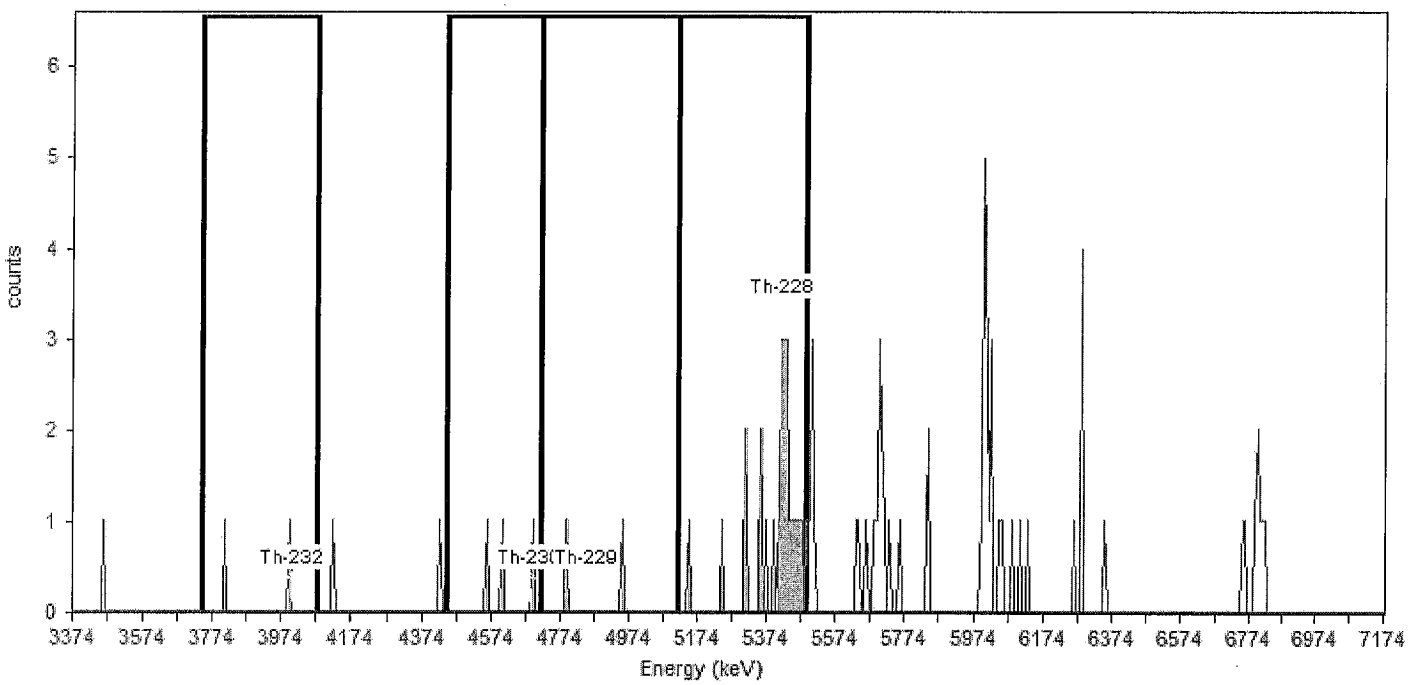
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: AV247 SN: 51-027F3
Acquisition Start Date: 5/11/2014 7:18:10PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Background Date: 4/13/2014 7:09:46PM
Bkgd Info: Sample: ICB;AV247; Det: AV247; Spectrum #1; 4/13/2014 7:09:46 PM

Energy Calibration: IC-8876;AV247-20130620
Efficiency Calibration:IC-8876;AV247-20130620
Calibration Date: 6/20/2013 11:02:57PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.33% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:5/5/2014 2:08:32AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	44.5	100.2	2	0.0000	2.00	3.426E-002	pCi/mL
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	10.7	99.7	3	1.9690	1.03	1.775E-002	pCi/mL
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	44.5	99.8	2	5.9690	-3.97	-6.827E-002	pCi/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	75.2	99.8	25	21.0000	4.00	6.929E-002	pCi/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:40:26PM 5/12/2014

Sample

Sample Name: Verifcation 2 Type: Sample
Spectrum #4 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 0.10 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: U-232_00025_Th
:
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

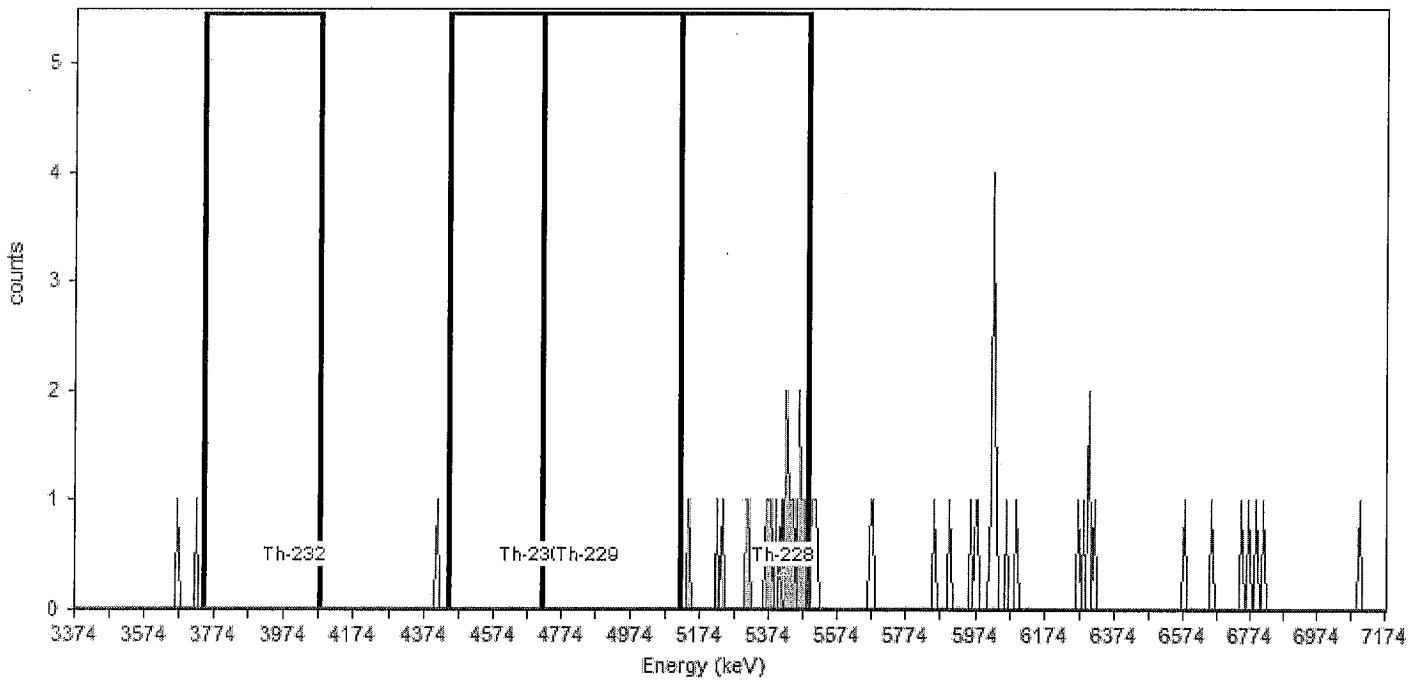
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: AV248 SN: 51-005P4
Acquisition Start Date: 5/11/2014 7:18:10PM
Live Time: 960.00 min.
Real Time: 960.57 min.
Background Date: 4/13/2014 7:09:47PM
Bkgd Info: Sample: ICB;AV248; Det: AV248; Spectrum #1; 4/13/2014 7:09:47 PM

Energy Calibration: IC-8877;AV248-20130620
Efficiency Calibration:IC-8877;AV248-20130620
Calibration Date: 6/20/2013 11:03:01PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.38% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:5/5/2014 2:08:32AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	.0	100.2	0	1.0000	-1.00	-1.775E-002	pCi/mL
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	.0	99.7	0	0.0000	0.00	0.000E+000	pCi/mL
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	.0	99.8	0	3.0000	-3.00	-5.347E-002	pCi/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	36.7	99.8	19	6.0000	13.09	2.349E-001	pCi/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:40:32PM 5/12/2014

Sample

Sample Name: Verifcation 3 Type: Sample
Spectrum #4 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 0.10 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: U-232_00025_Th
:
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

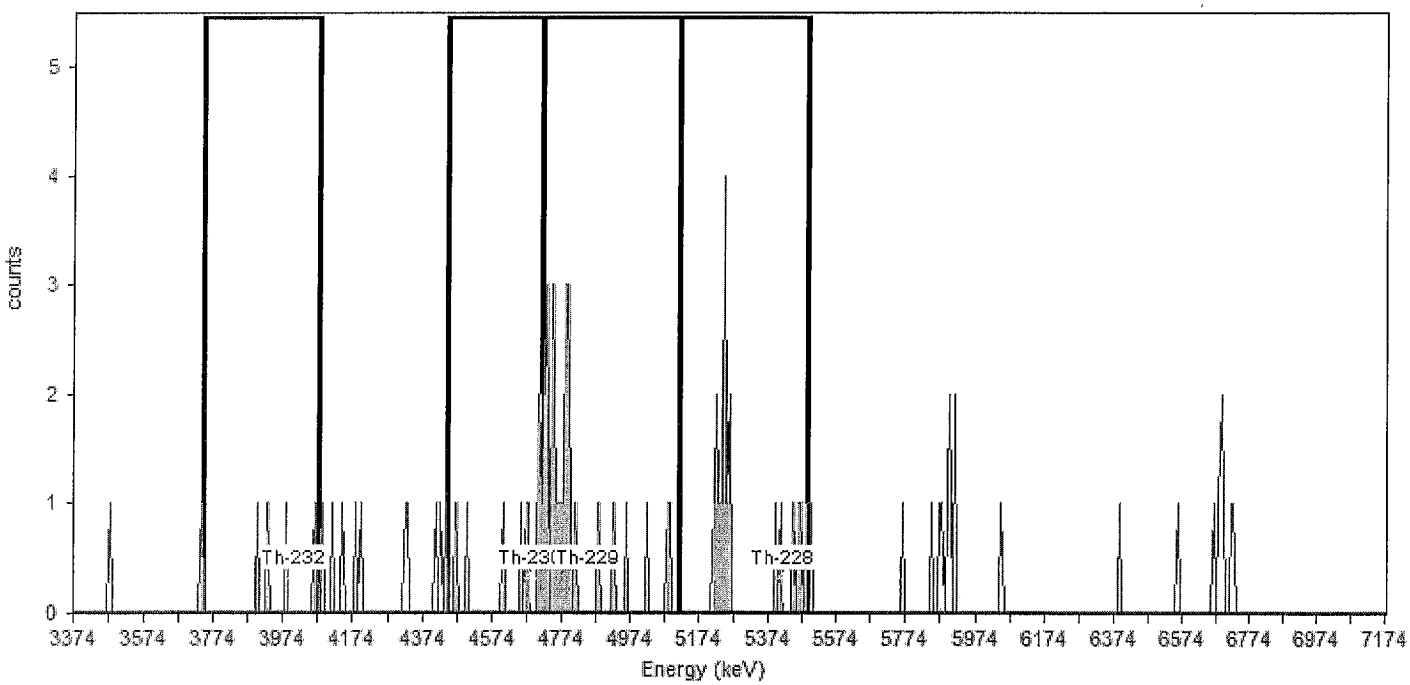
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: AV249 SN: 51-005EE5
Acquisition Start Date: 5/11/2014 7:18:10PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Background Date: 4/13/2014 7:09:47PM
Bkgd Info: Sample: ICB;AV249; Det: AV249; Spectrum #1; 4/13/2014 7:09:47 PM

Energy Calibration: IC-9520;AV249-20130620
Efficiency Calibration:IC-9520;AV249-20130620
Calibration Date: 6/20/2013 11:03:06PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.78% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction:5/5/2014 2:08:32AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	10.3	100.2	4	1.0000	3.00	5.058E-002	pCi/mL
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	33.4	99.7	9	0.0000	9.34	1.582E-001	pCi/mL
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	97.9	99.8	25	5.0000	20.03	3.391E-001	pCi/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	47.7	99.8	19	7.9134	11.09	1.890E-001	pCi/mL

Reagent

U-232_00026

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

U - 232 _ 00026

Reagent ID: U-232_00026

		Expiration Date:	05/06/2015
Description:	U-232 Unclean tracer Bottle A	Laboratory:	TestAmerica St. Louis
No. of Bottles:	1	Prepared By:	Bernsen, Sarah C
Storage Location:	RAD Actinide STDs	Solvent:	2M HNO3
Reagent Volume:	1000.000 mL	Solvent Lot:	n/a
Creation Date:	06/13/2013		
Container(s):	363622		
Comment:	Standard was put into 2 bottles (Bottle A)		

363622
ID: U-232_00026
Exp: 05/06/15 Prpd: SCB Crl: 06/13/13
U-232 Unclean tracer Bott

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
U-232	U-232_00009	08/25/2061	10280.70700	dpm/mL	82.24566	dpm/mL

Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
U-232_00009	U-232 Parent		08/25/61				8.00000	mL

St. Louis Radiological Standard Reverification Form

Standard ID Number: U-232_00020 (A)
True Value = 80.0456 DPM/L or g
Date Analyzed: 5/6/2014

Radionuclide: U-232

	Replicates	
#1	77.49	DPM/L or g
#2	80.95	DPM/L or g
#3	78.03	DPM/L or g

Mean = 78.82333

1 sigma = 1.861433 1.96 sigma = 3.648409

True Value minus 5% = 76.04332 (True Value - 5%)
True Value plus 5% = 84.04788 (True Value + 5%)

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

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

Standard Reverification Acceptable? Yes

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

Reviewed By/Date: RTM 5/7/2014

SOP Reference: STL-QA-0002, Current Revision

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:11:46PM 5/7/2014

Sample

Sample Name: Verification 1 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 0.10 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: U-232 Unclean (Bottle A)
:
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

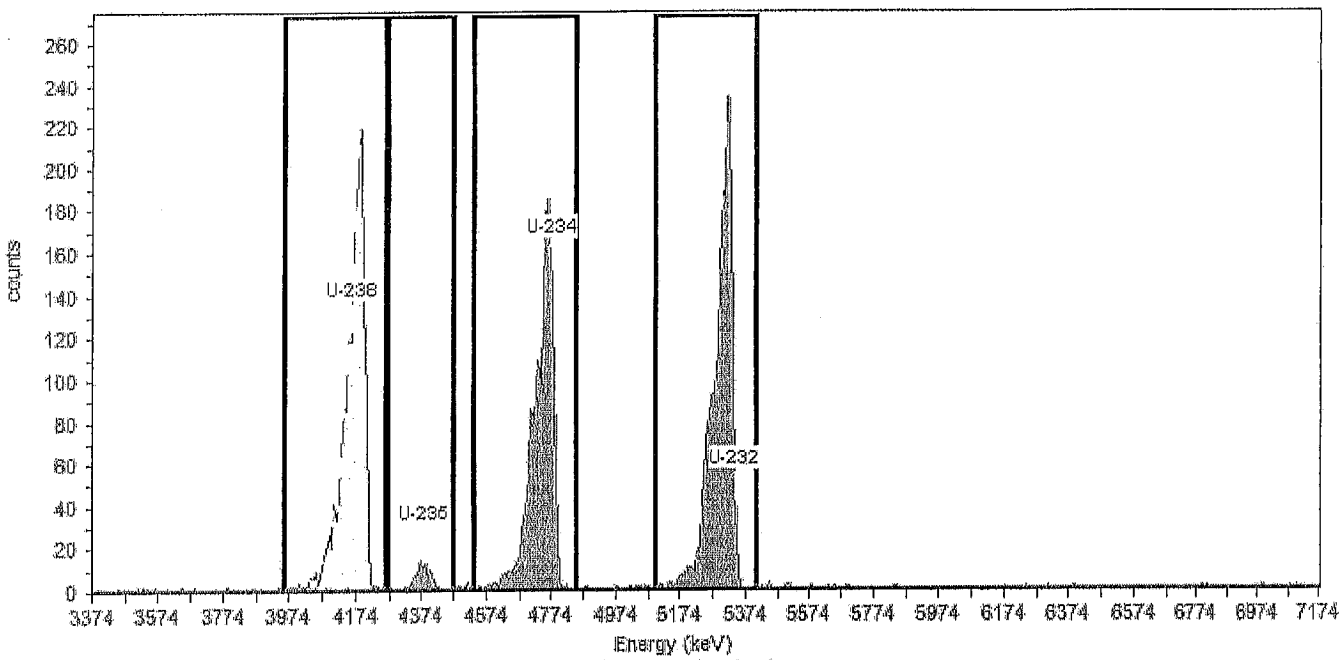
Tracer Name: UNAT Spike_00001
Tracer Activity: 72.26 DPM / mL x (Vol.) 0.10 mL = 7.23 DPM
Tracer Ref. Date: 3/30/2008 5:52:22PM

Tracer Nuclide: U-238
Tracer Recovery: 92.48%

Acquisition

Detector: AV240 SN: 51-005Q1
Acquisition Start Date: 5/6/2014 7:23:24PM
Live Time: 960.00 min.
Real Time: 960.67 min.
Background Date: 4/13/2014 7:09:45PM
Bkgd Info: Sample: ICB;AV240; Det: AV240; Spectrum #1; 4/13/2014 7:09:45 PM

Energy Calibration: IC-9817;AV240-20130620
Efficiency Calibration:IC-9817;AV240-20130620
Calibration Date: 6/20/2013 11:02:31PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.06% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:5/6/2014 7:22:37PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	58.9	100.0	1736	0.0000	1736.00	6.683E+001	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	53.1	80.2	84	0.0000	84.00	4.360E+000	DPM/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	66.7	99.8	1619	2.0000	1617.00	6.745E+001	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	64.3	100.1	1865	2.0000	1863.00	7.749E+001	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:11:53PM 5/7/2014

Sample

Sample Name: Verification 2 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 0.10 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: U-232 Unclean (Bottle A)
:
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

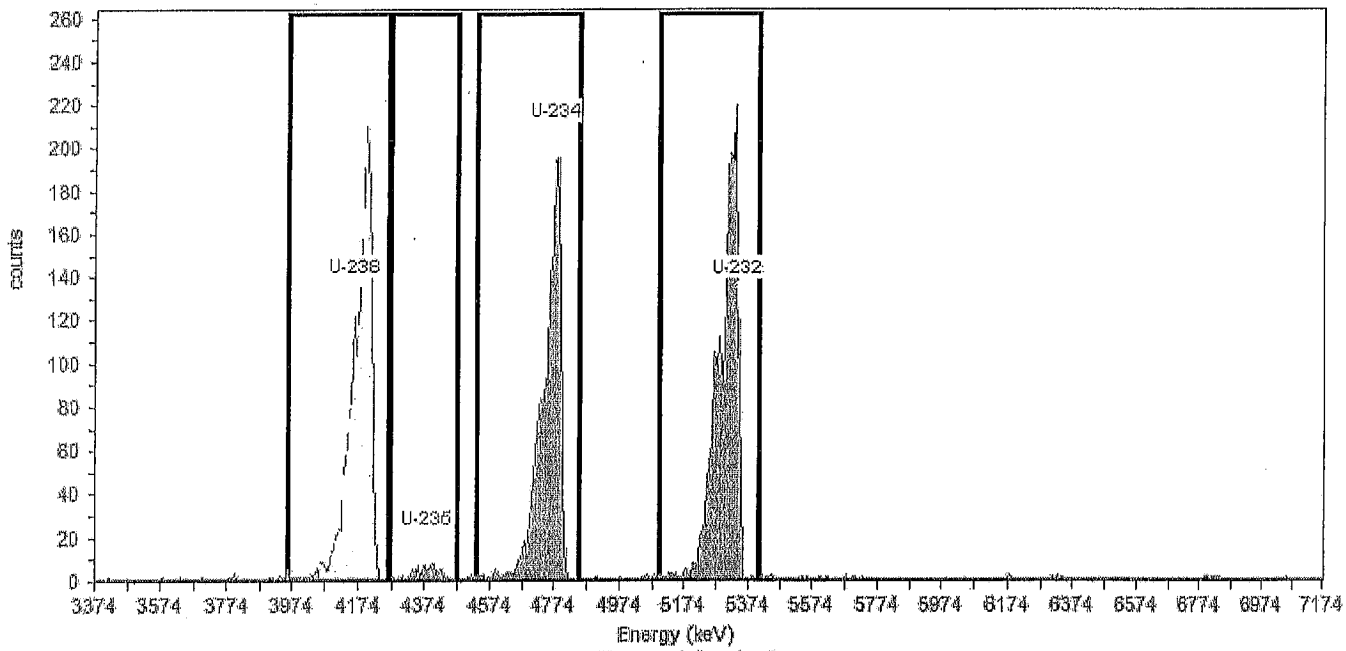
Tracer Name: UNAT Spike_00001
Tracer Activity: 72.26 DPM / mL x (Vol.) 0.10 mL = 7.23 DPM
Tracer Ref. Date: 3/30/2008 5:52:22PM

Tracer Nuclide: U-238
Tracer Recovery: 89.37%

Acquisition

Detector: AV241 SN: 50-005P1
Acquisition Start Date: 5/6/2014 7:23:25PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Background Date: 4/13/2014 7:09:45PM
Bkgd Info: Sample: ICB;AV241; Det: AV241; Spectrum #1; 4/13/2014 7:09:45 PM

Energy Calibration: IC-9884;AV241-20130620
Efficiency Calibration:IC-9884;AV241-20130620
Calibration Date: 6/20/2013 11:02:35PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.05% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:5/6/2014 7:22:37PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	66.5	100.0	1677	0.0000	1677.00	6.459E+001	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	81.2	80.2	68	0.0000	68.00	3.654E+000	DPM/mL
U-234	4776.4	4,776.8	0.6	4530.3	4851.0	62.4	99.8	1585	3.0000	1582.00	6.831E+001	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	66.5	100.1	1883	3.0000	1880.00	8.095E+001	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:11:59PM 5/7/2014

Sample

Sample Name: Verification 3 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 0.10 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: U-232 Unclean (Bottle A)
:
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

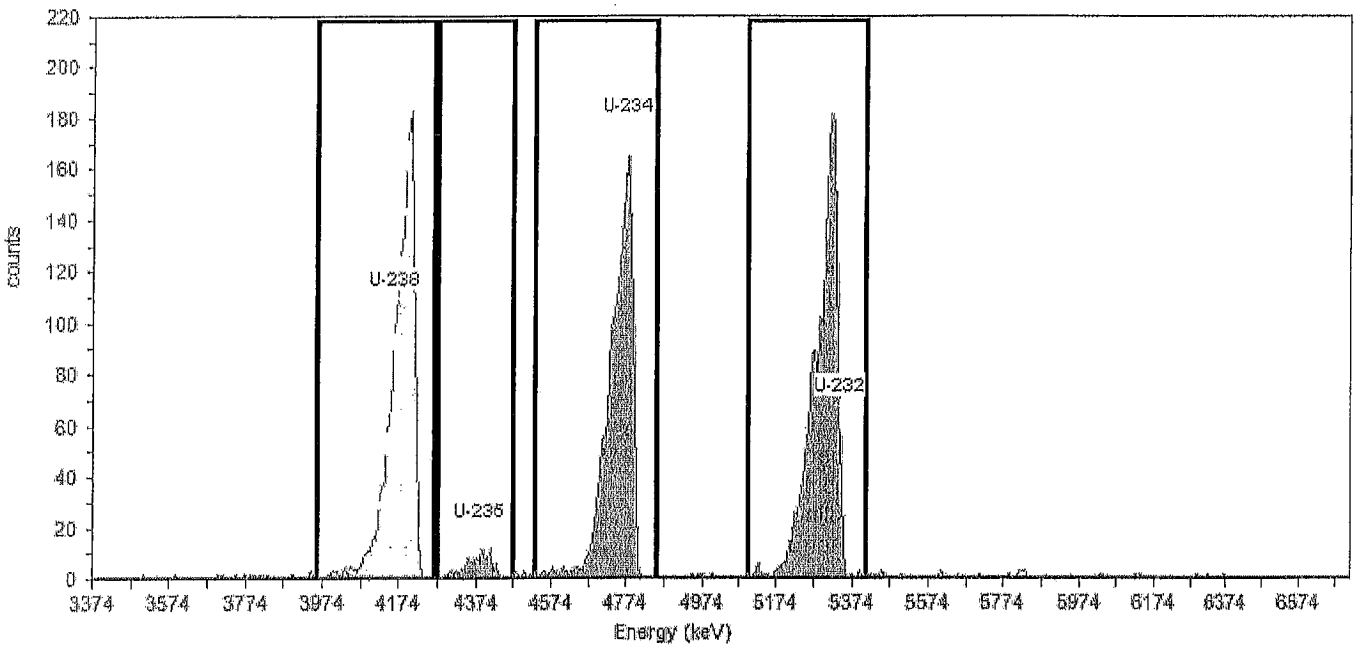
Tracer Name: UNAT Spike_00001
Tracer Activity: 72.26 DPM / mL x (Vol.) 0.10 mL = 7.23 DPM
Tracer Ref. Date: 3/30/2008 5:52:22PM

Tracer Nuclide: U-238
Tracer Recovery: 79.16%

Acquisition

Detector: AV242 SN: 51-005P7
Acquisition Start Date: 5/6/2014 7:23:25PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Background Date: 4/13/2014 7:09:45PM
Bkgd Info: Sample: ICB;AV242; Det: AV242; Spectrum #1; 4/13/2014 7:09:45 PM

Energy Calibration: IC-9885;AV242-20130620
Efficiency Calibration:IC-9885;AV242-20130620
Calibration Date: 6/20/2013 11:02:39PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.86% +/- 0.39% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:5/6/2014 7:22:37PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	63.4	100.0	1477	2.0000	1475.00	5.721E+001	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	75.2	80.2	87	0.0000	87.00	5.315E+000	DPM/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	70.8	99.8	1468	2.0000	1466.00	7.197E+001	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	65.1	100.1	1597	3.0000	1594.00	7.803E+001	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

U-232 unclean tracer verification

Actinide Prep (bottle A)

Batch No.: _____

Balance ID: _____

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

No.	Sample Number	Aliquot (g / mL)	X	Initials
1	Verification-1	0.1	240	
2	2	1	241	
3	3	1	242	
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Tracer ☐ N/A

Initials / Date

Isotope: UNAT

Std Sol'n No.: UNATSpike-00021

Vol (mL): 0.1

Ref Activity (dpm/mL): 234- 70.169
235- 3.370
238- 72.204

Act Ref Date: 3-30-08

Samples Spiked and Traced By: SUB 5-5-14
Initials / Date

Verification Signature & Date: MB 5/8/14
Initials / Date

LCS Standard ☐ N/A

Initials / Date

Isotope: U-232 unclean

Std Sol'n ID.: U-232-00020

Vol (mL): 0.1

Ref Activity (dpm/mL): 82.247

Act Ref Date: 8-25-11

SOP's applied in preparing these samples. Mark box to left for all that apply:

☐ ST-RC-0003 Rev.	☐ ST-RC-0040 Rev.	☐ ST-RC-0110 Rev.
☐ ST-RC-0004 Rev.	☐ ST-RC-0041 Rev.	☐ ST-RC-0120 Rev.
☐ ST-RC-0014 Rev.	☐ ST-RC-0050 Rev.	☐ ST-RC-0232 Rev.
☐ ST-RC-0020 Rev.	☐ ST-RC-0090 Rev.	☐ ST-RC-0238 Rev.
☐ ST-RC-0021 Rev.	☐ ST-RC-0100 Rev.	☐ ST-RC-0240 Rev.
		☐ ST-RC-0241 Rev.
		☐ ST-RC-0242 Rev.
		☐ ST-RC-5016 Rev.
		☐
		☐

Isotope(s)

αβ ☐	Iso Pu ☐	Tc-99 ☐	Iso Cm ☐
Iso Am ☐	Ra ☐	Iso Th ☐	Pu-241 ☐
KPA ☐	Sr ☐	Iso U ☑	Th-229 ☐
Np ☐	TAR ☐	C-14 ☑	Cl-36 ☐

Count Time	Matrix
Long Count ☐	Soil ☐
Short Count ☐	H_2O ☐

Prepared By: SUB.

Date: 5/2/14

Reviewed by: _____

Date: _____

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

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

U - 232 - 00020

Reagent ID: U-232_00020

		Expiration Date:	06/18/2014
Description:	U-232 Unclean tracer	Laboratory:	TestAmerica St. Louis
No. of Bottles:	1	Prepared By:	Bramblett, Megan L
Storage Location:	RAD Actinide STDs	Solvent:	2M HNO3
Reagent Volume:	1000.000 mL	Solvent Lot:	n/a
Creation Date:	06/13/2013		
Container(s):	147873		
Comment:	Standard was put into 2 bottles (Bottle A and Bottle B)		

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
U-232	U-232_00009	08/25/2061	10280.70700	dpm/mL	82.24566	dpm/mL

Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
U-232_00009	U-232 Parent		08/25/61				8.00000	mL

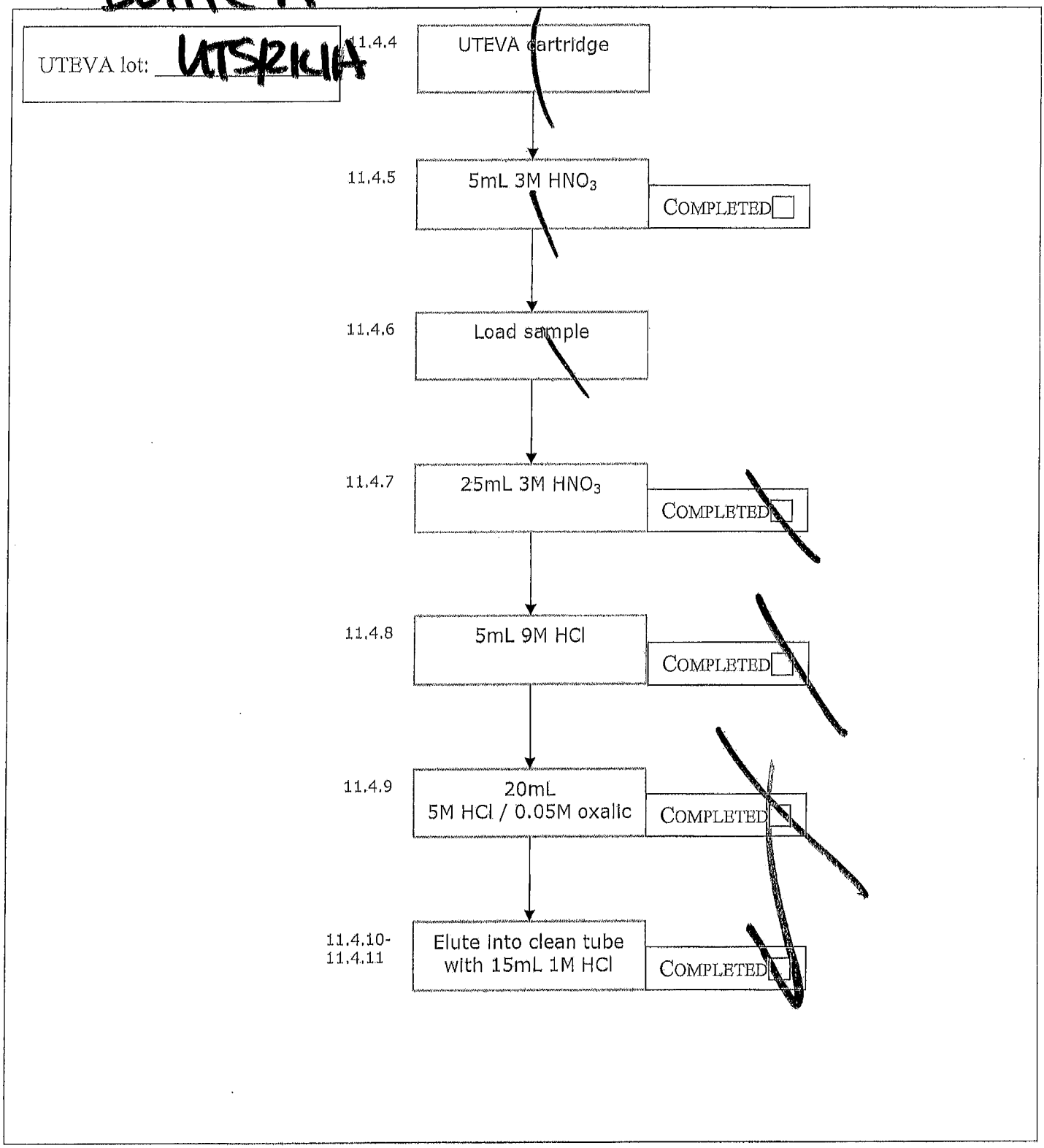
Uranium only via UTEVA

Batch: U232 090320 (Verification) ST-RC-0238

*All rinses should flow at 1 mL/minute (only 3M HNO_3 may be done at 3 mL/minute)

Bottle A

UTEVA lot: UTSR1418



Reagent

UNAT Ampoule_00001

New Brunswick Laboratory
U.S. Department of Energy

Certificate of Analysis

CRM 145

Uranyl (Normal) Nitrate Assay and Isotopic Solution

Uranium Mass Fraction: **0.0101356 g U/g solution ± 0.0000011 g U/g solution**
[10.1356 mg U/g solution ± 0.0011 mg U/g solution]

	$^{234}U/^{238}U$	$^{235}U/^{238}U$
Atom Ratio:	**0.000052841**	**0.0072543**
Atom Ratio Uncertainty:	**0.000000082**	**0.0000040**

	^{234}U	^{235}U	^{238}U
Atom Percent:	**0.0052458**	**0.72017**	**99.27458**
Atom Percent Uncertainty:	**0.0000081**	**0.00039**	**0.00039**
Weight Percent:	**0.0051579**	**0.71114**	**99.28370**
Weight Percent Uncertainty:	**0.0000080**	**0.00038**	**0.00038**

Relative Atomic Weight: **238.028918**
Relative Atomic Weight Uncertainty: **0.000012**

Note: ^{233}U and ^{236}U were not detected. The detection limit of uranium ratios for the technique used is 5×10^{-9}.

This Certified Reference Material (CRM) is a uranium concentration and isotopic solution standard intended for use in calibration of and/or quality control for uranium analysis methods. Each unit of CRM 145 consists of approximately 20-mL of uranyl nitrate solution in 1M nitric acid, contained in a sealed glass ampoule.

NOTE: The vial should be handled under proper radiologically-controlled conditions at all times.

The certified uranium content value is based on the mass of high-purity metal dissolved and diluted to a known solution mass. The stated uranium concentration was calculated as the prepared value and verified experimentally by the NBL-modified Davies and Gray titration. The certified uranium isotopic composition and atomic weight is based upon measurements performed on multiple samples by two different measurement techniques on a Thermal Ionization Mass Spectrometer (TIMS), calibrated using CRM U030-A as primary comparator and CRM 129-A as a quality control sample. The isotopic values are shared with CRM 112-A, uranium (normal) metal standard which was the source of uranium used to produce the solutions.

RAD13-0018
UNAT Spike
marrss
None
Prep/Opened: 5/3/2013
Exp(1): 5/10/2014
Exp(2): 5/10/2014

All uncertainties for the certified values are expressed as expanded uncertainties (U) where $U = k*u_c$, where u_c is the

September 30, 2010
Argonne, Illinois

www.nbl.doe.gov

Jon Neuhoff, Director
New Brunswick Laboratory

(Revision of Certificate dated March 30, 2008)

127971
ID: UNAT_00008
Exp: 05/10/14 Prpd: SB Crl: 05/03/13
UNAT spike

combined standard uncertainty and the coverage factor k = 2. Uncertainties were determined according to the JCGM 100:2008 *Guide to the Expression of Uncertainty in Measurement*. The coverage factor of 2 was chosen to provide an approximate 95% level of confidence. The input quantities associated with the uranium content included uncertainties due to weighing, CRM 112-A purity, and buoyancy factors. The input quantities associated with the uranium isotopic composition included uncertainties from the certified value for CRM U030-A, measurement precision, and background corrections associated with the analytical techniques.

The CRM was produced by dissolving uranium metal in a single batch and container, with extensive mixing of the resultant solution followed by dispensation into individual bottles. Subsequent measurements of a random sampling of the total lot produced did not indicate any inhomogeneity in uranium concentration or isotopic composition. The minimum sample sizes taken from packaged units and measured were 30 mg U by titration and 1 μg U by TIMS. The NBL makes no recommendation as to the minimum sample size to be used to ensure concentration or isotopic homogeneity.

Users are cautioned that once the vial is opened, the uranium concentration and/or isotopic composition of the material may be affected by evaporative losses or environmental contamination. User's should take appropriate precautions to safeguard the material before, during and after use to ensure valid certificate values.

Recommended Procedure for Ampoule Handling and Dispensing of Solution

1. The ampoule contains a strongly acidic solution of uranium. Appropriate precautions should be taken.

2. Before opening the ampoule, ensure that any dried uranium or condensed liquid in the neck or body of the ampoule is re-dissolved into solution. This can be accomplished by inverting the ampoule repeatedly.

3. The glass ampoules are scored at the neck for ease of opening. However, glass burrs and fragments pose a cut hazard to anyone opening the ampoules. Appropriate precautions should be taken.

4. Lightly moisten the scored line on the neck with distilled water to help ensure a clean break at the score.

5. Because of the narrow neck of the ampoule it may be difficult or impossible to pour the solution out. Here is one possible method:

    a. Obtain approximately 12-cm length of plastic capillary tubing (e.g. i.d. 0f 0.1", o.d. of 0.16").
    b. Insert one end of the capillary tubing fully into the ampoule
    c. Fold the remaining length of tubing along the outside of the ampoule, ensuring that the tube is not crimped and will allow the free flow of air through the tube and into the ampoule.
    d. Holding the ampoule and tubing in one hand, and a beaker or dispensing bottle in another, invert the ampoule over the container allowing the solution to drain into it.
    e. The capillary tubing allows air to flow into the ampoule, eliminating the "airlock" created by the narrow neck of the open ampoule.

6. The user should be wary of evaporative losses once the ampoule is opened, and prevent uranium contamination of the sample. It is recommended that the entire solution be accurately weighed and aliquanted as soon as possible after opening the sample. Precautions should be taken (clean glass/plastic ware, air filtration, etc) to prevent uranium contamination of the CRM with subsequent perturbation of the isotopic composition.

Reagent

UNAT Spike_00001

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

UNAT Spike_00001

Reagent ID: UNAT Spike_00001

Description:	UNAT_spike UNAT_00009	Expiration Date:	11/13/2014
No. of Bottles:	1	Laboratory:	TestAmerica St. Louis
Storage Location:	RAD Actinide STDs	Prepared By:	Bramblett, Megan L
Reagent Volume:	200.000 mL	Solvent:	1M HNO3
Creation Date:	11/11/2013	Solvent Lot:	n/a
Container(s):	243735		
Comment:			

243735
ID: UNAT Spike_00001
Exp: 11/13/14 Prpd: MLM Crt: 11/11/13
UNAT_spike UNAT_00009

Reagent Analyte Information

Analyte	Source ID	Source Expiration Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
U-234	UNAT Parent_00001	03/30/2058	706.91200	dpm/mL	70.69123	dpm/mL
U-235	UNAT Parent_00001	03/30/2058	33.70600	dpm/mL	3.37064	dpm/mL
U-238	UNAT Parent_00001	03/30/2058	722.65000	dpm/mL	72.26499	dpm/mL

Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
UNAT Parent_00001	UNAT Parent		03/30/58				20.00000	mL

St. Louis Radiological Standard Reverification Form

Standard ID Number: UNAT_00009
True Value = 70.69123 DPM/L or g
Date Analyzed: 11/13/2013

Radionuclide: U-234

	Replicates	
#1	72.62	DPM/L or g
#2	68.99	DPM/L or g
#3	71.84	DPM/L or g

Mean = 71.15

1 sigma = 1.910838 1.96 sigma = 3.745242

True Value minus 5% = 67.15667 (True Value - 5%)
True Value plus 5% = 74.22579 (True Value + 5%)

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

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

Standard Reverification Acceptable? **Yes**

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

Reviewed By/Date: RTM 11/14/2013

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: UNAT_00009
True Value = 72.264991 DPM/L or g
Date Analyzed: 11/13/2013

Radionuclide: U-238

	Replicates	
#1	75.65	DPM/L or g
#2	69.41	DPM/L or g
#3	72.64	DPM/L or g

Mean = 72.56667

1 sigma = 3.120646 1.96 sigma = 6.116467

True Value minus 5% = 68.65174 (True Value - 5%)
True Value plus 5% = 75.87824 (True Value + 5%)

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

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

Standard Reverification Acceptable? **Yes**

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

Reviewed By/Date: RTM 11/14/2013

SOP Reference: STL-QA-0002, Current Revision

Sample

Sample Name: Verification 1 Type: Sample
Spectrum #2 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 0.10 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: UNATSpike_00001
:
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

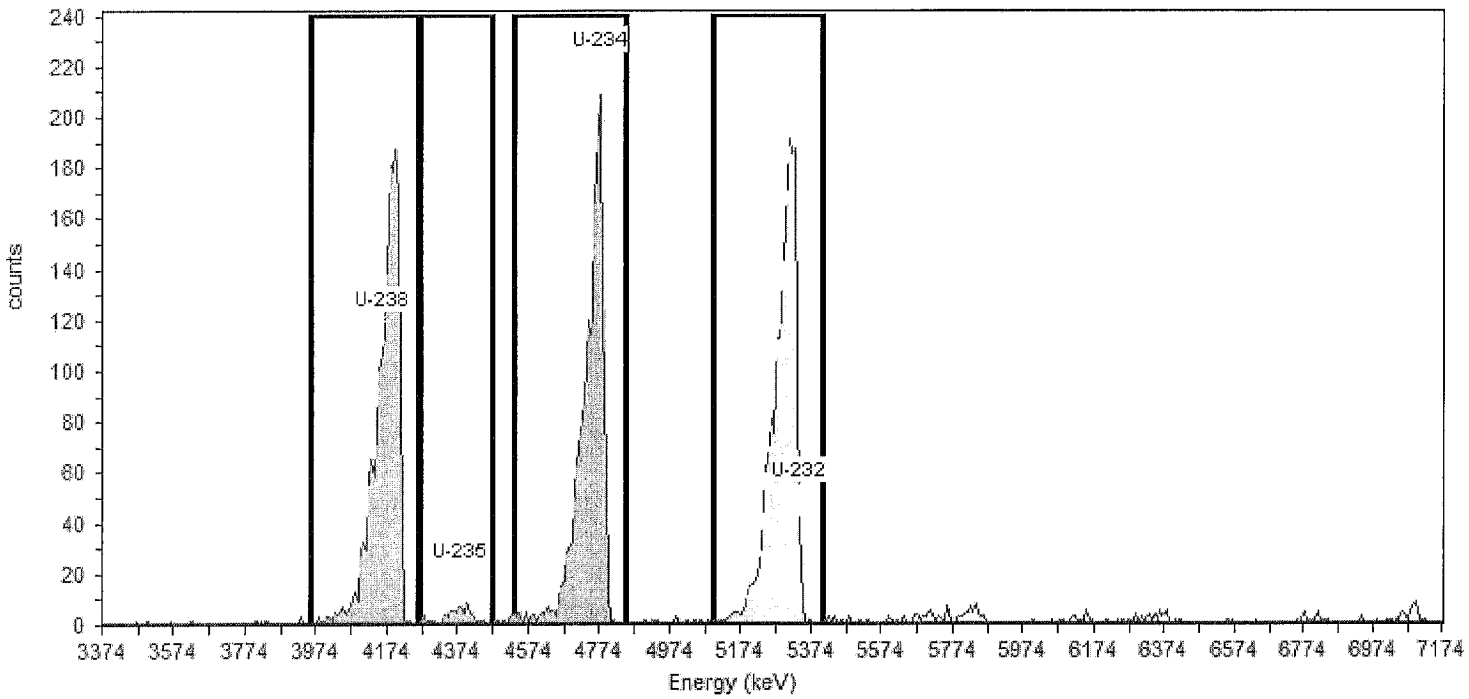
Tracer Name: U-232_00020
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.10 mL = 8.22 DPM
Tracer Ref. Date: 8/25/2011 4:56:42PM

Tracer Nuclide: U-232
Tracer Recovery: 89.79%

Acquisition

Detector: AV248 SN: 51-005P4
Acquisition Start Date: 11/13/2013 9:57:05PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Background Date: 10/17/2013 1:19:22AM
Bkgd Info: Sample: ICB;AV248; Det: AV248; Spectrum #1; 10/17/2013 1:19:22 AM

Energy Calibration: IC-8877;AV248-20130620
Efficiency Calibration:IC-8877;AV248-20130620
Calibration Date: 6/20/2013 11:03:01PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.38% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:11/13/2013 1:51:53AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM/mL	2.00Sigma TPU DPM/mL	Critical Level DPM/mL	MDA DPM/mL
U-238	4157.453	3956.099	4261.858	64.114	100.0	1,720.00	0.0000	1,720	7.565E+001	9.204E+000	0.000E+000	1.190E-001
U-235	4381.179	4269.316	4470.670	66.924	80.2	66.00	0.0000	66	3.619E+000	9.846E-001	0.000E+000	1.484E-001
U-234	4776.430	4530.331	4851.005	65.069	99.8	1,654.00	6.0000	1,648	7.262E+001	8.872E+000	2.511E-001	6.215E-001
U-232	5343.203	5097.104	5410.321	69.400	100.1	1,837.00	5.0000	1,832	7.385E+001	8.202E+000	2.335E-001	5.886E-001

Sample

Sample Name: Verification 2 Type: Sample
Spectrum #2 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 0.10 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: UNATSpike_00001
:
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

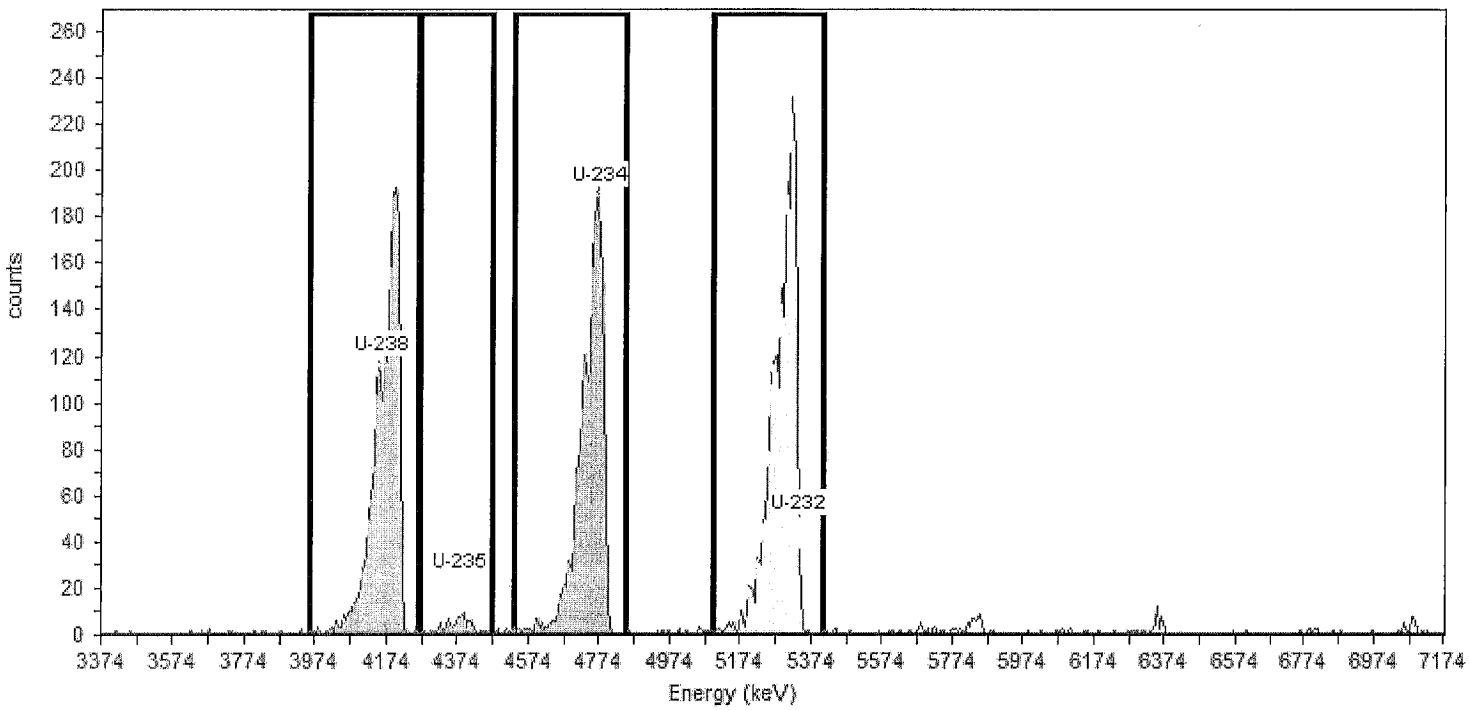
Tracer Name: U-232_00020
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.10 mL = 8.22 DPM
Tracer Ref. Date: 8/25/2011 4:56:42PM

Tracer Nuclide: U-232
Tracer Recovery: 94.44%

Acquisition

Detector: AV249 SN: 51-005EE5
Acquisition Start Date: 11/13/2013 9:57:05PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Background Date: 10/17/2013 1:19:22AM
Bkgd Info: Sample: ICB;AV249; Det: AV249; Spectrum #1; 10/17/2013 1:19:22 AM

Energy Calibration: IC-9520;AV249-20130620
Efficiency Calibration:IC-9520;AV249-20130620
Calibration Date: 6/20/2013 11:03:06PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.78% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:11/13/2013 1:51:53AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM/mL	2.00Sigma TPU DPM/mL	Critical Level DPM/mL	MDA DPM/mL
U-238	4157.453	3956.099	4261.858	74.002	100.0	1,748.00	0.0000	1,748	6.941E+001	8.399E+000	0.000E+000	1.075E-001
U-235	4381.179	4269.316	4470.670	60.410	80.2	68.00	1.0000	67	3.317E+000	9.014E-001	1.152E-001	3.644E-001
U-234	4776.430	4530.331	4851.005	68.212	99.8	1,738.00	4.0000	1,734	6.899E+001	8.357E+000	1.851E-001	4.779E-001
U-232	5343.203	5097.104	5410.321	74.844	100.1	2,035.00	6.0000	2,029	7.767E+001	8.568E+000	2.310E-001	5.717E-001

Sample

Sample Name: Verification 3 Type: Sample
Spectrum #2 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 0.10 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: UNATSpike_00001
:
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

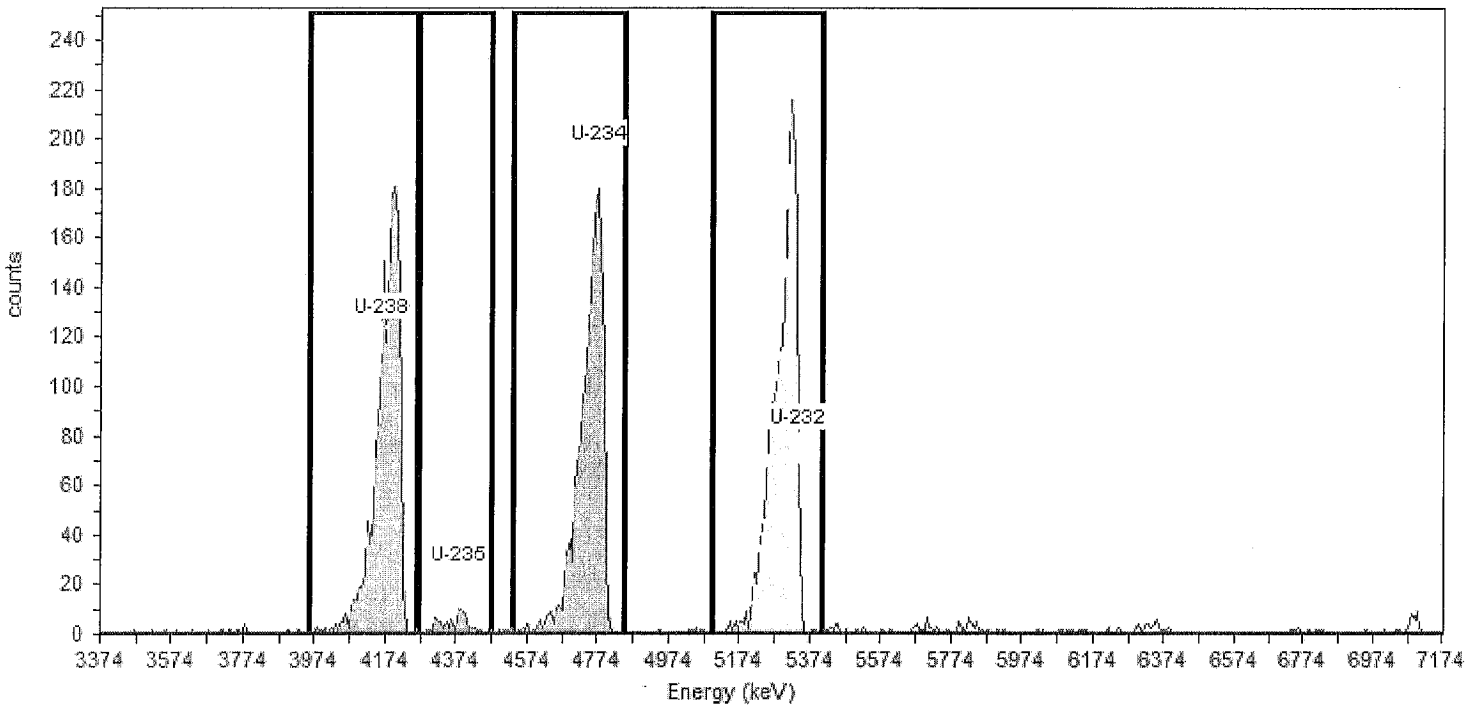
Tracer Name: U-232_00020
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.10 mL = 8.22 DPM
Tracer Ref. Date: 8/25/2011 4:56:42PM

Tracer Nuclide: U-232
Tracer Recovery: 91.57%

Acquisition

Detector: AV250 SN: 51-027F2
Acquisition Start Date: 11/13/2013 9:57:05PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Background Date: 10/17/2013 1:19:23AM
Bkgd Info: Sample: ICB;AV250; Det: AV250; Spectrum #1; 10/17/2013 1:19:23 AM

Energy Calibration: IC-8879;AV250-20130620
Efficiency Calibration:IC-8879;AV250-20130620
Calibration Date: 6/20/2013 11:03:10PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.67% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:11/13/2013 1:51:53AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM/mL	2.00Sigma TPU DPM/mL	Critical Level DPM/mL	MDA DPM/mL
U-238	4157.453	3956.099	4261.858	67.349	100.0	1,706.00	3.0000	1,703	7.264E+001	8.844E+000	1.719E-001	4.592E-001
U-235	4381.179	4269.316	4470.670	90.510	80.2	73.00	0.0000	73	3.882E+000	1.012E+000	0.000E+000	1.439E-001
U-234	4776.430	4530.331	4851.005	67.867	99.8	1,683.00	2.0000	1,681	7.184E+001	8.755E+000	1.406E-001	3.969E-001
U-232	5343.203	5097.104	5410.321	70.227	100.1	1,893.00	4.0000	1,889	7.532E+001	8.352E+000	2.026E-001	5.230E-001

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Actinide Prep

UNAT

Batch No. : —

Balance ID : —

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

No.	Sample Number	Aliquot (g / mL)	MS	Initials shift
1	Verification 1	0.1	147	RC = 248
2	2	1	148	RC = 249
3	3		149	RC = 250
4				
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21				
22				
23				
24				

Tracer ☐ N/A

Initials / Date

Isotope : U-232

Std Sol'n No. : U-232_0020

Vol (mL) : 0.1

Ref Activity (dpm/mL) : 82.247 dpm/mL

Act Ref Date : 8.25.11

Samples Spiked and Traced By: MB 11/11/13 (Initials / Date)

Verification Signature & Date: LM 11-11-13 (Initials / Date)

LCS Standard ☐ N/A

Initials / Date

Isotope : UNAT

Std Sol'n ID. : UNATSPIKE_0001

Vol (mL) : 0.1

Ref Activity (dpm/mL) : U234 = 70.000 dpm/mL U238 = 72.200 dpm/mL U235 = 3.370 dpm/mL

Act Ref Date : 3.30.08

SOP's applied in preparing these samples. Mark box to left for all that apply:

☐ ST-RC-0003 Rev.	☐ ST-RC-0040 Rev.	☐ ST-RC-0110 Rev.
☐ ST-RC-0004 Rev.	☐ ST-RC-0041 Rev.	☐ ST-RC-0120 Rev.
☐ ST-RC-0014 Rev.	☐ ST-RC-0050 Rev.	☐ ST-RC-0232 Rev.
☐ ST-RC-0020 Rev.	☐ ST-RC-0090 Rev.	☑ ST-RC-0238 Rev.
☐ ST-RC-0021 Rev.	☑ ST-RC-0100 Rev.	☐ ST-RC-0240 Rev.
		☐ ST-RC-0241 Rev.
		☐ ST-RC-0242 Rev.
		☐ ST-RC-5016 Rev.
		☐
		☐

Isotope(s)

αβ ☐	Iso Pu ☐	Tc-99 ☐	Iso Cm ☐
Iso Am ☐	Ra ☐	Iso Th ☐	Pu-241 ☐
KPA ☐	Sr ☐	Iso U ☑	Th-229 ☐
Np ☐	TAR ☐	C-14 ☑	Cl-36 ☐

Count Time	Matrix
Long Count ☐	Soil ☐
Short Count ☐	H_2O ☐

Prepared By : MB

Date : 11/11/13

Reviewed by: _____

Date: _____

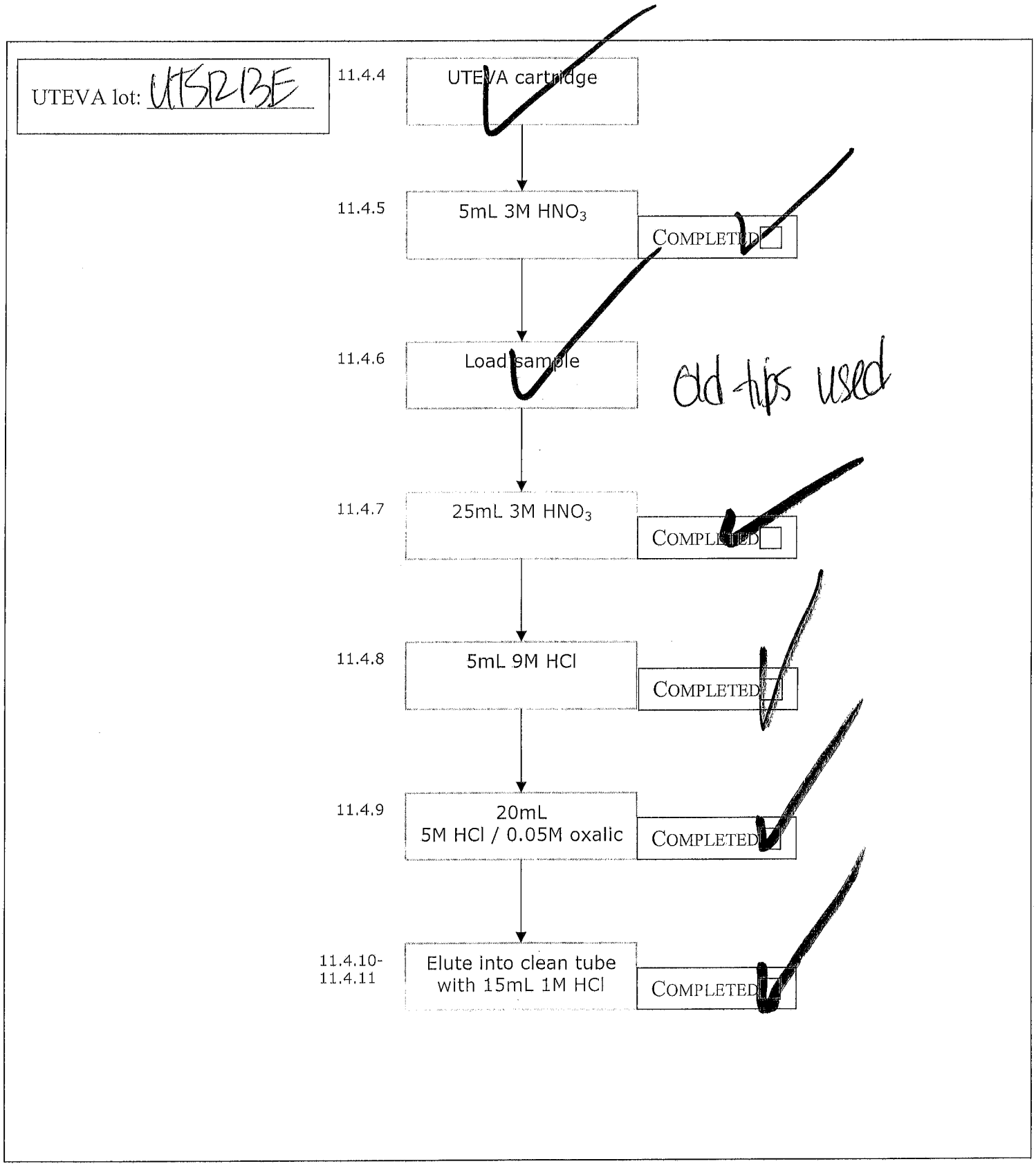
\\Slsvr01\RAD\MasterForms\RAD-0045 Rev(3)

Uranium only via UTEVA

Batch: UNAT Verification

ST-RC-0238

*All rinses should flow at 1 mL/minute (only 3M HNO_3 may be done at 3 mL/minute)



METALS

COVER PAGE
METALS

Lab Name: TestAmerica St. Louis Job Number: 160-6694-1

SDG No.:

Project: EPA Region 5 START 3 Contract

Client Sample ID	Lab Sample ID
2222-SD01	160-6694-1
2222-SD02	160-6694-2
2222-SD03	160-6694-3
2222-SD04	160-6694-4
2222-SD05	160-6694-5
2222-SD06	160-6694-6
2222-RIN-01	160-6694-7

Comments:

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: 2222-SD01 Lab Sample ID: 160-6694-1

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG ID.:

Matrix: Solid Date Sampled: 05/15/2014 08:25

Reporting Basis: DRY Date Received: 05/16/2014 06:45

% Solids: 72.3

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7429-90-5	Aluminum	10000	270	57	mg/Kg			10	6010C
7440-36-0	Antimony	4.1	13	4.1	mg/Kg	U		10	6010C
7440-38-2	Arsenic	4.2	13	3.1	mg/Kg	J		10	6010C
7440-39-3	Barium	150	66	1.5	mg/Kg			10	6010C
7440-41-7	Beryllium	1.0	6.6	1.0	mg/Kg	U		10	6010C
7440-43-9	Cadmium	0.80	6.6	0.45	mg/Kg	J		10	6010C
7440-70-2	Calcium	5200	3300	89	mg/Kg			10	6010C
7440-47-3	Chromium	44	13	1.8	mg/Kg			10	6010C
7440-48-4	Cobalt	10	66	1.9	mg/Kg	J		10	6010C
7440-50-8	Copper	41	33	3.3	mg/Kg			10	6010C
7439-89-6	Iron	16000	130	26	mg/Kg			10	6010C
7439-92-1	Lead	120	13	1.7	mg/Kg			10	6010C
7439-95-4	Magnesium	5000	1300	42	mg/Kg			10	6010C
7439-96-5	Manganese	220	13	1.1	mg/Kg			10	6010C
7440-02-0	Nickel	20	53	1.5	mg/Kg	J		10	6010C
7440-09-7	Potassium	1100	6600	960	mg/Kg	J		10	6010C
7782-49-2	Selenium	2.7	20	2.7	mg/Kg	U		10	6010C
7440-22-4	Silver	0.93	13	0.93	mg/Kg	U		10	6010C
7440-23-5	Sodium	150	1300	100	mg/Kg	J		10	6010C
7440-28-0	Thallium	2.5	27	2.5	mg/Kg	U		10	6010C
7440-62-2	Vanadium	24	66	6.7	mg/Kg	J		10	6010C
7440-66-6	Zinc	170	66	7.5	mg/Kg		B	10	6010C
7439-97-6	Mercury	0.097	0.041	0.014	mg/Kg			1	7471B

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: 2222-SD02 Lab Sample ID: 160-6694-2

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG ID.:

Matrix: Solid Date Sampled: 05/15/2014 09:45

Reporting Basis: DRY Date Received: 05/16/2014 06:45

% Solids: 71.9

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7429-90-5	Aluminum	5000	240	51	mg/Kg			10	6010C
7440-36-0	Antimony	3.7	12	3.7	mg/Kg	U		10	6010C
7440-38-2	Arsenic	2.8	12	2.8	mg/Kg	U		10	6010C
7440-39-3	Barium	41	60	1.3	mg/Kg	J		10	6010C
7440-41-7	Beryllium	0.89	6.0	0.89	mg/Kg	U		10	6010C
7440-43-9	Cadmium	0.40	6.0	0.40	mg/Kg	U		10	6010C
7440-70-2	Calcium	26000	3000	80	mg/Kg			10	6010C
7440-47-3	Chromium	26	12	1.6	mg/Kg			10	6010C
7440-48-4	Cobalt	8.3	60	1.7	mg/Kg	J		10	6010C
7440-50-8	Copper	42	30	2.9	mg/Kg			10	6010C
7439-89-6	Iron	12000	120	24	mg/Kg			10	6010C
7439-92-1	Lead	71	12	1.5	mg/Kg			10	6010C
7439-95-4	Magnesium	10000	1200	38	mg/Kg			10	6010C
7439-96-5	Manganese	150	12	0.95	mg/Kg			10	6010C
7440-02-0	Nickel	16	48	1.4	mg/Kg	J		10	6010C
7440-09-7	Potassium	1000	6000	860	mg/Kg	J		10	6010C
7782-49-2	Selenium	2.5	18	2.5	mg/Kg	U		10	6010C
7440-22-4	Silver	0.83	12	0.83	mg/Kg	U		10	6010C
7440-23-5	Sodium	140	1200	91	mg/Kg	J		10	6010C
7440-28-0	Thallium	2.3	24	2.3	mg/Kg	U		10	6010C
7440-62-2	Vanadium	14	60	6.0	mg/Kg	J		10	6010C
7440-66-6	Zinc	140	60	6.7	mg/Kg		B	10	6010C
7439-97-6	Mercury	0.043	0.050	0.017	mg/Kg	J		1	7471B

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: 2222-SD03 Lab Sample ID: 160-6694-3

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG ID.:

Matrix: Solid Date Sampled: 05/15/2014 08:50

Reporting Basis: DRY Date Received: 05/16/2014 06:45

% Solids: 52.4

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7429-90-5	Aluminum	11000	350	76	mg/Kg			10	6010C
7440-36-0	Antimony	5.7	18	5.5	mg/Kg	J		10	6010C
7440-38-2	Arsenic	5.7	18	4.2	mg/Kg	J		10	6010C
7440-39-3	Barium	100	89	1.9	mg/Kg			10	6010C
7440-41-7	Beryllium	1.3	8.9	1.3	mg/Kg	U		10	6010C
7440-43-9	Cadmium	1.2	8.9	0.60	mg/Kg	J		10	6010C
7440-70-2	Calcium	17000	4400	120	mg/Kg			10	6010C
7440-47-3	Chromium	610	18	2.4	mg/Kg			10	6010C
7440-48-4	Cobalt	16	89	2.6	mg/Kg	J		10	6010C
7440-50-8	Copper	140	44	4.3	mg/Kg			10	6010C
7439-89-6	Iron	23000	180	35	mg/Kg			10	6010C
7439-92-1	Lead	290	18	2.3	mg/Kg			10	6010C
7439-95-4	Magnesium	7900	1800	56	mg/Kg			10	6010C
7439-96-5	Manganese	300	18	1.4	mg/Kg			10	6010C
7440-02-0	Nickel	40	71	2.1	mg/Kg	J		10	6010C
7440-09-7	Potassium	1800	8900	1300	mg/Kg	J		10	6010C
7782-49-2	Selenium	3.7	27	3.7	mg/Kg	U		10	6010C
7440-22-4	Silver	1.2	18	1.2	mg/Kg	U		10	6010C
7440-23-5	Sodium	180	1800	140	mg/Kg	J		10	6010C
7440-28-0	Thallium	3.4	35	3.4	mg/Kg	U		10	6010C
7440-62-2	Vanadium	33	89	9.0	mg/Kg	J		10	6010C
7440-66-6	Zinc	430	89	10	mg/Kg		B	10	6010C
7439-97-6	Mercury	0.18	0.061	0.020	mg/Kg			1	7471B

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: 2222-SD04 Lab Sample ID: 160-6694-4

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG ID.:

Matrix: Solid Date Sampled: 05/15/2014 09:05

Reporting Basis: DRY Date Received: 05/16/2014 06:45

% Solids: 28.6

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7429-90-5	Aluminum	9100	690	150	mg/Kg			10	6010C
7440-36-0	Antimony	11	35	11	mg/Kg	U		10	6010C
7440-38-2	Arsenic	26	35	8.2	mg/Kg	J		10	6010C
7440-39-3	Barium	100	170	3.8	mg/Kg	J		10	6010C
7440-41-7	Beryllium	2.6	17	2.6	mg/Kg	U		10	6010C
7440-43-9	Cadmium	3.5	17	1.2	mg/Kg	J		10	6010C
7440-70-2	Calcium	17000	8600	230	mg/Kg			10	6010C
7440-47-3	Chromium	70	35	4.8	mg/Kg			10	6010C
7440-48-4	Cobalt	19	170	5.0	mg/Kg	J		10	6010C
7440-50-8	Copper	210	86	8.5	mg/Kg			10	6010C
7439-89-6	Iron	28000	350	69	mg/Kg			10	6010C
7439-92-1	Lead	520	35	4.5	mg/Kg			10	6010C
7439-95-4	Magnesium	7000	3500	110	mg/Kg			10	6010C
7439-96-5	Manganese	320	35	2.8	mg/Kg			10	6010C
7440-02-0	Nickel	58	140	4.0	mg/Kg	J		10	6010C
7440-09-7	Potassium	2500	17000	2500	mg/Kg	U		10	6010C
7782-49-2	Selenium	7.1	52	7.1	mg/Kg	U		10	6010C
7440-22-4	Silver	2.4	35	2.4	mg/Kg	U		10	6010C
7440-23-5	Sodium	900	3500	260	mg/Kg	J		10	6010C
7440-28-0	Thallium	6.6	69	6.6	mg/Kg	U		10	6010C
7440-62-2	Vanadium	23	170	18	mg/Kg	J		10	6010C
7440-66-6	Zinc	760	170	19	mg/Kg		B	10	6010C
7439-97-6	Mercury	0.045	0.10	0.035	mg/Kg	J		1	7471B

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: 2222-SD05 Lab Sample ID: 160-6694-5

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG ID.:

Matrix: Solid Date Sampled: 05/15/2014 09:15

Reporting Basis: DRY Date Received: 05/16/2014 06:45

% Solids: 76.9

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7429-90-5	Aluminum	4200	260	55	mg/Kg			10	6010C
7440-36-0	Antimony	4.0	13	4.0	mg/Kg	U		10	6010C
7440-38-2	Arsenic	3.1	13	3.1	mg/Kg	U		10	6010C
7440-39-3	Barium	16	65	1.4	mg/Kg	J		10	6010C
7440-41-7	Beryllium	0.97	6.5	0.97	mg/Kg	U		10	6010C
7440-43-9	Cadmium	0.44	6.5	0.44	mg/Kg	U		10	6010C
7440-70-2	Calcium	16000	3200	87	mg/Kg			10	6010C
7440-47-3	Chromium	18	13	1.8	mg/Kg			10	6010C
7440-48-4	Cobalt	9.0	65	1.9	mg/Kg	J		10	6010C
7440-50-8	Copper	38	32	3.2	mg/Kg			10	6010C
7439-89-6	Iron	15000	130	26	mg/Kg			10	6010C
7439-92-1	Lead	42	13	1.7	mg/Kg			10	6010C
7439-95-4	Magnesium	6500	1300	41	mg/Kg			10	6010C
7439-96-5	Manganese	130	13	1.0	mg/Kg			10	6010C
7440-02-0	Nickel	17	52	1.5	mg/Kg	J		10	6010C
7440-09-7	Potassium	940	6500	940	mg/Kg	U		10	6010C
7782-49-2	Selenium	2.7	19	2.7	mg/Kg	U		10	6010C
7440-22-4	Silver	0.91	13	0.91	mg/Kg	U		10	6010C
7440-23-5	Sodium	110	1300	99	mg/Kg	J		10	6010C
7440-28-0	Thallium	2.5	26	2.5	mg/Kg	U		10	6010C
7440-62-2	Vanadium	13	65	6.6	mg/Kg	J		10	6010C
7440-66-6	Zinc	130	65	7.3	mg/Kg		B	10	6010C
7439-97-6	Mercury	0.11	0.038	0.013	mg/Kg			1	7471B

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: 2222-SD06 Lab Sample ID: 160-6694-6

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG ID.:

Matrix: Solid Date Sampled: 05/15/2014 08:45

Reporting Basis: DRY Date Received: 05/16/2014 06:45

% Solids: 54.9

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7429-90-5	Aluminum	10000	310	66	mg/Kg			10	6010C
7440-36-0	Antimony	5.3	15	4.8	mg/Kg	J		10	6010C
7440-38-2	Arsenic	5.6	15	3.6	mg/Kg	J		10	6010C
7440-39-3	Barium	99	77	1.7	mg/Kg			10	6010C
7440-41-7	Beryllium	1.2	7.7	1.2	mg/Kg	U		10	6010C
7440-43-9	Cadmium	2.0	7.7	0.53	mg/Kg	J		10	6010C
7440-70-2	Calcium	29000	3900	100	mg/Kg			10	6010C
7440-47-3	Chromium	510	15	2.1	mg/Kg			10	6010C
7440-48-4	Cobalt	18	77	2.2	mg/Kg	J		10	6010C
7440-50-8	Copper	180	39	3.8	mg/Kg			10	6010C
7439-89-6	Iron	22000	150	31	mg/Kg			10	6010C
7439-92-1	Lead	390	15	2.0	mg/Kg			10	6010C
7439-95-4	Magnesium	8500	1500	49	mg/Kg			10	6010C
7439-96-5	Manganese	260	15	1.2	mg/Kg			10	6010C
7440-02-0	Nickel	38	62	1.8	mg/Kg	J		10	6010C
7440-09-7	Potassium	1600	7700	1100	mg/Kg	J		10	6010C
7782-49-2	Selenium	3.2	23	3.2	mg/Kg	U		10	6010C
7440-22-4	Silver	1.1	15	1.1	mg/Kg	U		10	6010C
7440-23-5	Sodium	170	1500	120	mg/Kg	J		10	6010C
7440-28-0	Thallium	2.9	31	2.9	mg/Kg	U		10	6010C
7440-62-2	Vanadium	31	77	7.8	mg/Kg	J		10	6010C
7440-66-6	Zinc	550	77	8.7	mg/Kg		B	10	6010C
7439-97-6	Mercury	0.24	0.056	0.019	mg/Kg			1	7471B

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: 2222-RIN-01 Lab Sample ID: 160-6694-7

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG ID.:

Matrix: Water Date Sampled: 05/15/2014 08:10

Reporting Basis: WET Date Received: 05/16/2014 06:45

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7429-90-5	Aluminum	22	200	22	ug/L	U		1	6010C
7440-36-0	Antimony	3.7	10	3.7	ug/L	U		1	6010C
7440-38-2	Arsenic	1.8	10	1.8	ug/L	U		1	6010C
7440-39-3	Barium	2.1	50	2.1	ug/L	U		1	6010C
7440-41-7	Beryllium	0.28	5.0	0.28	ug/L	U		1	6010C
7440-43-9	Cadmium	0.34	5.0	0.34	ug/L	U		1	6010C
7440-70-2	Calcium	54	1000	54	ug/L	U		1	6010C
7440-47-3	Chromium	3.4	10	3.4	ug/L	U		1	6010C
7440-48-4	Cobalt	2.7	50	2.7	ug/L	U		1	6010C
7440-50-8	Copper	2.1	25	2.1	ug/L	U		1	6010C
7439-89-6	Iron	13	100	13	ug/L	U		1	6010C
7439-92-1	Lead	0.60	10	0.60	ug/L	U		1	6010C
7439-95-4	Magnesium	51	1000	51	ug/L	U		1	6010C
7439-96-5	Manganese	1.0	15	1.0	ug/L	U		1	6010C
7440-02-0	Nickel	2.6	40	2.6	ug/L	U		1	6010C
7440-09-7	Potassium	460	5000	460	ug/L	U		1	6010C
7782-49-2	Selenium	2.1	15	2.1	ug/L	U		1	6010C
7440-22-4	Silver	0.99	10	0.99	ug/L	U		1	6010C
7440-23-5	Sodium	110	1000	110	ug/L	U		1	6010C
7440-28-0	Thallium	2.4	20	2.4	ug/L	U		1	6010C
7440-62-2	Vanadium	4.4	50	4.4	ug/L	U		1	6010C
7440-66-6	Zinc	9.2	20	8.3	ug/L	J		1	6010C
7439-97-6	Mercury	0.060	0.20	0.060	ug/L	U		1	7470A

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

ICV Source: ICP ICV_00008 Concentration Units: ug/L

CCV Source: ICP CAL2/CCV_00018

Analyte	ICV 160-123642/5 05/22/2014 10:40				CCV 160-123642/11 05/22/2014 11:03				CCV 160-123642/34 05/22/2014 12:37			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
Aluminum	50800		50000	102	51000		50000	102	50900		50000	102
Antimony	1000		1000	100	1020		1000	102	1010		1000	101
Arsenic	4930		5000	99	5060		5000	101	4990		5000	100
Barium	4980		5000	100	5090		5000	102	5100		5000	102
Beryllium	4990		5000	100	4990		5000	100	5050		5000	101
Cadmium	5010		5000	100	5120		5000	102	5050		5000	101
Calcium	50400		50000	101	50600		50000	101	50100		50000	100
Chromium	5060		5000	101	5030		5000	101	4990		5000	100
Cobalt	5120		5000	102	5020		5000	100	4970		5000	99
Copper	5000		5000	100	5140		5000	103	5090		5000	102
Iron	49500		50000	99	49000		50000	98	49700		50000	99
Lead	5050		5000	101	5150		5000	103	5080		5000	102
Magnesium	48800		50000	98	48000		50000	96	48500		50000	97
Manganese	4970		5000	99	4950		5000	99	5020		5000	100
Nickel	5070		5000	101	5150		5000	103	5080		5000	102
Potassium	51400		50000	103	52800		50000	106	51900		50000	104
Selenium	998		1000	100	1010		1000	101	999		1000	100
Silver	987		1000	99	983		1000	98	986		1000	99
Sodium	51900		50000	104	52900		50000	106	52100		50000	104
Thallium	1040		1000	104	1030		1000	103	1020		1000	102
Vanadium	4930		5000	99	4850		5000	97	4920		5000	98
Zinc	4990		5000	100	5100		5000	102	5040		5000	101

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

ICV Source: ICP ICV_00008 Concentration Units: ug/L

CCV Source: ICP CAL2/CCV_00018

Analyte	CCV 160-123642/46 05/22/2014 13:23				CCV 160-123642/70 05/22/2014 14:56				CCV 160-123642/82 05/22/2014 15:43			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
Aluminum	49500		50000	99	48400		50000	97	48800		50000	98
Antimony	1010		1000	101	1030		1000	103	1030		1000	103
Arsenic	5040		5000	101	5160		5000	103	5160		5000	103
Barium	4940		5000	99	5000		5000	100	5050		5000	101
Beryllium	5050		5000	101	5020		5000	100	5090		5000	102
Cadmium	5110		5000	102	5260		5000	105	5220		5000	104
Calcium	51600		50000	103	53900		50000	108	54200		50000	108
Chromium	5080		5000	102	5280		5000	106	5300		5000	106
Cobalt	5110		5000	102	5290		5000	106	5340		5000	107
Copper	5110		5000	102	5210		5000	104	5170		5000	103
Iron	50200		50000	100	49300		50000	99	50400		50000	101
Lead	5180		5000	104	5370		5000	107	5360		5000	107
Magnesium	49100		50000	98	49300		50000	99	49700		50000	99
Manganese	5030		5000	101	4960		5000	99	5030		5000	101
Nickel	5150		5000	103	5350		5000	107	5320		5000	106
Potassium	50400		50000	101	49100		50000	98	49800		50000	100
Selenium	1010		1000	101	1020		1000	102	1030		1000	103
Silver	996		1000	100	1020		1000	102	1030		1000	103
Sodium	50400		50000	101	48600		50000	97	49600		50000	99
Thallium	1050		1000	105	1080		1000	108	1090		1000	109
Vanadium	5000		5000	100	4920		5000	98	5060		5000	101
Zinc	5120		5000	102	5280		5000	106	5280		5000	106

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

ICV Source: ICP ICV_00008 Concentration Units: ug/L

CCV Source: ICP CAL2/CCV_00018

Analyte	CCV 160-123642/94 05/22/2014 16:29											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
Aluminum	49300		50000	99								
Antimony	1020		1000	102								
Arsenic	5070		5000	101								
Barium	5070		5000	101								
Beryllium	4960		5000	99								
Cadmium	5150		5000	103								
Calcium	52800		50000	106								
Chromium	5200		5000	104								
Cobalt	5230		5000	105								
Copper	5140		5000	103								
Iron	49000		50000	98								
Lead	5240		5000	105								
Magnesium	47800		50000	96								
Manganese	4900		5000	98								
Nickel	5200		5000	104								
Potassium	50800		50000	102								
Selenium	1010		1000	101								
Silver	1020		1000	102								
Sodium	50900		50000	102								
Thallium	1070		1000	107								
Vanadium	4930		5000	99								
Zinc	5180		5000	104								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

ICV Source: Hg Curve Int._00404 Concentration Units: ug/L

CCV Source: Hg Curve Int._00403

Analyte	ICV 160-123936/7 05/27/2014 10:10				CCV 160-123936/19 05/27/2014 10:12							
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
Mercury	5.02		5.00	100	4.91		5.00	98				

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

ICV Source: Hg QC Int._00388 Concentration Units: ug/L

CCV Source: Hg Curve Int._00405

Analyte	ICV 160-124146/7 05/28/2014 09:14				CCV 160-124146/19 05/28/2014 09:51				CCV 160-124146/22 05/28/2014 09:58			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
Mercury	5.15		5.00	103	5.01		5.00	100	5.02		5.00	100

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2B-IN
CRQL CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Method: 6010C Instrument ID: ICP6500

Lab Sample ID: CRI 160-123642/7 Concentration Units: ug/L

CRQL Check Standard Source: ICP CAL1/LLC_00012

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
Aluminum	200	206		103	70-130
Antimony	10.0	10.7		107	70-130
Arsenic	10.0	9.20	J	92	70-130
Barium	50.0	51.2		102	70-130
Beryllium	5.00	5.10		102	70-130
Cadmium	5.00	5.20		104	70-130
Calcium	1000	1120		112	70-130
Chromium	10.0	10.4		104	70-130
Cobalt	50.0	55.1		110	70-130
Copper	25.0	25.5		102	70-130
Iron	100	106		106	70-130
Lead	10.0	11.1		111	70-130
Magnesium	1000	935	J	93	70-130
Manganese	15.0	15.5		103	70-130
Nickel	40.0	44.8		112	70-130
Potassium	5000	5230		105	70-130
Selenium	15.0	14.5	J	97	70-130
Silver	10.0	10.0		100	70-130
Sodium	1000	1050		105	70-130
Thallium	20.0	24.0		120	70-130
Vanadium	50.0	47.4	J	95	70-130
Zinc	20.0	21.1		106	70-130

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IIB-IN

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Concentration Units: ug/L

Analyte	RL	ICB 160-123642/6 05/22/2014 10:44		CCB 160-123642/12 05/22/2014 11:07		CCB 160-123642/35 05/22/2014 12:41		CCB 160-123642/47 05/22/2014 13:27	
		Found	C	Found	C	Found	C	Found	C
Aluminum	200	22	U	22	U	22	U	22	U
Antimony	10	3.7	U	3.7	U	3.7	U	3.7	U
Arsenic	10	1.8	U	1.8	U	1.8	U	1.8	U
Barium	50	2.1	U	2.1	U	2.1	U	2.1	U
Beryllium	5.0	0.28	U	0.28	U	0.800	J	0.28	U
Cadmium	5.0	0.34	U	0.34	U	0.34	U	0.34	U
Calcium	1000	54	U	54	U	54	U	54	U
Chromium	10	3.4	U	3.4	U	3.4	U	3.4	U
Cobalt	50	2.7	U	2.7	U	2.7	U	2.7	U
Copper	25	2.1	U	2.1	U	2.1	U	2.1	U
Iron	100	13	U	13	U	13	U	13	U
Lead	10	0.900	J	0.600	J	1.30	J	0.60	U
Magnesium	1000	51	U	51	U	51	U	51	U
Manganese	15	1.0	U	1.0	U	1.00	J	1.0	U
Nickel	40	2.6	U	2.6	U	2.6	U	2.6	U
Potassium	5000	460	U	460	U	460	U	460	U
Selenium	15	2.1	U	2.1	U	2.1	U	2.10	J
Silver	10	0.99	U	0.99	U	0.99	U	0.99	U
Sodium	1000	110	U	110	U	110	U	110	U
Thallium	20	2.4	U	2.4	U	2.4	U	2.4	U
Vanadium	50	4.4	U	4.4	U	4.4	U	4.4	U
Zinc	20	8.3	U	8.3	U	8.3	U	8.3	U

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Concentration Units: ug/L

Analyte	RL	CCB 160-123642/71 05/22/2014 15:00		CCB 160-123642/83 05/22/2014 15:46		CCB 160-123642/95 05/22/2014 16:33			
		Found	C	Found	C	Found	C	Found	C
Aluminum	200	22	U	22	U	22	U		
Antimony	10	3.7	U	3.7	U	3.7	U		
Arsenic	10	1.8	U	1.8	U	1.8	U		
Barium	50	2.1	U	2.1	U	2.1	U		
Beryllium	5.0	0.28	U	0.28	U	0.28	U		
Cadmium	5.0	0.400	J	0.34	U	0.34	U		
Calcium	1000	54	U	54	U	54	U		
Chromium	10	3.4	U	3.4	U	3.4	U		
Cobalt	50	2.7	U	2.7	U	2.7	U		
Copper	25	2.1	U	2.1	U	2.1	U		
Iron	100	13	U	13	U	13	U		
Lead	10	0.800	J	0.800	J	0.600	J		
Magnesium	1000	51	U	51	U	51	U		
Manganese	15	1.0	U	1.0	U	1.0	U		
Nickel	40	2.6	U	2.6	U	2.6	U		
Potassium	5000	460	U	460	U	460	U		
Selenium	15	2.1	U	2.1	U	2.1	U		
Silver	10	0.99	U	0.99	U	0.99	U		
Sodium	1000	110	U	110	U	110	U		
Thallium	20	2.4	U	2.4	U	2.4	U		
Vanadium	50	4.4	U	4.4	U	4.4	U		
Zinc	20	8.3	U	8.3	U	8.3	U		

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Concentration Units: ug/L

Analyte	RL	ICB 160-123936/8 05/27/2014 10:10		CCB 160-123936/20 05/27/2014 10:13					
		Found	C	Found	C	Found	C	Found	C
Mercury	0.20	0.060	U	0.060	U				

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Concentration Units: ug/L

Analyte	RL	ICB 160-124146/8 05/28/2014 09:17		CCB 160-124146/20 05/28/2014 09:53		CCB 160-124146/23 05/28/2014 10:00			
		Found	C	Found	C	Found	C	Found	C
Mercury	0.20	0.060	U	0.060	U	0.060	U		

Italicized analytes were not requested for this sequence.

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Concentration Units: mg/Kg Lab Sample ID: MB 160-122752/1-A

Instrument Code: ICP6500 Batch No.: 123642

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	3.8	U		6010C
7440-36-0	Antimony	0.27	U		6010C
7440-38-2	Arsenic	0.21	U		6010C
7440-39-3	Barium	0.097	U		6010C
7440-41-7	Beryllium	0.066	U		6010C
7440-43-9	Cadmium	0.030	U		6010C
7440-70-2	Calcium	5.9	U		6010C
7440-47-3	Chromium	0.12	U		6010C
7440-48-4	Cobalt	0.13	U		6010C
7440-50-8	Copper	0.22	U		6010C
7439-89-6	Iron	1.8	U		6010C
7439-92-1	Lead	0.11	U		6010C
7439-95-4	Magnesium	2.8	U		6010C
7439-96-5	Manganese	0.071	U		6010C
7440-02-0	Nickel	0.10	U		6010C
7440-09-7	Potassium	64	U		6010C
7782-49-2	Selenium	0.18	U		6010C
7440-22-4	Silver	0.062	U		6010C
7440-23-5	Sodium	6.7	U		6010C
7440-28-0	Thallium	0.17	U		6010C
7440-62-2	Vanadium	0.45	U		6010C
7440-66-6	Zinc	1.49	J		6010C

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Concentration Units: ug/L Lab Sample ID: MB 160-122863/1-A

Instrument Code: ICP6500 Batch No.: 123642

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	22	U		6010C
7440-36-0	Antimony	3.7	U		6010C
7440-38-2	Arsenic	1.8	U		6010C
7440-39-3	Barium	2.1	U		6010C
7440-41-7	Beryllium	0.28	U		6010C
7440-43-9	Cadmium	0.34	U		6010C
7440-70-2	Calcium	54	U		6010C
7440-47-3	Chromium	3.4	U		6010C
7440-48-4	Cobalt	2.7	U		6010C
7440-50-8	Copper	2.1	U		6010C
7439-89-6	Iron	13	U		6010C
7439-92-1	Lead	0.60	U		6010C
7439-95-4	Magnesium	51	U		6010C
7439-96-5	Manganese	1.0	U		6010C
7440-02-0	Nickel	2.6	U		6010C
7440-09-7	Potassium	460	U		6010C
7782-49-2	Selenium	2.1	U		6010C
7440-22-4	Silver	0.99	U		6010C
7440-23-5	Sodium	110	U		6010C
7440-28-0	Thallium	2.4	U		6010C
7440-62-2	Vanadium	4.4	U		6010C
7440-66-6	Zinc	8.3	U		6010C

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Concentration Units: ug/L Lab Sample ID: MB 160-123407/1-A

Instrument Code: HAA2 Batch No.: 123936

CAS No.	Analyte	Concentration	C	Q	Method
7439-97-6	Mercury	0.060	U		7470A

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Concentration Units: mg/Kg Lab Sample ID: MB 160-123919/1-A

Instrument Code: HAA2 Batch No.: 124146

CAS No.	Analyte	Concentration	C	Q	Method
7439-97-6	Mercury	0.010	U		7471B

FORM III-IN

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Lab Sample ID: ICSA 160-123642/8 Instrument ID: ICP6500

Lab File ID: 052214C1a.asc ICS Source: ICPC MIX ICSA_00037

Concentration Units: ug/L

Analyte	True Solution A	Found Solution A	Percent Recovery
Aluminum	**100000**	**102300**	**102**
Antimony		**5.40**	
Arsenic		**0.0000**	
Barium		**0.500**	
Beryllium		**0.0000**	
Cadmium		**0.0000**	
Calcium	**100000**	**98980**	**99**
Chromium		**9.20**	
Cobalt		**2.20**	
Copper		**0.0000**	
Iron	**100000**	**99200**	**99**
Lead		**2.40**	
Magnesium	**100000**	**100700**	**101**
Manganese		**5.00**	
Nickel		**1.60**	
Potassium	**100000**	**102500**	**103**
Selenium		**0.600**	
Silver		**0.200**	
Sodium	**100000**	**97390**	**97**
Thallium		**0.0000**	
Vanadium		**0.0000**	
Zinc		**0.0000**	

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Lab Sample ID: ICSAB 160-123642/9 Instrument ID: ICP6500

Lab File ID: 052214C1a.asc ICS Source: ICPC MIX AB_00041

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
Aluminum	**100000**	**103200**	**103**
Antimony	**500**	**496**	**99**
Arsenic	**2500**	**2503**	**100**
Barium	**2500**	**2581**	**103**
Beryllium	**2500**	**2564**	**103**
Cadmium	**2500**	**2524**	**101**
Calcium	**100000**	**96300**	**96**
Chromium	**2500**	**2462**	**98**
Cobalt	**2500**	**2435**	**97**
Copper	**2500**	**2505**	**100**
Iron	**100000**	**97360**	**97**
Lead	**2500**	**2472**	**99**
Magnesium	**100000**	**98640**	**99**
Manganese	**2500**	**2470**	**99**
Nickel	**2500**	**2468**	**99**
Potassium	**100000**	**103600**	**104**
Selenium	**500**	**506**	**101**
Silver	**500**	**492**	**98**
Sodium	**100000**	**102600**	**103**
Thallium	**500**	**492**	**98**
Vanadium	**2500**	**2458**	**98**
Zinc	**2500**	**2534**	**101**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: 2222-SD01 MS
Lab ID: 160-6694-1 MS
Lab Name: TestAmerica St. Louis
Job No.: 160-6694-1
SDG No.:
Matrix: Solid
Concentration Units: mg/Kg
% Solids: 72.3

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
Aluminum	13800		10000		1200	299	75-125	4	6010C
Antimony	36.2		4.1	U	60.0	60	75-125	F1	6010C
Arsenic	127		4.2	J	120	103	75-125		6010C
Barium	236		150		120	71	75-125	F1	6010C
Beryllium	122		1.0	U	120	101	75-125		6010C
Cadmium	131		0.80	J	120	108	75-125		6010C
Calcium	6280		5200		1200	90	75-125	4	6010C
Chromium	169		44		120	104	75-125		6010C
Cobalt	146		10	J	120	113	75-125		6010C
Copper	169		41		120	106	75-125		6010C
Iron	17000		16000		1200	54	75-125	4	6010C
Lead	234		120		120	92	75-125		6010C
Magnesium	5850		5000		1200	69	75-125	4	6010C
Manganese	327		220		120	93	75-125		6010C
Nickel	157		20	J	120	114	75-125		6010C
Potassium	2450	J	1100	J	1200	114	75-125		6010C
Selenium	60.6		2.7	U	60.0	101	75-125		6010C
Silver	25.9		0.93	U	24.0	108	75-125		6010C
Sodium	1380		150	J	1200	102	75-125		6010C
Thallium	27.7		2.5	U	24.0	116	75-125		6010C
Vanadium	154		24	J	120	109	75-125		6010C
Zinc	267		170		120	80	75-125		6010C

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.
Note - Results and Reporting Limits have been adjusted for dry weight.

FORM VA - IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: 2222-SD06 MS
Lab ID: 160-6694-6 MS
Lab Name: TestAmerica St. Louis
Job No.: 160-6694-1
SDG No.:
Matrix: Solid
Concentration Units: mg/Kg
% Solids: 54.9

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
Mercury	1.59		0.24		1.47	92	80-120		7471B

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.
Note - Results and Reporting Limits have been adjusted for dry weight.

FORM VA - IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: 2222-RIN-01 MS
Lab ID: 160-6694-7 MS
Lab Name: TestAmerica St. Louis
Job No.: 160-6694-1
SDG No.:
Matrix: Water
Concentration Units: ug/L
% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
Mercury	5.11		0.060	U	5.00	102	80-120		7470A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: 2222-SD01 MSD
Lab ID: 160-6694-1 MSD
Lab Name: TestAmerica St. Louis
Job No.: 160-6694-1
SDG No.:
Matrix: Solid
Concentration Units: mg/Kg
% Solids: 72.3

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
Aluminum	15500		1360	388	75-125	12	30	4	6010C
Antimony	41.1		68.2	60	75-125	12	30	F1	6010C
Arsenic	149		136	106	75-125	15	30		6010C
Barium	268		136	86	75-125	13	30		6010C
Beryllium	141		136	103	75-125	15	30		6010C
Cadmium	149		136	108	75-125	13	30		6010C
Calcium	4860		1360	-25	75-125	25	30	F1	6010C
Chromium	184		136	103	75-125	8	30		6010C
Cobalt	164		136	112	75-125	11	30		6010C
Copper	184		136	105	75-125	9	30		6010C
Iron	17000		1360	44	75-125	0	30	4	6010C
Lead	245		136	88	75-125	4	30		6010C
Magnesium	5780		1360	56	75-125	1	30	F1	6010C
Manganese	325		136	81	75-125	1	30		6010C
Nickel	177		136	115	75-125	12	30		6010C
Potassium	2650	J	1360	116	75-125	8	30		6010C
Selenium	72.4		68.2	106	75-125	18	30		6010C
Silver	28.8		27.3	106	75-125	10	30		6010C
Sodium	1570		1360	104	75-125	13	30		6010C
Thallium	32.6		27.3	120	75-125	16	30		6010C
Vanadium	173		136	110	75-125	12	30		6010C
Zinc	278		136	78	75-125	4	30		6010C

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.
Note - Results and Reporting Limits have been adjusted for dry weight.

FORM VD - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: 2222-SD06 MSD
Lab ID: 160-6694-6 MSD
Lab Name: TestAmerica St. Louis
Job No.: 160-6694-1
SDG No.:
Matrix: Solid
Concentration Units: mg/Kg
% Solids: 54.9

Analyte	(SDR) C		Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
Mercury	1.36		1.32	84	80-120	16	30		7471B

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.
Note - Results and Reporting Limits have been adjusted for dry weight.

FORM VD - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: 2222-RIN-01 MSD
Lab ID: 160-6694-7 MSD
Lab Name: TestAmerica St. Louis
Job No.: 160-6694-1
SDG No.:
Matrix: Water
Concentration Units: ug/L
% Solids:

Analyte	(SDR) C		Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
Mercury	5.05		5.00	101	80-120	1	20		7470A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

LINEAR RANGE CHECK STANDARD
METALS -

Lab ID: LRC 160-123642/10

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

Sample Matrix: Water LCS Source: ICP CAL3\LRC_00010

Analyte	Water(ug/L)							
	True	Found	C	%R	Limits		Q	Method
Aluminum	100000	104000		104	90	110		6010C
Antimony	2000	2040		102	90	110		6010C
Arsenic	10000	10100		101	90	110		6010C
Barium	10000	10100		101	90	110		6010C
Beryllium	10000	9940		99	90	110		6010C
Cadmium	10000	10200		102	90	110		6010C
Calcium	100000	98400		98	90	110		6010C
Chromium	10000	9930		99	90	110		6010C
Cobalt	10000	9810		98	90	110		6010C
Copper	10000	10200		102	90	110		6010C
Iron	100000	99000		99	90	110		6010C
Lead	10000	9980		100	90	110		6010C
Magnesium	100000	101000		101	90	110		6010C
Manganese	10000	10000		100	90	110		6010C
Nickel	10000	10000		100	90	110		6010C
Potassium	100000	104000		104	90	110		6010C
Selenium	2000	2030		101	90	110		6010C
Silver	2000	2000		100	90	110		6010C
Sodium	100000	102000		102	90	110		6010C
Thallium	2000	1950		98	90	110		6010C
Vanadium	10000	9870		99	90	110		6010C
Zinc	10000	10000		100	90	110		6010C

Calculations are performed before rounding to avoid round-off errors in calculated results.

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-122863/2-A

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

Sample Matrix: Water LCS Source: PREP 1 and 2_00002

Analyte	Water(ug/L)							
	True	Found	C	%R	Limits		Q	Method
Aluminum	10000	11000		110	80	120		6010C
Antimony	500	540		108	80	120		6010C
Arsenic	1000	1080		108	80	120		6010C
Barium	1000	1090		109	80	120		6010C
Beryllium	1000	1070		107	80	120		6010C
Cadmium	1000	1110		111	80	120		6010C
Calcium	10000	11100		111	80	120		6010C
Chromium	1000	1110		111	80	120		6010C
Cobalt	1000	1110		111	80	120		6010C
Copper	1000	1150		115	80	120		6010C
Iron	10000	10800		108	80	120		6010C
Lead	1000	1140		114	80	120		6010C
Magnesium	10000	9980		100	80	120		6010C
Manganese	1000	1080		108	80	120		6010C
Nickel	1000	1150		115	80	120		6010C
Potassium	10000	11500		115	80	120		6010C
Selenium	500	542		108	80	120		6010C
Silver	200	211		106	80	120		6010C
Sodium	10000	11700		117	80	120		6010C
Thallium	200	238		119	80	120		6010C
Vanadium	1000	1060		106	80	120		6010C
Zinc	1000	1110		111	80	120		6010C

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

7A-IN
LCS-CERTIFIED REFERENCE MATERIAL
METALS

Lab ID: LCSSRM 160-122752/2-A

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

Sample Matrix: Solid LCS Source: PR_LCSSRM_00004

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
Aluminum	9390	6720		71.6	43.5	156.5		6010C
Antimony	129	80.3		62.2	22.4	249.6		6010C
Arsenic	88.4	87.7		99.3	69.0	131.2		6010C
Barium	210	190		90.7	73.3	126.7		6010C
Beryllium	55.8	54.0		96.8	73.1	127.1		6010C
Cadmium	142	148		104.3	73.2	128.2		6010C
Calcium	7530	8030		106.6	74.6	125.4		6010C
Chromium	86.8	90.8		104.6	69.1	131.3		6010C
Cobalt	199	217		109.1	74.4	125.6		6010C
Copper	268	271		101.2	76.1	123.9		6010C
Iron	12800	10400		81.4	31.6	168.0		6010C
Lead	97.9	104		105.9	70.8	128.7		6010C
Magnesium	2850	2480		86.9	65.3	134.7		6010C
Manganese	425	413		97.1	76.2	123.5		6010C
Nickel	236	256		108.7	74.2	128.0		6010C
Potassium	2570	2110		82.2	61.1	138.9		6010C
Selenium	127	126		99.4	66.6	133.9		6010C
Silver	66.2	65.3		98.6	67.1	132.9		6010C
Sodium	1040	965		92.8	60.4	139.4		6010C
Thallium	140	162		115.9	68.3	132.1		6010C
Vanadium	156	145		92.7	71.8	129.5		6010C
Zinc	130	130		99.9	66.9	133.1		6010C

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-123407/2-A

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

Sample Matrix: Water LCS Source: Hg Curve Int._00401

Analyte	Water(ug/L)							
	True	Found	C	%R	Limits		Q	Method
Mercury	5.00	4.74		95	80	120		7470A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

7A-IN
LCS-CERTIFIED REFERENCE MATERIAL
METALS

Lab ID: LCSSRM 160-123919/2-A

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

Sample Matrix: Solid LCS Source: PR_LCSSRM_00006

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
Mercury	9.03	7.70		85.3	51.3	148.4		7471B

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 160-6694-1

SDG No:

Lab Name: TestAmerica St. Louis Job No: 160-6694-1

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
Aluminum	10000		9590		6.0		6010C
Antimony	4.1	U	21	U	NC		6010C
Arsenic	4.2	J	16	U	NC		6010C
Barium	150		142	J	6.4		6010C
Beryllium	1.0	U	5.0	U	NC		6010C
Cadmium	0.80	J	2.3	U	NC		6010C
Calcium	5200		4920	J	5.3		6010C
Chromium	44		48.4	J	NC		6010C
Cobalt	10	J	11.3	J	NC		6010C
Copper	41		27.9	J	NC		6010C
Iron	16000		15500		5.8		6010C
Lead	120		118		5.1		6010C
Magnesium	5000		4760	J	5.1		6010C
Manganese	220		201		6.7		6010C
Nickel	20	J	18.6	J	NC		6010C
Potassium	1100	J	4800	U	NC		6010C
Selenium	2.7	U	14	U	NC		6010C
Silver	0.93	U	4.6	U	NC		6010C
Sodium	150	J	510	U	NC		6010C
Thallium	2.5	U	13	U	NC		6010C
Vanadium	24	J	34	U	NC		6010C
Zinc	170		189	J	NC		6010C

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 160-6694-6

SDG No:

Lab Name: TestAmerica St. Louis Job No: 160-6694-1

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
Mercury	0.24		0.197	J	NC		7471B

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 160-6694-7

SDG No:

Lab Name: TestAmerica St. Louis Job No: 160-6694-1

Matrix: Water Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
Mercury	0.060	U	0.30	U	NC		7470A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 160-6694-1

SDG Number:

Matrix: Water Instrument ID: ICP6500

Method: 6010C MDL Date: 03/19/2014 10:27

Prep Method: 3010A

Analyte	Wavelength/ Mass	RL (ug/L)	MDL (ug/L)
Aluminum		200	22.4
Antimony		10	3.74
Arsenic		10	1.78
Barium		50	2.12
Beryllium		5	0.283
Cadmium		5	0.336
Calcium		1000	54.2
Chromium		10	3.35
Cobalt		50	2.72
Copper		25	2.1
Iron		100	12.8
Lead		10	0.598
Magnesium		1000	50.5
Manganese		15	1
Nickel		40	2.57
Potassium		5000	456
Selenium		15	2.08
Silver		10	0.994
Sodium		1000	105
Thallium		20	2.38
Vanadium		50	4.39
Zinc		20	8.32

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 160-6694-1

SDG Number:

Matrix: Water Instrument ID: ICP6500

Method: 6010C XMDL Date: 03/19/2014 10:24

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
Aluminum		200	22.4
Antimony		10	3.74
Arsenic		10	1.78
Barium		50	2.12
Beryllium		5	0.283
Cadmium		5	0.336
Calcium		1000	54.2
Chromium		10	3.35
Cobalt		50	2.72
Copper		25	2.1
Iron		100	12.8
Lead		10	0.598
Magnesium		1000	50.5
Manganese		15	1
Nickel		40	2.57
Potassium		5000	456
Selenium		15	2.08
Silver		10	0.994
Sodium		1000	105
Thallium		20	2.38
Vanadium		50	4.39
Zinc		20	8.32

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 160-6694-1

SDG Number:

Matrix: Solid Instrument ID: ICP6500

Method: 6010C MDL Date: 03/19/2014 11:22

Prep Method: 3050B

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
Aluminum		20	4.26
Antimony		1	0.309
Arsenic		1	0.236
Barium		5	0.11
Beryllium		0.5	0.075
Cadmium		0.5	0.034
Calcium		250	6.73
Chromium		1	0.138
Cobalt		5	0.144
Copper		2.5	0.245
Iron		10	1.99
Lead		1	0.129
Magnesium		100	3.16
Manganese		1	0.08
Nickel		4	0.116
Potassium		500	72.4
Selenium		1.5	0.206
Silver		1	0.07
Sodium		100	7.62
Thallium		2	0.19
Vanadium		5	0.507
Zinc		5	0.562

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 160-6694-1

SDG Number:

Matrix: Solid Instrument ID: ICP6500

Method: 6010C XMDL Date: 03/19/2014 10:24

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
Aluminum		200	22.4
Antimony		10	3.74
Arsenic		10	1.78
Barium		50	2.12
Beryllium		5	0.283
Cadmium		5	0.336
Calcium		1000	54.2
Chromium		10	3.35
Cobalt		50	2.72
Copper		25	2.1
Iron		100	12.8
Lead		10	0.598
Magnesium		1000	50.5
Manganese		15	1
Nickel		40	2.57
Potassium		5000	456
Selenium		15	2.08
Silver		10	0.994
Sodium		1000	105
Thallium		20	2.38
Vanadium		50	4.39
Zinc		20	8.32

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 160-6694-1

SDG Number:

Matrix: Water Instrument ID: HAA2

Method: 7470A MDL Date: 06/28/2011 19:17

Prep Method: 7470A

Analyte	Wavelength/ Mass	RL (ug/L)	MDL (ug/L)
Mercury		0.2	0.06

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 160-6694-1

SDG Number:

Matrix: Water Instrument ID: HAA2

Method: 7470A XMDL Date: 06/28/2011 19:19

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
Mercury		0.2	0.06

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 160-6694-1

SDG Number:

Matrix: Solid Instrument ID: HAA2

Method: 7471B MDL Date: 01/15/2011 19:21

Prep Method: 7471B

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
Mercury		0.033	0.011

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 160-6694-1

SDG Number:

Matrix: Solid Instrument ID: HAA2

Method: 7471B XMDL Date: 06/28/2011 19:19

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
Mercury		0.2	0.06

11-IN
LINEAR RANGES
METALS

Lab Name: TestAmerica St. Louis Job No: 160-6694-1

SDG No.:

Instrument ID: ICP6500 Date: 09/25/2013 10:39

Analyte	Integ. Time (Sec.)	Concentration (mg/L)	Method
Aluminum		100	6010C
Antimony		2.0	6010C
Arsenic		10	6010C
Barium		10	6010C
Beryllium		10	6010C
Cadmium		10	6010C
Calcium		100	6010C
Chromium		10	6010C
Cobalt		10	6010C
Copper		10	6010C
Iron		100	6010C
Lead		10	6010C
Magnesium		100	6010C
Manganese		10	6010C
Nickel		10	6010C
Potassium		100	6010C
Selenium		2	6010C
Silver		4.0	6010C
Sodium		100	6010C
Thallium		2	6010C
Vanadium		10	6010C
Zinc		10	6010C

11-IN
LINEAR RANGES
METALS

Lab Name: TestAmerica St. Louis Job No: 160-6694-1

SDG No.:

Instrument ID: HAA2 Date: 03/14/2012 13:48

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
Mercury		10	7470A
Mercury		10	7471B

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-122752/1-A	05/19/2014 08:37	122752	0.5661		50
LCSSRM 160-122752/2-A	05/19/2014 08:37	122752	0.5603		50
160-6694-1	05/19/2014 08:37	122752	0.5210		50
160-6694-1 MS	05/19/2014 08:37	122752	0.5764		50
160-6694-1 MSD	05/19/2014 08:37	122752	0.5070		50
160-6694-2	05/19/2014 08:37	122752	0.5838		50
160-6694-3	05/19/2014 08:37	122752	0.5380		50
160-6694-4	05/19/2014 08:37	122752	0.5054		50
160-6694-5	05/19/2014 08:37	122752	0.5003		50
160-6694-6	05/19/2014 08:37	122752	0.5887		50

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Prep Method: 3010A

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight	Initial Volume (mL)	Final Volume (mL)
MB 160-122863/1-A	05/19/2014 10:57	122863		50	50
LCS 160-122863/2-A	05/19/2014 10:57	122863		50	50
160-6694-7	05/19/2014 10:57	122863		50	50

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Prep Method: 7470A

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight	Initial Volume (mL)	Final Volume (mL)
MB 160-123407/1-A	05/22/2014 07:51	123407		30	30
LCS 160-123407/2-A	05/22/2014 07:51	123407		30	30
160-6694-7	05/22/2014 07:51	123407		30	30
160-6694-7 MS	05/22/2014 07:51	123407		30	30
160-6694-7 MSD	05/22/2014 07:51	123407		30	30

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Prep Method: 7471B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-123919/1-A	05/27/2014 10:17	123919	0.6630		100
LCSSRM 160-123919/2-A	05/27/2014 10:17	123919	0.6576		100
160-6694-1	05/27/2014 10:17	123919	0.6750		100
160-6694-2	05/27/2014 10:17	123919	0.5543		100
160-6694-3	05/27/2014 10:17	123919	0.6151		100
160-6694-4	05/27/2014 10:17	123919	0.6591		100
160-6694-5	05/27/2014 10:17	123919	0.6784		100
160-6694-6	05/27/2014 10:17	123919	0.6474		100
160-6694-6 MS	05/27/2014 10:17	123919	0.6210		100
160-6694-6 MSD	05/27/2014 10:17	123919	0.6881		100

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Instrument ID: ICP6500 Analysis Method: 6010C

Start Date: 05/22/2014 10:24 End Date: 05/22/2014 20:41

Lab Sample Id	D/F	Type	Time	Analytes																													
				Ag	Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	Sb	Se	Tl	V	Zn								
ICIS 160-123642/1	1		10:24	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
IC 160-123642/2			10:28	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
IC 160-123642/3			10:32	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
IC 160-123642/4			10:36	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
ICV 160-123642/5	1		10:40	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
ICB 160-123642/6	1		10:44	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
CRI 160-123642/7	1		10:48	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
ICSA 160-123642/8	1		10:51	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
ICSAB 160-123642/9	1		10:55	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
LRC 160-123642/10	1		10:59	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
CCV 160-123642/11	1		11:03	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
CCB 160-123642/12	1		11:07	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
ZZZZZZ			11:11																														
ZZZZZZ			11:15																														
ZZZZZZ			11:19																														
ZZZZZZ			11:22																														
ZZZZZZ			11:26																														
ZZZZZZ			11:30																														
ZZZZZZ			11:34																														
ZZZZZZ			11:37																														
ZZZZZZ			11:41																														
CCV 160-123642/22			11:45																														
CCB 160-123642/23			11:48																														
ZZZZZZ			12:00																														
ZZZZZZ			12:04																														
ZZZZZZ			12:07																														
ZZZZZZ			12:11																														
ZZZZZZ			12:15																														
ZZZZZZ			12:19																														
ZZZZZZ			12:22																														
ZZZZZZ			12:26																														
ZZZZZZ			12:30																														
ZZZZZZ			12:34																														
CCV 160-123642/34	1		12:37	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
CCB 160-123642/35	1		12:41	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
MB 160-122863/1-A	1	T	12:45	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
LCS 160-122863/2-A	1	T	12:49	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
ZZZZZZ			12:53																														
ZZZZZZ			12:56																														
ZZZZZZ			13:00																														
ZZZZZZ			13:04																														
ZZZZZZ			13:07																														

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Instrument ID: ICP6500 Analysis Method: 6010C

Start Date: 05/22/2014 10:24 End Date: 05/22/2014 20:41

Lab Sample Id	D/F	Type	Time	Analytes																											
				Ag	Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	Sb	Se	Tl	V	Zn						
ZZZZZZ			13:11																												
160-6694-7	1	T	13:15	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
ZZZZZZ			13:19																												
CCV 160-123642/46	1		13:23	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
CCB 160-123642/47	1		13:27	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
ZZZZZZ			13:31																												
ZZZZZZ			13:34																												
ZZZZZZ			13:38																												
ZZZZZZ			13:42																												
ZZZZZZ			13:46																												
ZZZZZZ			13:50																												
ZZZZZZ			13:54																												
ZZZZZZ			13:58																												
ZZZZZZ			14:02																												
ZZZZZZ			14:06																												
CCV 160-123642/58			14:10																												
CCB 160-123642/59			14:14																												
ZZZZZZ			14:18																												
ZZZZZZ			14:22																												
ZZZZZZ			14:26																												
ZZZZZZ			14:29																												
ZZZZZZ			14:33																												
ZZZZZZ			14:37																												
ZZZZZZ			14:41																												
ZZZZZZ			14:44																												
ZZZZZZ			14:48																												
ZZZZZZ			14:52																												
CCV 160-123642/70	1		14:56	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
CCB 160-123642/71	1		15:00	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
ZZZZZZ			15:04																												
ZZZZZZ			15:08																												
ZZZZZZ			15:12																												
ZZZZZZ			15:16																												
ZZZZZZ			15:20																												
MB 160-122752/1-A	1	T	15:24	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
LCSSRM 160-122752/2-A	2	T	15:28	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
160-6694-1	10	T	15:31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
160-6694-1 SD	50	T	15:35	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
160-6694-1 MS	10	T	15:39	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
CCV 160-123642/82	1		15:43	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
CCB 160-123642/83	1		15:46	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
160-6694-1 MSD	10	T	15:50	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Instrument ID: ICP6500 Analysis Method: 6010C

Start Date: 05/22/2014 10:24 End Date: 05/22/2014 20:41

Lab Sample Id	D/F	Type	Time	Analytes																											
				Ag	Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	Sb	Se	Tl	V	Zn						
160-6694-2	10	T	15:54	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
160-6694-3	10	T	15:58	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
160-6694-4	10	T	16:02	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
160-6694-5	10	T	16:06	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
160-6694-6	10	T	16:10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
ZZZZZZ			16:13																												
ZZZZZZ			16:17																												
ZZZZZZ			16:21																												
ZZZZZZ			16:25																												
CCV 160-123642/94	1		16:29	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
CCB 160-123642/95	1		16:33	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
ZZZZZZ			16:37																												
ZZZZZZ			16:41																												
ZZZZZZ			16:44																												
ZZZZZZ			16:48																												
ZZZZZZ			16:52																												
ZZZZZZ			16:55																												
ZZZZZZ			16:59																												
ZZZZZZ			17:03																												
ZZZZZZ			17:06																												
ZZZZZZ			17:10																												
CCV 160-123642/106			17:14																												
CCB 160-123642/107			17:18																												
ZZZZZZ			17:22																												
ZZZZZZ			17:25																												
ZZZZZZ			17:29																												
ZZZZZZ			17:33																												
ZZZZZZ			17:37																												
ZZZZZZ			17:40																												
ZZZZZZ			17:44																												
ZZZZZZ			17:48																												
ZZZZZZ			17:52																												
ZZZZZZ			17:55																												
CCV 160-123642/118			17:59																												
CCB 160-123642/119			18:03																												
ZZZZZZ			18:07																												
ZZZZZZ			18:10																												
ZZZZZZ			18:14																												
ZZZZZZ			18:18																												
ZZZZZZ			18:22																												
ZZZZZZ			18:25																												
ZZZZZZ			18:29																												

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Instrument ID: ICP6500 Analysis Method: 6010C

Start Date: 05/22/2014 10:24 End Date: 05/22/2014 20:41

Lab Sample Id	D/F	Type	Time	Analytes																											
				Ag	Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	Sb	Se	Tl	V	Zn				
ZZZZZZ			18:33																												
ZZZZZZ			18:36																												
ZZZZZZ			18:40																												
CCV 160-123642/130			18:44																												
CCB 160-123642/131			18:48																												
ZZZZZZ			18:52																												
ZZZZZZ			18:56																												
ZZZZZZ			19:00																												
ZZZZZZ			19:03																												
ZZZZZZ			19:07																												
ZZZZZZ			19:11																												
ZZZZZZ			19:15																												
ZZZZZZ			19:18																												
ZZZZZZ			19:22																												
ZZZZZZ			19:26																												
CCV 160-123642/142			19:30																												
CCB 160-123642/143			19:33																												
ZZZZZZ			19:37																												
ZZZZZZ			19:41																												
ZZZZZZ			19:45																												
ZZZZZZ			19:49																												
ZZZZZZ			19:53																												
ZZZZZZ			19:56																												
ZZZZZZ			20:00																												
ZZZZZZ			20:04																												
ZZZZZZ			20:08																												
ZZZZZZ			20:11																												
CCV 160-123642/154			20:15																												
CCB 160-123642/155			20:19																												
ZZZZZZ			20:23																												
ZZZZZZ			20:27																												
ZZZZZZ			20:30																												
ZZZZZZ			20:34																												
CCV 160-123642/160			20:38																												
CCB 160-123642/161			20:41																												

Prep Types:
T = Total/NA

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Instrument ID: HAA2 Analysis Method: 7470A

Start Date: 05/27/2014 10:10 End Date: 05/27/2014 10:13

Lab Sample Id	D/F	Type	Time	Analytes																								
				Hg																								
IC 160-123936/1			10:10	X																								
IC 160-123936/2			10:10	X																								
IC 160-123936/3			10:10	X																								
IC 160-123936/4			10:10	X																								
IC 160-123936/5			10:10	X																								
IC 160-123936/6			10:10	X																								
ICV 160-123936/7	1		10:10	X																								
ICB 160-123936/8	1		10:10	X																								
MB 160-123407/1-A	1	T	10:12	X																								
LCS 160-123407/2-A	1	T	10:12	X																								
160-6694-7	1	T	10:12	X																								
160-6694-7 SD	5	T	10:12	X																								
160-6694-7 MS	1	T	10:12	X																								
160-6694-7 MSD	1	T	10:12	X																								
ZZZZZZ			10:12																									
ZZZZZZ			10:12																									
ZZZZZZ			10:12																									
ZZZZZZ			10:12																									
CCV 160-123936/19	1		10:12	X																								
CCB 160-123936/20	1		10:13	X																								
ZZZZZZ			10:13																									
ZZZZZZ			10:13																									
ZZZZZZ			10:13																									
ZZZZZZ			10:13																									
ZZZZZZ			10:13																									
ZZZZZZ			10:13																									
ZZZZZZ			10:13																									
ZZZZZZ			10:13																									
ZZZZZZ			10:13																									
ZZZZZZ			10:13																									
CCV 160-123936/31			10:13																									
CCB 160-123936/32			10:13																									
ZZZZZZ			10:13																									
ZZZZZZ			10:13																									
CCV 160-123936/35			10:13																									
CCB 160-123936/36			10:13																									

Prep Types:
T = Total/NA

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Instrument ID: HAA2 Analysis Method: 7471B

Start Date: 05/28/2014 09:02 End Date: 05/28/2014 10:00

Lab Sample Id	D/F	Type	Time	Analytes																								
				Hg																								
IC 160-124146/1			09:02	X																								
IC 160-124146/2			09:04	X																								
IC 160-124146/3			09:05	X																								
IC 160-124146/4			09:07	X																								
IC 160-124146/5			09:10	X																								
IC 160-124146/6			09:12	X																								
ICV 160-124146/7	1		09:14	X																								
ICB 160-124146/8	1		09:17	X																								
MB 160-123919/1-A	1	T	09:31	X																								
LCSSRM 160-123919/2-A	10	T	09:33	X																								
160-6694-1	1	T	09:35	X																								
160-6694-2	1	T	09:37	X																								
160-6694-3	1	T	09:39	X																								
160-6694-4	1	T	09:41	X																								
160-6694-5	1	T	09:43	X																								
160-6694-6	1	T	09:45	X																								
160-6694-6 SD	5	T	09:47	X																								
160-6694-6 MS	1	T	09:49	X																								
CCV 160-124146/19	1		09:51	X																								
CCB 160-124146/20	1		09:53	X																								
160-6694-6 MSD	1	T	09:56	X																								
CCV 160-124146/22	1		09:58	X																								
CCB 160-124146/23	1		10:00	X																								

Prep Types:
T = Total/NA

FORM XIII-IN

FC 5/23/14

ABATCH: 123642

File: 052214C1

	Pos ID	Rack	Row	Col	Type	Samplename	Comment	Custom ID1	Custom ID2	Custom ID3
1	1001	3	1	1	Unk	~~160-6588-D-7-A~~	~~DF=2~~			
2	1002	3	1	2	Unk	MB 160-119594/1-A				
3	1003	3	1	3	Unk	LCS 160-119594/2-				
4	1004	3	1	4	Unk	160-6426-A-1-B	DF=5			
5	1005	3	1	5	Unk	160-6426-A-1-B SD	DF=25			
6	1006	3	1	6	Unk	160-6426-A-1-C MS	DF=5			
7	1007	3	1	7	Unk	160-6426-A-1-D MS	DF=5			
8	1008	3	1	8	Unk	160-6426-A-2-B	DF=5			
9	1009	3	1	9	Unk	~~160-6426-A-2-B PD~~	~~DF=5~~			
10	1010	3	1	10	Unk	MB 160-122861/1-A				
11	1011	3	1	11	Unk	~~LCS 160-122861/2-~~				
12	1012	3	1	12	Unk	160-6677-D-2-A				
13	1013	3	1	13	Unk	160-6677-D-2-A SD	DF=5			
14	1014	3	1	14	Unk	160-6677-D-2-B MS				
15	1015	3	1	15	Unk	160-6677-D-2-C MS				
16	1016	3	2	1	Unk	160-6677-A-3-A				
17	1017	3	2	2	Unk	160-6677-D-6-A				
18	1018	3	2	3	Unk	160-6677-D-8-A				
19	1019	3	2	4	Unk	160-6677-C-11-A				
20	1020	3	2	5	Unk	MB 160-122863/1-A				
21	1021	3	2	6	Unk	LCS 160-122863/2-				
22	1022	3	2	7	Unk	160-6679-E-2-A				
23	1023	3	2	8	Unk	160-6679-E-2-A SD	DF=5			
24	1024	3	2	9	Unk	160-6679-E-2-B MS				
25	1025	3	2	10	Unk	160-6679-E-2-C MS				
26	1026	3	2	11	Unk	160-6679-E-4-A				
27	1027	3	2	12	Unk	160-6679-E-6-A				
28	1028	3	2	13	Unk	160-6694-F-7-A				
29	1029	3	2	14	Unk	LB 160-122888/1-B				
30	1030	3	2	15	Unk	LCS 160-123177/2-				
31	1031	3	3	1	Unk	160-6690-A-1-C				
32	1032	3	3	2	Unk	160-6690-A-1-C SD	DF=5			
33	1033	3	3	3	Unk	160-6690-A-1-D MS				
34	1034	3	3	4	Unk	160-6690-A-1-E MS				
35	1035	3	3	5	Unk	160-6690-A-2-C				
36	1036	3	3	6	Unk	160-6690-A-3-C				
37	1037	3	3	7	Unk	160-6690-A-4-C				
38	1038	3	3	8	Unk	160-6690-A-5-C				
39	1039	3	3	9	Unk	160-6690-A-6-C				
40	1040	3	3	10	Unk	160-6690-A-7-C				
41	1041	3	3	11	Unk	MB 160-122875/1-A				
42	1042	3	3	12	Unk	LCS 160-122875/2-				
43	1043	3	3	13	Unk	160-6714-D-1-A	DF=10			
44	1044	3	3	14	Unk	160-6714-D-1-A SD	DF=50			
45	1045	3	3	15	Unk	160-6714-D-1-B MS	DF=10			
46	1046	3	4	1	Unk	160-6714-D-1-C MS	DF=10			
47	1047	3	4	2	Unk	~~160-6714-H-2-A~~	~~DF=10~~			
48	1048	3	4	3	Unk	160-6714-H-3-A	DF=10			
49	1049	3	4	4	Unk	160-6714-H-4-A	DF=10			
50	1050	3	4	5	Unk	160-6714-H-5-A	DF=10			
51	1051	3	4	6	Unk	160-6714-H-6-A	DF=10			
52	1052	3	4	7	Unk	~~160-6714-H-7-A~~	~~DF=10~~			
53	1053	3	4	8	Unk	160-6714-H-8-A	DF=10			
54	1054	3	4	9	Unk	160-6714-H-9-A	DF=10			
55	1055	3	4	10	Unk	MB 160-122752/1-A				
56	1056	3	4	11	Unk	LCSSRM 160-12275	DF=2			
57	1057	3	4	12	Unk	160-6694-C-1-A	DF=10			
58	1058	3	4	13	Unk	160-6694-C-1-A SD	DF=50			
59	1059	3	4	14	Unk	160-6694-C-1-B MS	DF=10			
60	1060	3	4	15	Unk	160-6694-C-1-C MS	DF=10			
61	1061	3	5	1	Unk	160-6694-C-2-A	DF=10			
62	1062	3	5	2	Unk	160-6694-C-3-A	DF=10			
63	1063	3	5	3	Unk	160-6694-C-4-A	DF=10			

Already reported

- All

No Rerun

- All

- All

- All

rerun w/o Dilution

- All

rerun w/o Dilution

- All

- All

	Pos ID	Rack	Row	Col	Type	Samplename	Comment	Custom ID1	Custom ID2	Custom ID3
64	1064	3	5	4	Unk	160-6694-C-5-A	DF=10			
65	1065	3	5	5	Unk	160-6694-C-6-A	DF=10			
66	1066	3	5	6	Unk	160-6681-D-1-B	DF=10			
67	1067	3	5	7	Unk	LB 160-122248/1-B				
68	1068	3	5	8	Unk	LCS 160-122858/2-				
69	1069	3	5	9	Unk	160-6629-A-1-C				
70	1070	3	5	10	Unk	160-6629-A-1-C SD	DF=5			
71	1071	3	5	11	Unk	160-6629-A-1-D MS				
72	1072	3	5	12	Unk	160-6629-A-1-E MS				
73	1073	3	5	13	Unk	MB 160-123123/1-A				
74	1074	3	5	14	Unk	LCSSRM 160-12312	DF=2			
75	1075	3	5	15	Unk	160-6669-A-1-E	DF=10			
76	1076	3	6	1	Unk	160-6669-A-1-E SD	DF=50			
77	1077	3	6	2	Unk	160-6669-A-2-D	DF=10			
78	1078	3	6	3	Unk	160-6669-A-3-D	DF=10			
79	1079	3	6	4	Unk	160-6669-A-4-D	DF=10			
80	1080	3	6	5	Unk	160-6669-A-5-D	DF=10			
81	1081	3	6	6	Unk	160-6669-A-6-D	DF=10			
82	1082	3	6	7	Unk	160-6669-A-7-D	DF=10			
83	1083	3	6	8	Unk	160-6669-A-8-D	DF=10			
84	1084	3	6	9	Unk	160-6669-A-9-D	DF=10			
85	1085	3	6	10	Unk	160-6669-A-10-D	DF=10			
86	1086	3	6	11	Unk	160-6669-A-11-D	DF=10			
87	1087	3	6	12	Unk	160-6669-A-12-D	DF=10			
88	1088	3	6	13	Unk	160-6669-A-13-D	DF=10			
89	1089	3	6	14	Unk	160-6669-A-14-D	DF=10			
90	1090	3	6	15	Unk	160-6669-A-15-D	DF=10			
91	2001	4	1	1	Unk	160-6669-A-16-D	DF=10			
92	2002	4	1	2	Unk	160-6669-A-17-D	DF=10			
93	2003	4	1	3	Unk	160-6669-A-18-D	DF=10			
94	2004	4	1	4	Unk	160-6669-A-19-D	DF=10			
95	2005	4	1	5	Unk	160-6669-A-20-D	DF=10			
96	2006	4	1	6	Unk	MB 160-122573/1-A				
97	2007	4	1	7	Unk	LCSSRM 160-12257	DF=2			
98	2008	4	1	8	Unk	160-6651-H-1-A	DF=2			
99	2009	4	1	9	Unk	160-6651-H-1-A SD	DF=10			
100	2010	4	1	10	Unk	160-6651-H-3-A	DF=2			
101	2011	4	1	11	Unk	160-6672-A-8-A	DF=20			
102	2012	4	1	12	Unk	160-6672-A-9-A	DF=20			
103	2013	4	1	13	Unk	160-6672-A-10-A	DF=20			
104	2014	4	1	14	Unk	160-6672-A-11-A	DF=20			
105	2015	4	1	15	Unk	MB 160-122574/1-A				
106	2016	4	2	1	Unk	LCSSRM 160-12257	DF=2			
107	2017	4	2	2	Unk	160-6672-A-1-A	DF=20			
108	2018	4	2	3	Unk	160-6672-A-1-A SD	DF=100			
109	2019	4	2	4	Unk	160-6672-A-1-B MS	DF=20			
110	2020	4	2	5	Unk	160-6672-A-1-C MS	DF=20			
111	2021	4	2	6	Unk	160-6672-A-2-A	DF=20			
112	2022	4	2	7	Unk	160-6672-A-3-A	DF=20			
113	2023	4	2	8	Unk	160-6672-A-4-A	DF=20			
114	2024	4	2	9	Unk	160-6672-A-5-A	DF=20			
115	2025	4	2	10	Unk	160-6672-A-6-A	DF=20			
116	2026	4	2	11	Unk	160-6672-A-7-A	DF=20			
117	2027	4	2	12	Unk	MB 160-123259/1-A				
118	2028	4	2	13	Unk	LCSSRM 160-12325	DF=2			
119	2029	4	2	14	Unk	160-6698-D-1-B	DF=2			
120	2030	4	2	15	Unk	160-6698-D-1-B SD	DF=10			
121	2031	4	3	1	Unk	160-6698-D-1-C MS	DF=2			
122	2032	4	3	2	Unk	160-6698-D-1-D MS	DF=2			
123	2033	4	3	3	Unk	160-6698-D-2-B	DF=2			

Element, Wavelength and Order	Date of Fit	Date of Cal.	Type of Fit	Weighting	A0	A1	A2	n (Exponent)
Ag 328.068 {103}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	-0.000260	1.175092	0.000000	1.000000
Al 396.152 { 85}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.000346	0.221598	0.000000	1.000000
As 189.042 {478}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	-0.000054	0.053376	0.000000	1.000000
B 249.678 {135}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.000544	0.116070	0.000000	1.000000
Ba 455.403 { 74}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.019573	14.980559	0.000000	1.000000
Be 313.042 {108}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.000591	13.564703	0.000000	1.000000
Bi 223.061 {451}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.000101	0.060177	0.000000	1.000000
Ca 184.006 {483}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.000080	0.089777	0.000000	1.000000
Cd 228.802 {447}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	-0.000028	0.945001	0.000000	1.000000
Co 228.616 {448}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	-0.000096	0.325702	0.000000	1.000000
Cr 283.563 {119}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.001339	0.153639	0.000000	1.000000
Cu 217.894 {455}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.000151	0.080356	0.000000	1.000000
Fe 259.940 {130}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.000166	0.200482	0.000000	1.000000
K 766.490 { 44}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.001608	0.161371	0.000000	1.000000
Li 670.784 { 50}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	-0.010541	5.034046	0.000000	1.000000
Mg 279.806 {121}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	-0.000903	0.030621	0.000000	1.000000
Mn 257.610 {131}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	-0.000140	1.223193	0.000000	1.000000
Mo 202.030 {467}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.000017	0.398520	0.000000	1.000000
Na 589.592 { 57}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	-0.035893	0.557215	0.000000	1.000000
Ni 221.647 {452}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.000148	0.487103	0.000000	1.000000
P 177.495 {490}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.000034	0.052522	0.000000	1.000000
Pb 220.353 {453}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	-0.000280	0.104911	0.000000	1.000000
S 182.034 {485}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.000050	0.030111	0.000000	1.000000
Sb 206.833 {463}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.000222	0.068821	0.000000	1.000000
Se 196.090 {472}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.000100	0.038173	0.000000	1.000000
Si 251.611 {134}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.001872	0.060034	0.000000	1.000000
Sn 189.989 {478}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.000048	0.109727	0.000000	1.000000
Sr 407.771 { 83}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	-0.002959	20.915485	0.000000	1.000000
Th 283.231 {119}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.001851	0.078060	0.000000	1.000000
Ti 334.941 {101}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.002039	1.207626	0.000000	1.000000
Tl 190.856 {477}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	-0.000165	0.060274	0.000000	1.000000
U 367.007 { 92}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.021812	0.082120	0.000000	1.000000
V 290.882 {116}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	-0.000524	0.200259	0.000000	1.000000
Y 371.030 { 91}*	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	1.000000	0.000000	0.000000	1.000000
Zn 213.856 {458}	5/22/2014 10:40:09	5/22/2014 10:40:09	Linear	1/Conc	0.000529	0.483150	0.000000	1.000000

Element, Wavelength and Order	Correlation	Std Error of Est	Predicted MDL	Predicted MQL	Status	Reslope		QC Norm	
						Slope	Y-int	Slope factor	Offset
Ag 328.068 {103}	0.999858	0.000155	0.000514	0.001714	OK.	1.000000	0.000000	1	0
Al 396.152 { 85}	0.999672	0.001393	0.005530	0.018433	OK.	1.000000	0.000000	1	0
As 189.042 {478}	0.999977	0.000006	0.001248	0.004160	OK.	1.000000	0.000000	1	0
B 249.678 {135}	0.999100	0.000269	0.002647	0.008824	OK.	1.000000	0.000000	1	0
Ba 455.403 { 74}	0.999774	0.012349	0.000109	0.000362	OK.	1.000000	0.000000	1	0
Be 313.042 {108}	0.999994	0.000566	0.000036	0.000121	OK.	1.000000	0.000000	1	0
Bi 223.061 {451}	0.999902	0.000066	0.001851	0.006170	OK.	1.000000	0.000000	1	0
Ca 184.006 {483}	0.999774	0.001048	0.000732	0.002442	OK.	1.000000	0.000000	1	0
Cd 228.802 {447}	0.999994	0.000039	0.000118	0.000394	OK.	1.000000	0.000000	1	0
Co 228.616 {448}	0.999903	0.000176	0.000270	0.000902	OK.	1.000000	0.000000	1	0
Cr 283.563 {119}	0.999973	0.000020	0.000736	0.002454	OK.	1.000000	0.000000	1	0
Cu 217.894 {455}	0.999976	0.000015	0.001315	0.004385	OK.	1.000000	0.000000	1	0
Fe 259.940 {130}	0.999993	0.000128	0.001531	0.005105	OK.	1.000000	0.000000	1	0
K 766.490 { 44}	0.999637	0.005412	0.015663	0.052209	OK.	1.000000	0.000000	1	0
Li 670.784 { 50}	0.999412	0.006698	0.000526	0.001753	OK.	1.000000	0.000000	1	0
Mg 279.806 {121}	0.999892	0.000246	0.012176	0.040586	OK.	1.000000	0.000000	1	0
Mn 257.610 {131}	0.999995	0.000085	0.000271	0.000903	OK.	1.000000	0.000000	1	0
Mo 202.030 {467}	0.999936	0.000070	0.000197	0.000658	OK.	1.000000	0.000000	1	0
Na 589.592 { 57}	0.999584	0.008832	0.004755	0.015851	OK.	1.000000	0.000000	1	0
Ni 221.647 {452}	0.999881	0.000260	0.000246	0.000821	OK.	1.000000	0.000000	1	0
P 177.495 {490}	0.999771	0.000308	0.001249	0.004165	OK.	1.000000	0.000000	1	0
Pb 220.353 {453}	0.999899	0.000026	0.000986	0.003288	OK.	1.000000	0.000000	1	0
S 182.034 {485}	0.999953	0.000364	0.002081	0.006938	OK.	1.000000	0.000000	1	0
Sb 206.833 {463}	0.999957	0.000005	0.001438	0.004792	OK.	1.000000	0.000000	1	0
Se 196.090 {472}	0.999936	0.000004	0.001920	0.006401	OK.	1.000000	0.000000	1	0
Si 251.611 {134}	0.999913	0.000088	0.005301	0.017671	OK.	1.000000	0.000000	1	0
Sn 189.989 {478}	0.999878	0.000094	0.000543	0.001809	OK.	1.000000	0.000000	1	0
Sr 407.771 { 83}	1.000000	0.000155	0.000049	0.000163	OK.	1.000000	0.000000	1	0
Th 283.231 {119}	0.999985	0.000033	0.003391	0.011304	OK.	1.000000	0.000000	1	0
Ti 334.941 {101}	0.999989	0.000136	0.000571	0.001904	OK.	1.000000	0.000000	1	0
Tl 190.856 {477}	0.999708	0.000016	0.001281	0.004270	OK.	1.000000	0.000000	1	0
U 367.007 { 92}	0.999966	0.000099	0.008891	0.029637	OK.	1.000000	0.000000	1	0
V 290.882 {116}	0.999996	0.000023	0.002718	0.009060	OK.	1.000000	0.000000	1	0
Y 371.030 { 91}*	0.000000	0.000000	-1.000000	-1.000000	Warnin	1.000000	0.000000	1	0
Zn 213.856 {458}	0.999975	0.000085	0.000135	0.000450	OK.	1.000000	0.000000	1	0

Sample Name: CALBLK1 Acquired: 5/22/2014 10:24:42 Type: Cal
Method: 2014v3(v93) Mode: IR Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	**-.0003**	**.0003**	**-.0001**	**.0006**	**.0196**	**.0006**	**.0001**	**.0001**	**.0000**
Stddev	.0005	.0007	.0001	.0003	.0019	.0002	.0001	.0001	.000
%RSD	205.8	213.0	225.4	50.03	9.828	28.05	146.3	109.9	270.1
#1	.0004	.0002	.0001	.0008	.0184	.0005	.0002	.0000	.0000
#2	-.0006	-.0003	-.0002	.0005	.0185	.0008	.0002	.0000	.0001
#3	-.0005	.0012	.0000	.0003	.0218	.0005	-.0001	.0001	-.0001

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	**-.0001**	**.0013**	**.0002**	**.0002**	**.0017**	**-.0105**	**-.0009**	**-.0001**	**.0000**
Stddev	.0001	.0000	.0001	.0000	.0021	.0014	.0004	.0001	.0000
%RSD	71.23	.9805	52.87	16.48	128.4	12.87	44.68	102.1	162.7
#1	.0000	.0013	.0002	.0002	.0038	-.0116	-.0010	-.0002	.0000
#2	-.0002	.0013	.0001	.0001	-.0005	-.0090	-.0012	-.0003	.0000
#3	-.0001	.0014	.0002	.0002	.0017	-.0110	-.0005	.0000	.0000

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	**-.0358**	**.0001**	**.0000**	**-.0003**	**.0000**	**.0002**	**.0001**	**.0019**	**.0000**
Stddev	.0032	.0000	.0000	.0001	.0000	.0001	.0000	.0004	.0001
%RSD	9.001	10.02	107.1	34.54	89.55	47.53	8.859	21.52	183.6
#1	-.0392	.0001	.0001	-.0003	.0001	.0001	.0001	.0021	.0000
#2	-.0356	.0002	.0000	-.0004	.0000	.0003	.0001	.0014	.0000
#3	-.0328	.0001	.0000	-.0002	.0000	.0003	.0001	.0021	.0001

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	**-.0030**	**.0019**	**.0020**	**-.0002**	**.0218**	**-.0005**	**.0005**
Stddev	.0014	.0001	.0005	.0001	.0008	.0001	.0000
%RSD	46.47	6.277	23.03	44.77	3.707	15.97	5.640
#1	-.0045	.0017	.0023	-.0001	.0220	-.0005	.0005
#2	-.0025	.0019	.0015	-.0002	.0225	-.0004	.0005
#3	-.0019	.0019	.0024	-.0002	.0209	-.0006	.0005

Sample Name: CALBLK1 Acquired: 5/22/2014 10:24:42 Type: Cal
Method: 2014v3(v93) Mode: IR Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Int. Std.	Y_3710
Units	Cts/S
Avg	5869.3
Stddev	4.6
%RSD	.07889
#1	5874.6
#2	5866.3
#3	5866.9

Sample Name: CAL 1 Acquired: 5/22/2014 10:28:38 Type: Cal
Method: 2014v3(v93) Mode: IR Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	**.0124**	**.0427**	**.0004**	**.0064**	**.7697**	**.0720**	**.0134**	**.1056**	**.0048**
Stddev	.0007	.0006	.0001	.0003	.0009	.0008	.0001	.0002	.0001
%RSD	5.356	1.427	13.88	4.270	.1124	1.173	.7073	.1901	2.982
#1	.0129	.0431	.0004	.0062	.7698	.0710	.0133	.1054	.0047
#2	.0117	.0420	.0005	.0067	.7687	.0726	.0135	.1057	.0048
#3	.0128	.0429	.0005	.0062	.7704	.0723	.0135	.1057	.0050

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	**.0187**	**.0030**	**.0022**	**.0221**	**.7738**	**.2366**	**.0291**	**.0200**	**.0173**
Stddev	.0002	.0000	.0000	.0001	.0024	.0016	.0005	.0004	.0003
%RSD	.9058	1.228	.6001	.6049	.3155	.6629	1.683	2.137	1.808
#1	.0187	.0030	.0023	.0220	.7732	.2353	.0291	.0195	.0170
#2	.0186	.0031	.0022	.0222	.7716	.2361	.0286	.0202	.0172
#3	.0189	.0031	.0022	.0222	.7764	.2384	.0296	.0203	.0176

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	**.4883**	**.0230**	**.0148**	**.0010**	**.1532**	**.0008**	**.0006**	**.0249**	**.0124**
Stddev	.0052	.0002	.0002	.0000	.0020	.0001	.0001	.0001	.0001
%RSD	1.066	1.008	1.040	.4046	1.297	7.852	16.72	.4737	.6711
#1	.4880	.0227	.0147	.0010	.1512	.0008	.0006	.0250	.0124
#2	.4833	.0230	.0148	.0010	.1532	.0008	.0005	.0248	.0123
#3	.4937	.0232	.0150	.0010	.1551	.0009	.0008	.0248	.0124

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	**.1056**	**.0179**	**.0264**	**.0013**	**.0671**	**.0091**	**.0112**
Stddev	.0006	.0003	.0003	.0000	.0013	.0003	.0001
%RSD	.6023	1.675	1.061	3.564	1.869	2.959	.8692
#1	.1049	.0176	.0265	.0014	.0660	.0088	.0112
#2	.1062	.0178	.0261	.0013	.0669	.0094	.0111
#3	.1057	.0182	.0266	.0013	.0684	.0092	.0113

Sample Name: CAL 1 Acquired: 5/22/2014 10:28:38 Type: Cal
Method: 2014v3(v93) Mode: IR Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Int. Std.	Y_3710
Units	Cts/S
Avg	5779.7
Stddev	24.6
%RSD	.42618
#1	5799.4
#2	5752.1
#3	5787.6

Sample Name: Cal 2 Acquired: 5/22/2014 10:32:31 Type: Cal
Method: 2014v3(v93) Mode: IR Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	**1.156**	**10.69**	**.2641**	**.5696**	**72.67**	**68.12**	**.2976**	**4.584**	**4.707**
Stddev	.005	.03	.0009	.0028	.21	.17	.0016	.014	.017
%RSD	.4449	.2468	.3579	.4891	.2908	.2426	.5252	.3067	.3635
#1	1.160	10.67	.2652	.5728	72.86	68.12	.2994	4.597	4.727
#2	1.159	10.72	.2634	.5678	72.69	68.28	.2969	4.569	4.697
#3	1.150	10.68	.2638	.5681	72.44	67.95	.2965	4.584	4.697

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	**1.655**	**.7811**	**.3981**	**10.06**	**7.783**	**23.94**	**1.493**	**6.125**	**.4014**
Stddev	.004	.0005	.0020	.03	.034	.22	.010	.027	.0017
%RSD	.2510	.0662	.4939	.3273	.4410	.8992	.6678	.4472	.4331
#1	1.659	.7812	.4003	10.10	7.754	23.73	1.504	6.157	.4033
#2	1.654	.7806	.3973	10.04	7.821	24.16	1.485	6.111	.4011
#3	1.651	.7816	.3966	10.05	7.773	23.92	1.489	6.107	.3998

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	**26.71**	**2.478**	**2.703**	**.5347**	**1.485**	**.0691**	**.0375**	**.2975**	**.5577**
Stddev	.15	.008	.008	.0022	.007	.0005	.0001	.0016	.0016
%RSD	.5760	.3122	.3001	.4025	.5014	.7388	.1881	.5355	.2876
#1	26.56	2.487	2.712	.5371	1.493	.0696	.0376	.2978	.5590
#2	26.87	2.472	2.698	.5337	1.480	.0691	.0375	.2990	.5559
#3	26.70	2.475	2.698	.5332	1.481	.0686	.0375	.2958	.5581

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	**104.7**	**.3914**	**6.001**	**.0630**	**.5036**	**1.003**	**2.462**
Stddev	.6	.0027	.002	.0004	.0019	.005	.009
%RSD	.5543	.6774	.0256	.6810	.3791	.5483	.3657
#1	104.1	.3942	6.002	.0634	.5047	1.008	2.472
#2	105.3	.3911	6.002	.0630	.5046	1.003	2.459
#3	104.7	.3889	5.999	.0625	.5014	.9971	2.455

Sample Name: Cal 2 Acquired: 5/22/2014 10:32:31 Type: Cal
Method: 2014v3(v93) Mode: IR Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Int. Std.	Y_3710
Units	Cts/S
Avg	5748.2
Stddev	3.4
%RSD	.05866
#1	5744.7
#2	5748.5
#3	5751.4

Sample Name: Cal 3 Acquired: 5/22/2014 10:36:21 Type: Cal
Method: 2014v3(v93) Mode: IR Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	**2.398**	**22.58**	**.5357**	**1.166**	**152.1**	**135.3**	**.6040**	**8.867**	**9.479**
Stddev	.011	.11	.0006	.004	.6	1.7	.0007	.017	.020
%RSD	.4646	.5055	.1137	.3388	.4179	1.232	.1110	.1929	.2071
#1	2.392	22.64	.5352	1.162	152.2	136.8	.6046	8.858	9.467
#2	2.391	22.66	.5355	1.170	151.4	133.5	.6033	8.857	9.469
#3	2.411	22.45	.5364	1.166	152.7	135.6	.6042	8.887	9.502

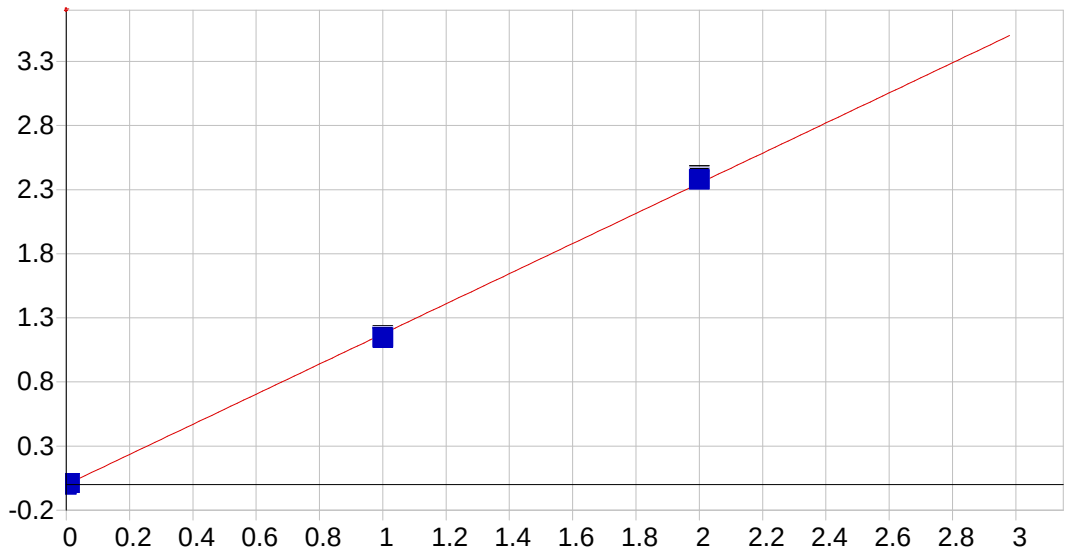
Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	**3.236**	**1.540**	**.8075**	**20.01**	**16.46**	**51.56**	**3.082**	**12.22**	**.7929**
Stddev	.004	.004	.0010	.03	.08	.44	.007	.01	.0010
%RSD	.1211	.2560	.1178	.1327	.4981	.8598	.2234	.1078	.1208
#1	3.239	1.537	.8071	19.99	16.47	51.61	3.086	12.24	.7929
#2	3.232	1.540	.8068	19.99	16.54	51.97	3.074	12.21	.7919
#3	3.237	1.545	.8086	20.04	16.38	51.09	3.086	12.22	.7938

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	**56.83**	**4.826**	**5.174**	**1.039**	**3.029**	**.1405**	**.0766**	**.6077**	**1.087**
Stddev	1.43	.010	.012	.002	.005	.0003	.0002	.0014	.001
%RSD	2.508	.2008	.2240	.1916	.1528	.1939	.2514	.2298	.1302
#1	58.40	4.818	5.183	1.038	3.028	.1403	.0767	.6091	1.086
#2	56.47	4.823	5.161	1.039	3.026	.1406	.0764	.6078	1.087
#3	55.62	4.836	5.178	1.041	3.035	.1408	.0768	.6063	1.089

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	**209.2**	**.7848**	**12.12**	**.1218**	**.9944**	**2.010**	**4.858**
Stddev	1.0	.0034	.02	.0004	.0046	.004	.005
%RSD	.4609	.4393	.1651	.3344	.4601	.2130	.0986
#1	209.4	.7824	12.14	.1223	.9897	2.006	4.858
#2	208.2	.7833	12.11	.1215	.9945	2.010	4.853
#3	210.1	.7888	12.10	.1217	.9989	2.015	4.862

Sample Name: Cal 3 Acquired: 5/22/2014 10:36:21 Type: Cal
Method: 2014v3(v93) Mode: IR Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Int. Std.	Y_3710
Units	Cts/S
Avg	5521.2
Stddev	13.2
%RSD	.23943
#1	5531.1
#2	5526.3
#3	5506.2

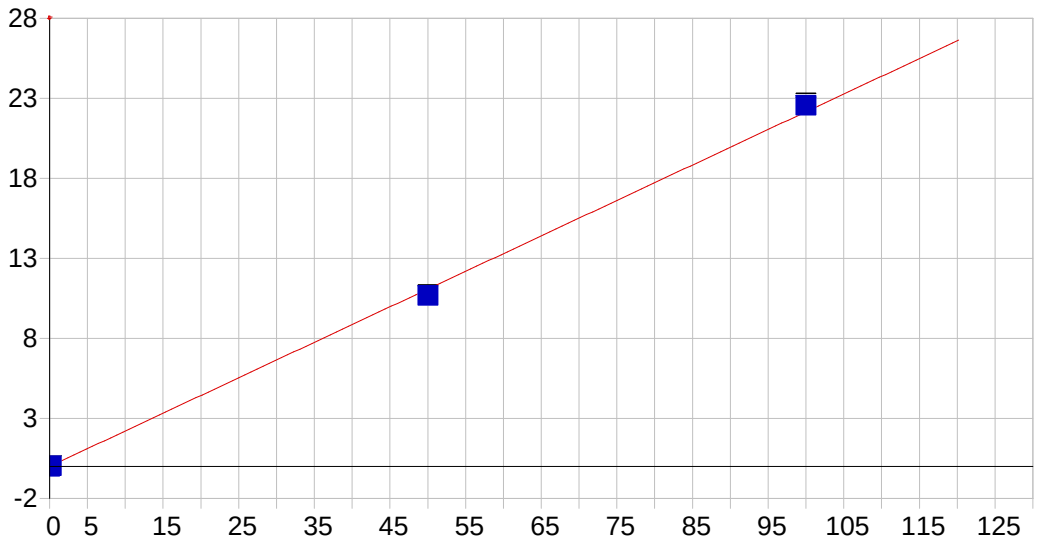


Ag 328.068 {103}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	-0.000260	Re-Slope:	1.000000
A1 (Gain):	1.175092	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999858	Status:	OK.
Std Error of Est:	0.000155		
Predicted MDL:	0.000514		
Predicted MQL:	0.001714		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00000	.000	.000	-.00026	.001	1
CAL 1	.01000	.00997	.000	-.306	.01243	.001	1
Cal 2	1.0000	.97596	-.024	-2.40	1.1564	.005	1
Cal 3	2.0000	2.0241	.024	1.20	2.3977	.011	1



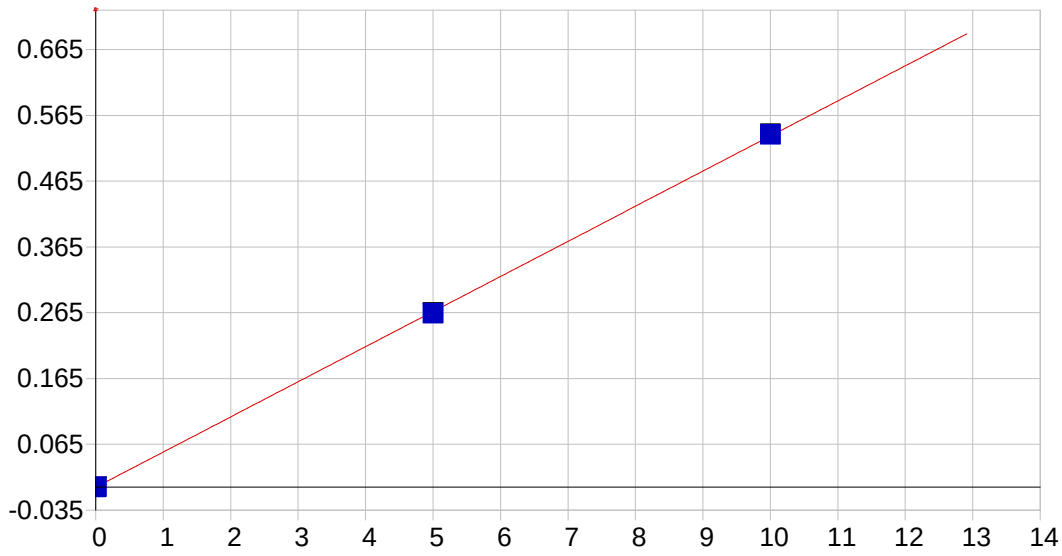
Al 396.152 { 85}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.000346	Re-Slope:	1.000000

A1 (Gain):	0.221598			Y-int:	0.000000
A2 (Curvature):	0.000000				
n (Exponent):	1.000000				
Correlation:	0.999672		Status:	OK.	
Std Error of Est:	0.001393				
Predicted MDL:	0.005530				
Predicted MQL:	0.018433				

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00001	.000	.000	.00035	.001	1
CAL 1	.20000	.18942	-.011	-5.29	.04267	.001	1
Cal 2	50.000	48.194	-1.81	-3.61	10.689	.026	1
Cal 3	100.00	101.82	1.82	1.82	22.580	.114	1

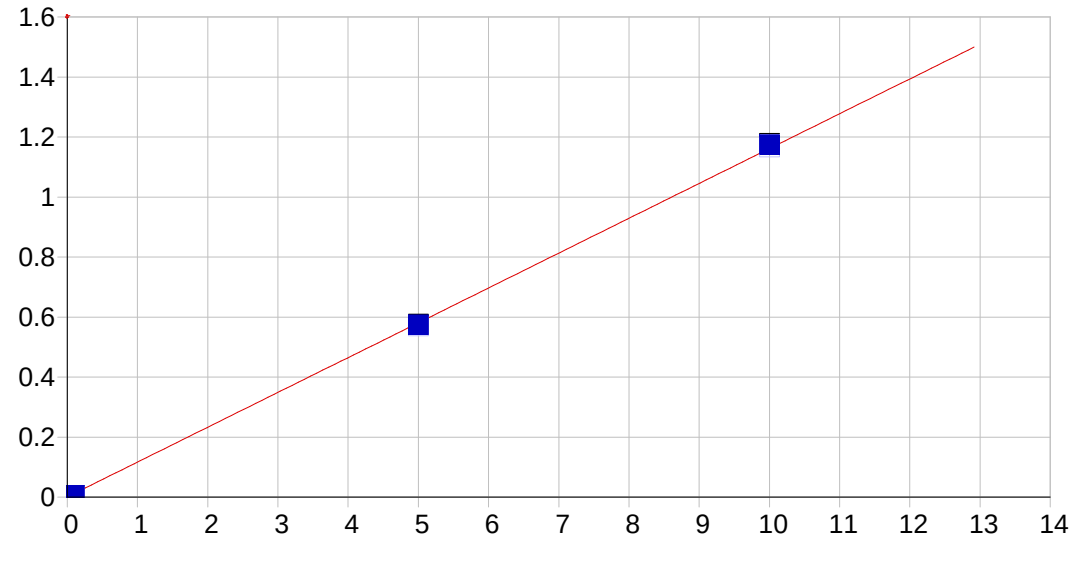


As 189.042 {478}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	-0.000054	Re-Slope:	1.000000
A1 (Gain):	0.053376	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999977	Status:	OK.
Std Error of Est:	0.000006		
Predicted MDL:	0.001248		
Predicted MQL:	0.004160		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00000	.000	.000	-.00005	.000	1
CAL 1	.01000	.00941	-.001	-5.87	.00045	.000	1
Cal 2	5.0000	4.9538	-.046	-.923	.26412	.001	1
Cal 3	10.000	10.047	.047	.468	.53571	.001	1

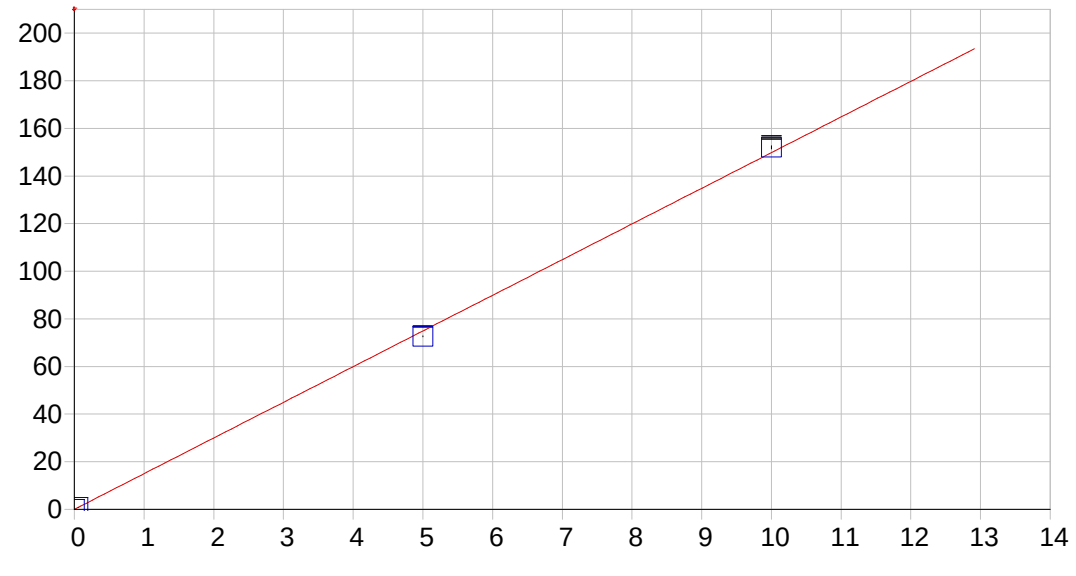


B 249.678 {135}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.000544	Re-Slope:	1.000000
A1 (Gain):	0.116070	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999100	Status:	OK.
Std Error of Est:	0.000269		
Predicted MDL:	0.002647		
Predicted MQL:	0.008824		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00005	.000	.000	.00055	.000	1
CAL 1	.10000	.05025	-.050	-49.8	.00637	.000	1
Cal 2	5.0000	4.9373	-.063	-1.25	.56958	.003	1
Cal 3	10.000	10.113	.113	1.13	1.1662	.004	1



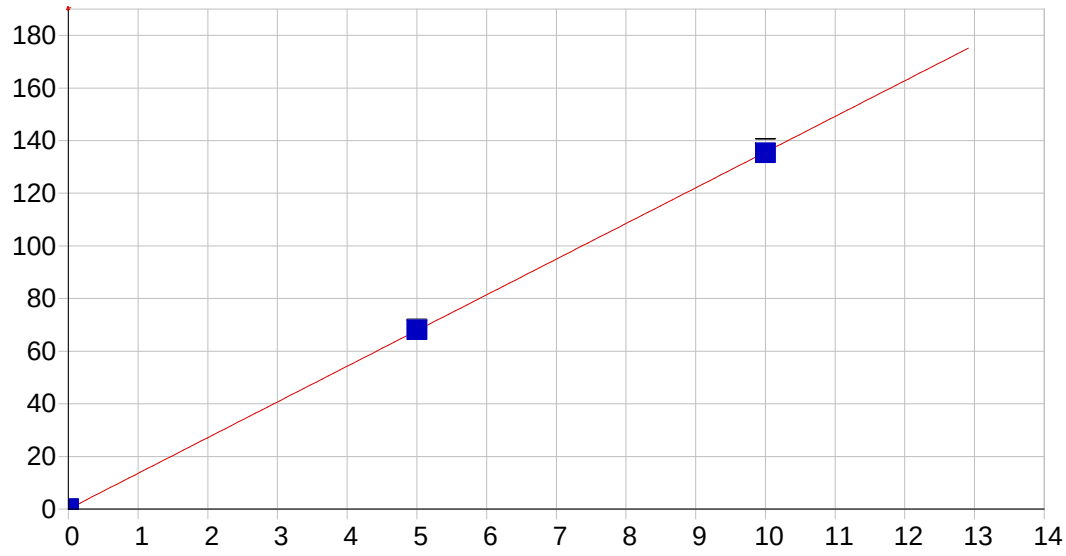
Ba 455.403 { 74}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.019573	Re-Slope:	1.000000
A1 (Gain):	14.980559	Y-int:	0.000000

A2 (Curvature):		0.000000					
n (Exponent):		1.000000					
Correlation:		0.999774		Status:	OK.		
Std Error of Est:		0.012349					
Predicted MDL:		0.000109					
Predicted MQL:		0.000362					

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00000	.000	.000	.01958	.002	1
CAL 1	.05000	.05007	.000	.144	.76968	.001	1
Cal 2	5.0000	4.8494	-.151	-3.01	72.666	.211	1
Cal 3	10.000	10.151	.151	1.51	152.08	.636	1

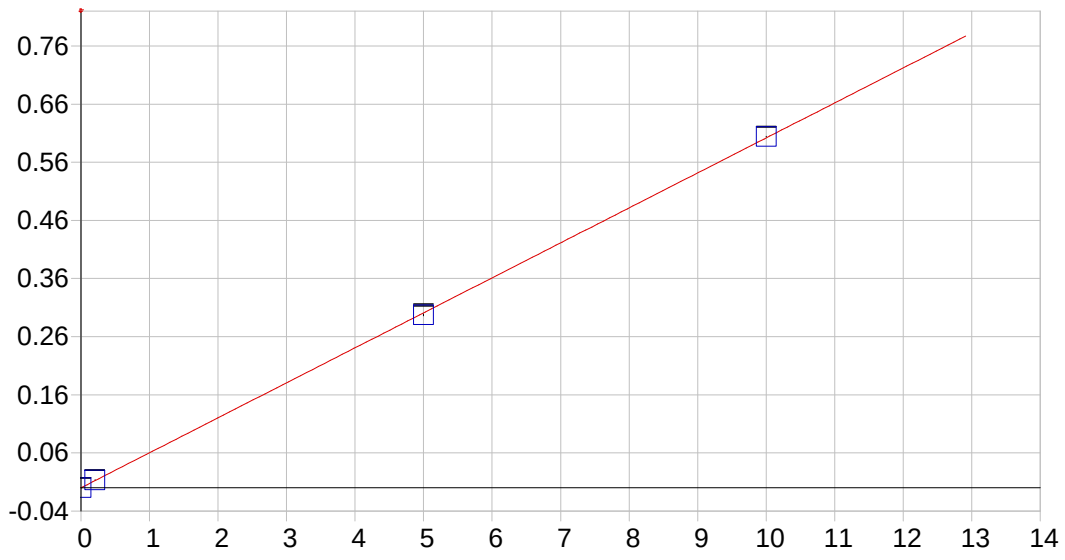


Be 313.042 {108}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.000591	Re-Slope:	1.000000
A1 (Gain):	13.564703	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999994	Status:	OK.
Std Error of Est:	0.000566		
Predicted MDL:	0.000036		
Predicted MQL:	0.000121		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00000	.000	.000	.00059	.000	1
CAL 1	.00500	.00527	.000	5.36	.07196	.001	1
Cal 2	5.0000	5.0230	.023	.460	68.115	.165	1
Cal 3	10.000	9.9767	-.023	-.233	135.29	1.67	1

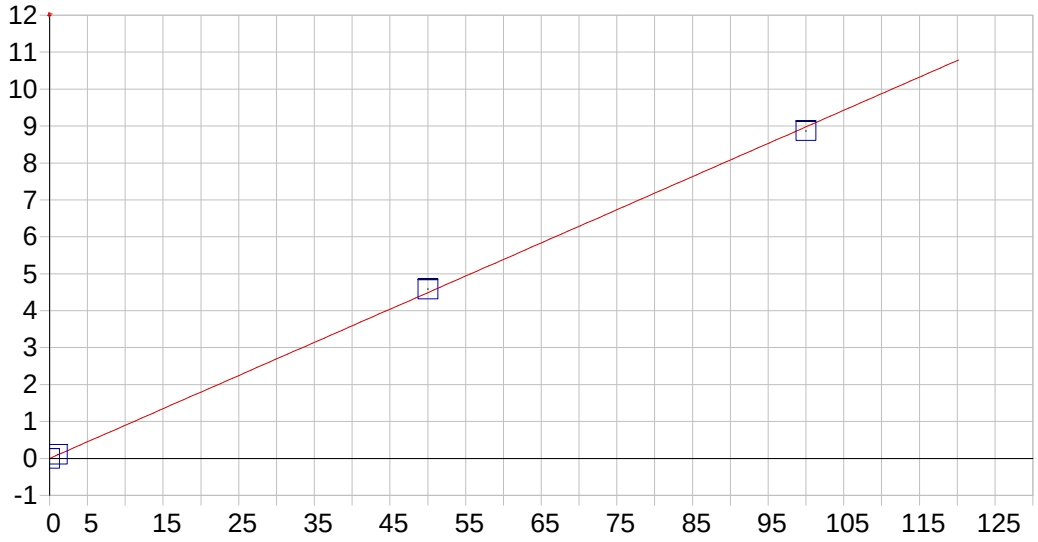


Bi 223.061 {451}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.000101	Re-Slope:	1.000000
A1 (Gain):	0.060177	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999902	Status:	OK.
Std Error of Est:	0.000066		
Predicted MDL:	0.001851		
Predicted MQL:	0.006170		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	-.00002	.000	.000	.00010	.000	1
CAL 1	.20000	.22103	.021	10.5	.01340	.000	1
Cal 2	5.0000	4.9432	-.057	-1.14	.29757	.002	1
Cal 3	10.000	10.036	.036	.358	.60402	.001	1



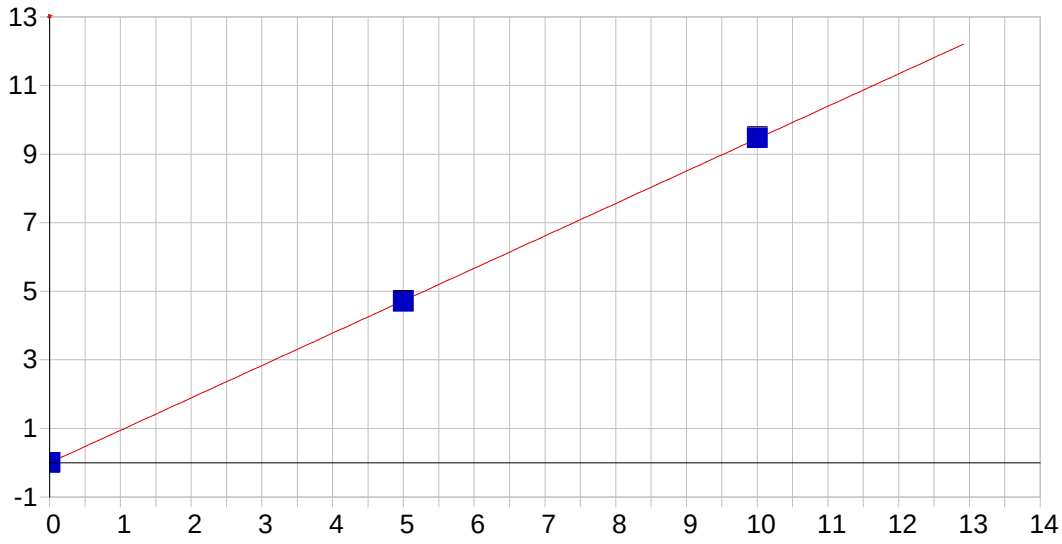
Ca 184.006 {483}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.000080	Re-Slope:	1.000000
A1 (Gain):	0.089777	Y-int:	0.000000

A2 (Curvature):		0.000000					
n (Exponent):		1.000000					
Correlation:		0.999774		Status:	OK.		
Std Error of Est:		0.001048					
Predicted MDL:		0.000732					
Predicted MQL:		0.002442					

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	-.00018	.000	.000	.00006	.000	1
CAL 1	1.0000	1.1753	.175	17.5	.10559	.000	1
Cal 2	50.000	51.056	1.06	2.11	4.5837	.014	1
Cal 3	100.00	98.769	-1.23	-1.23	8.8672	.017	1

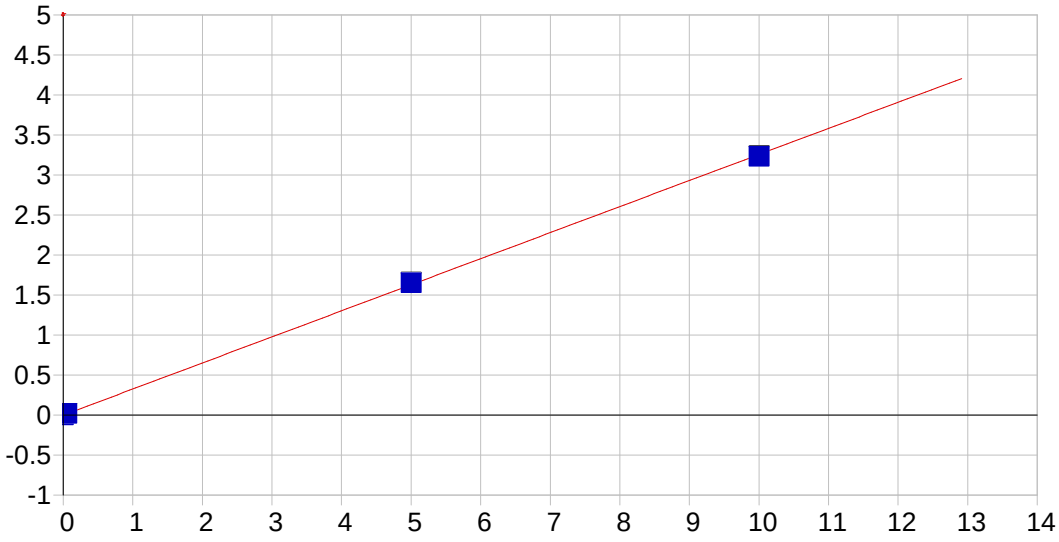


Cd 228.802 {447}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	-0.000028	Re-Slope:	1.000000
A1 (Gain):	0.945001	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999994	Status:	OK.
Std Error of Est:	0.000039		
Predicted MDL:	0.000118		
Predicted MQL:	0.000394		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00000	.000	.000	-.00003	.000	1
CAL 1	.00500	.00520	.000	3.91	.00481	.000	1
Cal 2	5.0000	4.9767	-.023	-.465	4.7068	.017	1
Cal 3	10.000	10.023	.023	.231	9.4794	.020	1

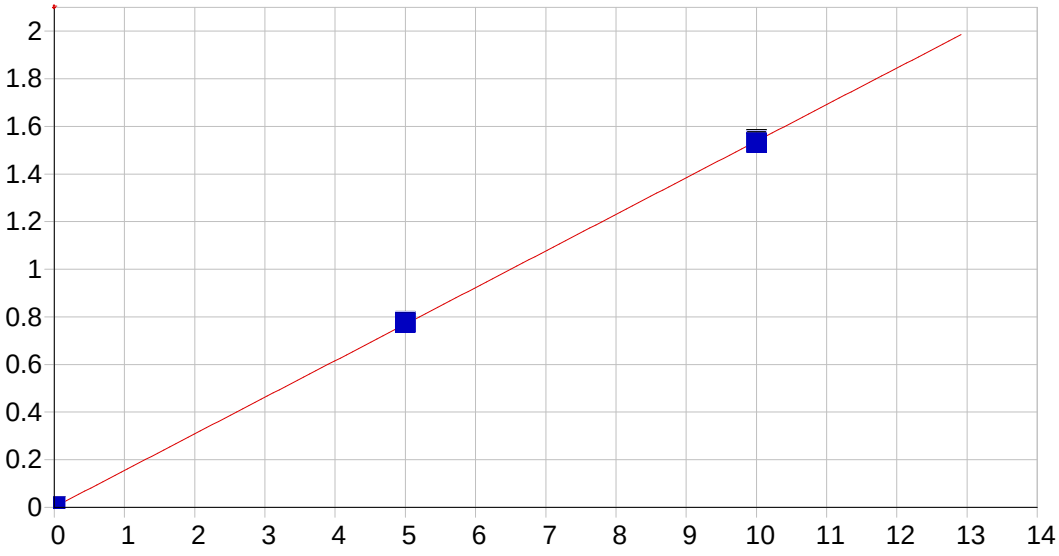


Co 228.616 {448}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	-0.000096	Re-Slope:	1.000000
A1 (Gain):	0.325702	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999903	Status:	OK.
Std Error of Est:	0.000176		
Predicted MDL:	0.000270		
Predicted MQL:	0.000902		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	-.00001	.000	.000	-.00010	.000	1
CAL 1	.05000	.05774	.008	15.5	.01872	.000	1
Cal 2	5.0000	5.0733	.073	1.47	1.6549	.004	1
Cal 3	10.000	9.9190	-.081	-.810	3.2358	.004	1



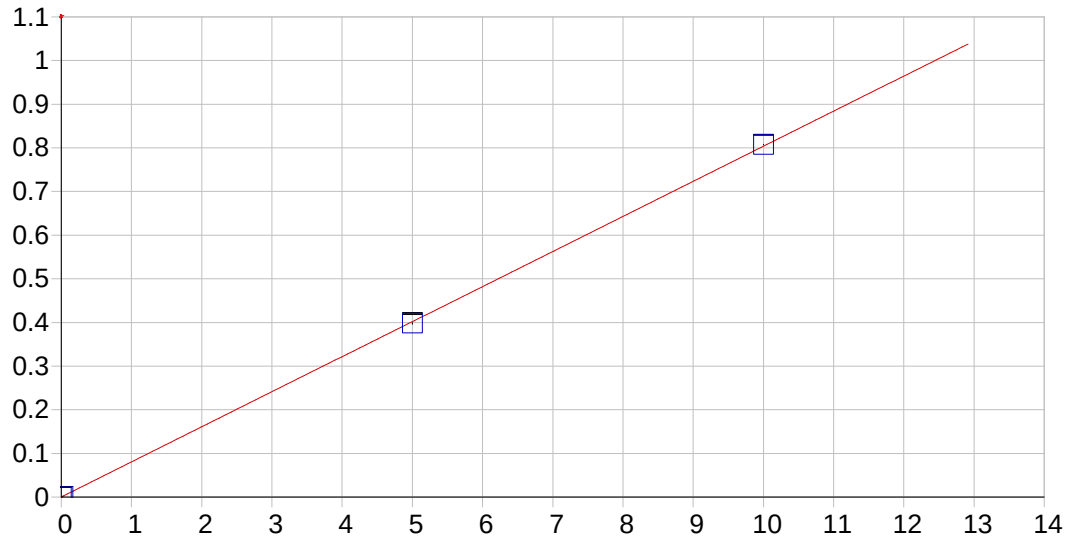
Cr 283.563 {119}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.001339	Re-Slope:	1.000000
A1 (Gain):	0.153639	Y-int:	0.000000

A2 (Curvature):		0.000000					
n (Exponent):		1.000000					
Correlation:		0.999973		Status:	OK.		
Std Error of Est:		0.000020					
Predicted MDL:		0.000736					
Predicted MQL:		0.002454					

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00000	.000	.000	.00134	.000	1
CAL 1	.01000	.01155	.002	15.5	.00304	.000	1
Cal 2	5.0000	5.0441	.044	.882	.78112	.001	1
Cal 3	10.000	9.9544	-.046	-.456	1.5404	.004	1

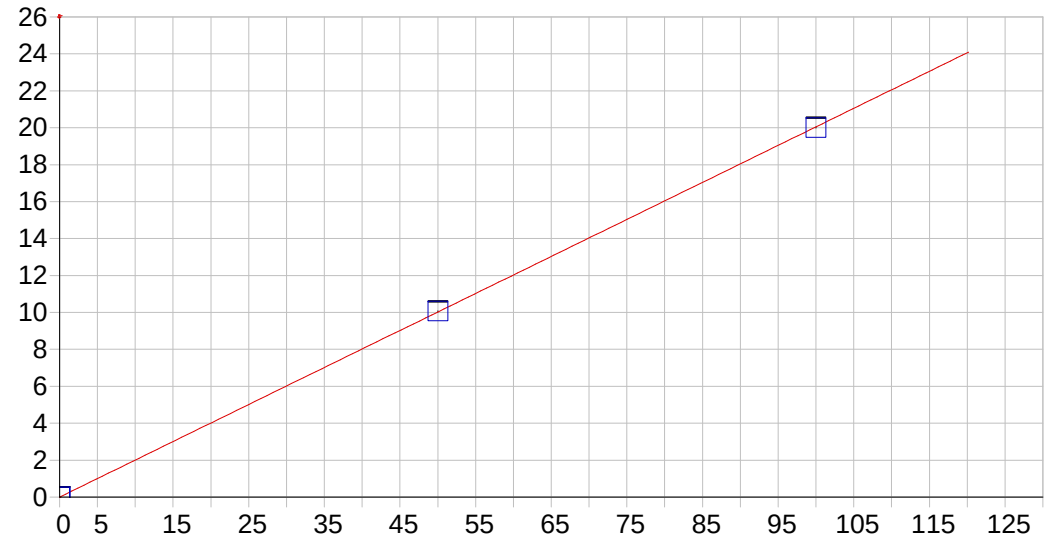


Cu 217.894 {455}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.000151	Re-Slope:	1.000000
A1 (Gain):	0.080356	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999976	Status:	OK.
Std Error of Est:	0.000015		
Predicted MDL:	0.001315		
Predicted MQL:	0.004385		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00000	.000	.000	.00015	.000	1
CAL 1	.02500	.02603	.001	4.13	.00224	.000	1
Cal 2	5.0000	4.9517	-.048	-.965	.39805	.002	1
Cal 3	10.000	10.047	.047	.472	.80750	.001	1

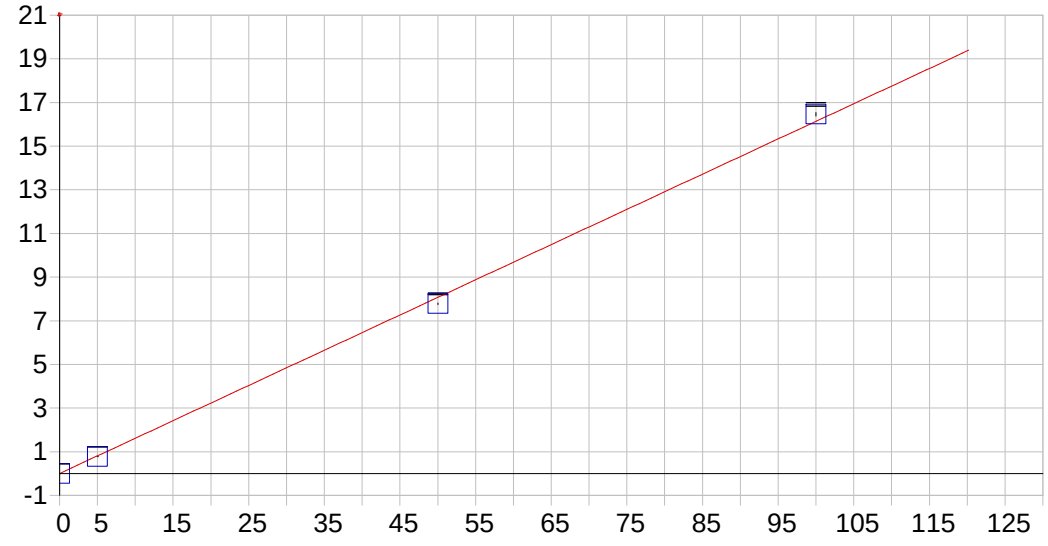


Fe 259.940 {130}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.000166	Re-Slope:	1.000000
A1 (Gain):	0.200482	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999993	Status:	OK.
Std Error of Est:	0.000128		
Predicted MDL:	0.001531		
Predicted MQL:	0.005105		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	-.00001	.000	.000	.00016	.000	1
CAL 1	.10000	.10950	.009	9.50	.02212	.000	1
Cal 2	50.000	50.192	.192	.385	10.063	.033	1
Cal 3	100.00	99.798	-.202	-.202	20.008	.027	1



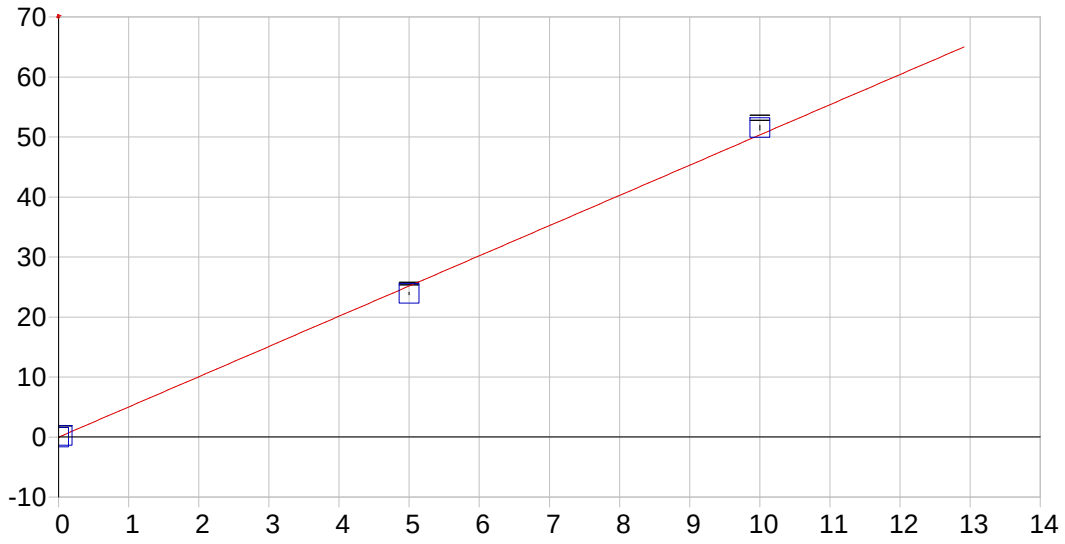
K 766.490 { 44}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.001608	Re-Slope:	1.000000
A1 (Gain):	0.161371	Y-int:	0.000000

A2 (Curvature):		0.000000					
n (Exponent):		1.000000					
Correlation:		0.999637		Status:	OK.		
Std Error of Est:		0.005412					
Predicted MDL:		0.015663					
Predicted MQL:		0.052209					

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00029	.000	.000	.00166	.002	1
CAL 1	5.0000	4.7850	-.215	-4.30	.77377	.002	1
Cal 2	50.000	48.219	-1.78	-3.56	7.7827	.034	1
Cal 3	100.00	102.00	2.00	2.00	16.461	.082	1

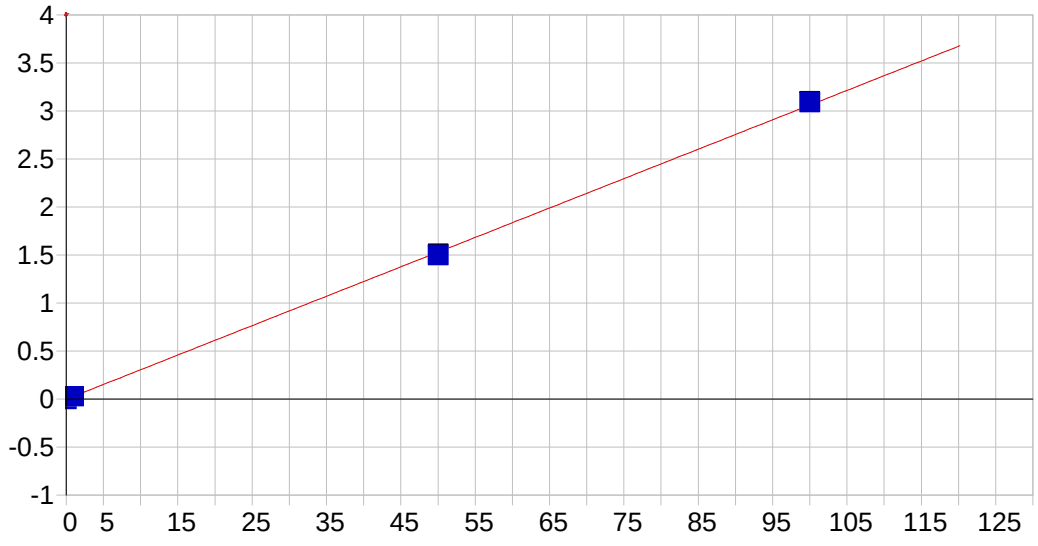


Li 670.784 { 50}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	-0.010541	Re-Slope:	1.000000
A1 (Gain):	5.034046	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999412	Status:	OK.
Std Error of Est:	0.006698		
Predicted MDL:	0.000526		
Predicted MQL:	0.001753		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00000	.000	.000	-.01053	.001	1
CAL 1	.05000	.04909	-.001	-1.81	.23660	.002	1
Cal 2	5.0000	4.7574	-.243	-4.85	23.938	.215	1
Cal 3	10.000	10.244	.244	2.44	51.556	.443	1

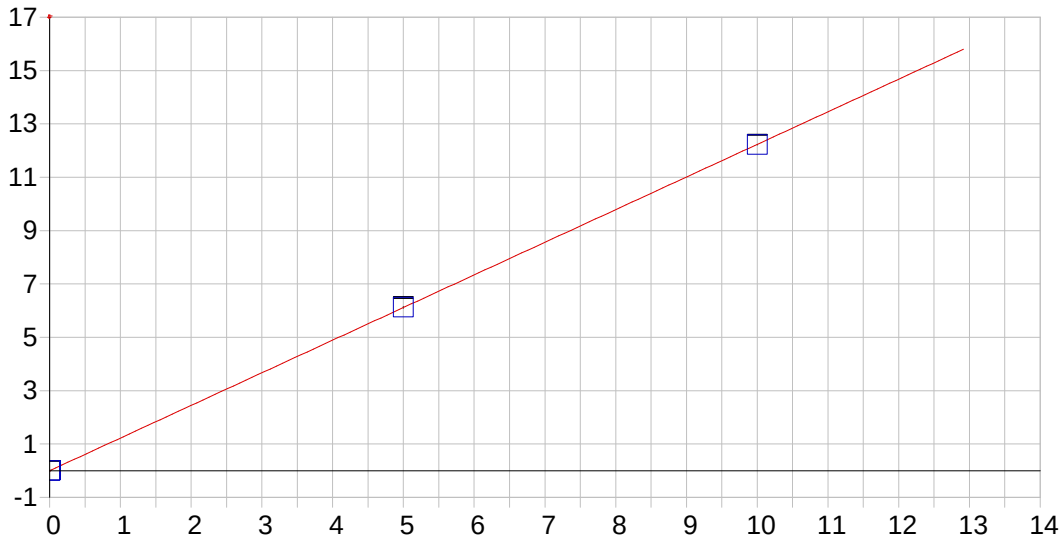


Mg 279.806 {121}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	-0.000903	Re-Slope:	1.000000
A1 (Gain):	0.030621	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999892	Status:	OK.
Std Error of Est:	0.000246		
Predicted MDL:	0.012176		
Predicted MQL:	0.040586		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00002	.000	.000	-.00090	.000	1
CAL 1	1.0000	.98642	-.014	-1.36	.02908	.000	1
Cal 2	50.000	48.969	-1.03	-2.06	1.4930	.010	1
Cal 3	100.00	101.04	1.04	1.04	3.0819	.007	1



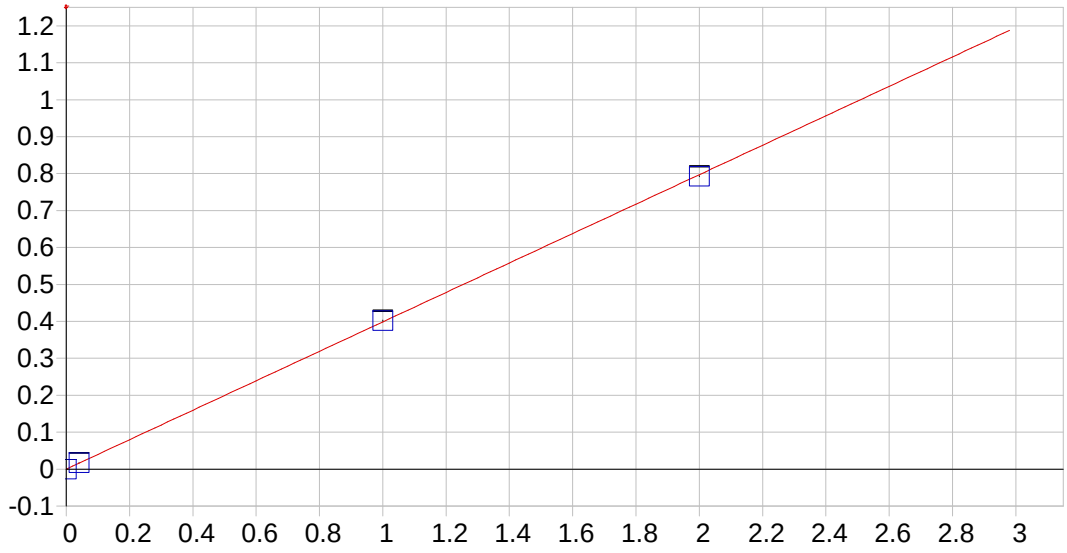
Mn 257.610 {131}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	-0.000140	Re-Slope:	1.000000
A1 (Gain):	1.223193	Y-int:	0.000000

A2 (Curvature):	0.000000					
n (Exponent):	1.000000					
Correlation:	0.999995		Status:	OK.		
Std Error of Est:	0.000085					
Predicted MDL:	0.000271					
Predicted MQL:	0.000903					

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00000	.000	.000	-.00014	.000	1
CAL 1	.01500	.01647	.001	9.77	.02000	.000	1
Cal 2	5.0000	5.0075	.008	.151	6.1251	.027	1
Cal 3	10.000	9.9910	-.009	-.090	12.221	.013	1

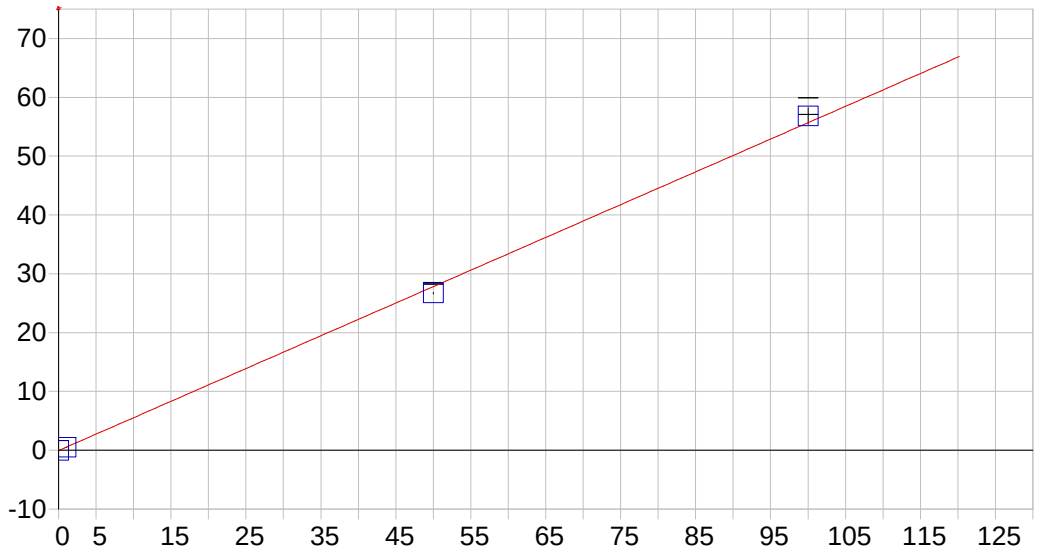


Mo 202.030 {467}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.000017	Re-Slope:	1.000000
A1 (Gain):	0.398520	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999936	Status:	OK.
Std Error of Est:	0.000070		
Predicted MDL:	0.000197		
Predicted MQL:	0.000658		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00000	.000	.000	.00002	.000	1
CAL 1	.04000	.04337	.003	8.43	.01730	.000	1
Cal 2	1.0000	1.0072	.007	.718	.40140	.002	1
Cal 3	2.0000	1.9895	-.011	-.527	.79285	.001	1

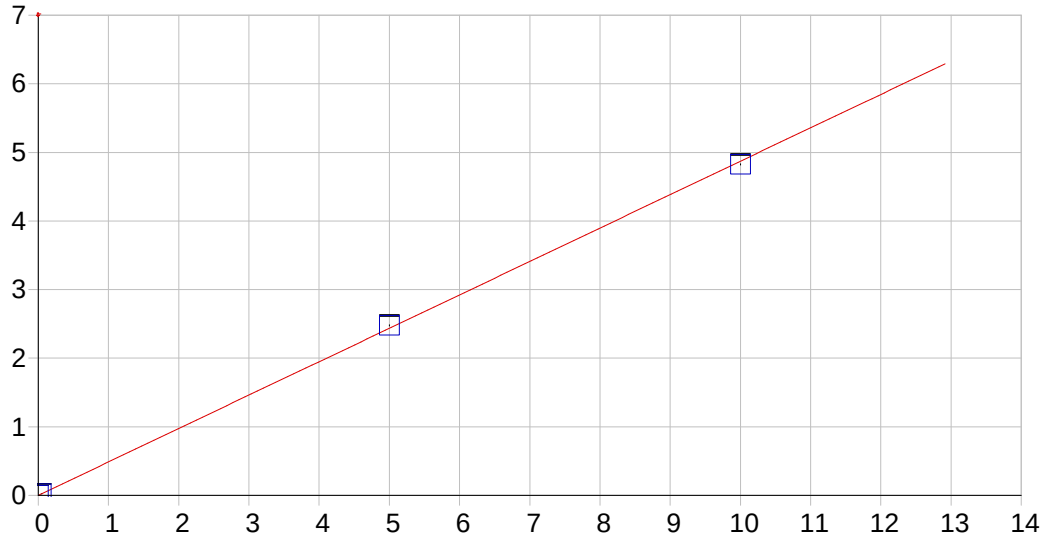


Na 589.592 { 57}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	-0.035893	Re-Slope:	1.000000
A1 (Gain):	0.557215	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999584	Status:	OK.
Std Error of Est:	0.008832		
Predicted MDL:	0.004755		
Predicted MQL:	0.015851		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00008	.000	.000	-.03585	.003	1
CAL 1	1.0000	.94079	-.059	-5.92	.48833	.005	1
Cal 2	50.000	48.001	-2.00	-4.00	26.711	.154	1
Cal 3	100.00	102.06	2.06	2.06	56.832	1.43	1



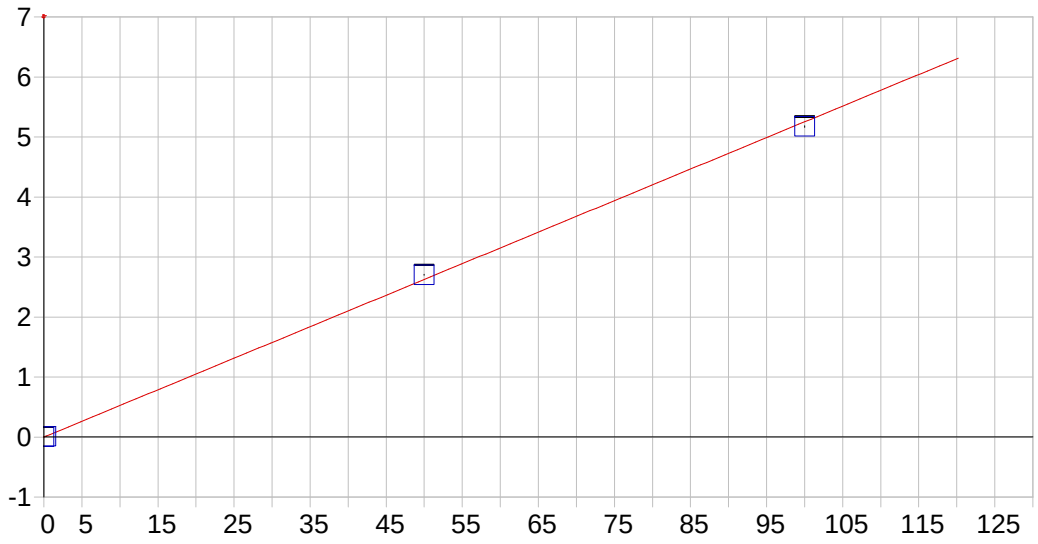
Ni 221.647 {452}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.000148	Re-Slope:	1.000000
A1 (Gain):	0.487103	Y-int:	0.000000

A2 (Curvature):		0.000000					
n (Exponent):		1.000000					
Correlation:		0.999881		Status:	OK.		
Std Error of Est:		0.000260					
Predicted MDL:		0.000246					
Predicted MQL:		0.000821					

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	-.00001	.000	.000	.00014	.000	1
CAL 1	.04000	.04689	.007	17.2	.02299	.000	1
Cal 2	5.0000	5.0868	.087	1.74	2.4780	.008	1
Cal 3	10.000	9.9063	-.094	-.937	4.8255	.010	1

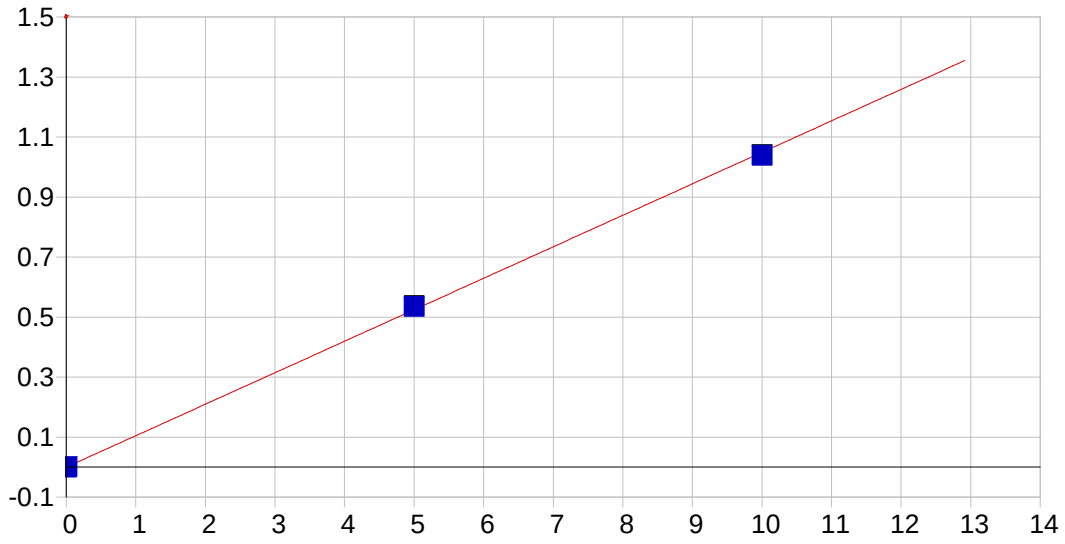


P 177.495 {490}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.000034	Re-Slope:	1.000000
A1 (Gain):	0.052522	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999771	Status:	OK.
Std Error of Est:	0.000308		
Predicted MDL:	0.001249		
Predicted MQL:	0.004165		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	-.00003	.000	.000	.00003	.000	1
CAL 1	.25000	.28137	.031	12.5	.01481	.000	1
Cal 2	50.000	51.459	1.46	2.92	2.7027	.008	1
Cal 3	100.00	98.510	-1.49	-1.49	5.1740	.012	1

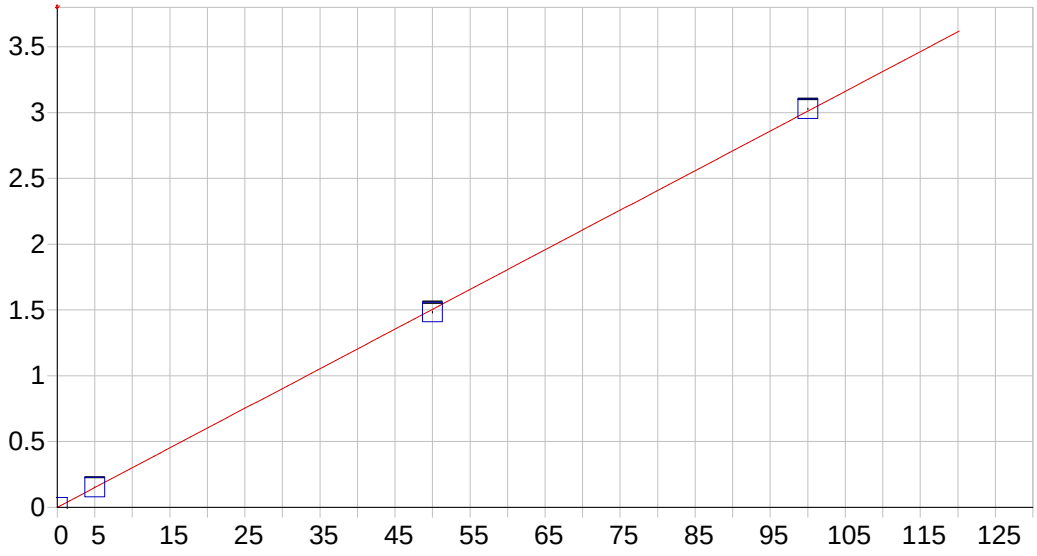


Pb 220.353 {453}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	-0.000280	Re-Slope:	1.000000
A1 (Gain):	0.104911	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999899	Status:	OK.
Std Error of Est:	0.000026		
Predicted MDL:	0.000986		
Predicted MQL:	0.003288		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00000	.000	.000	-.00028	.000	1
CAL 1	.01000	.01154	.002	15.4	.00098	.000	1
Cal 2	5.0000	5.0962	.096	1.92	.53468	.002	1
Cal 3	10.000	9.9022	-.098	-.978	1.0392	.002	1



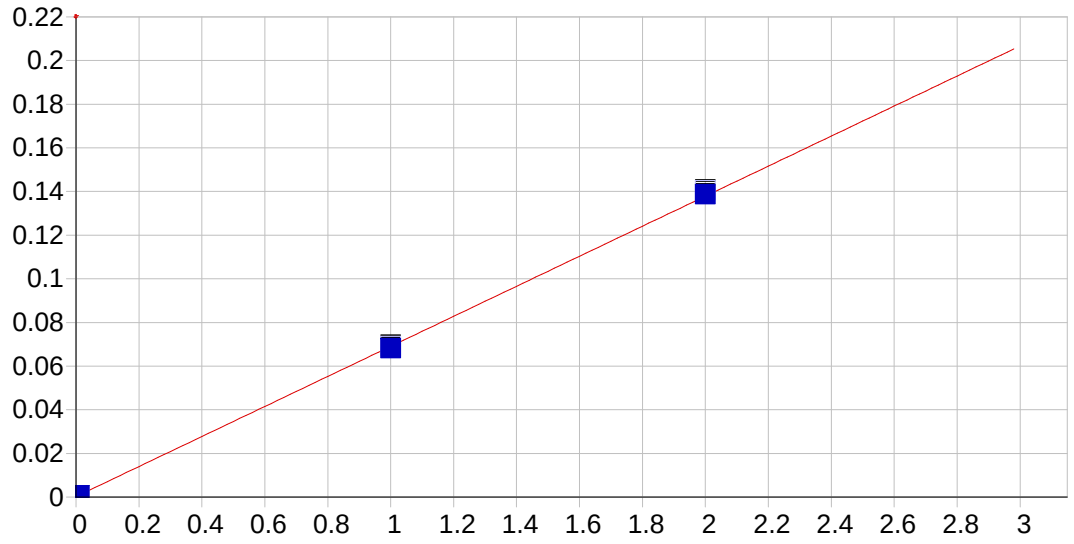
S 182.034 {485}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.000050	Re-Slope:	1.000000
A1 (Gain):	0.030111	Y-int:	0.000000

A2 (Curvature):		0.000000					
n (Exponent):		1.000000					
Correlation:		0.999953		Status:	OK.		
Std Error of Est:		0.000364					
Predicted MDL:		0.002081					
Predicted MQL:		0.006938					

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	-.00005	.000	.000	.00005	.000	1
CAL 1	5.0000	5.0846	.085	1.69	.15315	.002	1
Cal 2	50.000	49.310	-.690	-1.38	1.4848	.007	1
Cal 3	100.00	100.61	.606	.606	3.0294	.005	1

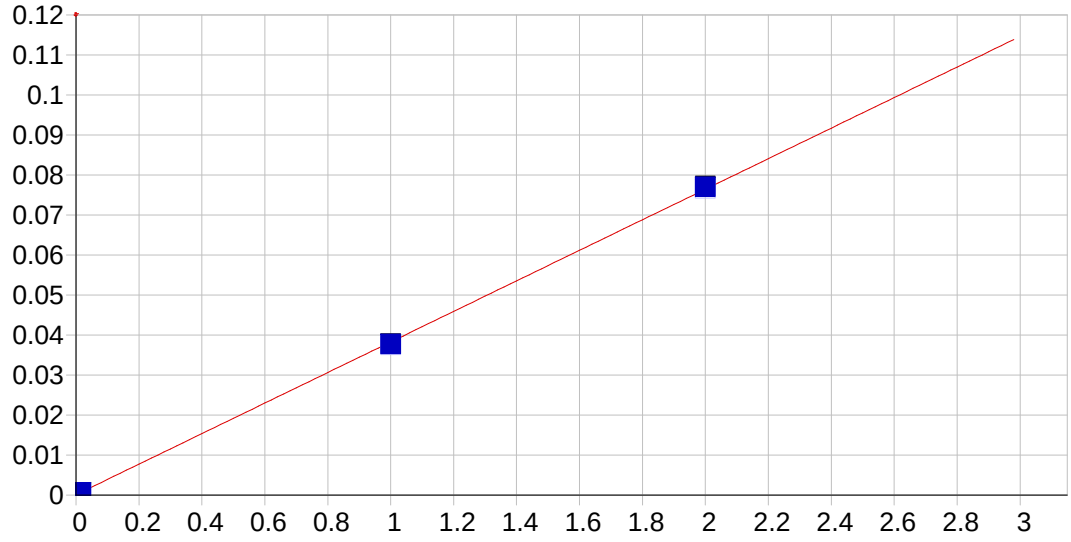


Sb 206.833 {463}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.000222	Re-Slope:	1.000000
A1 (Gain):	0.068821	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999957	Status:	OK.
Std Error of Est:	0.000005		
Predicted MDL:	0.001438		
Predicted MQL:	0.004792		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00000	.000	.000	.00022	.000	1
CAL 1	.01000	.00943	-.001	-5.72	.00083	.000	1
Cal 2	1.0000	.98779	-.012	-1.22	.06910	.001	1
Cal 3	2.0000	2.0127	.013	.637	.14054	.000	1

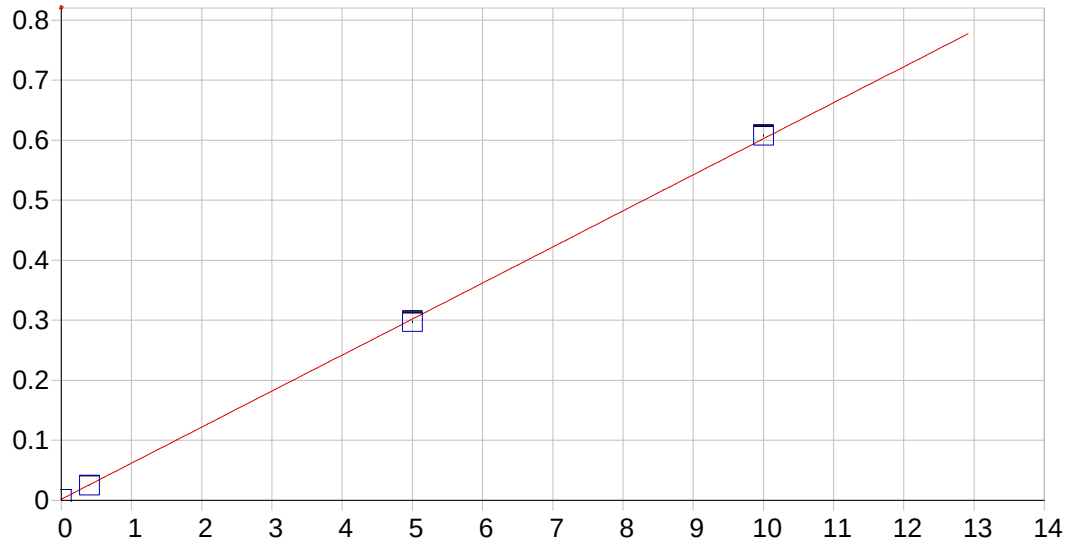


Se 196.090 {472}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.000100	Re-Slope:	1.000000
A1 (Gain):	0.038173	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999936	Status:	OK.
Std Error of Est:	0.000004		
Predicted MDL:	0.001920		
Predicted MQL:	0.006401		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00000	.000	.000	.00010	.000	1
CAL 1	.01500	.01410	-.001	-5.98	.00064	.000	1
Cal 2	1.0000	.98557	-.014	-1.44	.03752	.000	1
Cal 3	2.0000	2.0153	.015	.766	.07663	.000	1



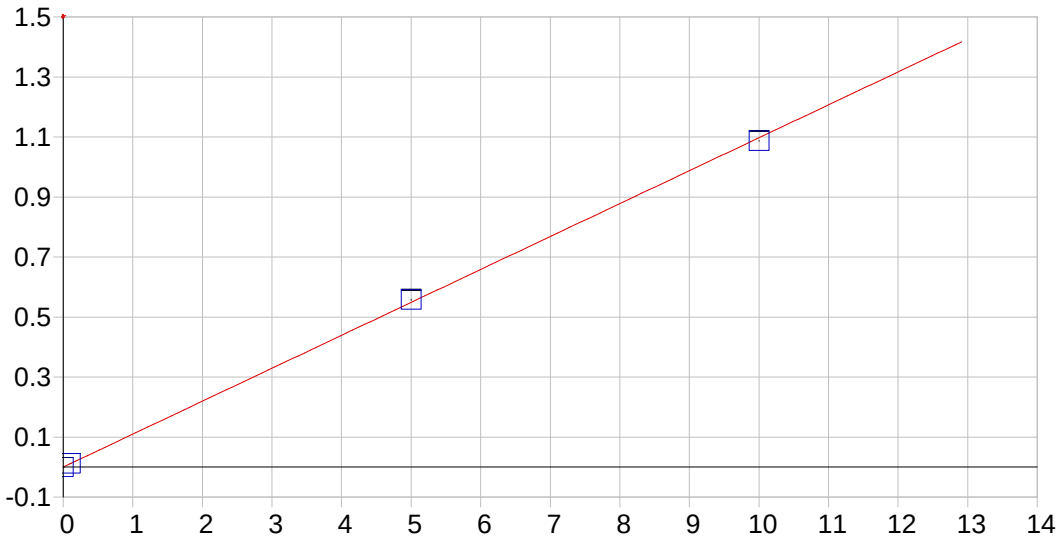
Si 251.611 {134}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.001872	Re-Slope:	1.000000
A1 (Gain):	0.060034	Y-int:	0.000000

A2 (Curvature):		0.000000					
n (Exponent):		1.000000					
Correlation:		0.999913		Status:	OK.		
Std Error of Est:		0.000088					
Predicted MDL:		0.005301					
Predicted MQL:		0.017671					

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00002	.000	.000	.00187	.000	1
CAL 1	.40000	.38319	-.017	-4.20	.02488	.000	1
Cal 2	5.0000	4.9251	-.075	-1.50	.29754	.002	1
Cal 3	10.000	10.092	.092	.918	.60772	.001	1

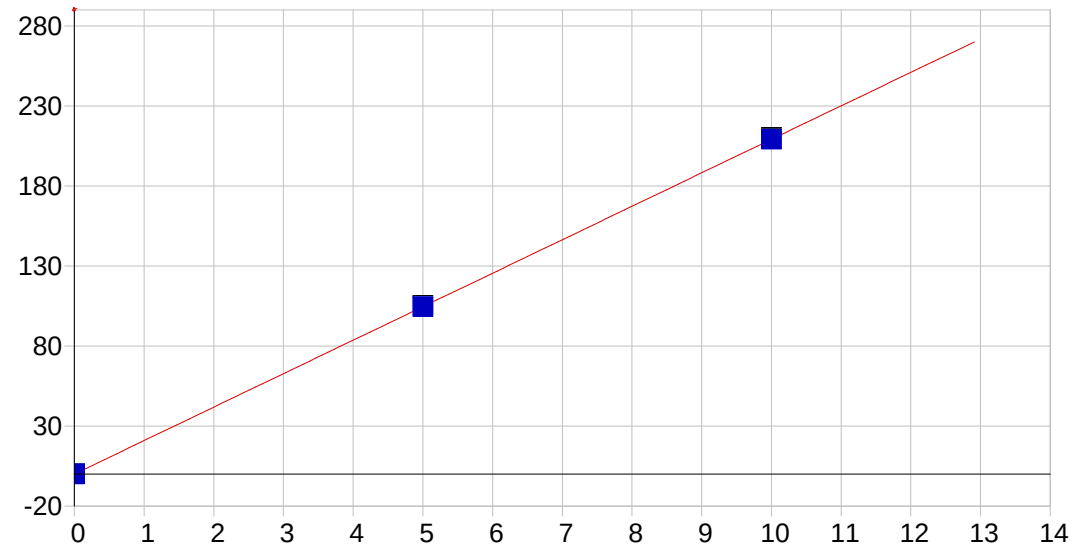


Sn 189.989 {478}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.000048	Re-Slope:	1.000000
A1 (Gain):	0.109727	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999878	Status:	OK.
Std Error of Est:	0.000094		
Predicted MDL:	0.000543		
Predicted MQL:	0.001809		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	-.00001	.000	.000	.00005	.000	1
CAL 1	.10000	.11212	.012	12.1	.01235	.000	1
Cal 2	5.0000	5.0817	.082	1.63	.55765	.002	1
Cal 3	10.000	9.9062	-.094	-.938	1.0870	.001	1

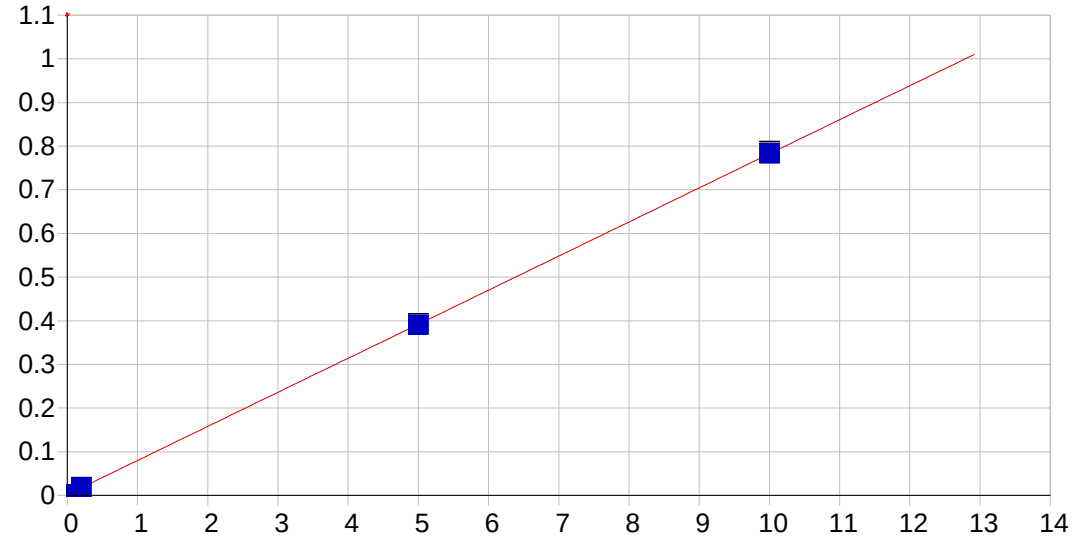


Sr 407.771 { 83}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	-0.002959	Re-Slope:	1.000000
A1 (Gain):	20.915485	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	1.000000	Status:	OK.
Std Error of Est:	0.000155		
Predicted MDL:	0.000049		
Predicted MQL:	0.000163		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00000	.000	.000	-.00296	.001	1
CAL 1	.00500	.00514	.000	2.75	.10558	.001	1
Cal 2	5.0000	5.0023	.002	.047	104.68	.580	1
Cal 3	10.000	9.9975	-.002	-.025	209.21	.964	1



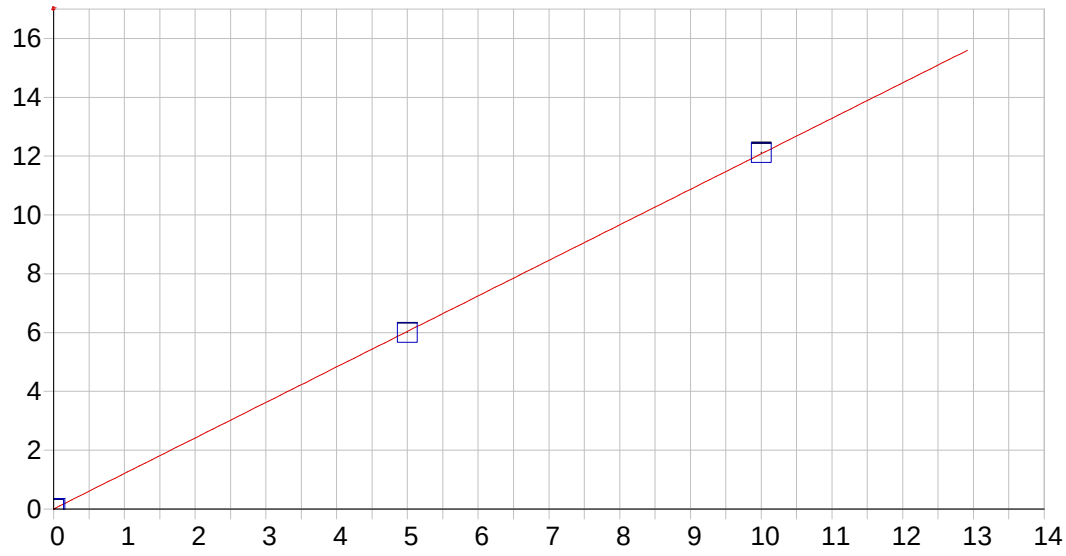
Th 283.231 {119}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.001851	Re-Slope:	1.000000
A1 (Gain):	0.078060	Y-int:	0.000000

A2 (Curvature):		0.000000					
n (Exponent):		1.000000					
Correlation:		0.999985		Status:	OK.		
Std Error of Est:		0.000033					
Predicted MDL:		0.003391					
Predicted MQL:		0.011304					

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	-.00001	.000	.000	.00185	.000	1
CAL 1	.20000	.20863	.009	4.31	.01791	.000	1
Cal 2	5.0000	4.9806	-.019	-.388	.39139	.003	1
Cal 3	10.000	10.011	.011	.109	.78482	.003	1

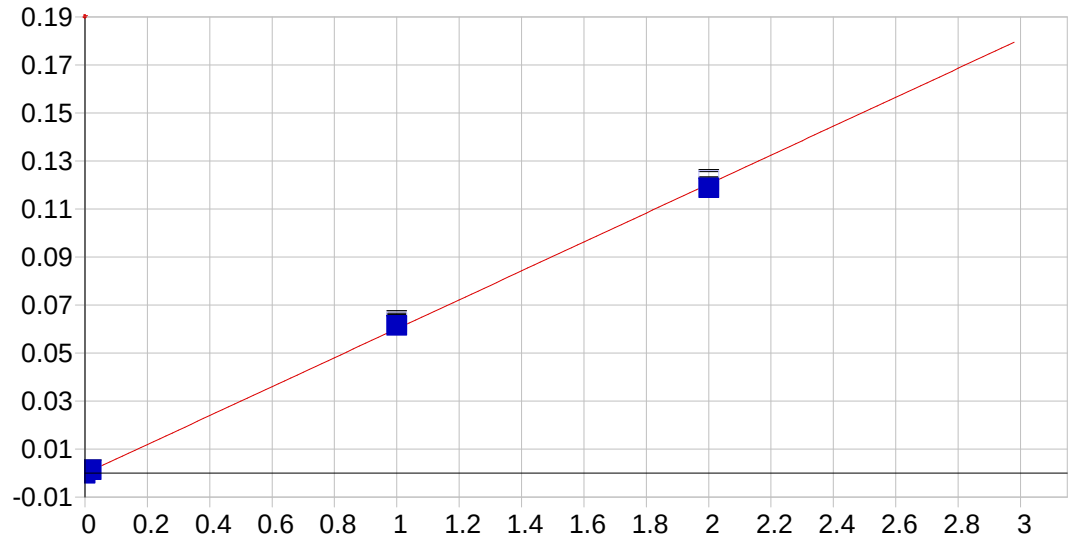


Ti 334.941 {101}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.002039	Re-Slope:	1.000000
A1 (Gain):	1.207626	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999989	Status:	OK.
Std Error of Est:	0.000136		
Predicted MDL:	0.000571		
Predicted MQL:	0.001904		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00000	.000	.000	.00204	.000	1
CAL 1	.02000	.02017	.000	.848	.02640	.000	1
Cal 2	5.0000	4.9676	-.032	-.648	6.0010	.002	1
Cal 3	10.000	10.032	.032	.322	12.117	.020	1

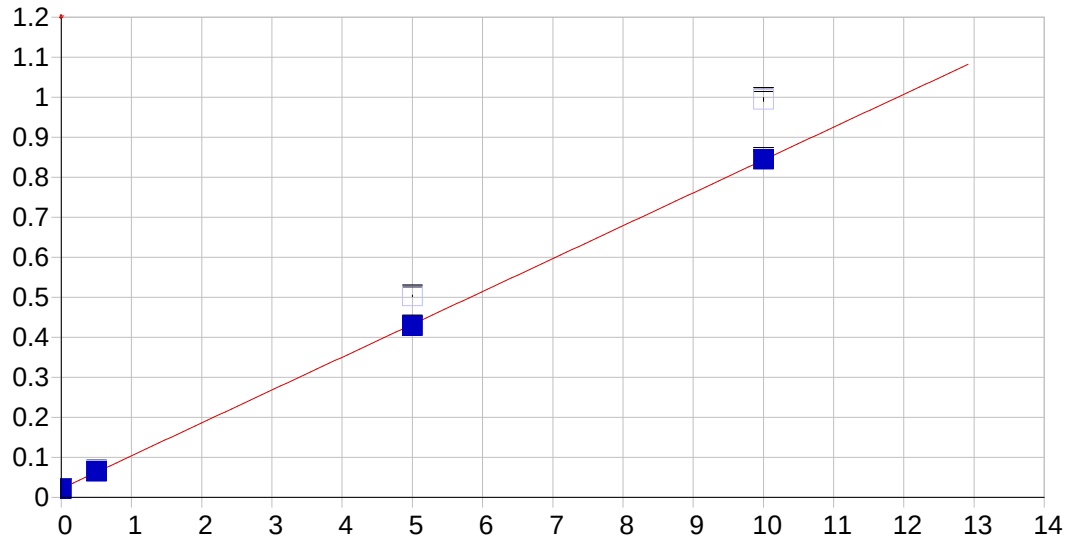


Tl 190.856 {477}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	-0.000165	Re-Slope:	1.000000
A1 (Gain):	0.060274	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999708	Status:	OK.
Std Error of Est:	0.000016		
Predicted MDL:	0.001281		
Predicted MQL:	0.004270		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00000	.000	.000	-.00017	.000	1
CAL 1	.02000	.02447	.004	22.3	.00132	.000	1
Cal 2	1.0000	1.0224	.022	2.24	.06299	.000	1
Cal 3	2.0000	1.9733	-.027	-1.34	.12183	.000	1



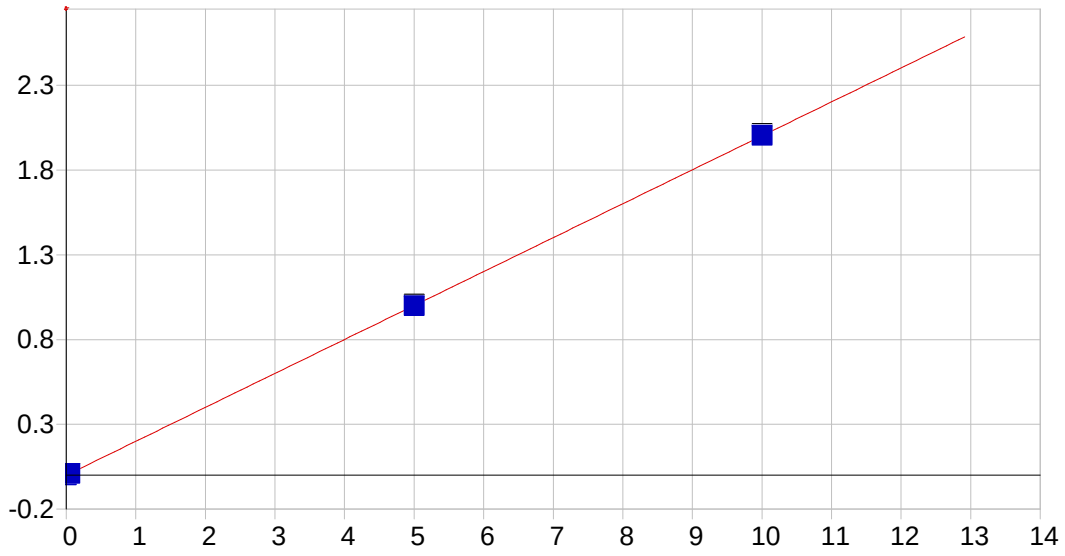
U 367.007 { 92}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.021812	Re-Slope:	1.000000
A1 (Gain):	0.082120	Y-int:	0.000000

A2 (Curvature):		0.000000					
n (Exponent):		1.000000					
Correlation:		0.999966		Status:	OK.		
Std Error of Est:		0.000099					
Predicted MDL:		0.008891					
Predicted MQL:		0.029637					

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	-.00002	.000	.000	.02181	.001	1
CAL 1	.50000	.52259	.023	4.52	.06710	.001	1
Cal 2	5.0000	4.9565	-.044	-.870	.50356	.002	1
Cal 3	10.000	10.023	.023	.233	.99437	.005	1

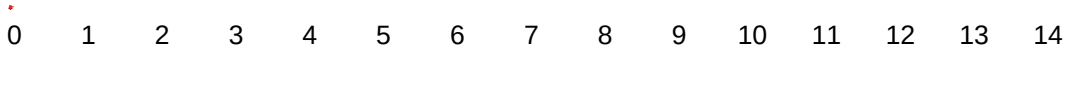


V 290.882 {116}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	-0.000524	Re-Slope:	1.000000
A1 (Gain):	0.200259	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999996	Status:	OK.
Std Error of Est:	0.000023		
Predicted MDL:	0.002718		
Predicted MQL:	0.009060		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CALBLK1	.00000	.00000	.000	.000	-.00052	.000	1
CAL 1	.05000	.04766	-.002	-4.69	.00914	.000	1
Cal 2	5.0000	4.9934	-.007	-.132	1.0026	.005	1
Cal 3	10.000	10.009	.009	.090	2.0102	.004	1

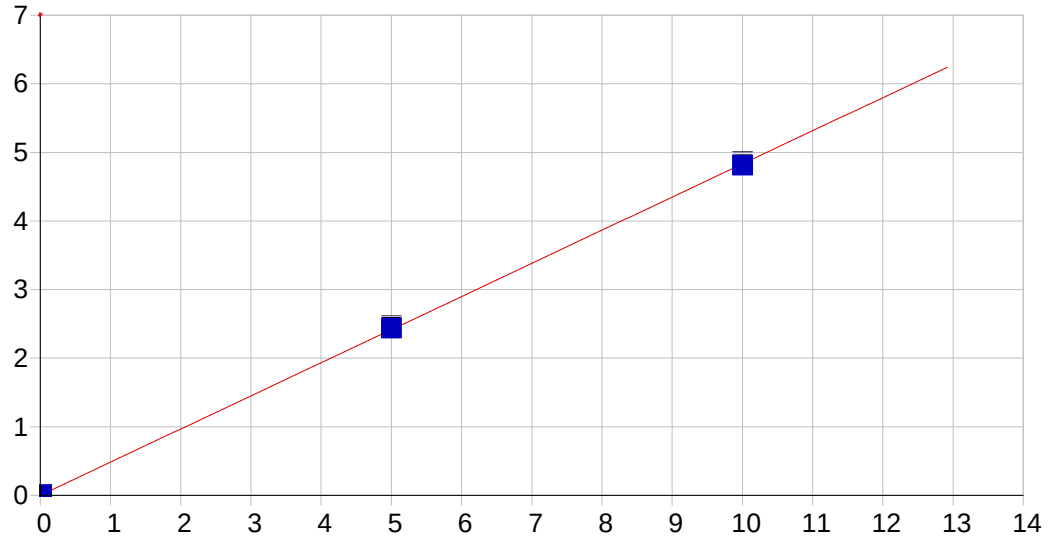


Y 371.030 { 91}*

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	1.000000	Re-Slope:	1.000000
A1 (Gain):	0.000000	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.000000	Status:	Warning Zero Gain
Std Error of Est:	0.000000		
Predicted MDL:	n/a		
Predicted MQL:	n/a		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
CAL 1	1.0000	.00000	-1.00	-100.	1.0000	.000	1
CALBLK1	.00000	.00000	.000	.000	1.0000	.000	1
Cal 2	5.0000	.00000	-5.00	-100.	1.0000	.000	1
Cal 3	10.000	.00000	-10.0	-100.	1.0000	.000	1



Zn 213.856 {458}

Date of Fit:	5/22/2014 10:40:09	Type of Fit:	Linear	Weighting:	1/Conc

A0 (Offset):	0.000529	Re-Slope:	1.000000
A1 (Gain):	0.483150	Y-int:	0.000000

A2 (Curvature):		0.000000					
n (Exponent):		1.000000					
Correlation:		0.999975		Status:	OK.		
Std Error of Est:		0.000085					
Predicted MDL:		0.000135					
Predicted MQL:		0.000450					
Std. Name	**Stated Conc.**	**Found Conc.**	**Difference**	**% Diff.**	**(S)IR**	**Std Dev**	**Emphasis**
CALBLK1	.00000	.00000	.000	.000	.00053	.000	1
CAL 1	.02000	.02178	.002	8.92	.01121	.000	1
Cal 2	5.0000	5.0448	.045	.896	2.4619	.009	1
Cal 3	10.000	9.9534	-.047	-.466	4.8575	.005	1

Sample Name: ICV Acquired: 5/22/2014 10:40:17 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.9874**	**50.80**	**4.929**	**5.071**	**4.978**	**4.987**	**5.000**	**50.43**	**5.005**
Stddev	.0143	.22	.073	.007	.084	.017	.079	.75	.075
%RSD	1.448	.4373	1.485	.1338	1.682	.3384	1.575	1.480	1.493
#1	1.004	50.56	5.014	5.064	4.881	4.987	5.091	51.29	5.091
#2	.9789	50.85	4.892	5.077	5.025	4.970	4.957	50.00	4.959
#3	.9795	50.99	4.882	5.073	5.028	5.004	4.952	50.00	4.965
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.117**	**5.057**	**4.996**	**49.49**	**51.39**	**5.325**	**48.80**	**4.971**	**1.020**
Stddev	.078	.075	.072	.37	.34	.065	.53	.042	.016
%RSD	1.531	1.477	1.437	.7501	.6707	1.218	1.080	.8370	1.586
#1	5.207	5.143	5.079	49.92	51.01	5.250	49.39	5.014	1.038
#2	5.074	5.016	4.960	49.28	51.46	5.359	48.39	4.931	1.010
#3	5.069	5.011	4.949	49.28	51.69	5.366	48.61	4.967	1.011
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**51.89**	**5.066**	F **5.541**	**5.047**	**49.50**	**1.001**	**.9976**	F **5.590**	**5.041**
Stddev	.45	.075	.086	.073	.77	.013	.0113	.007	.069
%RSD	.8686	1.474	1.561	1.440	1.550	1.322	1.132	.1267	1.377
#1	51.37	5.152	5.640	5.130	50.39	1.016	1.010	5.596	5.122
#2	52.16	5.018	5.492	4.999	49.07	.9920	.9890	5.591	5.002
#3	52.13	5.027	5.489	5.011	49.05	.9946	.9933	5.582	5.001
Check ?	Chk Pass	Chk Pass	Chk Fail	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Fail	Chk Pass
Value			5.000					5.000	
Range			10.00%					10.00%	

Sample Name: ICV Acquired: 5/22/2014 10:40:17 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**4.991**	**5.054**	**4.991**	**1.039**	**5.026**	**4.925**	**4.993**
Stddev	.040	.086	.014	.016	.077	.034	.075
%RSD	.8007	1.707	.2797	1.559	1.538	.6866	1.495
#1	4.964	5.153	5.007	1.058	5.115	4.958	5.079
#2	4.973	4.995	4.981	1.029	4.991	4.890	4.948
#3	5.037	5.013	4.987	1.031	4.973	4.926	4.951
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	**5847.6**
Stddev	77.6
%RSD	1.3266
#1	5758.7
#2	5901.5
#3	5882.5

Sample Name: ICB Acquired: 5/22/2014 10:44:06 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0055	.0006	.0117	.0003	.0002	<.0000	<.0000	.0002
Stddev	.0001	.0031	.0003	.0003	.0004	.0003	.0019	.0009	.0002
%RSD	38.19	55.99	55.51	2.844	114.9	101.0	127.8	93.94	93.22
#1	-.0004	.0086	.0005	.0115	.0007	.0005	.0006	-.0001	.0004
#2	-.0003	.0024	.0003	.0114	.0002	.0002	-.0021	-.0018	.0001
#3	-.0002	.0056	.0009	.0120	.0000	.0000	-.0030	-.0009	.0001
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	.0003	.0002	.0026	.0037	.0011	.0025	.0002	.0002
Stddev	.0001	.0011	.0005	.0027	.0122	.0009	.0017	.0003	.0002
%RSD	87.88	307.4	286.0	102.3	331.4	75.04	68.16	127.8	100.7
#1	.0002	-.0008	.0000	.0057	.0178	.0017	.0041	.0005	.0003
#2	.0000	.0006	-.0002	.0006	-.0034	.0016	.0025	.0003	.0000
#3	.0002	.0013	.0007	.0016	-.0034	.0002	.0008	-.0001	.0003
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0089	.0002	<.0000	.0009	.0040	.0019	<.0000	.0016	.0000
Stddev	.0034	.0001	.0003	.0011	.0019	.0005	.0021	.0017	.0006
%RSD	38.45	31.08	111.8	125.1	46.03	27.05	162.4	107.0	8163.
#1	.0128	.0002	-.0003	.0021	.0062	.0024	-.0033	.0028	-.0002
#2	.0070	.0002	.0000	.0006	.0029	.0014	.0009	-.0004	-.0005
#3	.0068	.0001	-.0006	.0000	.0031	.0019	-.0014	.0025	.0007
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Sample Name: ICB Acquired: 5/22/2014 10:44:06 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0003	.0010	.0003	<.0000	<.0000	<.0000	.0001
Stddev	.0002	.0058	.0004	.0012	.0014	.0007	.0001
%RSD	90.85	555.6	113.9	49.04	89.74	307.3	121.8
#1	.0005	-.0013	.0006	-.0019	-.0007	-.0008	.0002
#2	.0002	-.0033	-.0001	-.0039	-.0008	.0006	.0002
#3	.0000	.0077	.0005	-.0016	-.0031	-.0005	.0000
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit							
Low Limit							

Int. Std.	Y_3710
Units	Cts/S
Avg	6051.1
Stddev	14.9
%RSD	.24691
#1	6037.5
#2	6067.1
#3	6048.6

Sample Name: LLC Acquired: 5/22/2014 10:48:02 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0100**	**.2057**	**.0092**	**.0518**	**.0512**	**.0051**	**.2120**	**1.119**
Stddev	.0003	.0028	.0006	.0010	.0002	.0000	.0031	.002
%RSD	2.776	1.356	6.906	1.972	.4159	.6945	1.473	.1716
#1	.0103	.2046	.0090	.0523	.0511	.0050	.2150	1.121
#2	.0098	.2035	.0087	.0506	.0510	.0050	.2123	1.119
#3	.0098	.2088	.0099	.0524	.0514	.0051	.2088	1.117
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value								
Range								

Elem	Cd2288	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0052**	**.0551**	**.0104**	**.0255**	**.1056**	**5.228**	**.0570**	**.9347**
Stddev	.0000	.0003	.0007	.0001	.0015	.030	.0002	.0112
%RSD	.3741	.5765	7.078	.5148	1.399	.5788	.3941	1.200
#1	.0052	.0548	.0102	.0256	.1072	5.194	.0571	.9377
#2	.0052	.0554	.0098	.0255	.1042	5.237	.0567	.9441
#3	.0052	.0550	.0112	.0253	.1054	5.253	.0571	.9223
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value								
Range								

Elem	Mn2576	Mo2020	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0155**	**.0415**	**1.053**	**.0448**	**.2688**	**.0111**	**4.900**	**.0107**
Stddev	.0003	.0003	.003	.0001	.0013	.0002	.030	.0014
%RSD	1.641	.6093	.2883	.2612	.4660	1.377	.6176	12.69
#1	.0155	.0418	1.050	.0448	.2674	.0111	4.902	.0102
#2	.0158	.0414	1.056	.0449	.2699	.0110	4.929	.0123
#3	.0153	.0414	1.052	.0447	.2691	.0113	4.869	.0097
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value								
Range								

Sample Name: LLC Acquired: 5/22/2014 10:48:02 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Se1960	Si2516	Sn1899	Sr4077	Th2832	Ti3349	Tl1908	U_3670
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0145**	**.3815**	**.1070**	**.0051**	**.1974**	**.0193**	W **.0240**	**.5164**
Stddev	.0030	.0035	.0001	.0000	.0019	.0004	.0006	.0143
%RSD	20.81	.9109	.1175	.8751	.9541	1.850	2.327	2.767
#1	.0129	.3783	.1069	.0051	.1991	.0196	.0234	.5244
#2	.0180	.3810	.1069	.0051	.1978	.0189	.0241	.5249
#3	.0126	.3852	.1071	.0051	.1954	.0194	.0245	.4999
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Warn	Chk Pass
Value							.0200	
Range							20.00%	

Elem	V_2908	Zn2138
Units	ppm	ppm
Avg	**.0474**	**.0211**
Stddev	.0003	.0001
%RSD	.5500	.4273
#1	.0472	.0211
#2	.0477	.0210
#3	.0473	.0212
Check ?	Chk Pass	Chk Pass
Value		
Range		

Int. Std.	Y_3710
Units	Cts/S
Avg	**6020.6**
Stddev	11.1
%RSD	.18449
#1	6029.8
#2	6008.3
#3	6023.9

Sample Name: ICSA Acquired: 5/22/2014 10:51:55 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0002**	**102.3**	**<.0000**	**.0076**	**.0005**	**<.0000**	**.0130**
Stddev	.0008	.4	.0006	.0024	.0001	.0000	.0004
%RSD	339.0	.3502	192.2	31.08	21.39	191.7	3.184
#1	-.0007	101.9	.0004	.0053	.0004	.0000	.0130
#2	.0009	102.6	-.0006	.0075	.0004	.0000	.0134
#3	.0005	102.3	-.0008	.0100	.0006	.0000	.0126
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit							
Low Limit							

Elem	Ca1840	Cd2288	Co2286	Cr2835	Cu2178	Fe2599	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**98.98**	**<.0000**	**.0022**	**W .0092**	**<.0000**	**99.20**	**102.5**
Stddev	.29	.0001	.0001	.0001	.0007	.13	.5
%RSD	.2934	35.19	2.394	.6166	48.31	.1342	.4641
#1	99.31	-.0003	.0022	.0093	-.0013	99.35	102.0
#2	98.80	-.0001	.0022	.0092	-.0023	99.11	103.0
#3	98.82	-.0002	.0021	.0092	-.0009	99.13	102.4
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Warn	Chk Pass	Chk Pass	Chk Pass
High Limit				.0061			
Low Limit				-.0061			

Elem	Li6707	Mg2798	Mn2576	Mo2020	Na5895	Ni2216	P_1774
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0016**	**100.7**	**W .0050**	**<.0000**	**97.39**	**.0016**	**99.03**
Stddev	.0004	.2	.0001	.0003	.88	.0002	.38
%RSD	23.53	.2028	1.417	122.5	.9077	13.66	.3882
#1	.0018	100.9	.0050	-.0004	96.90	.0018	99.41
#2	.0012	100.6	.0051	-.0005	96.86	.0016	99.03
#3	.0019	100.5	.0050	.0001	98.41	.0014	98.65
Check ?	Chk Pass	Chk Pass	Chk Warn	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit			.0031				
Low Limit			-.0031				

Sample Name: ICSA Acquired: 5/22/2014 10:51:55 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899	Sr4077
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0024	102.4	.0054	.0006	.0019	<.0000	W<.0000
Stddev	.0013	.4	.0003	.0015	.0046	.0001	.0000
%RSD	53.03	.4090	6.183	253.8	238.5	13.32	.9399
#1	.0019	102.9	.0055	.0011	-.0019	-.0011	-.0046
#2	.0038	102.3	.0050	-.0011	.0007	-.0011	-.0047
#3	.0014	102.0	.0056	.0017	.0070	-.0009	-.0046
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Warn
High Limit							.0011
Low Limit							-.0011

Elem	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	F .2805	.0020	<.0000	.0211	<.0000	<.0000
Stddev	.0055	.0004	.0008	.0117	.0047	.0000
%RSD	1.964	22.12	21.56	55.60	519.5	.4801
#1	.2778	.0025	-.0030	.0092	-.0009	-.0067
#2	.2868	.0017	-.0040	.0326	-.0055	-.0068
#3	.2767	.0017	-.0046	.0214	.0038	-.0067
Check ?	Chk Fail	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit	.2000					
Low Limit	-.2000					

Int. Std.	Y_3710
Units	Cts/S
Avg	5595.1
Stddev	10.4
%RSD	.18551
#1	5583.2
#2	5602.3
#3	5599.9

Sample Name: ICSAB Acquired: 5/22/2014 10:55:51 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.4922**	**103.2**	**2.503**	**2.510**	**2.581**	**2.564**	**2.496**	**96.30**	**2.524**
Stddev	.0051	.8	.016	.013	.010	.009	.015	.61	.018
%RSD	1.043	.7768	.6343	.5236	.3776	.3417	.6109	.6307	.7015
#1	.4867	104.1	2.484	2.523	2.590	2.554	2.479	95.68	2.504
#2	.4931	103.0	2.511	2.512	2.583	2.570	2.506	96.31	2.531
#3	.4968	102.5	2.513	2.496	2.571	2.569	2.504	96.90	2.537
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**2.435**	**2.462**	**2.505**	**97.36**	**103.6**	**2.714**	**98.64**	**2.470**	**.4907**
Stddev	.018	.022	.020	.45	1.3	.053	.61	.011	.0031
%RSD	.7414	.9156	.7931	.4587	1.270	1.960	.6192	.4315	.6249
#1	2.414	2.438	2.482	96.86	105.0	2.771	98.02	2.461	.4875
#2	2.444	2.469	2.514	97.48	103.5	2.706	98.66	2.466	.4910
#3	2.447	2.481	2.519	97.73	102.4	2.666	99.24	2.482	.4936
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**102.6**	**2.468**	**95.66**	**2.472**	**98.37**	**.4959**	**.5055**	**2.514**	**2.477**
Stddev	2.0	.015	.80	.017	.73	.0047	.0053	.005	.014
%RSD	1.905	.5962	.8345	.7031	.7391	.9400	1.047	.1846	.5451
#1	101.6	2.452	94.76	2.453	97.55	.4905	.4994	2.510	2.462
#2	104.8	2.473	95.92	2.477	98.62	.4980	.5082	2.513	2.481
#3	101.3	2.480	96.29	2.487	98.94	.4991	.5088	2.519	2.489
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Sample Name: ICSAB Acquired: 5/22/2014 10:55:51 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**2.610**	**2.640**	**2.507**	**.4917**	**2.513**	**2.458**	**2.534**
Stddev	.003	.025	.002	.0032	.038	.007	.018
%RSD	.1253	.9535	.0855	.6601	1.498	.2668	.7285
#1	2.611	2.612	2.505	.4880	2.471	2.453	2.513
#2	2.606	2.647	2.507	.4932	2.523	2.456	2.542
#3	2.613	2.660	2.510	.4940	2.545	2.466	2.548
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	**5661.3**
Stddev	45.2
%RSD	.79802
#1	5710.4
#2	5652.1
#3	5621.4

Sample Name: LDR Acquired: 5/22/2014 10:59:35 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**1.999**	**104.0**	**10.14**	**10.06**	**10.11**	**9.935**	**10.10**	**98.41**	**10.17**
Stddev	.000	.1	.02	.01	.04	.063	.02	.17	.02
%RSD	.0182	.1300	.1865	.0849	.4018	.6364	.2210	.1777	.1513
#1	1.999	104.1	10.16	10.06	10.08	9.995	10.12	98.50	10.19
#2	2.000	103.9	10.13	10.05	10.15	9.869	10.08	98.53	10.17
#3	1.999	104.1	10.13	10.07	10.08	9.942	10.10	98.21	10.15
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**9.807**	**9.932**	**10.19**	**98.99**	**104.3**	**10.70**	**100.9**	**10.02**	**1.997**
Stddev	.023	.004	.02	.04	.2	.03	.2	.01	.005
%RSD	.2369	.0383	.2035	.0435	.1782	.2698	.1662	.0679	.2738
#1	9.832	9.935	10.22	98.94	104.2	10.70	100.8	10.03	2.004
#2	9.802	9.933	10.18	99.01	104.2	10.68	100.9	10.01	1.995
#3	9.787	9.927	10.18	99.02	104.5	10.74	101.1	10.02	1.994
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**101.9**	**10.04**	**97.57**	**9.977**	**100.8**	**2.035**	**2.026**	**10.22**	**10.00**
Stddev	2.7	.01	.26	.008	.2	.005	.006	.01	.01
%RSD	2.616	.1169	.2635	.0846	.1903	.2320	.2831	.0896	.1205
#1	99.81	10.05	97.87	9.987	101.0	2.041	2.031	10.22	10.01
#2	101.1	10.05	97.46	9.974	100.8	2.032	2.020	10.22	10.01
#3	104.9	10.03	97.39	9.971	100.6	2.033	2.028	10.23	9.988
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Sample Name: LDR Acquired: 5/22/2014 10:59:35 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**10.06**	**9.754**	**10.10**	**1.954**	**10.08**	**9.871**	**9.998**
Stddev	.08	.011	.01	.007	.02	.026	.017
%RSD	.7903	.1087	.0854	.3808	.2100	.2655	.1665
#1	10.11	9.766	10.10	1.962	10.07	9.870	10.02
#2	9.969	9.753	10.09	1.948	10.10	9.898	9.994
#3	10.10	9.745	10.10	1.951	10.06	9.845	9.984
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	**5447.2**
Stddev	6.1
%RSD	.11122
#1	5440.5
#2	5449.1
#3	5452.1

Sample Name: CCV Acquired: 5/22/2014 11:03:33 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.9825**	**51.01**	**5.056**	**4.925**	**5.088**	**4.989**	**5.110**	**50.64**	**5.115**
Stddev	.0055	.11	.037	.013	.090	.026	.030	.20	.027
%RSD	.5618	.2238	.7264	.2643	1.767	.5161	.5802	.3885	.5281
#1	.9828	50.97	5.028	4.913	5.143	4.976	5.088	50.57	5.095
#2	.9879	50.92	5.097	4.939	5.136	5.019	5.144	50.86	5.146
#3	.9769	51.14	5.041	4.923	4.984	4.974	5.100	50.48	5.103
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.023**	**5.030**	**5.144**	**49.02**	**52.81**	F **5.519**	**48.04**	**4.951**	**1.014**
Stddev	.033	.032	.031	.18	.21	.036	.21	.019	.006
%RSD	.6596	.6359	.6006	.3679	.3995	.6555	.4399	.3755	.6307
#1	5.001	5.025	5.120	48.91	52.69	5.513	48.04	4.957	1.009
#2	5.061	5.064	5.179	49.22	52.68	5.486	48.25	4.965	1.021
#3	5.006	5.001	5.132	48.92	53.05	5.558	47.83	4.930	1.013
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Fail	Chk Pass	Chk Pass	Chk Pass
Value						5.000			
Range						10.00%			

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**52.86**	**5.154**	**51.43**	**5.151**	**50.20**	**1.019**	**1.014**	**5.003**	**5.145**
Stddev	.30	.024	.35	.026	.32	.008	.007	.013	.026
%RSD	.5595	.4611	.6883	.4967	.6380	.8062	.6804	.2545	.5003
#1	52.65	5.135	51.22	5.138	49.94	1.011	1.008	5.010	5.128
#2	52.73	5.181	51.84	5.180	50.55	1.027	1.022	4.989	5.175
#3	53.20	5.146	51.23	5.135	50.09	1.019	1.012	5.011	5.133
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Sample Name: CCV Acquired: 5/22/2014 11:03:33 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.133**	**4.884**	**5.003**	**1.025**	**5.109**	**4.848**	**5.097**
Stddev	.068	.014	.013	.006	.035	.008	.031
%RSD	1.319	.2770	.2560	.6300	.6889	.1564	.6121
#1	5.126	4.884	4.990	1.025	5.122	4.841	5.076
#2	5.069	4.898	5.015	1.032	5.136	4.856	5.133
#3	5.204	4.870	5.003	1.019	5.069	4.848	5.083
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	**5679.0**
Stddev	21.5
%RSD	.37868
#1	5684.0
#2	5655.5
#3	5697.6

Sample Name: CCB Acquired: 5/22/2014 11:07:22 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0001**	**<.0000**	**<.0000**	**.0118**	**.0000**	**.0000**	**.0012**	**<.0000**	**.0001**
Stddev	.0006	.0034	.0013	.0007	.0000	.0000	.0009	.0009	.0001
%RSD	443.8	52.65	832.1	5.881	211.1	31.52	73.37	87.68	114.0
#1	.0005	-.0038	-.0011	.0122	.0000	.0001	.0002	-.0016	.0001
#2	.0005	-.0052	.0013	.0110	.0000	.0000	.0015	-.0014	.0000
#3	-.0006	-.0102	-.0006	.0121	.0001	.0000	.0018	.0000	.0003
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0005**	**.0010**	**.0000**	**.0001**	**.0110**	**.0011**	**.0111**	**.0004**	**.0002**
Stddev	.0002	.0008	.0002	.0007	.0162	.0001	.0045	.0002	.0001
%RSD	43.40	78.87	1484.	731.6	147.8	8.958	40.87	59.11	37.20
#1	.0003	.0002	.0002	.0007	.0225	.0011	.0107	.0005	.0001
#2	.0005	.0017	-.0002	.0003	.0180	.0009	.0159	.0005	.0002
#3	.0007	.0009	.0001	-.0007	-.0076	.0011	.0068	.0001	.0003
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0125**	**.0001**	**.0018**	**.0006**	**.0038**	**.0007**	**.0017**	**<.0000**	**.0000**
Stddev	.0030	.0002	.0018	.0011	.0016	.0009	.0013	.0050	.0001
%RSD	23.65	314.0	102.2	174.9	41.03	117.0	72.69	443.8	653.9
#1	.0111	.0003	-.0001	-.0004	.0054	.0013	.0017	-.0064	-.0001
#2	.0105	-.0002	.0020	.0005	.0023	-.0002	.0030	.0036	.0000
#3	.0159	.0001	.0035	.0018	.0037	.0011	.0005	-.0006	.0001
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Sample Name: CCB Acquired: 5/22/2014 11:07:22 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	<.0000	.0001	.0007	<.0000	.0014	.0000
Stddev	.0000	.0011	.0003	.0008	.0093	.0009	.0001
%RSD	220.6	55.23	372.6	123.5	60.23	59.36	216.7
#1	.0000	-.0028	-.0002	.0004	-.0073	.0023	.0000
#2	-.0001	-.0007	.0003	.0016	-.0134	.0006	.0002
#3	.0000	-.0022	.0001	.0000	-.0255	.0015	.0000
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit							
Low Limit							

Int. Std.	Y_3710
Units	Cts/S
Avg	6016.5
Stddev	23.0
%RSD	.38200
#1	5999.2
#2	6007.7
#3	6042.6

Sample Name: 160-6588-D-7-A Acquired: 5/22/2014 11:11:19 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0126	<.0000	.0348	.3127	.0001	<.0000	41.92	.0001
Stddev	.0004	.0038	.0017	.0021	.0022	.0003	.0015	1.03	.0001
%RSD	208.6	30.64	104.8	5.949	.7040	205.4	354.8	2.455	66.17
#1	-.0001	.0102	.0003	.0326	.3132	.0000	-.0018	42.93	.0002
#2	-.0006	.0105	-.0027	.0351	.3147	.0000	-.0007	41.96	.0000
#3	.0001	.0170	-.0026	.0367	.3103	.0005	.0012	40.87	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0003	.0015	<.0000	.0142	1.322	.0057	17.44	.0035	.0013
Stddev	.0003	.0004	.0006	.0034	.015	.0013	.10	.0002	.0002
%RSD	99.00	22.96	32.24	23.72	1.098	22.89	.5496	4.390	16.62
#1	.0004	.0019	-.0012	.0123	1.308	.0054	17.55	.0034	.0013
#2	.0000	.0014	-.0017	.0122	1.337	.0045	17.40	.0035	.0011
#3	.0004	.0013	-.0023	.0181	1.321	.0071	17.37	.0037	.0015
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	12.92	.0015	.0071	.0012	1.544	.0013	.0005	4.862	<.0000
Stddev	.31	.0002	.0012	.0005	.040	.0008	.0025	.024	.0003
%RSD	2.365	10.72	16.88	46.10	2.585	64.43	504.4	.5012	44.98
#1	12.93	.0017	.0059	.0009	1.583	.0017	.0029	4.882	-.0003
#2	13.23	.0014	.0083	.0018	1.545	.0019	.0006	4.870	-.0008
#3	12.61	.0015	.0071	.0008	1.503	.0003	-.0020	4.835	-.0007
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6588-D-7-A Acquired: 5/22/2014 11:11:19 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0718	.0014	.0006	<.0000	<.0000	.0013	.0107
Stddev	.0003	.0018	.0011	.0006	.0056	.0035	.0003
%RSD	.4359	125.9	181.4	36.39	39.20	261.6	3.135
#1	.0715	.0014	.0000	-.0016	-.0079	-.0007	.0111
#2	.0721	.0032	.0000	-.0012	-.0185	-.0007	.0106
#3	.0716	-.0004	.0019	-.0025	-.0161	.0053	.0104
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5932.4
Stddev	6.5
%RSD	.10893
#1	5930.2
#2	5927.3
#3	5939.7

Sample Name: MB 160-119594/1-A Acquired: 5/22/2014 11:15:13 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0102	<.0000	.0126	.0002	<.0000	.0003	.0631	.0001
Stddev	.0001	.0010	.0018	.0036	.0001	.0000	.0007	.0054	.0002
%RSD	64.96	10.00	285.8	28.72	55.62	146.7	223.6	8.545	118.0
#1	.0000	.0091	-.0024	.0085	.0002	.0000	-.0002	.0694	.0003
#2	-.0003	.0112	.0012	.0140	.0001	.0000	.0012	.0598	.0000
#3	-.0002	.0102	-.0007	.0153	.0001	.0000	.0000	.0602	.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0000	.0007	.0002	.0121	.0092	.0008	.0203	.0001	.0001
Stddev	.0003	.0001	.0008	.0015	.0261	.0001	.0168	.0003	.0001
%RSD	707.3	12.49	504.0	12.81	284.8	14.31	82.49	283.2	55.06
#1	.0004	.0007	.0006	.0105	.0101	.0008	.0272	-.0003	.0001
#2	.0000	.0006	-.0008	.0135	.0348	.0007	.0012	.0002	.0001
#3	-.0002	.0007	.0008	.0122	-.0174	.0009	.0326	.0004	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0377	.0005	.0031	.0002	.0059	.0011	.0024	.0915	.0002
Stddev	.0020	.0001	.0005	.0002	.0006	.0008	.0033	.0003	.0003
%RSD	5.268	18.96	17.19	85.14	10.99	73.87	136.3	.3625	157.6
#1	.0399	.0004	.0037	.0001	.0058	.0010	-.0013	.0915	.0005
#2	.0360	.0006	.0026	.0004	.0066	.0020	.0037	.0912	-.0001
#3	.0373	.0005	.0031	.0001	.0053	.0004	.0050	.0919	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: MB 160-119594/1-A Acquired: 5/22/2014 11:15:13 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0000	<.0000	<.0000	<.0000	<.0000	<.0000	.0144
Stddev	.0000	.0044	.0006	.0008	.0084	.0011	.0001
%RSD	75.98	360.8	123.8	113.2	96.62	32.32	.5780
#1	.0001	.0013	.0001	-.0008	.0009	-.0046	.0143
#2	.0000	.0014	-.0005	.0001	-.0126	-.0025	.0145
#3	.0001	-.0063	-.0010	-.0014	-.0144	-.0030	.0144
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	6019.9
Stddev	9.3
%RSD	.15368
#1	6027.1
#2	6009.4
#3	6023.1

Sample Name: LCS 160-119594/2-A Acquired: 5/22/2014 11:19:09 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2096	10.75	1.026	2.549	1.068	1.043	1.061	10.77	1.064
Stddev	.0007	.03	.002	.001	.001	.003	.006	.03	.003
%RSD	.3429	.2788	.2215	.0390	.1293	.3099	.5621	.2831	.2969
#1	.2089	10.71	1.028	2.550	1.066	1.047	1.068	10.81	1.068
#2	.2103	10.77	1.025	2.548	1.068	1.043	1.060	10.75	1.064
#3	.2096	10.75	1.024	2.550	1.069	1.041	1.056	10.76	1.061
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.069	1.077	1.103	10.34	10.94	1.173	9.610	1.040	.5316
Stddev	.005	.004	.004	.05	.06	.010	.035	.002	.0029
%RSD	.4416	.3474	.3559	.4470	.5127	.8672	.3619	.2313	.5489
#1	1.074	1.079	1.107	10.39	10.88	1.161	9.626	1.042	.5345
#2	1.069	1.080	1.103	10.33	10.95	1.177	9.635	1.040	.5316
#3	1.065	1.073	1.099	10.30	10.99	1.180	9.570	1.037	.5286
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	11.42	1.116	1.076	1.096	10.07	.5287	.5202	5.153	1.093
Stddev	.07	.003	.003	.002	.03	.0016	.0023	.013	.006
%RSD	.6225	.2497	.2555	.2185	.2813	.3108	.4414	.2578	.5257
#1	11.33	1.120	1.076	1.098	10.10	.5305	.5225	5.149	1.100
#2	11.45	1.115	1.079	1.098	10.06	.5276	.5203	5.168	1.089
#3	11.47	1.115	1.073	1.094	10.05	.5279	.5179	5.142	1.090
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: LCS 160-119594/2-A Acquired: 5/22/2014 11:19:09 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.112	1.015	1.051	.2238	1.108	1.012	1.059
Stddev	.000	.009	.001	.0005	.018	.005	.004
%RSD	.0334	.9263	.0500	.2120	1.595	.4593	.3473
#1	1.112	1.017	1.052	.2243	1.095	1.015	1.063
#2	1.112	1.023	1.051	.2235	1.128	1.014	1.058
#3	1.113	1.005	1.051	.2235	1.101	1.007	1.055
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5863.5
Stddev	21.2
%RSD	.36131
#1	5839.7
#2	5870.5
#3	5880.3

Sample Name: 160-6426-A-1-B Acquired: 5/22/2014 11:22:39 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=5

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0000**	**21.22**	**.0102**	**.0103**	**.2961**	**.0015**	**<.0000**	**4.558**	**<.0000**
Stddev	.0006	.09	.0004	.0040	.0019	.0008	.0003	.055	.0001
%RSD	1289.	.4119	3.968	38.31	.6349	53.26	339.4	1.206	559.5
#1	.0006	21.15	.0106	.0075	.2940	.0011	-.0003	4.500	.0000
#2	.0001	21.19	.0098	.0149	.2969	.0024	.0003	4.564	.0000
#3	-.0005	21.32	.0102	.0087	.2975	.0010	-.0003	4.609	.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0176**	**.0321**	**.0227**	**27.69**	**1.722**	**.0143**	**3.853**	**.5154**	**.0003**
Stddev	.0004	.0008	.0013	.13	.006	.0009	.018	.0011	.0003
%RSD	2.302	2.469	5.921	.4671	.3784	6.351	.4737	.2206	129.0
#1	.0171	.0312	.0231	27.61	1.715	.0133	3.832	.5147	.0003
#2	.0177	.0324	.0212	27.62	1.723	.0151	3.865	.5148	-.0001
#3	.0179	.0327	.0237	27.84	1.727	.0144	3.862	.5167	.0006
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.7018**	**.0318**	**.5888**	**.0212**	**.2610**	**.0006**	**<.0000**	**5.274**	**.0012**
Stddev	.0104	.0003	.0076	.0008	.0040	.0012	.0014	.011	.0005
%RSD	1.485	1.094	1.292	3.614	1.530	214.6	538.9	.2053	42.04
#1	.6923	.0317	.5819	.0214	.2569	-.0006	-.0018	5.274	.0017
#2	.7129	.0315	.5876	.0218	.2611	.0017	.0008	5.262	.0007
#3	.7001	.0322	.5970	.0204	.2649	.0006	.0003	5.284	.0012
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6426-A-1-B Acquired: 5/22/2014 11:22:39 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=5

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0259	.0848	.3678	<.0000	<.0000	.0488	.0769
Stddev	.0009	.0032	.0020	.0007	.0032	.0047	.0010
%RSD	3.278	3.729	.5339	15.95	26.68	9.566	1.328
#1	.0253	.0880	.3655	-.0039	-.0129	.0534	.0758
#2	.0269	.0816	.3689	-.0047	-.0143	.0490	.0771
#3	.0257	.0849	.3689	-.0053	-.0083	.0441	.0778
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	6361.2
Stddev	15.3
%RSD	.24089
#1	6349.3
#2	6355.8
#3	6378.5

Sample Name: 160-6426-A-1-B SD Acquired: 5/22/2014 11:26:29 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=25

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	4.349	.0018	.0023	.0601	.0002	.0010	.9185	.0000
Stddev	.0005	.027	.0003	.0018	.0002	.0000	.0021	.0030	.0001
%RSD	279.3	.6118	15.08	78.78	.3831	8.002	202.9	.3267	662.1
#1	.0002	4.341	.0021	.0040	.0602	.0002	.0016	.9160	.0002
#2	-.0007	4.379	.0015	.0003	.0603	.0002	-.0013	.9218	-.0001
#3	.0000	4.328	.0018	.0027	.0599	.0002	.0028	.9176	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0039	.0068	.0015	5.720	.3378	.0033	.7853	.1053	<.0000
Stddev	.0003	.0008	.0006	.003	.0076	.0003	.0123	.0003	.0000
%RSD	6.637	12.21	36.00	.0574	2.255	10.29	1.565	.3159	36.44
#1	.0042	.0078	.0010	5.719	.3376	.0029	.7911	.1050	-.0001
#2	.0037	.0063	.0021	5.719	.3455	.0036	.7937	.1053	-.0001
#3	.0039	.0064	.0015	5.724	.3302	.0034	.7712	.1056	-.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1534	.0064	.1193	.0051	.0537	<.0000	<.0000	1.064	.0005
Stddev	.0009	.0001	.0006	.0007	.0013	.0013	.0009	.011	.0000
%RSD	.6111	2.286	.4770	13.08	2.420	309.1	209.2	1.014	2.020
#1	.1544	.0065	.1195	.0058	.0550	-.0002	-.0002	1.052	.0005
#2	.1525	.0063	.1197	.0045	.0524	-.0018	-.0015	1.068	.0005
#3	.1532	.0065	.1186	.0051	.0535	.0008	.0003	1.073	.0005
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6426-A-1-B SD Acquired: 5/22/2014 11:26:29 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=25

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0051	.0207	.0742	<.0000	.0029	.0113	.0192
Stddev	.0000	.0045	.0003	.0009	.0090	.0018	.0001
%RSD	.8929	21.56	.4508	95.82	305.3	15.48	.6544
#1	.0052	.0159	.0740	-.0010	-.0073	.0093	.0194
#2	.0051	.0246	.0746	.0000	.0095	.0121	.0192
#3	.0051	.0216	.0741	-.0018	.0067	.0126	.0192
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5994.2
Stddev	12.5
%RSD	.20861
#1	6006.9
#2	5993.6
#3	5982.0

Sample Name: 160-6426-A-1-C MS Acquired: 5/22/2014 11:30:23 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=5

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0405**	**37.04**	**.2120**	**.3669**	**.5324**	**.1925**	**.2111**	**7.746**	**.2088**
Stddev	.0006	.33	.0056	.0034	.0024	.0009	.0046	.183	.0050
%RSD	1.407	.8925	2.645	.9143	.4478	.4831	2.202	2.364	2.418
#1	.0400	37.02	.2055	.3659	.5326	.1915	.2075	7.566	.2037
#2	.0404	36.72	.2151	.3641	.5300	.1927	.2095	7.740	.2088
#3	.0411	37.38	.2154	.3706	.5347	.1933	.2164	7.932	.2138
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.2370**	**.2479**	**.2359**	**37.20**	**5.110**	**.2290**	**6.813**	**2.232**	**.1008**
Stddev	.0057	.0010	.0051	.17	.060	.0033	.037	.012	.0025
%RSD	2.397	.3916	2.151	.4437	1.177	1.446	.5373	.5511	2.464
#1	.2311	.2470	.2306	37.02	5.086	.2297	6.772	2.220	.0984
#2	.2373	.2477	.2363	37.23	5.065	.2254	6.823	2.232	.1007
#3	.2425	.2490	.2407	37.35	5.178	.2319	6.843	2.245	.1033
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**2.743**	**.2559**	**.9084**	**.2456**	**2.297**	**.0402**	**.1001**	**5.211**	**.2059**
Stddev	.039	.0066	.0251	.0069	.064	.0016	.0033	.032	.0044
%RSD	1.414	2.591	2.766	2.825	2.785	3.944	3.259	.6211	2.152
#1	2.741	.2496	.8827	.2389	2.230	.0394	.0964	5.193	.2014
#2	2.706	.2553	.9096	.2452	2.304	.0392	.1027	5.191	.2061
#3	2.783	.2628	.9329	.2527	2.357	.0420	.1011	5.248	.2103
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6426-A-1-C MS Acquired: 5/22/2014 11:30:23 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=5

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2325	.2976	.7629	.0425	.2118	.2656	.2997
Stddev	.0010	.0034	.0024	.0012	.0036	.0045	.0074
%RSD	.4165	1.150	.3196	2.907	1.707	1.713	2.461
#1	.2321	.2939	.7616	.0429	.2080	.2650	.2923
#2	.2317	.2981	.7614	.0412	.2121	.2614	.2997
#3	.2335	.3007	.7657	.0436	.2152	.2704	.3070
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	6325.9
Stddev	18.3
%RSD	.28987
#1	6343.5
#2	6327.3
#3	6306.9

Sample Name: 160-6426-A-1-D MSD Acquired: 5/22/2014 11:34:03 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=5

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0382	35.72	.2024	.3590	.5208	.1877	.1993	6.846	.1971
Stddev	.0006	.24	.0044	.0027	.0021	.0002	.0023	.125	.0028
%RSD	1.581	.6624	2.182	.7584	.4057	.1258	1.140	1.824	1.414
#1	.0381	35.52	.2013	.3620	.5185	.1880	.1978	6.762	.1952
#2	.0376	35.65	.1986	.3582	.5214	.1877	.1982	6.786	.1958
#3	.0388	35.98	.2073	.3567	.5226	.1875	.2020	6.989	.2003
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2204	.2359	.2238	35.06	5.062	.2320	6.522	1.131	.0940
Stddev	.0025	.0016	.0018	.12	.040	.0039	.045	.006	.0009
%RSD	1.147	.6806	.7945	.3343	.7918	1.675	.6966	.5311	1.000
#1	.2188	.2360	.2221	35.18	5.019	.2279	6.574	1.136	.0937
#2	.2191	.2342	.2236	34.94	5.068	.2323	6.497	1.124	.0933
#3	.2234	.2375	.2256	35.05	5.098	.2357	6.494	1.133	.0951
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	2.759	.2432	.8860	.2347	2.176	.0431	.0950	6.119	.1936
Stddev	.019	.0045	.0104	.0036	.028	.0007	.0021	.005	.0027
%RSD	.6961	1.839	1.171	1.539	1.264	1.660	2.242	.0811	1.407
#1	2.740	.2401	.8812	.2324	2.155	.0436	.0928	6.121	.1911
#2	2.758	.2412	.8789	.2328	2.165	.0435	.0949	6.113	.1934
#3	2.778	.2483	.8979	.2388	2.207	.0423	.0971	6.122	.1965
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6426-A-1-D MSD Acquired: 5/22/2014 11:34:03 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=5

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2284	.2819	.7393	.0406	.2040	.2617	.2809
Stddev	.0007	.0050	.0011	.0021	.0115	.0051	.0041
%RSD	.3114	1.775	.1494	5.093	5.648	1.968	1.468
#1	.2276	.2827	.7389	.0387	.1908	.2655	.2780
#2	.2288	.2766	.7385	.0404	.2091	.2558	.2791
#3	.2289	.2865	.7406	.0428	.2121	.2637	.2856
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	6400.8
Stddev	36.9
%RSD	.57679
#1	6372.1
#2	6442.4
#3	6387.8

Sample Name: 160-6426-A-2-B Acquired: 5/22/2014 11:37:44 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=5

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0001**	**13.73**	**.0100**	**.0056**	**.3025**	**.0008**	**<.0000**	**4.382**	**.0004**
Stddev	.0001	.09	.0007	.0004	.0018	.0000	.0013	.043	.0000
%RSD	49.87	.6717	6.701	7.240	.5915	2.792	100.6	.9850	6.990
#1	.0002	13.73	.0093	.0054	.3028	.0008	-.0005	4.334	.0005
#2	.0001	13.82	.0101	.0053	.3041	.0008	-.0029	4.394	.0004
#3	.0001	13.63	.0106	.0060	.3006	.0008	-.0007	4.418	.0004
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0143**	**.0237**	**.0195**	**21.92**	**1.642**	**.0099**	**2.717**	**.7928**	**.0004**
Stddev	.0004	.0000	.0013	.09	.039	.0005	.009	.0044	.0001
%RSD	3.069	.1110	6.827	.3941	2.355	5.353	.3200	.5605	18.77
#1	.0139	.0237	.0210	21.83	1.667	.0093	2.719	.7883	.0004
#2	.0143	.0237	.0192	21.93	1.662	.0101	2.708	.7929	.0005
#3	.0147	.0237	.0184	22.01	1.598	.0104	2.725	.7972	.0004
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**1.731**	**.0227**	**1.347**	**.0328**	**.5466**	**.0008**	**<.0000**	**5.850**	**.0011**
Stddev	.026	.0003	.015	.0010	.0066	.0008	.0022	.013	.0004
%RSD	1.483	1.342	1.081	2.948	1.208	100.7	149.3	.2284	39.98
#1	1.753	.0224	1.332	.0318	.5397	.0013	.0010	5.846	.0007
#2	1.736	.0229	1.349	.0338	.5471	-.0001	-.0031	5.865	.0011
#3	1.703	.0228	1.361	.0327	.5529	.0012	-.0023	5.839	.0015
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6426-A-2-B Acquired: 5/22/2014 11:37:44 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=5

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0316	.0630	.3572	<.0000	<.0000	.0362	.0844
Stddev	.0002	.0027	.0015	.0009	.0034	.0012	.0007
%RSD	.7401	4.271	.4195	26.90	56.95	3.341	.8175
#1	.0315	.0631	.3559	-.0024	-.0094	.0366	.0838
#2	.0318	.0602	.3588	-.0034	-.0027	.0348	.0843
#3	.0314	.0656	.3568	-.0042	-.0057	.0371	.0852
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	6399.7
Stddev	11.6
%RSD	.18200
#1	6413.1
#2	6394.0
#3	6392.0

Sample Name: 160-6426-A-2-B PDS Acquired: 5/22/2014 11:41:31 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=5

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0813**	**15.72**	**.1048**	**.4697**	**.7893**	**.0483**	**1.937**	**14.32**	**.0491**
Stddev	.0005	.13	.0012	.0029	.0075	.0002	.002	.06	.0003
%RSD	.5820	.8244	1.181	.6271	.9484	.3377	.0914	.4401	.5505
#1	.0809	15.58	.1062	.4683	.7827	.0481	1.937	14.25	.0488
#2	.0818	15.75	.1042	.4678	.7879	.0483	1.936	14.33	.0493
#3	.0811	15.84	.1039	.4731	.7974	.0484	1.939	14.38	.0492
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.5150**	**.1138**	**.2684**	**21.73**	**55.87**	**.6134**	**11.24**	**.8928**	**.3861**
Stddev	.0022	.0006	.0009	.05	.88	.0122	.07	.0040	.0009
%RSD	.4280	.5115	.3397	.2168	1.582	1.996	.6439	.4461	.2292
#1	.5125	.1133	.2684	21.68	54.93	.6007	11.31	.8974	.3857
#2	.5156	.1136	.2674	21.75	55.98	.6144	11.17	.8906	.3856
#3	.5168	.1144	.2693	21.76	56.69	.6251	11.24	.8903	.3872
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**12.89**	**.4355**	**3.861**	**.1324**	**46.61**	**.0940**	**.1444**	**9.356**	**.9827**
Stddev	.25	.0012	.011	.0006	.01	.0012	.0023	.033	.0022
%RSD	1.964	.2865	.2957	.4178	.0188	1.324	1.583	.3549	.2193
#1	12.62	.4341	3.854	.1325	46.60	.0953	.1470	9.363	.9802
#2	12.91	.4363	3.856	.1317	46.61	.0940	.1435	9.321	.9840
#3	13.13	.4361	3.874	.1328	46.61	.0928	.1427	9.386	.9838
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6426-A-2-B PDS Acquired: 5/22/2014 11:41:31 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=5

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0798	1.847	.5300	.2103	4.971	.4869	.2798
Stddev	.0007	.017	.0019	.0013	.038	.0022	.0007
%RSD	.8658	.9307	.3607	.6007	.7657	.4569	.2360
#1	.0791	1.845	.5295	.2097	4.983	.4860	.2791
#2	.0798	1.865	.5283	.2095	5.002	.4853	.2799
#3	.0805	1.830	.5321	.2118	4.929	.4895	.2804
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	6210.0
Stddev	11.3
%RSD	.18204
#1	6202.1
#2	6205.0
#3	6223.0

Sample Name: CCV Acquired: 5/22/2014 11:45:05 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.9884**	**50.80**	**5.006**	**4.958**	**5.127**	**5.043**	**5.081**	**50.82**	**5.105**
Stddev	.0007	.27	.001	.008	.018	.016	.009	.12	.003
%RSD	.0731	.5380	.0266	.1654	.3569	.3232	.1788	.2415	.0661
#1	.9882	50.77	5.008	4.951	5.147	5.053	5.074	50.95	5.102
#2	.9892	50.54	5.006	4.967	5.121	5.024	5.078	50.79	5.104
#3	.9877	51.08	5.005	4.955	5.113	5.051	5.091	50.71	5.109
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.020**	**5.044**	**5.123**	**49.70**	**51.87**	**5.391**	**48.75**	**5.027**	**1.012**
Stddev	.009	.018	.008	.11	.72	.097	.09	.016	.001
%RSD	.1720	.3465	.1644	.2208	1.392	1.795	.1797	.3141	.0558
#1	5.028	5.052	5.114	49.79	51.78	5.366	48.83	5.041	1.013
#2	5.021	5.055	5.131	49.73	51.19	5.309	48.76	5.031	1.011
#3	5.011	5.024	5.123	49.58	52.63	5.498	48.65	5.010	1.012
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**51.91**	**5.135**	**51.25**	**5.135**	**49.75**	**1.010**	**.9983**	**5.057**	**5.133**
Stddev	.80	.006	.07	.007	.02	.003	.0038	.026	.009
%RSD	1.538	.1145	.1396	.1276	.0314	.3229	.3817	.5191	.1845
#1	51.74	5.142	51.32	5.142	49.74	1.008	1.002	5.077	5.144
#2	51.20	5.134	51.25	5.130	49.75	1.008	.9985	5.066	5.129
#3	52.78	5.131	51.17	5.132	49.77	1.014	.9944	5.027	5.126
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value Range									

Sample Name: CCV Acquired: 5/22/2014 11:45:05 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.156**	**4.902**	**5.038**	**1.026**	**5.106**	**4.908**	**5.084**
Stddev	.027	.022	.003	.002	.016	.013	.002
%RSD	.5161	.4498	.0576	.2246	.3219	.2712	.0352
#1	5.167	4.881	5.041	1.028	5.105	4.910	5.086
#2	5.125	4.925	5.038	1.024	5.123	4.920	5.082
#3	5.175	4.901	5.035	1.024	5.090	4.894	5.084
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	**5630.6**
Stddev	8.6
%RSD	.15218
#1	5620.7
#2	5635.0
#3	5636.1

Sample Name: CCB Acquired: 5/22/2014 11:48:54 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0051	<.0000	.0070	.0002	.0002	.0010	<.0000	.0001
Stddev	.0002	.0057	.0011	.0014	.0000	.0000	.0013	.0005	.0001
%RSD	85.61	112.4	90.81	20.43	20.50	9.256	126.1	184.3	60.33
#1	-.0004	.0031	-.0004	.0070	.0003	.0002	.0026	-.0007	.0001
#2	.0000	.0006	-.0007	.0084	.0002	.0002	.0005	-.0004	.0001
#3	-.0001	.0115	-.0024	.0056	.0002	.0002	.0001	.0003	.0002
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	.0009	<.0000	.0037	<.0000	.0011	.0142	.0003	.0002
Stddev	.0005	.0004	.0010	.0011	.0064	.0006	.0037	.0002	.0001
%RSD	533.0	46.30	94.30	30.28	87.55	53.04	25.89	59.93	77.53
#1	-.0004	.0005	-.0019	.0039	-.0010	.0017	.0130	.0004	.0003
#2	.0001	.0013	.0000	.0047	-.0137	.0011	.0184	.0004	.0000
#3	.0006	.0008	-.0010	.0025	-.0071	.0005	.0113	.0001	.0002
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0127	<.0000	.0013	.0010	.0035	.0007	<.0000	.0050	.0003
Stddev	.0030	.0002	.0012	.0013	.0020	.0008	.0013	.0028	.0003
%RSD	23.51	4081.	95.93	129.5	58.57	115.7	196.0	56.83	109.4
#1	.0099	.0000	.0021	.0018	.0034	.0012	-.0003	.0018	.0005
#2	.0158	-.0003	.0019	-.0005	.0015	-.0002	.0004	.0057	.0004
#3	.0123	.0002	-.0001	.0018	.0055	.0010	-.0021	.0074	-.0001
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Sample Name: CCB Acquired: 5/22/2014 11:48:54 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0002	<.0000	.0003	.0002	<.0000	.0000	<.0000
Stddev	.0000	.0034	.0006	.0005	.0052	.0005	.0001
%RSD	20.49	176.0	167.0	185.2	63.50	3259.	586.9
#1	.0003	.0003	.0004	-.0001	-.0142	.0001	-.0001
#2	.0002	-.0058	-.0003	.0008	-.0054	-.0005	.0001
#3	.0002	-.0002	.0008	.0001	-.0050	.0005	.0000
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit							
Low Limit							

Int. Std.	Y_3710
Units	Cts/S
Avg	6098.9
Stddev	22.9
%RSD	.37574
#1	6098.7
#2	6076.0
#3	6121.9

Sample Name: MB 160-122861/1-A Acquired: 5/22/2014 12:00:32 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	<.0000	<.0000	.0031	.0000	<.0000	<.0000	.0111	<.0000
Stddev	.0001	.0006	.0005	.0055	.0000	.0000	.0010	.0003	.0002
%RSD	19.47	29.65	31120.	177.7	707.5	118.0	102.8	2.700	1140.
#1	-.0005	-.0017	.0006	-.0007	.0000	.0000	.0001	.0112	-.0002
#2	-.0004	-.0025	-.0001	.0006	.0000	.0000	-.0018	.0114	.0002
#3	-.0004	-.0014	-.0005	.0094	.0001	.0000	-.0012	.0108	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0002	.0010	<.0000	.0017	<.0000	.0010	.0030	.0002	<.0000
Stddev	.0001	.0002	.0019	.0012	.0205	.0004	.0070	.0003	.0001
%RSD	26.71	20.41	152.0	70.60	163.4	44.25	231.7	118.0	41.21
#1	.0003	.0012	.0006	.0021	-.0290	.0010	.0105	.0005	-.0001
#2	.0001	.0009	-.0032	.0004	.0104	.0005	.0020	.0000	-.0001
#3	.0002	.0008	-.0011	.0027	-.0191	.0013	-.0034	.0001	-.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0129	.0001	.0003	.0001	.0040	<.0000	.0017	.0060	<.0000
Stddev	.0032	.0002	.0003	.0008	.0010	.0005	.0014	.0057	.0004
%RSD	25.07	184.1	96.23	825.3	25.66	51.72	85.67	94.63	103.2
#1	.0092	.0000	.0002	.0009	.0036	-.0016	.0006	.0023	-.0001
#2	.0144	.0003	.0005	.0001	.0052	-.0005	.0033	.0031	-.0002
#3	.0150	-.0001	.0001	-.0007	.0033	-.0010	.0011	.0125	-.0008
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: MB 160-122861/1-A Acquired: 5/22/2014 12:00:32 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	<.0000	<.0000	<.0000	<.0000	.0009	.0060
Stddev	.0000	.0035	.0002	.0006	.0017	.0010	.0001
%RSD	20.32	431.9	153.0	29.70	7.154	113.0	1.211
#1	.0001	.0009	-.0002	-.0014	-.0212	.0012	.0060
#2	.0001	.0016	-.0003	-.0023	-.0237	-.0002	.0059
#3	.0001	-.0049	.0001	-.0025	-.0244	.0018	.0060
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	6094.3
Stddev	23.6
%RSD	.38708
#1	6105.4
#2	6110.3
#3	6067.2

Sample Name: LCS 160-122861/2-A Acquired: 5/22/2014 12:04:26 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.2080**	**10.99**	**1.066**	**2.027**	**1.081**	**1.043**	**1.077**	**10.90**	**1.095**
Stddev	.0012	.03	.004	.005	.003	.003	.003	.06	.006
%RSD	.5661	.3009	.4038	.2334	.2465	.2352	.2939	.5403	.5584
#1	.2073	10.96	1.071	2.031	1.081	1.046	1.081	10.96	1.101
#2	.2093	10.99	1.065	2.030	1.078	1.041	1.076	10.91	1.096
#3	.2073	11.03	1.063	2.022	1.084	1.043	1.075	10.84	1.088
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**1.095**	**1.088**	**1.141**	**10.45**	**11.84**	**1.284**	**9.784**	**1.052**	**.5271**
Stddev	.007	.007	.005	.04	.08	.011	.045	.005	.0024
%RSD	.6616	.6600	.4369	.4026	.6959	.8498	.4604	.4894	.4491
#1	1.102	1.094	1.146	10.50	11.75	1.271	9.824	1.057	.5295
#2	1.095	1.089	1.141	10.43	11.90	1.288	9.735	1.046	.5271
#3	1.088	1.080	1.136	10.42	11.88	1.292	9.793	1.052	.5248
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**12.07**	**1.135**	**1.123**	**1.125**	**10.29**	**.5333**	**.5423**	**.0352**	**1.086**
Stddev	.11	.005	.009	.005	.05	.0035	.0033	.0016	.006
%RSD	.8859	.4874	.7695	.4547	.4856	.6652	.6078	4.412	.5870
#1	11.95	1.141	1.131	1.129	10.33	.5339	.5459	.0351	1.092
#2	12.15	1.135	1.125	1.126	10.31	.5365	.5396	.0369	1.086
#3	12.11	1.130	1.114	1.119	10.23	.5295	.5413	.0338	1.079
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: LCS 160-122861/2-A Acquired: 5/22/2014 12:04:26 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.123	1.031	1.030	.2337	1.101	1.033	1.092
Stddev	.002	.002	.002	.0021	.010	.006	.006
%RSD	.1663	.1577	.2229	.8921	.8853	.5908	.5156
#1	1.123	1.032	1.032	.2358	1.091	1.032	1.097
#2	1.121	1.030	1.027	.2337	1.109	1.028	1.092
#3	1.125	1.033	1.030	.2316	1.104	1.040	1.086
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5878.7
Stddev	24.6
%RSD	.41804
#1	5855.1
#2	5877.0
#3	5904.1

Sample Name: 160-6677-D-2-A Acquired: 5/22/2014 12:07:54 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0002	.0104	.0003	.0464	.0653	.0001	.0020	62.42	.0001
Stddev	.0010	.0055	.0012	.0004	.0001	.0001	.0021	.12	.0001
%RSD	480.9	52.44	350.0	.8976	.1533	181.2	109.4	.1946	69.06
#1	-.0009	.0124	.0015	.0460	.0654	.0002	.0025	62.29	.0001
#2	.0006	.0146	.0003	.0464	.0652	.0000	-.0004	62.44	.0002
#3	.0009	.0042	-.0008	.0468	.0653	.0001	.0037	62.53	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0007	.0267	<.0000	.0113	5.844	.0079	20.43	.0006	.0040
Stddev	.0002	.0004	.0004	.0012	.015	.0007	.05	.0000	.0002
%RSD	27.92	1.398	44.34	10.60	.2538	9.229	.2265	7.344	5.652
#1	.0009	.0266	-.0015	.0119	5.859	.0084	20.47	.0006	.0042
#2	.0008	.0272	-.0008	.0099	5.843	.0071	20.45	.0005	.0038
#3	.0005	.0265	-.0007	.0120	5.830	.0083	20.38	.0006	.0040
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	22.65	.0052	.0159	.0044	16.78	.0031	.0027	23.20	<.0000
Stddev	.10	.0004	.0002	.0016	.02	.0011	.0016	.07	.0004
%RSD	.4234	7.004	1.465	36.67	.1405	36.73	58.15	.2912	45.18
#1	22.66	.0054	.0160	.0051	16.81	.0018	.0027	23.14	-.0009
#2	22.74	.0054	.0160	.0025	16.77	.0035	.0011	23.27	-.0005
#3	22.55	.0048	.0156	.0054	16.76	.0040	.0043	23.19	-.0013
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6677-D-2-A Acquired: 5/22/2014 12:07:54 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2784	<.0000	.0007	<.0000	<.0000	.0241	.0068
Stddev	.0007	.0023	.0006	.0010	.0103	.0014	.0001
%RSD	.2420	202.7	78.01	126.8	106.4	5.917	1.930
#1	.2788	-.0037	.0003	-.0016	.0022	.0225	.0067
#2	.2777	-.0003	.0005	.0003	-.0159	.0253	.0069
#3	.2788	.0006	.0014	-.0009	-.0155	.0246	.0067
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5900.1
Stddev	12.1
%RSD	.20477
#1	5905.6
#2	5908.5
#3	5886.3

Sample Name: 160-6677-D-2-A SD Acquired: 5/22/2014 12:11:45 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=5

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0096	<.0000	.0073	.0144	<.0000	.0009	13.26	.0000
Stddev	.0007	.0040	.0009	.0008	.0000	.0000	.0020	.00	.0001
%RSD	292.9	41.29	403.3	10.99	.1901	265.2	220.9	.0045	136.0
#1	.0003	.0061	-.0005	.0080	.0145	.0000	.0028	13.26	.0000
#2	.0000	.0139	-.0009	.0064	.0144	.0000	.0010	13.26	.0000
#3	-.0011	.0088	.0008	.0076	.0144	.0000	-.0011	13.26	.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0003	.0059	<.0000	.0025	1.126	.0023	4.049	.0002	.0009
Stddev	.0001	.0002	.0007	.0004	.020	.0007	.022	.0001	.0001
%RSD	40.86	3.391	28.58	16.76	1.782	31.74	.5425	41.88	12.08
#1	.0004	.0062	-.0021	.0029	1.104	.0028	4.048	.0001	.0010
#2	.0002	.0058	-.0020	.0021	1.130	.0015	4.028	.0001	.0008
#3	.0003	.0059	-.0033	.0027	1.143	.0026	4.071	.0003	.0009
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	4.370	.0013	.0033	.0010	3.302	.0024	.0011	4.542	<.0000
Stddev	.075	.0001	.0018	.0011	.016	.0001	.0006	.017	.0003
%RSD	1.712	9.235	55.10	106.1	.4690	4.819	59.18	.3732	76.21
#1	4.284	.0012	.0052	.0020	3.317	.0025	.0007	4.523	-.0001
#2	4.422	.0012	.0016	-.0001	3.286	.0024	.0018	4.555	-.0005
#3	4.402	.0014	.0029	.0011	3.302	.0023	.0007	4.549	-.0007
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6677-D-2-A SD Acquired: 5/22/2014 12:11:45 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=5

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0549	<.0000	.0002	.0007	<.0000	.0054	.0050
Stddev	.0001	.0012	.0002	.0007	.0133	.0016	.0001
%RSD	.2517	71.10	113.0	111.8	57.03	28.77	2.039
#1	.0547	-.0006	.0002	.0015	-.0222	.0048	.0051
#2	.0549	-.0030	.0005	.0001	-.0107	.0072	.0049
#3	.0550	-.0016	.0000	.0004	-.0373	.0042	.0051
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5911.4
Stddev	10.9
%RSD	.18504
#1	5913.5
#2	5921.1
#3	5899.5

Sample Name: 160-6677-D-2-B MS Acquired: 5/22/2014 12:15:36 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2097	10.76	1.052	2.119	1.139	1.060	1.046	72.55	1.083
Stddev	.0024	.02	.008	.006	.003	.004	.006	.59	.008
%RSD	1.167	.1736	.7245	.2714	.2391	.3877	.6239	.8079	.7303
#1	.2078	10.76	1.052	2.115	1.137	1.055	1.045	72.16	1.080
#2	.2124	10.75	1.060	2.126	1.139	1.064	1.053	73.22	1.092
#3	.2088	10.78	1.045	2.117	1.143	1.061	1.040	72.26	1.077
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.066	1.102	1.106	10.57	16.88	1.190	30.50	1.048	.5238
Stddev	.009	.010	.009	.06	.09	.010	.22	.007	.0036
%RSD	.8437	.8940	.8275	.6144	.5097	.8404	.7329	.6902	.6892
#1	1.059	1.098	1.104	10.52	16.92	1.194	30.41	1.043	.5212
#2	1.076	1.113	1.117	10.64	16.78	1.179	30.76	1.056	.5279
#3	1.065	1.095	1.099	10.55	16.94	1.198	30.34	1.044	.5222
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	33.02	1.094	1.141	1.083	26.92	.5259	.5318	23.03	1.056
Stddev	.22	.008	.009	.011	.22	.0051	.0044	.05	.009
%RSD	.6627	.7315	.8111	.9884	.8109	.9738	.8258	.2355	.8167
#1	33.11	1.091	1.134	1.078	26.82	.5229	.5277	22.98	1.053
#2	32.77	1.104	1.152	1.096	27.17	.5318	.5365	23.09	1.066
#3	33.18	1.089	1.137	1.077	26.77	.5229	.5313	23.02	1.050
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6677-D-2-B MS Acquired: 5/22/2014 12:15:36 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.390	1.043	1.036	.2224	1.094	1.068	1.081
Stddev	.005	.015	.004	.0015	.008	.009	.009
%RSD	.3761	1.406	.4262	.6928	.7344	.8146	.7861
#1	1.385	1.041	1.031	.2239	1.102	1.062	1.076
#2	1.390	1.059	1.040	.2226	1.094	1.078	1.091
#3	1.396	1.030	1.035	.2208	1.086	1.064	1.077
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5755.4
Stddev	44.1
%RSD	.76607
#1	5785.9
#2	5704.8
#3	5775.4

Sample Name: 160-6677-D-2-C MSD Acquired: 5/22/2014 12:19:04 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2147	10.96	1.072	2.150	1.149	1.055	1.065	73.84	1.098
Stddev	.0016	.04	.017	.009	.003	.005	.013	.65	.011
%RSD	.7570	.3732	1.619	.4266	.2297	.4990	1.174	.8834	.9974
#1	.2129	11.01	1.052	2.146	1.151	1.049	1.051	73.10	1.085
#2	.2151	10.93	1.082	2.144	1.146	1.057	1.072	74.08	1.103
#3	.2161	10.95	1.083	2.161	1.150	1.059	1.073	74.34	1.106
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.083	1.112	1.125	10.57	17.54	1.243	30.63	1.049	.5336
Stddev	.009	.010	.014	.07	.08	.017	.16	.003	.0053
%RSD	.8687	.9024	1.252	.6521	.4390	1.338	.5104	.2469	.9857
#1	1.073	1.100	1.109	10.49	17.63	1.262	30.50	1.046	.5277
#2	1.087	1.117	1.133	10.62	17.47	1.232	30.58	1.051	.5354
#3	1.090	1.119	1.133	10.59	17.53	1.236	30.80	1.050	.5378
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	34.60	1.105	1.164	1.096	27.62	.5377	.5426	23.39	1.069
Stddev	.22	.012	.013	.012	.36	.0077	.0064	.03	.012
%RSD	.6240	1.065	1.083	1.109	1.298	1.430	1.180	.1444	1.138
#1	34.85	1.092	1.150	1.082	27.21	.5294	.5360	23.38	1.056
#2	34.46	1.111	1.168	1.102	27.77	.5390	.5430	23.37	1.074
#3	34.49	1.113	1.174	1.104	27.88	.5446	.5488	23.43	1.079
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6677-D-2-C MSD Acquired: 5/22/2014 12:19:04 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.398	1.071	1.037	.2274	1.112	1.078	1.096
Stddev	.002	.010	.003	.0030	.004	.003	.011
%RSD	.1356	.9382	.2707	1.319	.3542	.2795	1.023
#1	1.397	1.066	1.034	.2241	1.107	1.075	1.083
#2	1.396	1.065	1.038	.2298	1.114	1.080	1.101
#3	1.400	1.083	1.039	.2285	1.114	1.080	1.104
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5704.8
Stddev	32.1
%RSD	.56247
#1	5740.6
#2	5695.4
#3	5678.5

Sample Name: 160-6677-A-3-A Acquired: 5/22/2014 12:22:32 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	.0105	<.0000	.0648	.0323	.0001	.0009	60.66	.0002
Stddev	.0002	.0055	.0004	.0018	.0002	.0002	.0004	.18	.0001
%RSD	152.1	52.70	26.52	2.843	.5179	199.6	44.72	.2943	52.31
#1	.0003	.0059	-.0014	.0659	.0321	.0001	.0011	60.47	.0003
#2	.0001	.0089	-.0011	.0659	.0324	.0002	.0004	60.83	.0001
#3	.0000	.0166	-.0019	.0627	.0322	-.0001	.0010	60.69	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0012	.0082	.0059	.0068	5.606	.0063	19.58	.0038	.0299
Stddev	.0006	.0002	.0006	.0009	.036	.0004	.13	.0002	.0002
%RSD	53.17	2.148	9.716	12.54	.6457	6.217	.6470	6.578	.6927
#1	.0019	.0081	.0058	.0062	5.622	.0059	19.44	.0040	.0296
#2	.0008	.0084	.0065	.0078	5.564	.0067	19.66	.0039	.0300
#3	.0009	.0083	.0053	.0064	5.631	.0061	19.65	.0035	.0300
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	23.07	.0084	.1240	.0036	30.19	.0024	.0031	21.34	<.0000
Stddev	.16	.0003	.0014	.0005	.07	.0014	.0003	.06	.0007
%RSD	.6923	4.110	1.129	12.89	.2182	58.99	8.116	.2843	53.01
#1	23.15	.0088	.1246	.0037	30.13	.0013	.0028	21.27	-.0005
#2	22.88	.0082	.1250	.0031	30.26	.0019	.0033	21.37	-.0013
#3	23.16	.0082	.1224	.0040	30.19	.0041	.0031	21.37	-.0019
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6677-A-3-A Acquired: 5/22/2014 12:22:32 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2572	.0024	<.0000	<.0000	<.0000	.0013	.0084
Stddev	.0016	.0009	.0002	.0013	.0079	.0018	.0000
%RSD	.6287	38.44	527.5	39.03	60.72	140.9	.5277
#1	.2557	.0019	-.0001	-.0022	-.0039	.0034	.0084
#2	.2569	.0018	.0002	-.0032	-.0178	.0004	.0084
#3	.2589	.0034	-.0002	-.0049	-.0175	.0001	.0084
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5874.6
Stddev	30.0
%RSD	.51152
#1	5909.3
#2	5857.5
#3	5856.9

Sample Name: 160-6677-D-6-A Acquired: 5/22/2014 12:26:23 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0031	<.0000	.0152	.0680	<.0000	.0024	63.44	.0001
Stddev	.0005	.0080	.0011	.0008	.0002	.0000	.0016	.07	.0001
%RSD	290.1	253.3	601.6	5.456	.2760	334.3	68.89	.1180	57.49
#1	.0002	.0027	-.0001	.0161	.0681	.0000	.0040	63.35	.0001
#2	-.0007	.0113	.0009	.0151	.0681	.0000	.0007	63.48	.0000
#3	.0000	-.0046	-.0014	.0145	.0678	.0000	.0025	63.48	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0002	.0499	<.0000	.0045	5.876	.0068	19.75	.0002	.0039
Stddev	.0001	.0004	.0006	.0005	.063	.0005	.01	.0002	.0001
%RSD	51.96	.7485	22.76	11.10	1.076	7.971	.0392	64.11	2.074
#1	.0001	.0502	-.0019	.0043	5.865	.0063	19.76	.0001	.0040
#2	.0001	.0495	-.0030	.0042	5.944	.0073	19.74	.0004	.0039
#3	.0002	.0501	-.0028	.0051	5.820	.0069	19.76	.0002	.0038
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	33.20	.0049	.0168	.0048	12.98	.0019	.0027	22.22	<.0000
Stddev	.33	.0001	.0013	.0007	.05	.0019	.0017	.09	.0011
%RSD	.9832	2.336	7.976	13.65	.4165	98.22	61.32	.3894	72.08
#1	33.12	.0048	.0157	.0052	12.96	.0029	.0011	22.27	-.0005
#2	33.57	.0051	.0165	.0041	12.94	.0031	.0027	22.27	-.0027
#3	32.93	.0049	.0183	.0052	13.04	-.0003	.0044	22.12	-.0014
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6677-D-6-A Acquired: 5/22/2014 12:26:23 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2641	.0028	.0004	<.0000	<.0000	.0231	.0082
Stddev	.0011	.0005	.0004	.0006	.0039	.0022	.0001
%RSD	.4346	18.44	92.19	31.64	88.09	9.461	1.299
#1	.2643	.0028	.0003	-.0018	-.0061	.0243	.0083
#2	.2651	.0032	.0008	-.0024	.0000	.0244	.0081
#3	.2629	.0022	.0001	-.0013	-.0071	.0206	.0081
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5833.9
Stddev	11.5
%RSD	.19754
#1	5834.7
#2	5822.0
#3	5845.0

Sample Name: 160-6677-D-8-A Acquired: 5/22/2014 12:30:15 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0000**	**.0049**	**.0006**	**.0138**	**.0747**	**<.0000**	**<.0000**	**64.05**	**.0001**
Stddev	.0001	.0062	.0003	.0023	.0001	.0000	.0011	.12	.0001
%RSD	323.3	124.9	53.98	16.67	.1691	56.46	47.12	.1905	121.8
#1	-.0001	.0028	.0004	.0152	.0745	.0000	-.0012	64.18	.0002
#2	.0001	.0119	.0004	.0112	.0746	.0000	-.0026	64.05	.0000
#3	.0001	.0001	.0010	.0151	.0748	.0000	-.0035	63.93	.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0007**	**.0426**	**<.0000**	**.0012**	**6.263**	**.0073**	**20.07**	**.0002**	**.0039**
Stddev	.0003	.0007	.0016	.0024	.046	.0004	.02	.0003	.0002
%RSD	41.32	1.625	93.71	196.0	.7326	5.015	.1006	138.3	4.519
#1	.0004	.0422	-.0007	.0006	6.217	.0069	20.07	.0006	.0040
#2	.0009	.0422	-.0009	.0040	6.264	.0075	20.08	.0001	.0037
#3	.0008	.0434	-.0035	-.0008	6.309	.0075	20.05	.0000	.0038
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**35.25**	**.0052**	**.0175**	**.0047**	**20.69**	**.0021**	**.0035**	**22.90**	**<.0000**
Stddev	.18	.0002	.0002	.0011	.05	.0009	.0015	.03	.0007
%RSD	.5111	3.352	1.224	24.49	.2485	45.20	44.23	.1340	61.17
#1	35.16	.0053	.0177	.0059	20.70	.0014	.0017	22.89	-.0015
#2	35.13	.0053	.0174	.0037	20.73	.0016	.0042	22.88	-.0003
#3	35.46	.0050	.0173	.0044	20.63	.0031	.0045	22.93	-.0014
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6677-D-8-A Acquired: 5/22/2014 12:30:15 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2746	.0001	<.0000	<.0000	<.0000	.0242	.0065
Stddev	.0003	.0016	.0003	.0008	.0053	.0027	.0002
%RSD	.1250	2298.	645.9	55.84	36.92	11.19	2.530
#1	.2742	.0015	.0003	-.0005	-.0195	.0221	.0066
#2	.2749	-.0016	-.0004	-.0019	-.0089	.0272	.0063
#3	.2747	.0004	-.0001	-.0019	-.0148	.0232	.0066
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5914.1
Stddev	2.5
%RSD	.04208
#1	5912.5
#2	5912.9
#3	5917.0

Sample Name: 160-6677-C-11-A Acquired: 5/22/2014 12:34:06 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0003	.0061	.0001	.0637	.0339	<.0000	<.0000	59.51	.0001
Stddev	.0004	.0050	.0008	.0001	.0002	.0000	.0007	.29	.0001
%RSD	127.0	81.41	1131.	.1007	.6641	174.7	41.70	.4830	77.37
#1	.0003	.0024	.0007	.0637	.0339	.0000	-.0023	59.82	.0000
#2	.0008	.0042	-.0008	.0637	.0341	.0000	-.0009	59.44	.0002
#3	-.0001	.0118	.0003	.0636	.0336	.0000	-.0019	59.25	.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0209	.0076	.0078	.0318	5.761	.0077	19.40	.1619	.0285
Stddev	.0001	.0009	.0019	.0011	.053	.0003	.09	.0007	.0001
%RSD	.5470	11.43	24.50	3.537	.9151	4.509	.4689	.4377	.4266
#1	.0209	.0069	.0091	.0305	5.787	.0073	19.43	.1625	.0286
#2	.0210	.0074	.0056	.0326	5.796	.0079	19.31	.1611	.0284
#3	.0208	.0086	.0088	.0323	5.701	.0079	19.48	.1621	.0284
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	23.63	.0114	.1289	.0054	29.93	.0030	.0025	21.34	<.0000
Stddev	.21	.0004	.0007	.0011	.16	.0017	.0024	.04	.0003
%RSD	.9084	3.784	.5064	20.74	.5470	58.79	94.78	.2102	25.59
#1	23.68	.0115	.1294	.0043	30.10	.0013	.0051	21.39	-.0009
#2	23.82	.0110	.1281	.0065	29.77	.0048	.0018	21.30	-.0015
#3	23.40	.0118	.1292	.0054	29.91	.0028	.0005	21.33	-.0015
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6677-C-11-A Acquired: 5/22/2014 12:34:06 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2574	.0033	.0004	<.0000	<.0000	.0014	.0095
Stddev	.0007	.0013	.0005	.0015	.0008	.0004	.0001
%RSD	.2557	41.10	135.6	95.95	27.67	32.01	.7108
#1	.2581	.0020	.0008	-.0026	-.0024	.0009	.0095
#2	.2571	.0047	-.0002	.0001	-.0026	.0014	.0094
#3	.2569	.0032	.0005	-.0022	-.0040	.0018	.0096
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5919.8
Stddev	18.6
%RSD	.31392
#1	5898.4
#2	5932.0
#3	5928.9

Sample Name: CCV Acquired: 5/22/2014 12:37:57 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.9861**	**50.89**	**4.988**	**5.005**	**5.100**	**5.046**	**5.052**	**50.05**	**5.050**
Stddev	.0037	.20	.001	.006	.081	.040	.009	.14	.004
%RSD	.3769	.3980	.0153	.1117	1.594	.7891	.1734	.2768	.0736
#1	.9861	50.82	4.988	5.001	5.150	5.041	5.056	49.97	5.048
#2	.9823	51.12	4.989	5.011	5.006	5.009	5.059	49.97	5.047
#3	.9897	50.73	4.987	5.003	5.144	5.088	5.042	50.21	5.054
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**4.971**	**4.992**	**5.087**	**49.73**	**51.86**	**5.388**	**48.51**	**5.016**	**1.004**
Stddev	.009	.026	.003	.20	.32	.061	.28	.018	.001
%RSD	.1906	.5139	.0584	.4063	.6075	1.135	.5842	.3593	.0628
#1	4.975	4.979	5.088	49.78	51.96	5.402	48.54	5.012	1.005
#2	4.960	4.975	5.089	49.51	52.11	5.441	48.22	5.000	1.004
#3	4.978	5.021	5.083	49.91	51.51	5.321	48.78	5.035	1.005
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**52.06**	**5.075**	**51.17**	**5.076**	**49.63**	**1.007**	**.9988**	**5.069**	**5.068**
Stddev	.47	.007	.11	.010	.03	.003	.0005	.016	.006
%RSD	.9027	.1402	.2140	.1930	.0671	.2520	.0501	.3114	.1164
#1	52.20	5.068	51.23	5.073	49.62	1.005	.9985	5.073	5.065
#2	52.45	5.074	51.04	5.067	49.66	1.006	.9993	5.052	5.063
#3	51.54	5.082	51.24	5.086	49.60	1.010	.9985	5.083	5.074
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Sample Name: CCV Acquired: 5/22/2014 12:37:57 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.147**	**4.899**	**5.035**	**1.016**	**5.097**	**4.923**	**5.035**
Stddev	.036	.018	.002	.003	.046	.029	.005
%RSD	.7014	.3676	.0445	.2454	.9027	.5981	.1097
#1	5.111	4.894	5.035	1.014	5.092	4.892	5.035
#2	5.148	4.884	5.033	1.014	5.054	4.926	5.029
#3	5.183	4.919	5.037	1.018	5.145	4.951	5.040
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	**5717.8**
Stddev	27.6
%RSD	.48287
#1	5727.9
#2	5739.0
#3	5686.6

Sample Name: CCB Acquired: 5/22/2014 12:41:46 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0070	<.0000	.0059	.0008	.0008	.0023	<.0000	.0000
Stddev	.0004	.0124	.0005	.0024	.0013	.0012	.0015	.0007	.0001
%RSD	178.0	176.9	82.66	40.70	150.9	151.3	65.77	207.0	211.4
#1	-.0008	.0046	-.0005	.0050	.0001	.0001	.0036	.0004	.0001
#2	.0000	.0204	-.0002	.0086	.0023	.0022	.0006	-.0003	.0000
#3	.0000	-.0040	-.0011	.0041	.0001	.0001	.0028	-.0011	.0000
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0002	.0013	<.0000	.0069	<.0000	.0012	.0062	.0010	.0002
Stddev	.0002	.0005	.0019	.0116	.0190	.0014	.0042	.0012	.0002
%RSD	123.1	40.00	82.68	168.7	8092.	114.2	68.71	128.5	99.15
#1	.0005	.0010	-.0015	.0011	-.0206	.0003	.0018	.0002	.0004
#2	.0000	.0010	-.0009	.0202	.0170	.0028	.0103	.0024	.0003
#3	.0002	.0019	-.0045	-.0007	.0029	.0005	.0063	.0003	.0000
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0175	.0003	.0008	.0013	.0043	.0010	.0003	.0021	.0006
Stddev	.0172	.0001	.0008	.0003	.0017	.0013	.0013	.0020	.0004
%RSD	98.26	45.86	98.59	20.23	39.77	133.3	441.9	95.90	68.22
#1	.0070	.0004	.0017	.0012	.0053	.0014	.0016	.0002	.0006
#2	.0373	.0003	.0003	.0011	.0052	.0020	.0004	.0018	.0002
#3	.0081	.0001	.0003	.0016	.0023	-.0005	-.0011	.0042	.0009
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Sample Name: CCB Acquired: 5/22/2014 12:41:46 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0008	<.0000	.0011	<.0000	<.0000	<.0000	.0000
Stddev	.0013	.0010	.0014	.0009	.0062	.0018	.0001
%RSD	161.6	62.77	124.9	454.4	49.41	888.7	1346.
#1	.0001	-.0006	.0002	-.0012	-.0064	.0012	.0001
#2	.0022	-.0025	.0028	.0004	-.0189	.0004	-.0001
#3	.0000	-.0016	.0004	.0002	-.0125	-.0022	.0001
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit							
Low Limit							

Int. Std.	Y_3710
Units	Cts/S
Avg	5927.7
Stddev	11.0
%RSD	.18558
#1	5935.6
#2	5932.3
#3	5915.1

Sample Name: MB 160-122863/1-A Acquired: 5/22/2014 12:45:42 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0034	<.0000	.0020	<.0000	<.0000	.0002	.0235	.0001
Stddev	.0002	.0045	.0001	.0013	.0001	.0000	.0014	.0001	.0001
%RSD	76.53	134.1	8.930	68.15	471.9	381.6	844.5	.5725	91.73
#1	-.0001	.0061	-.0009	.0035	.0001	.0000	.0012	.0237	.0001
#2	-.0003	.0059	-.0011	.0009	.0000	.0000	-.0014	.0234	.0000
#3	-.0006	-.0019	-.0011	.0016	-.0002	.0000	.0007	.0235	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0005	<.0000	.0001	<.0000	.0009	<.0000	.0002	<.0000
Stddev	.0001	.0008	.0006	.0014	.0201	.0005	.0129	.0002	.0002
%RSD	264.6	144.4	109.3	1094.	116.1	54.71	258.5	126.9	146.5
#1	.0000	-.0003	.0001	.0011	-.0175	.0009	-.0162	.0004	.0001
#2	-.0002	.0012	-.0006	-.0015	.0029	.0013	-.0080	.0001	-.0003
#3	.0001	.0008	-.0010	.0008	-.0372	.0004	.0092	.0000	-.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0189	.0002	.0010	.0004	.0040	.0004	<.0000	.0052	<.0000
Stddev	.0038	.0001	.0011	.0007	.0011	.0006	.0020	.0038	.0001
%RSD	19.93	54.36	115.2	195.2	26.39	150.1	476.4	71.98	33.80
#1	.0165	.0004	.0010	.0012	.0053	.0002	.0019	.0088	-.0005
#2	.0169	.0001	.0021	-.0001	.0034	-.0001	-.0016	.0056	-.0005
#3	.0232	.0002	-.0002	.0000	.0035	.0011	-.0015	.0013	-.0003
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: MB 160-122863/1-A Acquired: 5/22/2014 12:45:42 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	<.0000	<.0000	<.0000	<.0000	.0011	.0068
Stddev	.0000	.0024	.0003	.0004	.0057	.0023	.0000
%RSD	50.50	166.4	219.1	55.43	29.82	204.4	.6363
#1	.0001	-.0001	-.0003	-.0007	-.0135	.0036	.0068
#2	.0000	.0000	.0002	-.0003	-.0249	.0004	.0069
#3	.0001	-.0041	-.0004	-.0011	-.0188	-.0007	.0069
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	6123.8
Stddev	14.7
%RSD	.23967
#1	6117.0
#2	6140.7
#3	6113.8

Sample Name: LCS 160-122863/2-A Acquired: 5/22/2014 12:49:37 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2113	10.97	1.078	2.068	1.093	1.069	1.088	11.14	1.110
Stddev	.0016	.05	.004	.006	.004	.001	.004	.03	.004
%RSD	.7592	.4397	.3385	.2895	.3744	.0926	.4119	.2748	.3926
#1	.2109	11.01	1.074	2.064	1.096	1.070	1.088	11.11	1.108
#2	.2100	10.97	1.078	2.075	1.094	1.070	1.084	11.12	1.107
#3	.2131	10.91	1.081	2.065	1.088	1.068	1.093	11.17	1.115
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.113	1.109	1.153	10.75	11.54	1.236	9.978	1.079	.5360
Stddev	.007	.006	.005	.01	.11	.014	.023	.002	.0028
%RSD	.6009	.5334	.4541	.0952	.9214	1.117	.2313	.1646	.5178
#1	1.112	1.104	1.149	10.74	11.63	1.246	9.994	1.080	.5350
#2	1.107	1.108	1.151	10.75	11.57	1.243	9.952	1.077	.5339
#3	1.120	1.116	1.159	10.76	11.42	1.220	9.989	1.080	.5391
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	11.73	1.152	1.142	1.142	10.40	.5397	.5420	.0423	1.104
Stddev	.11	.005	.006	.005	.04	.0030	.0029	.0077	.005
%RSD	.9405	.4282	.5356	.4121	.3937	.5593	.5262	18.18	.4963
#1	11.79	1.150	1.144	1.142	10.39	.5370	.5435	.0354	1.101
#2	11.81	1.149	1.136	1.138	10.37	.5392	.5387	.0506	1.100
#3	11.61	1.158	1.148	1.147	10.45	.5430	.5437	.0410	1.110
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: LCS 160-122863/2-A Acquired: 5/22/2014 12:49:37 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.139	1.046	1.054	.2375	1.121	1.055	1.105
Stddev	.004	.002	.001	.0018	.007	.004	.005
%RSD	.3549	.1934	.0924	.7738	.5986	.3635	.4794
#1	1.142	1.047	1.055	.2380	1.119	1.051	1.102
#2	1.140	1.043	1.053	.2354	1.116	1.059	1.101
#3	1.134	1.046	1.054	.2390	1.128	1.056	1.111
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5833.2
Stddev	17.1
%RSD	.29320
#1	5847.7
#2	5837.4
#3	5814.3

Sample Name: 160-6679-E-2-A Acquired: 5/22/2014 12:53:06 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0000**	**.0025**	**.0002**	**.0181**	**.0715**	**.0000**	**.0024**	**73.86**	**.0001**
Stddev	.0003	.0026	.0031	.0019	.0003	.0001	.0022	.44	.0001
%RSD	640.3	104.9	1566.	10.36	.3833	127.1	90.71	.5933	215.5
#1	.0000	-.0005	.0036	.0179	.0717	.0001	.0022	73.36	.0001
#2	-.0002	.0038	-.0005	.0162	.0712	.0000	.0003	74.05	-.0001
#3	.0003	.0042	-.0025	.0200	.0715	.0000	.0047	74.17	.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0005**	**.0213**	**<.0000**	**.0028**	**6.154**	**.0069**	**24.55**	**.0001**	**.0025**
Stddev	.0001	.0010	.0007	.0021	.059	.0000	.11	.0003	.0001
%RSD	26.60	4.738	22.14	73.94	.9525	.4944	.4522	188.7	5.298
#1	.0004	.0213	-.0024	.0050	6.202	.0069	24.48	.0004	.0023
#2	.0005	.0203	-.0037	.0009	6.089	.0069	24.50	.0002	.0025
#3	.0007	.0223	-.0037	.0026	6.172	.0070	24.68	-.0002	.0026
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**17.04**	**.0053**	**.0123**	**.0049**	**16.26**	**.0026**	**.0034**	**23.33**	**<.0000**
Stddev	.15	.0002	.0013	.0004	.08	.0008	.0029	.03	.0005
%RSD	.8681	3.981	10.42	7.636	.4886	30.75	85.62	.1417	27.81
#1	17.17	.0052	.0133	.0053	16.18	.0017	.0031	23.29	-.0018
#2	16.88	.0056	.0128	.0045	16.25	.0032	.0006	23.35	-.0011
#3	17.07	.0052	.0108	.0050	16.34	.0028	.0065	23.35	-.0020
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6679-E-2-A Acquired: 5/22/2014 12:53:06 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.3280	.0038	.0005	<.0000	<.0000	.0229	.0080
Stddev	.0012	.0029	.0004	.0002	.0124	.0029	.0001
%RSD	.3710	78.49	68.14	5.192	269.6	12.75	1.762
#1	.3287	.0066	.0007	-.0030	.0049	.0230	.0082
#2	.3266	.0007	.0007	-.0032	-.0187	.0258	.0080
#3	.3286	.0040	.0001	-.0029	-.0001	.0200	.0080
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5800.2
Stddev	19.9
%RSD	.34257
#1	5806.5
#2	5816.3
#3	5778.0

Sample Name: 160-6679-E-2-A SD Acquired: 5/22/2014 12:56:57 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=5

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0026	<.0000	.0055	.0144	<.0000	.0007	15.30	.0000
Stddev	.0005	.0107	.0006	.0015	.0001	.0000	.0008	.08	.0001
%RSD	84.12	410.4	41.78	27.49	.8579	126.8	119.4	.5415	146.2
#1	-.0011	.0099	-.0021	.0062	.0143	.0000	.0015	15.21	.0001
#2	-.0004	-.0097	-.0010	.0038	.0144	.0000	.0006	15.33	.0001
#3	-.0002	.0076	-.0011	.0065	.0146	.0000	-.0001	15.37	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0002	.0046	<.0000	.0014	1.194	.0018	4.736	.0002	.0006
Stddev	.0002	.0004	.0011	.0007	.008	.0003	.015	.0003	.0002
%RSD	91.86	9.472	46.37	47.60	.6774	17.97	.3228	204.7	41.44
#1	.0000	.0047	-.0016	.0016	1.191	.0015	4.721	-.0002	.0009
#2	.0003	.0042	-.0035	.0006	1.203	.0022	4.751	.0005	.0004
#3	.0003	.0050	-.0018	.0019	1.187	.0019	4.737	.0001	.0005
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	3.354	.0011	.0021	.0012	3.100	.0005	.0016	4.560	<.0000
Stddev	.009	.0001	.0016	.0004	.026	.0006	.0006	.019	.0001
%RSD	.2680	10.03	78.55	32.27	.8476	115.5	39.50	.4169	31.61
#1	3.354	.0011	.0030	.0009	3.074	-.0001	.0023	4.538	-.0003
#2	3.346	.0011	.0031	.0016	3.099	.0011	.0014	4.572	-.0004
#3	3.364	.0013	.0002	.0010	3.127	.0005	.0011	4.570	-.0006
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6679-E-2-A SD Acquired: 5/22/2014 12:56:57 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=5

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0657	<.0000	<.0000	<.0000	<.0000	.0041	.0064
Stddev	.0002	.0024	.0005	.0004	.0086	.0002	.0002
%RSD	.2456	233.2	144.2	13.25	42.61	5.191	3.826
#1	.0657	-.0036	-.0008	-.0029	-.0106	.0039	.0065
#2	.0655	-.0007	.0002	-.0025	-.0273	.0042	.0065
#3	.0659	.0012	-.0005	-.0033	-.0230	.0042	.0061
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5995.6
Stddev	35.7
%RSD	.59553
#1	6033.7
#2	5990.3
#3	5962.8

Sample Name: 160-6679-E-2-B MS Acquired: 5/22/2014 13:00:49 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.2098**	**11.02**	**1.073**	**2.106**	**1.163**	**1.071**	**1.062**	**84.18**	**1.101**
Stddev	.0012	.05	.003	.009	.005	.003	.007	.09	.003
%RSD	.5605	.4828	.2900	.4217	.4610	.2833	.6693	.1060	.2264
#1	.2092	11.08	1.075	2.116	1.169	1.072	1.068	84.19	1.101
#2	.2111	11.02	1.075	2.104	1.163	1.073	1.064	84.26	1.103
#3	.2089	10.97	1.070	2.099	1.158	1.067	1.054	84.08	1.098
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**1.065**	**1.093**	**1.126**	**10.65**	**17.96**	**1.236**	**35.16**	**1.064**	**.5266**
Stddev	.004	.005	.005	.03	.12	.012	.12	.003	.0022
%RSD	.3818	.4760	.4474	.2979	.6471	.9809	.3299	.3104	.4215
#1	1.068	1.091	1.124	10.67	18.09	1.250	35.05	1.060	.5271
#2	1.067	1.099	1.132	10.66	17.91	1.229	35.28	1.067	.5285
#3	1.060	1.089	1.122	10.61	17.87	1.228	35.14	1.065	.5241
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**29.28**	**1.108**	**1.150**	**1.093**	**26.83**	**.5366**	**.5433**	**24.02**	**1.066**
Stddev	.26	.002	.008	.004	.09	.0007	.0006	.06	.004
%RSD	.8713	.2072	.6738	.3546	.3529	.1246	.1060	.2352	.3465
#1	29.57	1.108	1.153	1.092	26.88	.5359	.5432	24.06	1.068
#2	29.17	1.110	1.156	1.098	26.87	.5372	.5439	24.06	1.069
#3	29.09	1.106	1.141	1.090	26.72	.5366	.5427	23.96	1.062
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6679-E-2-B MS Acquired: 5/22/2014 13:00:49 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.470	1.032	1.048	.2223	1.100	1.068	1.093
Stddev	.007	.002	.003	.0014	.010	.004	.004
%RSD	.4512	.1761	.2429	.6306	.8738	.3505	.3381
#1	1.476	1.030	1.049	.2225	1.091	1.064	1.095
#2	1.471	1.033	1.050	.2208	1.110	1.071	1.096
#3	1.463	1.033	1.045	.2236	1.099	1.069	1.089
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5700.7
Stddev	3.1
%RSD	.05480
#1	5702.7
#2	5697.1
#3	5702.3

Sample Name: 160-6679-E-2-C MSD Acquired: 5/22/2014 13:04:17 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2125	11.00	1.078	2.134	1.168	1.079	1.054	84.98	1.104
Stddev	.0014	.08	.006	.017	.009	.009	.007	.44	.006
%RSD	.6798	.6825	.5454	.8117	.7741	.8022	.6779	.5169	.5111
#1	.2109	10.99	1.077	2.119	1.167	1.076	1.055	84.56	1.104
#2	.2137	11.09	1.084	2.153	1.177	1.089	1.061	85.44	1.110
#3	.2130	10.94	1.072	2.129	1.159	1.072	1.047	84.93	1.099
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.080	1.109	1.122	10.77	17.63	1.210	35.00	1.070	.5278
Stddev	.005	.004	.009	.08	.09	.003	.33	.007	.0025
%RSD	.4354	.3112	.7866	.7142	.5116	.2608	.9493	.6203	.4691
#1	1.077	1.105	1.120	10.72	17.59	1.209	34.81	1.067	.5261
#2	1.085	1.112	1.131	10.86	17.74	1.214	35.39	1.078	.5306
#3	1.078	1.110	1.114	10.73	17.57	1.208	34.81	1.066	.5266
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	28.74	1.115	1.162	1.101	26.60	.5329	.5422	23.79	1.068
Stddev	.15	.006	.009	.006	.16	.0035	.0076	.22	.006
%RSD	.5362	.5136	.7281	.5274	.5960	.6582	1.401	.9449	.5213
#1	28.66	1.114	1.157	1.100	26.61	.5311	.5447	23.74	1.065
#2	28.92	1.122	1.172	1.107	26.76	.5370	.5482	24.03	1.074
#3	28.65	1.111	1.157	1.096	26.44	.5307	.5337	23.59	1.065
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6679-E-2-C MSD Acquired: 5/22/2014 13:04:17 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.471	1.055	1.049	.2279	1.120	1.081	1.100
Stddev	.012	.003	.009	.0017	.011	.012	.005
%RSD	.8080	.2830	.8958	.7277	.9917	1.085	.4539
#1	1.469	1.057	1.047	.2290	1.109	1.070	1.098
#2	1.484	1.057	1.060	.2286	1.121	1.094	1.105
#3	1.461	1.052	1.042	.2260	1.131	1.079	1.095
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5656.4
Stddev	33.6
%RSD	.59331
#1	5691.7
#2	5624.9
#3	5652.5

Sample Name: 160-6679-E-4-A Acquired: 5/22/2014 13:07:45 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0108	<.0000	.0169	.0799	.0000	.0011	95.11	.0000
Stddev	.0002	.0042	.0008	.0028	.0001	.0000	.0004	.14	.0001
%RSD	56.94	38.39	56.96	16.31	.1838	59.50	39.03	.1446	158.1
#1	-.0002	.0111	-.0006	.0138	.0800	.0000	.0012	94.97	.0000
#2	-.0002	.0148	-.0015	.0180	.0798	.0001	.0015	95.25	.0001
#3	-.0005	.0065	-.0023	.0190	.0798	.0001	.0006	95.10	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0004	.0590	<.0000	.0084	6.933	.0073	31.89	.0028	.0021
Stddev	.0001	.0011	.0002	.0018	.021	.0004	.06	.0003	.0002
%RSD	28.39	1.879	6.668	21.03	.3030	6.083	.1937	12.07	9.937
#1	.0004	.0602	-.0033	.0104	6.957	.0074	31.90	.0030	.0022
#2	.0006	.0580	-.0037	.0071	6.924	.0068	31.95	.0029	.0023
#3	.0004	.0588	-.0037	.0076	6.918	.0077	31.83	.0024	.0019
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	19.50	.0051	.0131	.0045	18.97	.0029	.0034	23.44	<.0000
Stddev	.04	.0001	.0008	.0005	.12	.0009	.0011	.07	.0004
%RSD	.1834	2.161	5.784	11.04	.6587	31.75	30.95	.3129	28.43
#1	19.52	.0052	.0135	.0051	19.00	.0018	.0040	23.48	-.0017
#2	19.53	.0050	.0135	.0041	19.07	.0035	.0022	23.48	-.0018
#3	19.46	.0050	.0122	.0045	18.83	.0033	.0041	23.35	-.0010
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6679-E-4-A Acquired: 5/22/2014 13:07:45 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.4145	.0049	.0010	<.0000	.0030	.0241	.0075
Stddev	.0017	.0023	.0001	.0008	.0069	.0013	.0002
%RSD	.4084	46.36	12.39	66.14	233.6	5.592	2.214
#1	.4164	.0071	.0009	-.0008	-.0050	.0242	.0077
#2	.4139	.0050	.0010	-.0008	.0068	.0254	.0074
#3	.4131	.0026	.0012	-.0022	.0070	.0227	.0074
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5771.2
Stddev	10.6
%RSD	.18385
#1	5783.0
#2	5768.2
#3	5762.4

Sample Name: 160-6679-E-6-A Acquired: 5/22/2014 13:11:35 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0100	<.0000	.0167	.0881	.0001	.0023	81.31	.0001
Stddev	.0002	.0021	.0012	.0016	.0003	.0002	.0011	.25	.0002
%RSD	1363.	20.83	210.2	9.701	.3661	209.4	47.35	.3042	139.1
#1	-.0003	.0100	.0007	.0186	.0878	.0000	.0020	81.59	.0003
#2	.0001	.0080	-.0007	.0157	.0882	.0003	.0014	81.20	.0000
#3	.0001	.0121	-.0017	.0158	.0884	.0000	.0034	81.13	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0004	.0326	<.0000	.0178	6.903	.0079	25.12	.0003	.0028
Stddev	.0003	.0003	.0012	.0006	.103	.0009	.08	.0004	.0000
%RSD	76.95	.8527	49.71	3.366	1.487	10.92	.3296	116.7	1.041
#1	.0007	.0324	-.0016	.0175	6.790	.0081	25.21	.0000	.0028
#2	.0001	.0325	-.0038	.0185	6.931	.0086	25.11	.0007	.0028
#3	.0006	.0329	-.0018	.0173	6.989	.0069	25.05	.0002	.0028
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	27.68	.0054	.0117	.0047	15.00	.0021	.0051	24.16	<.0000
Stddev	.39	.0000	.0005	.0002	.13	.0015	.0003	.05	.0001
%RSD	1.401	.8546	4.646	3.316	.8626	73.27	4.975	.2119	5.404
#1	27.26	.0054	.0116	.0046	15.15	.0032	.0049	24.17	-.0021
#2	27.76	.0054	.0112	.0046	14.91	.0004	.0054	24.20	-.0021
#3	28.02	.0054	.0123	.0048	14.94	.0027	.0052	24.10	-.0023
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6679-E-6-A Acquired: 5/22/2014 13:11:35 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.3356	.0062	.0005	<.0000	.0052	.0249	.0081
Stddev	.0008	.0023	.0004	.0010	.0066	.0007	.0001
%RSD	.2402	37.15	77.09	54.51	128.4	2.710	1.290
#1	.3352	.0077	.0001	-.0017	-.0025	.0252	.0082
#2	.3350	.0073	.0007	-.0029	.0086	.0241	.0080
#3	.3365	.0035	.0009	-.0009	.0094	.0253	.0080
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5726.3
Stddev	25.7
%RSD	.44955
#1	5698.0
#2	5748.2
#3	5732.7

Sample Name: 160-6694-F-7-A Acquired: 5/22/2014 13:15:26 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	<.0000	<.0000	.0008	.0000	<.0000	.0013	.0267	.0001
Stddev	.0008	.0058	.0008	.0015	.0001	.0000	.0027	.0003	.0001
%RSD	236.1	318.4	85.15	183.6	180.6	128.0	205.2	1.280	189.7
#1	.0006	-.0062	-.0017	.0020	.0000	.0000	.0040	.0271	.0000
#2	-.0009	.0048	-.0008	-.0008	.0000	.0000	-.0013	.0266	.0000
#3	-.0007	-.0040	-.0002	.0013	.0001	.0000	.0011	.0264	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	.0009	.0008	.0014	<.0000	.0010	.0038	.0006	.0000
Stddev	.0002	.0007	.0007	.0003	.0127	.0003	.0138	.0002	.0001
%RSD	151.8	83.26	93.89	23.19	120.7	28.31	363.8	31.26	297.6
#1	.0002	.0008	.0008	.0017	.0041	.0007	.0159	.0006	.0001
#2	.0003	.0002	.0015	.0013	-.0172	.0012	-.0113	.0007	-.0001
#3	-.0001	.0016	.0000	.0011	-.0185	.0011	.0068	.0004	.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0319	.0005	.0006	<.0000	.0057	.0007	.0002	.0103	.0006
Stddev	.0062	.0000	.0007	.0003	.0008	.0012	.0017	.0018	.0003
%RSD	19.58	3.906	118.2	64.81	13.29	168.2	695.4	16.97	59.64
#1	.0295	.0006	.0004	-.0009	.0056	-.0006	.0021	.0115	.0009
#2	.0272	.0005	.0014	-.0002	.0050	.0009	-.0012	.0112	.0006
#3	.0390	.0005	.0000	-.0004	.0065	.0019	-.0002	.0083	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6694-F-7-A Acquired: 5/22/2014 13:15:26 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0000	.0007	.0004	<.0000	.0116	.0009	.0092
Stddev	.0000	.0018	.0002	.0018	.0083	.0017	.0002
%RSD	121.8	269.4	60.06	100.7	71.90	196.9	1.787
#1	.0001	-.0014	.0002	-.0004	.0021	-.0003	.0090
#2	.0000	.0016	.0006	-.0011	.0149	.0001	.0094
#3	.0000	.0018	.0004	-.0038	.0178	.0028	.0093
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5936.5
Stddev	18.4
%RSD	.30950
#1	5945.7
#2	5915.3
#3	5948.4

Sample Name: LB 160-122888/1-B Acquired: 5/22/2014 13:19:20 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0002**	**.0304**	**<.0000**	**.0691**	**.0098**	**.0000**	**.0005**	**.6241**	**.0003**
Stddev	.0005	.0066	.0005	.0019	.0001	.0000	.0015	.0011	.0000
%RSD	291.0	21.65	46.07	2.814	.6168	101.2	325.9	.1843	9.289
#1	.0007	.0247	-.0005	.0713	.0098	.0000	.0019	.6247	.0003
#2	.0001	.0376	-.0015	.0684	.0097	.0000	-.0010	.6228	.0003
#3	-.0003	.0290	-.0013	.0676	.0099	.0000	.0004	.6249	.0003
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0001**	**.0024**	**.0009**	**.1675**	**.1642**	**.0010**	**.1562**	**.0015**	**.0005**
Stddev	.0000	.0001	.0015	.0012	.0029	.0007	.0069	.0001	.0002
%RSD	19.60	5.053	167.9	.7418	1.772	71.25	4.450	7.594	32.61
#1	.0001	.0025	.0010	.1681	.1674	.0002	.1626	.0014	.0004
#2	.0001	.0025	.0022	.1684	.1634	.0016	.1488	.0016	.0006
#3	.0001	.0023	-.0007	.1661	.1618	.0012	.1571	.0015	.0007
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**509.5**	**.0006**	**.0073**	**.0009**	**.1838**	**.0002**	**.0001**	**.0614**	**.0003**
Stddev	.7	.0000	.0008	.0007	.0007	.0021	.0016	.0044	.0008
%RSD	.1427	4.259	11.28	78.32	.3711	948.4	2357.	7.237	294.3
#1	509.7	.0006	.0065	.0017	.1842	.0002	.0001	.0638	-.0001
#2	508.8	.0006	.0072	.0009	.1842	-.0019	-.0016	.0641	-.0002
#3	510.2	.0006	.0082	.0002	.1830	.0023	.0017	.0563	.0011
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: LB 160-122888/1-B Acquired: 5/22/2014 13:19:20 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0012	.0013	.0002	<.0000	<.0000	<.0000	.0140
Stddev	.0000	.0023	.0005	.0011	.0050	.0027	.0001
%RSD	2.451	181.0	208.6	30.78	15.72	192.8	.7698
#1	.0011	-.0014	-.0001	-.0029	-.0367	.0008	.0138
#2	.0012	.0029	.0000	-.0031	-.0323	-.0007	.0140
#3	.0012	.0023	.0008	-.0050	-.0267	-.0043	.0140
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5681.6
Stddev	14.8
%RSD	.25960
#1	5677.1
#2	5698.1
#3	5669.7

Sample Name: CCV Acquired: 5/22/2014 13:23:26 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.9958**	**49.49**	**5.039**	**4.962**	**4.940**	**5.047**	**5.082**	**51.57**	**5.105**
Stddev	.0081	.15	.043	.011	.070	.032	.044	.38	.050
%RSD	.8171	.2942	.8614	.2186	1.423	.6239	.8684	.7274	.9711
#1	.9920	49.33	4.999	4.952	4.864	5.021	5.050	51.22	5.059
#2	.9902	49.60	5.033	4.974	5.003	5.039	5.065	51.52	5.099
#3	1.005	49.56	5.085	4.960	4.953	5.082	5.133	51.97	5.157
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.108**	**5.083**	**5.109**	**50.20**	**50.39**	**5.100**	**49.06**	**5.033**	**1.022**
Stddev	.037	.043	.043	.09	.10	.018	.20	.017	.008
%RSD	.7322	.8423	.8353	.1859	.2077	.3636	.4132	.3295	.7804
#1	5.072	5.050	5.072	50.10	50.39	5.082	48.82	5.013	1.015
#2	5.107	5.069	5.100	50.24	50.28	5.098	49.15	5.042	1.021
#3	5.146	5.131	5.156	50.28	50.49	5.119	49.20	5.043	1.031
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**50.41**	**5.145**	**52.63**	**5.175**	**50.20**	**1.012**	**1.008**	**4.991**	**5.156**
Stddev	.10	.045	.41	.048	.42	.010	.011	.029	.040
%RSD	.1973	.8845	.7736	.9293	.8372	1.012	1.100	.5814	.7718
#1	50.34	5.102	52.24	5.130	49.82	1.006	1.002	4.958	5.117
#2	50.37	5.141	52.59	5.171	50.13	1.007	1.002	5.013	5.153
#3	50.52	5.193	53.05	5.225	50.65	1.024	1.021	5.002	5.197
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Sample Name: CCV Acquired: 5/22/2014 13:23:26 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.062**	**4.994**	**5.016**	**1.047**	**5.089**	**4.996**	**5.119**
Stddev	.049	.030	.020	.005	.048	.008	.040
%RSD	.9578	.6021	.3899	.4898	.9428	.1687	.7864
#1	5.010	4.968	4.995	1.043	5.069	4.990	5.081
#2	5.105	4.988	5.021	1.045	5.055	4.993	5.113
#3	5.072	5.027	5.033	1.053	5.144	5.006	5.161
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	**5553.9**
Stddev	41.9
%RSD	.75472
#1	5592.4
#2	5560.2
#3	5509.2

Sample Name: CCB Acquired: 5/22/2014 13:27:15 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	<.0000	<.0000	.0067	.0001	.0001	<.0000	<.0000	.0001
Stddev	.0002	.0078	.0012	.0027	.0001	.0001	.0014	.0009	.0000
%RSD	166.8	4904.	156.7	40.28	122.8	52.67	88.64	80.81	55.10
#1	-.0004	-.0082	-.0020	.0086	.0001	.0001	-.0027	-.0002	.0001
#2	-.0001	.0004	-.0008	.0078	.0003	.0002	-.0021	-.0010	.0001
#3	.0000	.0073	.0005	.0036	.0000	.0001	.0000	-.0020	.0000
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	.0001	<.0000	.0024	<.0000	.0010	<.0000	.0002	<.0000
Stddev	.0002	.0007	.0003	.0003	.0065	.0004	.0145	.0002	.0001
%RSD	123.6	822.4	29.22	14.04	203.5	37.96	214.3	99.28	266.2
#1	-.0001	-.0006	-.0010	.0028	.0026	.0013	-.0042	.0005	.0000
#2	.0003	.0001	-.0015	.0021	-.0020	.0011	.0063	.0000	-.0001
#3	.0002	.0007	-.0009	.0024	-.0102	.0006	-.0225	.0002	.0000
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0190	.0001	.0011	<.0000	.0036	<.0000	.0021	.0041	.0003
Stddev	.0058	.0001	.0008	.0006	.0027	.0015	.0007	.0045	.0004
%RSD	30.61	99.80	70.58	166.6	74.69	245.5	33.22	107.9	112.2
#1	.0152	.0000	.0017	-.0006	.0044	-.0017	.0013	.0081	.0004
#2	.0257	.0002	.0003	-.0008	.0058	.0011	.0025	-.0007	.0007
#3	.0161	.0002	.0012	.0003	.0006	-.0012	.0024	.0050	-.0001
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Sample Name: CCB Acquired: 5/22/2014 13:27:15 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	<.0000	<.0000	<.0000	<.0000	<.0000	<.0000
Stddev	.0001	.0012	.0003	.0005	.0079	.0022	.0001
%RSD	106.9	218.5	177.1	90.35	519.8	155.4	218.2
#1	.0000	-.0002	.0002	.0000	-.0008	-.0033	.0000
#2	.0002	.0004	-.0004	-.0008	-.0097	.0010	.0000
#3	.0000	-.0019	-.0004	-.0008	.0060	-.0020	-.0001
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit							
Low Limit							

Int. Std.	Y_3710
Units	Cts/S
Avg	6001.6
Stddev	15.7
%RSD	.26162
#1	5989.6
#2	6019.4
#3	5995.8

Sample Name: LCS 160-123177/2-A Acquired: 5/22/2014 13:31:11 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2058	10.05	1.050	2.049	1.005	1.036	.9863	10.66	1.046
Stddev	.0006	.05	.004	.006	.001	.004	.0042	.03	.003
%RSD	.2868	.4887	.3986	.3146	.1202	.4007	.4279	.2941	.3077
#1	.2061	9.997	1.052	2.052	1.004	1.041	.9905	10.64	1.047
#2	.2061	10.09	1.053	2.053	1.006	1.034	.9864	10.70	1.047
#3	.2051	10.08	1.046	2.041	1.006	1.035	.9821	10.64	1.042
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.008	1.017	1.043	10.40	10.10	1.010	9.653	1.024	.5063
Stddev	.002	.006	.004	.03	.08	.012	.053	.002	.0011
%RSD	.2189	.5826	.3485	.2835	.8223	1.170	.5478	.2171	.2125
#1	1.009	1.015	1.048	10.44	10.01	.9970	9.710	1.026	.5070
#2	1.010	1.024	1.042	10.38	10.17	1.020	9.646	1.023	.5069
#3	1.006	1.013	1.041	10.39	10.11	1.012	9.605	1.022	.5051
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	486.3	1.040	1.129	.9986	10.53	.5133	.5400	.1210	1.015
Stddev	2.5	.002	.004	.0048	.04	.0025	.0014	.0012	.003
%RSD	.5221	.1611	.3390	.4802	.4079	.4927	.2652	.9928	.3348
#1	487.0	1.040	1.133	.9992	10.58	.5127	.5388	.1207	1.016
#2	483.5	1.041	1.127	1.003	10.52	.5111	.5416	.1200	1.018
#3	488.4	1.038	1.127	.9936	10.49	.5160	.5396	.1223	1.011
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: LCS 160-123177/2-A Acquired: 5/22/2014 13:31:11 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.045	.9818	1.028	.1947	.9360	1.030	1.067
Stddev	.001	.0037	.003	.0014	.0065	.002	.002
%RSD	.0785	.3767	.2557	.7102	.6910	.1539	.1625
#1	1.046	.9780	1.031	.1963	.9434	1.031	1.068
#2	1.044	.9854	1.027	.1941	.9315	1.028	1.069
#3	1.045	.9820	1.027	.1937	.9330	1.030	1.066
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5553.4
Stddev	7.1
%RSD	.12832
#1	5555.6
#2	5545.4
#3	5559.2

Sample Name: 160-6690-A-1-C Acquired: 5/22/2014 13:34:50 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0001**	**.0752**	**<.0000**	**.0330**	**.1238**	**.0002**	**<.0000**	**16.82**	**.0004**
Stddev	.0003	.0024	.0002	.0004	.0006	.0000	.0007	.06	.0002
%RSD	263.2	3.243	21.66	1.166	.4863	20.31	83.50	.3761	51.02
#1	.0002	.0738	-.0011	.0328	.1236	.0003	.0000	16.78	.0003
#2	-.0002	.0781	-.0007	.0334	.1245	.0002	-.0014	16.78	.0003
#3	.0004	.0738	-.0010	.0327	.1233	.0002	-.0012	16.89	.0007
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0137**	**.0020**	**.0013**	**.0423**	**.4146**	**.0019**	**3.230**	**1.343**	**.0003**
Stddev	.0006	.0009	.0019	.0016	.0110	.0005	.026	.005	.0002
%RSD	4.608	45.49	148.9	3.826	2.656	29.17	.7921	.3399	55.62
#1	.0133	.0027	.0034	.0408	.4084	.0023	3.217	1.341	.0005
#2	.0135	.0024	-.0004	.0441	.4274	.0013	3.214	1.340	.0003
#3	.0145	.0010	.0008	.0421	.4081	.0020	3.260	1.348	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**512.9**	**.0035**	**.0051**	**.0039**	**.2326**	**.0016**	**.0018**	**1.286**	**.0002**
Stddev	3.7	.0003	.0016	.0011	.0064	.0009	.0011	.003	.0002
%RSD	.7165	9.837	30.37	29.49	2.739	53.16	65.09	.2214	113.4
#1	511.6	.0038	.0051	.0043	.2272	.0026	.0031	1.283	.0000
#2	517.1	.0032	.0036	.0047	.2311	.0010	.0010	1.288	.0002
#3	510.0	.0037	.0067	.0026	.2397	.0012	.0012	1.287	.0004
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6690-A-1-C Acquired: 5/22/2014 13:34:50 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0518	.0012	.0009	<.0000	<.0000	<.0000	.0117
Stddev	.0001	.0044	.0005	.0009	.0063	.0015	.0001
%RSD	.2584	380.4	55.65	16.21	16.03	72.90	.9240
#1	.0517	.0056	.0012	-.0054	-.0353	-.0013	.0116
#2	.0519	.0011	.0011	-.0046	-.0466	-.0038	.0116
#3	.0517	-.0032	.0003	-.0063	-.0360	-.0011	.0118
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5549.8
Stddev	38.4
%RSD	.69139
#1	5583.5
#2	5557.8
#3	5508.0

Sample Name: 160-6690-A-1-C SD Acquired: 5/22/2014 13:38:53 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=5

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0001**	**.0147**	**.0001**	**.0075**	**.0254**	**.0000**	**<.0000**	**3.642**	**.0001**
Stddev	.0002	.0076	.0007	.0019	.0002	.0000	.0021	.005	.0000
%RSD	162.4	51.26	585.5	25.45	.6827	152.4	713.4	.1465	30.53
#1	-.0001	.0101	.0009	.0082	.0254	.0000	.0018	3.647	.0001
#2	.0003	.0107	-.0001	.0054	.0252	.0000	-.0002	3.637	.0001
#3	.0002	.0235	-.0004	.0090	.0255	.0000	-.0024	3.643	.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0028**	**.0014**	**<.0000**	**.0088**	**.0713**	**.0012**	**.6555**	**.2727**	**.0000**
Stddev	.0003	.0006	.0012	.0019	.0091	.0003	.0062	.0013	.0001
%RSD	11.21	42.10	127.5	21.09	12.70	27.13	.9471	.4721	217.9
#1	.0026	.0008	-.0012	.0108	.0807	.0011	.6484	.2726	.0000
#2	.0031	.0014	-.0020	.0072	.0626	.0016	.6581	.2740	.0000
#3	.0027	.0019	.0004	.0084	.0705	.0010	.6600	.2714	.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**105.2**	**.0006**	**.0010**	**.0015**	**.0487**	**.0006**	**.0002**	**.2565**	**.0004**
Stddev	1.5	.0001	.0007	.0007	.0005	.0007	.0011	.0034	.0004
%RSD	1.412	13.96	69.24	49.29	.9873	119.9	610.5	1.320	123.2
#1	104.9	.0006	.0017	.0010	.0492	.0009	.0014	.2559	.0006
#2	103.9	.0005	.0007	.0011	.0488	-.0002	-.0002	.2601	-.0001
#3	106.8	.0007	.0005	.0023	.0482	.0010	-.0006	.2534	.0006
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6690-A-1-C SD Acquired: 5/22/2014 13:38:53 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=5

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0106	.0016	<.0000	<.0000	<.0000	<.0000	.0070
Stddev	.0001	.0073	.0005	.0012	.0051	.0006	.0001
%RSD	.5479	456.6	162.0	33.21	15.47	31.33	.7482
#1	.0106	.0087	-.0008	-.0024	-.0278	-.0013	.0071
#2	.0105	-.0059	-.0004	-.0047	-.0380	-.0016	.0070
#3	.0106	.0019	.0002	-.0037	-.0330	-.0024	.0070
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5605.3
Stddev	9.0
%RSD	.16085
#1	5603.0
#2	5597.7
#3	5615.3

Sample Name: 160-6690-A-1-D MS Acquired: 5/22/2014 13:42:55 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.2005**	**9.878**	**1.006**	**1.906**	**1.100**	**.9892**	**.9686**	**26.80**	**.9969**
Stddev	.0012	.006	.003	.007	.001	.0020	.0024	.07	.0024
%RSD	.6204	.0647	.2656	.3613	.0669	.2024	.2455	.2630	.2388
#1	.2006	9.883	1.006	1.909	1.100	.9890	.9683	26.81	.9962
#2	.1992	9.871	1.003	1.899	1.101	.9873	.9664	26.72	.9949
#3	.2017	9.881	1.008	1.912	1.101	.9913	.9711	26.86	.9995
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.9643**	**.9690**	**.9918**	**9.672**	**10.21**	**1.004**	**12.35**	**2.348**	**.4947**
Stddev	.0012	.0044	.0042	.028	.05	.009	.08	.011	.0009
%RSD	.1281	.4585	.4226	.2927	.4741	.8479	.6493	.4659	.1823
#1	.9647	.9692	.9898	9.673	10.25	1.009	12.42	2.353	.4942
#2	.9629	.9644	.9889	9.644	10.24	1.008	12.26	2.335	.4941
#3	.9652	.9733	.9966	9.700	10.16	.9941	12.35	2.354	.4957
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**545.0**	**.9866**	**1.081**	**.9448**	**10.39**	**.5038**	**.5179**	**1.435**	**.9873**
Stddev	9.1	.0028	.007	.0061	.04	.0021	.0035	.002	.0027
%RSD	1.672	.2800	.6624	.6493	.3862	.4095	.6798	.1024	.2694
#1	555.4	.9886	1.080	.9503	10.39	.5014	.5147	1.435	.9863
#2	541.6	.9835	1.075	.9382	10.35	.5051	.5174	1.437	.9852
#3	538.2	.9879	1.089	.9459	10.43	.5049	.5217	1.435	.9903
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6690-A-1-D MS Acquired: 5/22/2014 13:42:55 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.065	.9273	1.019	.1799	.8957	.9684	1.017
Stddev	.001	.0059	.002	.0013	.0057	.0027	.003
%RSD	.1009	.6346	.1858	.7170	.6371	.2809	.2756
#1	1.064	.9328	1.019	.1792	.9016	.9669	1.017
#2	1.066	.9211	1.016	.1814	.8902	.9667	1.014
#3	1.065	.9279	1.020	.1791	.8953	.9715	1.019
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5595.4
Stddev	18.4
%RSD	.32909
#1	5598.1
#2	5612.4
#3	5575.8

Sample Name: 160-6690-A-1-E MSD Acquired: 5/22/2014 13:46:34 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.2040**	**10.19**	**1.070**	**1.982**	**1.132**	**1.037**	**.9885**	**27.49**	**1.066**
Stddev	.0017	.04	.007	.002	.004	.003	.0093	.03	.003
%RSD	.8539	.3443	.6628	.1172	.3372	.2549	.9401	.1191	.2642
#1	.2030	10.15	1.062	1.980	1.128	1.036	.9785	27.45	1.063
#2	.2060	10.22	1.074	1.982	1.134	1.035	.9968	27.51	1.066
#3	.2030	10.19	1.074	1.984	1.134	1.040	.9902	27.50	1.069
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**1.026**	**1.029**	**1.055**	**10.16**	**10.49**	**1.019**	**12.81**	**2.374**	**.5068**
Stddev	.003	.003	.003	.02	.04	.006	.03	.001	.0014
%RSD	.2974	.2557	.3252	.2182	.4215	.5892	.2458	.0583	.2859
#1	1.023	1.026	1.052	10.16	10.45	1.012	12.83	2.375	.5056
#2	1.027	1.031	1.055	10.14	10.50	1.022	12.77	2.374	.5084
#3	1.029	1.030	1.058	10.18	10.53	1.023	12.81	2.373	.5063
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**529.5**	**1.058**	**1.141**	**1.014**	**10.62**	**.5163**	**.5493**	**1.384**	**1.019**
Stddev	3.4	.002	.003	.002	.04	.0004	.0030	.005	.003
%RSD	.6366	.2055	.2652	.1524	.3592	.0831	.5389	.3320	.2881
#1	526.5	1.056	1.138	1.013	10.58	.5158	.5459	1.381	1.016
#2	533.2	1.060	1.141	1.012	10.64	.5166	.5515	1.389	1.021
#3	528.8	1.059	1.144	1.015	10.64	.5164	.5505	1.381	1.021
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6690-A-1-E MSD Acquired: 5/22/2014 13:46:34 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.101	.9764	1.022	.1920	.9412	1.021	1.080
Stddev	.003	.0035	.001	.0011	.0080	.002	.002
%RSD	.2688	.3536	.0982	.5741	.8474	.2201	.1772
#1	1.098	.9726	1.022	.1933	.9403	1.023	1.077
#2	1.103	.9794	1.021	.1911	.9337	1.019	1.081
#3	1.103	.9773	1.023	.1917	.9496	1.020	1.080
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5473.4
Stddev	10.6
%RSD	.19443
#1	5483.9
#2	5473.8
#3	5462.6

Sample Name: 160-6690-A-2-C Acquired: 5/22/2014 13:50:13 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	.1107	<.0000	.1058	.1256	.0001	.0015	52.95	.0002
Stddev	.0005	.0021	.0017	.0007	.0002	.0000	.0014	.24	.0001
%RSD	627.4	1.918	250.9	.7048	.1888	28.75	95.08	.4620	53.00
#1	-.0004	.1119	-.0014	.1067	.1253	.0001	.0013	53.14	.0001
#2	.0002	.1082	-.0019	.1054	.1256	.0001	.0002	53.03	.0002
#3	.0005	.1119	.0013	.1054	.1258	.0000	.0030	52.67	.0003
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0004	.0024	<.0000	.0963	.7029	.0015	7.386	.0243	.0003
Stddev	.0003	.0004	.0007	.0015	.0188	.0003	.050	.0005	.0000
%RSD	63.35	18.76	26.69	1.539	2.682	21.28	.6735	1.915	16.70
#1	.0006	.0024	-.0023	.0980	.6948	.0018	7.443	.0238	.0003
#2	.0001	.0028	-.0021	.0954	.7244	.0015	7.366	.0244	.0003
#3	.0006	.0019	-.0034	.0954	.6893	.0012	7.350	.0247	.0004
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	510.8	.0019	.0030	.0006	.2287	.0021	.0001	2.227	<.0000
Stddev	7.3	.0002	.0021	.0017	.0016	.0007	.0004	.028	.0003
%RSD	1.424	11.03	72.10	286.3	.7142	31.01	312.2	1.270	48.81
#1	509.2	.0020	.0021	-.0004	.2298	.0023	-.0001	2.248	-.0004
#2	518.7	.0016	.0014	.0026	.2294	.0014	.0006	2.238	-.0005
#3	504.4	.0019	.0054	-.0004	.2268	.0027	-.0001	2.194	-.0009
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6690-A-2-C Acquired: 5/22/2014 13:50:13 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1133	.0025	.0017	<.0000	<.0000	.0002	.0160
Stddev	.0001	.0020	.0006	.0015	.0037	.0007	.0002
%RSD	.1202	79.36	32.12	47.15	11.49	401.3	1.110
#1	.1132	.0044	.0023	-.0027	-.0279	-.0006	.0162
#2	.1134	.0029	.0012	-.0050	-.0341	.0008	.0161
#3	.1134	.0004	.0016	-.0020	-.0344	.0003	.0158
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5508.5
Stddev	24.3
%RSD	.44037
#1	5485.2
#2	5506.7
#3	5533.6

Sample Name: 160-6690-A-3-C Acquired: 5/22/2014 13:54:15 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0374	<.0000	.0837	.1850	<.0000	<.0000	200.4	.0003
Stddev	.0005	.0052	.0016	.0018	.0004	.0000	.0017	.9	.0001
%RSD	336.1	13.85	100.2	2.181	.2186	50.20	146.7	.4659	21.08
#1	-.0001	.0343	-.0034	.0845	.1845	.0000	-.0027	199.9	.0003
#2	-.0006	.0434	-.0003	.0850	.1852	.0000	.0006	201.4	.0002
#3	.0003	.0344	-.0011	.0816	.1853	.0000	-.0013	199.7	.0004
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0009	.0030	<.0000	.0340	.7195	.0036	9.450	.0075	.0001
Stddev	.0002	.0003	.0013	.0005	.0035	.0006	.095	.0001	.0001
%RSD	21.95	10.40	44.11	1.362	.4804	15.99	1.001	1.054	113.6
#1	.0011	.0032	-.0025	.0344	.7155	.0037	9.528	.0075	.0001
#2	.0008	.0026	-.0020	.0335	.7219	.0030	9.476	.0075	.0003
#3	.0007	.0031	-.0045	.0340	.7210	.0041	9.345	.0076	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	506.1	.0006	.0021	.0012	.1637	.0034	.0013	1.472	<.0000
Stddev	4.4	.0001	.0009	.0010	.0015	.0002	.0006	.012	.0001
%RSD	.8750	19.59	40.36	82.31	.9099	6.562	45.67	.7869	10.38
#1	501.1	.0007	.0030	.0023	.1652	.0032	.0020	1.482	-.0014
#2	509.2	.0007	.0021	.0009	.1636	.0036	.0011	1.475	-.0014
#3	508.1	.0005	.0013	.0004	.1623	.0035	.0009	1.460	-.0012
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6690-A-3-C Acquired: 5/22/2014 13:54:15 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.3334	.0071	.0019	<.0000	.0137	<.0000	.0131
Stddev	.0005	.0037	.0003	.0004	.0121	.0036	.0001
%RSD	.1540	51.88	14.80	15.66	88.20	165.7	1.018
#1	.3337	.0063	.0021	-.0021	-.0002	-.0032	.0131
#2	.3338	.0112	.0020	-.0029	.0216	.0018	.0132
#3	.3329	.0040	.0016	-.0024	.0198	-.0052	.0129
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5452.8
Stddev	22.3
%RSD	.40856
#1	5438.0
#2	5442.1
#3	5478.5

Sample Name: 160-6690-A-4-C Acquired: 5/22/2014 13:58:17 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0619	<.0000	.0732	.1643	.0000	<.0000	90.88	.0002
Stddev	.0004	.0054	.0024	.0013	.0005	.0000	.0013	.80	.0001
%RSD	129.3	8.726	205.0	1.728	.3313	60.13	108.2	.8833	44.77
#1	.0001	.0570	-.0008	.0736	.1641	.0000	-.0018	90.56	.0002
#2	-.0005	.0610	.0010	.0742	.1638	.0000	.0003	91.80	.0001
#3	-.0005	.0677	-.0038	.0718	.1649	.0000	-.0023	90.29	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0007	.0036	<.0000	.0433	.7261	.0026	7.890	.0149	.0003
Stddev	.0003	.0002	.0006	.0009	.0087	.0005	.037	.0003	.0000
%RSD	40.85	5.130	27.70	2.192	1.203	20.55	.4666	1.858	13.92
#1	.0004	.0034	-.0018	.0440	.7161	.0024	7.890	.0151	.0002
#2	.0009	.0038	-.0021	.0437	.7301	.0032	7.927	.0150	.0003
#3	.0007	.0036	-.0031	.0422	.7322	.0022	7.854	.0146	.0003
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	514.6	.0021	.0041	.0018	.4326	.0038	.0024	1.813	<.0000
Stddev	8.7	.0002	.0006	.0005	.0030	.0005	.0005	.006	.0010
%RSD	1.693	8.333	13.61	25.75	.6920	13.87	21.10	.3341	149.4
#1	507.1	.0022	.0048	.0017	.4294	.0043	.0019	1.820	-.0015
#2	524.2	.0022	.0038	.0014	.4354	.0032	.0024	1.809	-.0008
#3	512.6	.0019	.0039	.0023	.4329	.0040	.0029	1.810	.0004
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6690-A-4-C Acquired: 5/22/2014 13:58:17 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1647	.0023	.0015	<.0000	<.0000	.0005	.0150
Stddev	.0007	.0050	.0008	.0006	.0152	.0018	.0002
%RSD	.4395	221.0	53.04	18.66	214.1	388.0	1.081
#1	.1643	.0048	.0013	-.0034	-.0234	.0008	.0151
#2	.1642	.0054	.0025	-.0028	-.0046	-.0015	.0151
#3	.1655	-.0035	.0009	-.0040	.0067	.0021	.0148
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5485.3
Stddev	41.8
%RSD	.76170
#1	5520.8
#2	5439.3
#3	5495.8

Sample Name: 160-6690-A-5-C Acquired: 5/22/2014 14:02:19 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0003**	**.0457**	**<.0000**	**.0678**	**.2089**	**.0000**	**<.0000**	**145.2**	**.0004**
Stddev	.0004	.0078	.0007	.0014	.0003	.0000	.0027	.3	.0002
%RSD	171.9	17.16	40.31	2.052	.1233	32.68	260.0	.2119	40.10
#1	.0007	.0381	-.0014	.0666	.2090	.0000	.0016	145.0	.0006
#2	-.0002	.0453	-.0026	.0674	.2086	.0000	-.0038	145.6	.0003
#3	.0003	.0537	-.0013	.0693	.2091	.0000	-.0010	145.1	.0003
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0013**	**.0026**	**<.0000**	**.0303**	**.7853**	**.0031**	**15.23**	**.5282**	**.0003**
Stddev	.0003	.0005	.0004	.0006	.0030	.0007	.05	.0033	.0002
%RSD	26.78	18.96	12.16	1.857	.3783	23.12	.3578	.6316	64.73
#1	.0016	.0023	-.0027	.0309	.7875	.0023	15.17	.5247	.0004
#2	.0013	.0032	-.0031	.0302	.7865	.0038	15.24	.5287	.0001
#3	.0009	.0024	-.0034	.0297	.7819	.0033	15.27	.5313	.0004
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**516.9**	**.0058**	**.0033**	**.0011**	**.3419**	**.0039**	**.0038**	**1.591**	**<.0000**
Stddev	6.4	.0005	.0010	.0007	.0004	.0024	.0003	.001	.0005
%RSD	1.239	8.627	29.58	62.38	.1312	62.80	8.072	.0543	35.11
#1	523.5	.0054	.0030	.0015	.3424	.0066	.0035	1.590	-.0017
#2	516.4	.0064	.0026	.0003	.3416	.0018	.0041	1.591	-.0016
#3	510.8	.0057	.0044	.0016	.3416	.0032	.0040	1.592	-.0008
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6690-A-5-C Acquired: 5/22/2014 14:02:19 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2512	.0069	.0013	<.0000	<.0000	<.0000	.0154
Stddev	.0003	.0029	.0004	.0004	.0175	.0024	.0001
%RSD	.1073	42.25	29.72	9.689	175.4	91.62	.6743
#1	.2514	.0056	.0010	-.0043	-.0288	-.0029	.0154
#2	.2509	.0048	.0017	-.0040	-.0069	-.0001	.0154
#3	.2512	.0102	.0011	-.0049	.0058	-.0049	.0155
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5506.3
Stddev	17.1
%RSD	.30995
#1	5525.1
#2	5502.1
#3	5491.7

Sample Name: 160-6690-A-6-C Acquired: 5/22/2014 14:06:19 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0390	<.0000	.0610	.1778	<.0000	.0003	234.1	.0002
Stddev	.0001	.0073	.0006	.0010	.0012	.0000	.0011	1.2	.0001
%RSD	23.61	18.80	88.00	1.685	.6765	263.4	339.8	.5153	37.16
#1	-.0007	.0391	-.0006	.0602	.1792	.0000	.0016	232.9	.0001
#2	-.0005	.0317	-.0014	.0606	.1772	.0000	.0000	234.1	.0003
#3	-.0008	.0464	-.0002	.0621	.1770	.0000	-.0006	235.3	.0003
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0008	.0021	<.0000	.0222	.7918	.0033	10.26	.0689	.0009
Stddev	.0000	.0004	.0019	.0005	.0340	.0001	.09	.0009	.0002
%RSD	3.503	21.08	42.12	2.372	4.298	2.661	.9202	1.244	23.40
#1	.0008	.0018	-.0049	.0220	.7558	.0032	10.16	.0680	.0009
#2	.0008	.0026	-.0024	.0228	.7963	.0033	10.27	.0691	.0007
#3	.0008	.0020	-.0062	.0218	.8234	.0034	10.35	.0697	.0011
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	544.9	.0015	.0025	.0015	.4808	.0032	.0013	1.174	<.0000
Stddev	11.7	.0001	.0007	.0007	.0029	.0026	.0002	.010	.0001
%RSD	2.152	8.008	25.98	49.86	.6002	82.59	18.48	.8739	3.991
#1	547.7	.0013	.0018	.0011	.4777	.0022	.0010	1.162	-.0018
#2	555.0	.0015	.0027	.0010	.4813	.0012	.0014	1.178	-.0019
#3	532.0	.0016	.0031	.0023	.4834	.0062	.0014	1.181	-.0019
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6690-A-6-C Acquired: 5/22/2014 14:06:19 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.3824	.0011	.0014	<.0000	.0269	<.0000	.0132
Stddev	.0023	.0039	.0004	.0011	.0124	.0009	.0001
%RSD	.5945	363.1	28.15	31.64	46.12	49.73	.9593
#1	.3850	-.0033	.0018	-.0022	.0223	-.0027	.0131
#2	.3813	.0025	.0011	-.0040	.0175	-.0021	.0131
#3	.3808	.0041	.0013	-.0040	.0410	-.0009	.0133
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5444.9
Stddev	39.2
%RSD	.72075
#1	5483.2
#2	5446.6
#3	5404.8

Sample Name: CCV Acquired: 5/22/2014 14:10:22 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**1.022**	**49.47**	**5.206**	**4.729**	**5.103**	**4.984**	**5.235**	**53.08**	**5.256**
Stddev	.005	.06	.076	.006	.016	.023	.071	.54	.057
%RSD	.4577	.1307	1.463	.1367	.3149	.4590	1.355	1.025	1.093
#1	1.020	49.54	5.183	4.735	5.114	4.973	5.219	52.99	5.238
#2	1.020	49.46	5.144	4.731	5.084	4.968	5.173	52.58	5.210
#3	1.028	49.42	5.291	4.722	5.111	5.010	5.312	53.66	5.320
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.243**	**5.217**	**5.261**	**48.18**	**51.15**	**5.178**	**47.56**	**4.826**	**1.050**
Stddev	.065	.026	.059	.02	.17	.017	.03	.009	.013
%RSD	1.240	.5070	1.120	.0404	.3398	.3224	.0675	.1818	1.240
#1	5.231	5.199	5.249	48.18	51.08	5.182	47.52	4.824	1.047
#2	5.185	5.204	5.209	48.16	51.35	5.192	47.58	4.819	1.039
#3	5.313	5.247	5.325	48.20	51.03	5.160	47.57	4.836	1.065
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**50.96**	**5.323**	**54.07**	**5.329**	**51.86**	**1.045**	**1.041**	**4.782**	**5.315**
Stddev	.20	.066	.59	.054	.76	.018	.018	.015	.061
%RSD	.3830	1.246	1.099	1.009	1.472	1.684	1.697	.3217	1.155
#1	50.97	5.304	53.99	5.315	51.65	1.039	1.040	4.799	5.296
#2	51.16	5.268	53.52	5.284	51.22	1.031	1.024	4.775	5.266
#3	50.77	5.397	54.70	5.389	52.70	1.064	1.059	4.771	5.384
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Sample Name: CCV Acquired: 5/22/2014 14:10:22 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.088**	**5.103**	**4.975**	**1.067**	**5.249**	**4.825**	**5.269**
Stddev	.039	.049	.007	.011	.026	.004	.064
%RSD	.7588	.9515	.1449	.9845	.4871	.0842	1.216
#1	5.093	5.074	4.983	1.066	5.219	4.820	5.252
#2	5.125	5.075	4.969	1.057	5.265	4.827	5.214
#3	5.048	5.159	4.973	1.078	5.261	4.828	5.339
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	**5404.8**
Stddev	17.2
%RSD	.31784
#1	5408.4
#2	5419.9
#3	5386.1

Sample Name: CCB Acquired: 5/22/2014 14:14:11 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0001**	**<.0000**	**<.0000**	**.0082**	**.0001**	**.0000**	**<.0000**	**<.0000**	**.0000**
Stddev	.0006	.0070	.0013	.0024	.0000	.0000	.0019	.0009	.0001
%RSD	601.9	314.6	365.4	29.39	52.56	87.30	135.3	1567.	119.8
#1	-.0005	-.0093	-.0015	.0109	.0001	.0000	.0008	.0009	.0001
#2	.0007	.0046	.0010	.0065	.0001	.0001	-.0026	-.0005	.0000
#3	.0002	-.0020	-.0005	.0071	.0000	.0000	-.0025	-.0006	.0001
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0002**	**.0014**	**<.0000**	**<.0000**	**.0211**	**.0002**	**<.0000**	**.0004**	**.0002**
Stddev	.0002	.0007	.0011	.0007	.0183	.0003	.0111	.0003	.0002
%RSD	90.37	52.09	86.10	105.6	86.67	169.2	319.7	80.52	95.21
#1	.0000	.0006	-.0003	-.0003	.0042	.0002	.0037	.0003	.0000
#2	.0004	.0017	-.0024	-.0003	.0187	.0006	-.0162	.0008	.0001
#3	.0002	.0020	-.0011	-.0015	.0405	-.0001	.0021	.0001	.0004
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0344**	**.0003**	**.0017**	**.0000**	**.0029**	**.0016**	**.0012**	**<.0000**	**.0007**
Stddev	.0033	.0002	.0013	.0007	.0006	.0006	.0012	.0089	.0002
%RSD	9.458	88.89	79.75	1673.	19.86	36.01	101.1	523.3	33.85
#1	.0315	.0001	.0017	.0008	.0023	.0020	-.0002	-.0110	.0004
#2	.0337	.0005	.0030	-.0006	.0035	.0018	.0020	.0066	.0008
#3	.0379	.0002	.0004	.0000	.0028	.0009	.0018	-.0007	.0008
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Sample Name: CCB Acquired: 5/22/2014 14:14:11 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	.0027	<.0000	<.0000	<.0000	<.0000	.0002
Stddev	.0001	.0013	.0002	.0014	.0153	.0013	.0001
%RSD	90.59	46.34	97.78	48.44	76.31	280.0	79.59
#1	.0001	.0014	.0000	-.0014	-.0025	.0010	.0001
#2	.0001	.0039	-.0003	-.0031	-.0309	-.0009	.0003
#3	.0000	.0029	-.0001	-.0041	-.0269	-.0014	.0001
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit							
Low Limit							

Int. Std.	Y_3710
Units	Cts/S
Avg	5678.8
Stddev	8.2
%RSD	.14496
#1	5686.6
#2	5670.2
#3	5679.6

Sample Name: 160-6690-A-7-C Acquired: 5/22/2014 14:18:07 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0280	<.0000	.0529	.1683	<.0000	.0008	230.4	.0006
Stddev	.0004	.0042	.0006	.0036	.0005	.0000	.0016	1.8	.0002
%RSD	679.2	15.18	39.13	6.726	.2682	44.72	189.3	.7730	30.22
#1	-.0004	.0289	-.0017	.0496	.1678	.0000	.0018	232.4	.0008
#2	-.0001	.0316	-.0022	.0524	.1685	.0000	.0017	229.9	.0004
#3	.0004	.0233	-.0010	.0567	.1686	.0000	-.0010	228.9	.0006
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0013	.0029	<.0000	.0133	.4805	.0039	6.656	.5441	.0003
Stddev	.0002	.0003	.0008	.0008	.0169	.0007	.023	.0025	.0002
%RSD	12.54	11.79	13.47	5.878	3.521	17.80	.3454	.4579	92.84
#1	.0011	.0032	-.0048	.0138	.4610	.0037	6.682	.5469	.0005
#2	.0014	.0027	-.0063	.0137	.4902	.0034	6.644	.5421	.0000
#3	.0013	.0026	-.0058	.0124	.4903	.0047	6.641	.5435	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	477.0	.0016	.0022	.0006	.3100	.0030	.0002	1.079	<.0000
Stddev	2.5	.0001	.0023	.0005	.0015	.0012	.0039	.002	.0006
%RSD	.5214	8.250	103.6	94.57	.4700	39.97	2192.	.1345	38.32
#1	475.1	.0015	.0029	.0001	.3116	.0044	.0046	1.079	-.0010
#2	479.8	.0016	-.0003	.0012	.3088	.0026	-.0015	1.081	-.0023
#3	475.9	.0018	.0041	.0004	.3097	.0021	-.0026	1.078	-.0017
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6690-A-7-C Acquired: 5/22/2014 14:18:07 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.3564	.0037	.0007	<.0000	.0379	<.0000	.0129
Stddev	.0005	.0053	.0002	.0017	.0073	.0014	.0002
%RSD	.1490	144.2	31.68	45.19	19.17	70.68	1.687
#1	.3558	.0061	.0008	-.0027	.0461	-.0022	.0131
#2	.3568	-.0024	.0005	-.0056	.0321	-.0032	.0129
#3	.3567	.0073	.0009	-.0027	.0356	-.0005	.0127
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5347.6
Stddev	21.8
%RSD	.40700
#1	5322.5
#2	5359.6
#3	5360.8

Sample Name: MB 160-122875/1-A Acquired: 5/22/2014 14:22:07 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0004**	**<.0000**	**<.0000**	**.0008**	**.0004**	**.0000**	**.0001**	**.0303**	**.0001**
Stddev	.0003	.0039	.0007	.0026	.0002	.0001	.0013	.0017	.0001
%RSD	81.01	209.6	139.2	345.1	37.09	469.5	1060.	5.479	81.27
#1	.0000	-.0006	.0002	-.0013	.0002	.0001	.0016	.0322	.0000
#2	.0006	-.0062	-.0006	.0037	.0005	-.0001	-.0009	.0291	.0002
#3	.0005	.0013	-.0012	-.0002	.0005	.0000	-.0003	.0296	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0001**	**.0008**	**<.0000**	**<.0000**	**.0584**	**.0007**	**.0056**	**.0001**	**.0000**
Stddev	.0001	.0004	.0015	.0010	.0085	.0004	.0062	.0002	.0001
%RSD	73.81	53.93	776.4	331.0	14.57	53.76	110.8	171.5	423.4
#1	.0000	.0003	.0014	-.0011	.0662	.0009	.0079	.0003	.0001
#2	.0002	.0008	-.0016	-.0006	.0597	.0008	-.0014	-.0001	.0001
#3	.0001	.0012	-.0003	.0008	.0493	.0003	.0103	.0001	-.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.1302**	**.0001**	**.0020**	**.0007**	**.0031**	**.0012**	**.0009**	**.0029**	**.0004**
Stddev	.0105	.0002	.0010	.0011	.0009	.0005	.0006	.0031	.0003
%RSD	8.075	230.0	51.81	151.7	28.84	42.51	60.94	104.5	77.61
#1	.1412	-.0001	.0031	-.0005	.0042	.0011	.0016	.0048	.0001
#2	.1203	.0000	.0011	.0016	.0025	.0018	.0006	-.0006	.0003
#3	.1290	.0003	.0019	.0011	.0027	.0008	.0006	.0047	.0008
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: MB 160-122875/1-A Acquired: 5/22/2014 14:22:07 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0010	.0025	.0001	<.0000	.0083	<.0000	.0138
Stddev	.0001	.0013	.0004	.0008	.0042	.0032	.0002
%RSD	6.857	49.44	335.2	26.14	50.40	146.8	1.117
#1	.0010	.0038	.0005	-.0022	.0045	-.0025	.0137
#2	.0010	.0013	-.0002	-.0037	.0128	.0012	.0140
#3	.0009	.0025	.0000	-.0035	.0077	-.0053	.0137
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5776.2
Stddev	12.7
%RSD	.22049
#1	5785.8
#2	5761.7
#3	5781.0

Sample Name: LCS 160-122875/2-A Acquired: 5/22/2014 14:26:02 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2136	10.27	1.060	1.921	1.043	1.019	1.061	11.39	1.092
Stddev	.0015	.05	.008	.006	.002	.006	.007	.06	.007
%RSD	.6856	.5051	.7576	.2955	.1856	.6156	.7065	.4877	.6292
#1	.2137	10.24	1.067	1.927	1.045	1.023	1.067	11.45	1.099
#2	.2122	10.33	1.051	1.915	1.041	1.012	1.053	11.34	1.086
#3	.2151	10.24	1.063	1.921	1.044	1.022	1.062	11.39	1.093
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.137	1.123	1.125	10.23	11.02	1.133	9.486	1.005	.5315
Stddev	.009	.007	.006	.07	.12	.014	.044	.002	.0041
%RSD	.7578	.6031	.5105	.6447	1.054	1.260	.4614	.2008	.7728
#1	1.146	1.127	1.130	10.28	10.92	1.123	9.530	1.007	.5359
#2	1.130	1.115	1.119	10.15	11.15	1.149	9.443	1.003	.5278
#3	1.135	1.128	1.125	10.25	11.01	1.126	9.483	1.006	.5308
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	11.24	1.142	1.159	1.141	10.23	.5258	.5338	.0354	1.089
Stddev	.18	.007	.010	.006	.07	.0033	.0029	.0040	.005
%RSD	1.590	.6232	.8696	.5329	.6363	.6212	.5488	11.32	.4585
#1	11.13	1.148	1.171	1.147	10.29	.5295	.5347	.0378	1.094
#2	11.44	1.134	1.151	1.135	10.16	.5235	.5305	.0308	1.086
#3	11.15	1.144	1.157	1.140	10.24	.5243	.5361	.0376	1.086
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: LCS 160-122875/2-A Acquired: 5/22/2014 14:26:02 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.079	1.098	.9952	.2421	1.126	1.027	1.102
Stddev	.003	.006	.0031	.0029	.009	.003	.006
%RSD	.3127	.5292	.3072	1.215	.7942	.2666	.5495
#1	1.081	1.101	.9960	.2446	1.134	1.028	1.108
#2	1.075	1.092	.9918	.2429	1.127	1.029	1.096
#3	1.080	1.102	.9977	.2388	1.117	1.024	1.102
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5629.8
Stddev	23.1
%RSD	.41053
#1	5603.8
#2	5648.1
#3	5637.3

Sample Name: 160-6714-D-1-A Acquired: 5/22/2014 14:29:30 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0007	<.0000	.0259	.0162	.0003	.0010	5.758	.0001
Stddev	.0004	.0024	.0004	.0009	.0004	.0005	.0009	.014	.0002
%RSD	112.9	342.3	233.6	3.316	2.340	175.2	91.48	.2357	215.8
#1	-.0007	-.0014	-.0007	.0258	.0160	.0000	.0000	5.760	.0002
#2	.0000	.0034	.0000	.0268	.0167	.0008	.0013	5.770	.0002
#3	-.0003	.0002	.0001	.0251	.0160	.0000	.0016	5.743	-.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0004	.0015	<.0000	.0019	.8067	.0144	.7380	.0005	.0006
Stddev	.0003	.0003	.0012	.0045	.0106	.0005	.0165	.0006	.0002
%RSD	83.22	18.91	80.08	240.0	1.308	3.329	2.242	110.1	30.99
#1	.0007	.0012	-.0028	-.0015	.8128	.0141	.7336	.0004	.0004
#2	.0001	.0018	-.0003	.0070	.7945	.0150	.7563	.0012	.0007
#3	.0003	.0016	-.0015	.0001	.8128	.0142	.7241	.0000	.0007
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	12.41	.0013	.0001	.0002	1.266	.0020	.0006	1.427	<.0000
Stddev	.08	.0002	.0009	.0002	.005	.0009	.0024	.012	.0002
%RSD	.6218	18.45	1507.	93.00	.4251	46.32	426.9	.8158	148.4
#1	12.34	.0010	.0005	.0002	1.271	.0024	.0023	1.432	-.0003
#2	12.41	.0014	-.0010	.0003	1.267	.0009	-.0021	1.435	-.0002
#3	12.49	.0014	.0006	.0000	1.261	.0026	.0015	1.414	.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6714-D-1-A Acquired: 5/22/2014 14:29:30 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1138	<.0000	.0005	<.0000	<.0000	.0005	.0061
Stddev	.0007	.0041	.0006	.0005	.0098	.0008	.0002
%RSD	.5906	425.5	130.0	27.36	936.9	164.5	2.537
#1	.1132	-.0038	.0000	-.0025	-.0056	-.0002	.0060
#2	.1146	.0038	.0012	-.0015	-.0077	.0014	.0063
#3	.1136	-.0029	.0002	-.0017	.0102	.0003	.0060
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5656.0
Stddev	17.4
%RSD	.30797
#1	5656.9
#2	5638.1
#3	5672.9

Sample Name: 160-6714-D-1-A SD Acquired: 5/22/2014 14:33:23 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=50

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0001**	**<.0000**	**<.0000**	**.0063**	**.0031**	**<.0000**	**.0005**	**1.107**	**.0000**
Stddev	.0002	.0028	.0004	.0005	.0000	.0000	.0020	.017	.0000
%RSD	225.9	1568.	120.2	8.166	1.028	64.01	414.7	1.545	53.93
#1	.0002	-.0033	.0001	.0057	.0031	.0000	.0028	1.126	.0000
#2	-.0001	.0006	-.0007	.0065	.0031	.0000	-.0005	1.095	.0000
#3	.0002	.0021	-.0005	.0067	.0030	-.0001	-.0008	1.099	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0003**	**.0003**	**.0004**	**.0023**	**.1475**	**.0032**	**.1452**	**.0003**	**.0002**
Stddev	.0001	.0012	.0013	.0007	.0134	.0004	.0058	.0001	.0002
%RSD	32.86	413.9	355.4	31.06	9.096	12.84	4.011	37.54	86.62
#1	.0002	.0015	.0018	.0017	.1397	.0032	.1464	.0002	.0001
#2	.0004	.0003	-.0009	.0020	.1630	.0028	.1389	.0003	.0001
#3	.0003	-.0009	.0003	.0031	.1399	.0036	.1503	.0005	.0004
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**2.406**	**.0004**	**.0002**	**<.0000**	**.2406**	**.0014**	**.0013**	**.2710**	**.0003**
Stddev	.022	.0002	.0004	.0005	.0043	.0011	.0022	.0066	.0002
%RSD	.9225	34.25	166.2	141.7	1.775	80.07	163.7	2.425	64.12
#1	2.393	.0003	.0000	-.0008	.2454	.0002	.0030	.2680	.0004
#2	2.432	.0006	.0000	-.0004	.2373	.0024	.0022	.2664	.0001
#3	2.393	.0005	.0007	.0002	.2390	.0015	-.0012	.2785	.0005
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6714-D-1-A SD Acquired: 5/22/2014 14:33:23 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=50

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0219	.0000	<.0000	<.0000	<.0000	<.0000	.0058
Stddev	.0000	.0006	.0003	.0003	.0122	.0013	.0001
%RSD	.1705	1667.	163.9	10.19	1016.	340.7	1.392
#1	.0218	.0007	.0000	-.0022	.0117	-.0007	.0058
#2	.0219	-.0004	-.0006	-.0027	-.0126	-.0015	.0057
#3	.0219	-.0002	-.0001	-.0025	-.0028	.0011	.0058
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5779.4
Stddev	80.3
%RSD	1.3891
#1	5687.5
#2	5835.8
#3	5814.8

Sample Name: 160-6714-D-1-B MS Acquired: 5/22/2014 14:37:16 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0209**	**1.007**	**.1051**	**.2140**	**.1191**	**.1035**	**.1044**	**6.597**	**.1088**
Stddev	.0003	.003	.0012	.0018	.0002	.0002	.0011	.005	.0002
%RSD	1.473	.3279	1.100	.8330	.1261	.1862	1.010	.0803	.1633
#1	.0205	1.009	.1048	.2155	.1192	.1033	.1055	6.603	.1087
#2	.0210	1.009	.1063	.2143	.1192	.1035	.1043	6.595	.1090
#3	.0211	1.004	.1040	.2120	.1190	.1037	.1034	6.593	.1086
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.1134**	**.1130**	**.1084**	**1.033**	**1.817**	**.1205**	**1.642**	**.1014**	**.0536**
Stddev	.0004	.0005	.0004	.001	.020	.0017	.014	.0004	.0001
%RSD	.3093	.4757	.3420	.0967	1.083	1.442	.8788	.4102	.2212
#1	.1138	.1124	.1084	1.034	1.822	.1204	1.626	.1010	.0537
#2	.1134	.1131	.1088	1.033	1.833	.1223	1.646	.1017	.0536
#3	.1131	.1135	.1080	1.032	1.795	.1189	1.655	.1016	.0534
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**13.01**	**.1183**	**.1142**	**.1170**	**2.224**	**.0520**	**.0540**	**1.394**	**.1099**
Stddev	.16	.0003	.0007	.0012	.004	.0009	.0019	.010	.0004
%RSD	1.227	.2866	.6516	1.043	.1638	1.672	3.577	.7009	.3447
#1	13.11	.1185	.1149	.1182	2.228	.0524	.0548	1.383	.1103
#2	13.08	.1179	.1134	.1170	2.225	.0527	.0555	1.402	.1096
#3	12.82	.1185	.1142	.1158	2.220	.0511	.0518	1.397	.1099
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6714-D-1-B MS Acquired: 5/22/2014 14:37:16 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2191	.1038	.1004	.0241	.0817	.1021	.1145
Stddev	.0005	.0023	.0003	.0004	.0034	.0022	.0001
%RSD	.2318	2.179	.2851	1.753	4.139	2.179	.0488
#1	.2196	.1018	.1007	.0246	.0781	.1030	.1145
#2	.2192	.1062	.1002	.0240	.0848	.0995	.1144
#3	.2186	.1034	.1002	.0238	.0823	.1037	.1145
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5744.6
Stddev	10.3
%RSD	.17884
#1	5756.2
#2	5741.1
#3	5736.5

Sample Name: 160-6714-D-1-C MSD Acquired: 5/22/2014 14:41:05 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0205	1.020	.1078	.2145	.1211	.1053	.1041	6.911	.1101
Stddev	.0002	.007	.0017	.0016	.0005	.0002	.0015	.033	.0009
%RSD	1.108	.7248	1.589	.7560	.4186	.1695	1.473	.4759	.7957
#1	.0206	1.016	.1065	.2133	.1216	.1055	.1039	6.878	.1091
#2	.0203	1.015	.1073	.2137	.1206	.1052	.1027	6.944	.1107
#3	.0208	1.029	.1098	.2163	.1212	.1053	.1057	6.911	.1105
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1144	.1156	.1124	1.048	1.891	.1216	1.718	.1029	.0539
Stddev	.0004	.0006	.0014	.001	.013	.0007	.010	.0003	.0002
%RSD	.3714	.5293	1.228	.1067	.6661	.5405	.5985	.2740	.4258
#1	.1139	.1155	.1109	1.048	1.878	.1224	1.718	.1027	.0537
#2	.1146	.1163	.1137	1.047	1.903	.1211	1.708	.1028	.0542
#3	.1147	.1151	.1125	1.049	1.891	.1214	1.728	.1033	.0539
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	13.68	.1192	.1152	.1166	2.292	.0512	.0539	1.470	.1103
Stddev	.02	.0009	.0004	.0004	.025	.0019	.0024	.009	.0002
%RSD	.1324	.7167	.3431	.3666	1.094	3.743	4.364	.6137	.1995
#1	13.69	.1183	.1155	.1162	2.264	.0519	.0516	1.479	.1101
#2	13.66	.1198	.1147	.1170	2.311	.0528	.0537	1.461	.1106
#3	13.68	.1197	.1154	.1166	2.302	.0491	.0563	1.469	.1103
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6714-D-1-C MSD Acquired: 5/22/2014 14:41:05 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2274	.1060	.1013	.0235	.0765	.1004	.1155
Stddev	.0008	.0022	.0011	.0006	.0141	.0013	.0007
%RSD	.3332	2.032	1.127	2.649	18.44	1.274	.6036
#1	.2281	.1036	.1002	.0229	.0628	.1005	.1148
#2	.2266	.1071	.1014	.0242	.0909	.1016	.1161
#3	.2273	.1074	.1025	.0235	.0758	.0990	.1158
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5623.3
Stddev	18.7
%RSD	.33282
#1	5637.3
#2	5602.1
#3	5630.6

Sample Name: 160-6714-H-2-A Acquired: 5/22/2014 14:44:52 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0004**	**<.0000**	**.0000**	**.0172**	**.0073**	**.0000**	**<.0000**	**2.098**	**.0001**
Stddev	.0003	.0081	.0002	.0039	.0001	.0000	.0014	.016	.0001
%RSD	82.11	673.1	664.2	22.35	1.231	237.2	208.2	.7644	81.15
#1	.0004	.0081	-.0002	.0129	.0073	.0000	-.0015	2.099	.0000
#2	.0001	-.0062	.0002	.0184	.0072	.0000	-.0014	2.081	.0002
#3	.0007	-.0055	.0000	.0204	.0074	.0000	.0009	2.113	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0002**	**.0036**	**<.0000**	**<.0000**	**.3264**	**.0021**	**1.389**	**.0002**	**.0029**
Stddev	.0002	.0003	.0014	.0009	.0151	.0004	.012	.0002	.0003
%RSD	107.5	8.884	156.0	75.68	4.621	17.69	.8563	109.1	10.43
#1	.0004	.0039	-.0024	-.0005	.3292	.0024	1.394	.0004	.0032
#2	.0004	.0034	-.0002	-.0008	.3101	.0017	1.376	.0001	.0026
#3	-.0001	.0034	.0000	-.0021	.3398	.0020	1.398	.0000	.0031
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.446**	**.0010**	**.0018**	**.0004**	**.9106**	**.0009**	**.0013**	**2.804**	**<.0000**
Stddev	.073	.0004	.0016	.0014	.0050	.0015	.0009	.033	.0005
%RSD	1.341	35.58	87.49	390.2	.5470	166.6	65.18	1.161	586.6
#1	5.416	.0009	.0001	-.0012	.9160	-.0003	.0005	2.787	-.0004
#2	5.393	.0007	.0020	.0006	.9062	.0026	.0013	2.785	.0005
#3	5.530	.0014	.0033	.0016	.9094	.0004	.0022	2.842	-.0003
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6714-H-2-A Acquired: 5/22/2014 14:44:52 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0567	.0029	<.0000	<.0000	<.0000	.0000	.0040
Stddev	.0007	.0045	.0005	.0016	.0075	.0030	.0001
%RSD	1.261	155.5	193.1	413.6	92.55	14030.	3.023
#1	.0564	.0002	.0003	.0014	-.0168	.0032	.0039
#2	.0561	.0081	-.0005	-.0013	-.0039	-.0028	.0040
#3	.0575	.0004	-.0006	-.0012	-.0037	-.0003	.0041
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5622.2
Stddev	62.4
%RSD	1.1106
#1	5629.4
#2	5680.8
#3	5556.5

Sample Name: 160-6714-H-3-A Acquired: 5/22/2014 14:48:46 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	.0009	<.0000	.0259	.0170	.0000	.0017	3.698	.0001
Stddev	.0004	.0032	.0003	.0025	.0001	.0000	.0010	.017	.0000
%RSD	293.8	363.0	26.98	9.445	.8226	305.0	60.73	.4511	22.81
#1	.0003	.0019	-.0014	.0262	.0171	.0000	.0016	3.706	.0001
#2	-.0003	-.0027	-.0012	.0234	.0170	.0001	.0007	3.710	.0001
#3	.0003	.0035	-.0008	.0282	.0168	.0000	.0027	3.679	.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	.0013	<.0000	.0005	.6616	.0142	.6633	.0003	.0007
Stddev	.0002	.0001	.0007	.0024	.0044	.0006	.0078	.0001	.0002
%RSD	371.8	9.401	53.03	472.7	.6584	3.941	1.172	22.90	23.42
#1	-.0001	.0014	-.0018	.0002	.6572	.0147	.6553	.0002	.0007
#2	.0003	.0012	-.0005	.0031	.6618	.0143	.6708	.0003	.0009
#3	.0000	.0014	-.0018	-.0017	.6659	.0136	.6637	.0003	.0005
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	12.79	.0004	.0011	.0001	.8374	.0007	<.0000	1.357	.0000
Stddev	.25	.0001	.0007	.0005	.0061	.0018	.0027	.013	.0001
%RSD	1.959	20.65	64.69	347.5	.7327	268.5	448500.	.9863	439.4
#1	12.99	.0005	.0003	.0002	.8334	.0027	-.0023	1.344	.0001
#2	12.87	.0004	.0016	-.0004	.8445	-.0003	.0030	1.370	.0000
#3	12.51	.0004	.0016	.0005	.8343	-.0004	-.0007	1.358	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6714-H-3-A Acquired: 5/22/2014 14:48:46 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0935	<.0000	<.0000	<.0000	<.0000	.0019	.0041
Stddev	.0003	.0044	.0008	.0006	.0046	.0018	.0001
%RSD	.3699	449.3	2477.	23.32	36.49	94.32	1.970
#1	.0938	-.0060	.0008	-.0020	-.0086	-.0001	.0042
#2	.0936	.0020	-.0008	-.0032	-.0177	.0023	.0040
#3	.0931	.0011	-.0001	-.0026	-.0117	.0034	.0040
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5661.2
Stddev	25.5
%RSD	.44961
#1	5660.8
#2	5635.9
#3	5686.8

Sample Name: 160-6714-H-4-A Acquired: 5/22/2014 14:52:40 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	<.0000	<.0000	.0252	.0125	<.0000	<.0000	4.146	.0000
Stddev	.0003	.0051	.0003	.0009	.0001	.0000	.0023	.009	.0000
%RSD	120.5	222.6	56.56	3.641	.6928	721.7	2016.	.2206	99.11
#1	-.0005	-.0019	-.0007	.0259	.0125	.0000	.0014	4.150	.0001
#2	.0001	.0026	-.0002	.0242	.0124	.0000	.0010	4.153	.0000
#3	-.0003	-.0075	-.0006	.0254	.0124	.0000	-.0027	4.136	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	.0024	<.0000	<.0000	.6994	.0159	.8488	.0003	.0004
Stddev	.0000	.0006	.0021	.0005	.0204	.0001	.0133	.0002	.0001
%RSD	27.67	26.31	437.9	170.2	2.914	.5341	1.565	85.15	35.50
#1	.0002	.0031	.0019	-.0005	.6761	.0158	.8398	.0005	.0004
#2	.0001	.0025	-.0014	.0003	.7083	.0160	.8641	.0001	.0005
#3	.0001	.0018	-.0019	-.0007	.7139	.0159	.8427	.0002	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	12.65	.0007	.0010	.0006	1.006	.0009	.0012	1.348	<.0000
Stddev	.06	.0002	.0011	.0003	.006	.0007	.0032	.018	.0004
%RSD	.5040	32.14	109.6	52.90	.5912	73.20	266.2	1.343	900.8
#1	12.65	.0007	-.0002	.0007	1.013	.0003	-.0025	1.329	.0000
#2	12.71	.0009	.0020	.0009	1.003	.0016	.0036	1.365	-.0004
#3	12.59	.0005	.0012	.0003	1.003	.0009	.0025	1.349	.0003
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6714-H-4-A Acquired: 5/22/2014 14:52:40 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1082	.0002	<.0000	<.0000	<.0000	<.0000	.0040
Stddev	.0001	.0017	.0006	.0007	.0095	.0020	.0000
%RSD	.0839	723.2	167.4	408.5	41.77	188.8	.5509
#1	.1083	-.0017	.0003	.0003	-.0175	-.0024	.0040
#2	.1081	.0009	-.0008	-.0010	-.0171	.0012	.0040
#3	.1083	.0015	-.0007	.0001	-.0337	-.0019	.0040
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5522.5
Stddev	16.7
%RSD	.30254
#1	5527.2
#2	5504.0
#3	5536.4

Sample Name: CCV Acquired: 5/22/2014 14:56:35 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**1.023**	**48.44**	**5.156**	**4.761**	**5.004**	**5.020**	**5.165**	**53.94**	**5.260**
Stddev	.001	.51	.015	.011	.023	.003	.016	.20	.018
%RSD	.0693	1.050	.2921	.2308	.4608	.0624	.3055	.3781	.3404
#1	1.023	48.80	5.160	4.773	5.024	5.024	5.160	53.92	5.252
#2	1.022	48.65	5.139	4.755	5.010	5.019	5.152	53.75	5.248
#3	1.023	47.86	5.168	4.754	4.979	5.018	5.182	54.16	5.281
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.294**	**5.281**	**5.209**	**49.32**	**49.13**	**4.854**	**49.25**	**4.958**	**1.058**
Stddev	.013	.022	.014	.13	.69	.114	.31	.016	.003
%RSD	.2531	.4091	.2737	.2735	1.394	2.354	.6303	.3290	.2809
#1	5.286	5.267	5.208	49.34	49.60	4.929	49.16	4.951	1.056
#2	5.286	5.271	5.195	49.18	49.45	4.911	48.99	4.946	1.057
#3	5.309	5.306	5.223	49.45	48.35	4.723	49.59	4.977	1.062
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**48.63**	**5.347**	**54.21**	**5.367**	**51.13**	**1.029**	**1.020**	**4.838**	**5.355**
Stddev	.83	.019	.16	.018	.22	.006	.006	.041	.012
%RSD	1.705	.3632	.2943	.3340	.4307	.5414	.6038	.8443	.2319
#1	49.25	5.348	54.09	5.366	51.13	1.028	1.026	4.884	5.351
#2	48.97	5.327	54.14	5.350	50.91	1.024	1.013	4.824	5.345
#3	47.69	5.366	54.39	5.386	51.35	1.035	1.020	4.806	5.369
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Sample Name: CCV Acquired: 5/22/2014 14:56:35 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.064**	**5.148**	**5.000**	**1.075**	**5.227**	**4.922**	**5.284**
Stddev	.014	.021	.008	.001	.017	.007	.016
%RSD	.2779	.4124	.1575	.0603	.3283	.1520	.3109
#1	5.078	5.125	5.009	1.076	5.223	4.913	5.280
#2	5.050	5.154	4.997	1.075	5.212	4.924	5.270
#3	5.064	5.166	4.994	1.075	5.246	4.927	5.302
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	**5307.3**
Stddev	25.8
%RSD	.48580
#1	5324.8
#2	5319.3
#3	5277.7

Sample Name: CCB Acquired: 5/22/2014 15:00:23 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0000**	**<.0000**	**<.0000**	**.0079**	**.0001**	**.0001**	**<.0000**	**.0019**	**.0004**
Stddev	.0004	.0037	.0011	.0033	.0002	.0000	.0023	.0048	.0003
%RSD	4966.	111.3	178.7	41.69	287.8	14.91	179.6	248.5	72.49
#1	-.0004	-.0037	-.0009	.0112	-.0002	.0001	-.0011	-.0008	.0002
#2	.0002	-.0068	-.0016	.0046	.0001	.0001	-.0037	-.0009	.0003
#3	.0002	.0006	.0006	.0080	.0002	.0001	.0009	.0074	.0007
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0005**	**.0030**	**<.0000**	**.0004**	**<.0000**	**.0011**	**<.0000**	**.0001**	**.0002**
Stddev	.0003	.0027	.0016	.0013	.0080	.0004	.0094	.0003	.0002
%RSD	71.10	88.83	102.0	323.5	1727.	35.24	984.1	661.7	90.09
#1	.0006	.0017	-.0022	.0017	-.0045	.0012	.0098	-.0003	.0001
#2	.0001	.0013	-.0028	-.0009	-.0056	.0007	-.0073	.0001	.0001
#3	.0008	.0060	.0002	.0004	.0087	.0015	-.0054	.0004	.0004
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0139**	**.0004**	**.0038**	**.0008**	**.0054**	**.0000**	**.0009**	**.0009**	**.0003**
Stddev	.0039	.0006	.0048	.0012	.0047	.0021	.0021	.0048	.0008
%RSD	27.79	123.9	126.5	158.9	87.24	17100.	228.4	530.9	302.8
#1	.0095	.0003	.0017	.0022	.0045	-.0004	.0011	-.0026	-.0006
#2	.0155	.0000	.0004	.0001	.0012	-.0018	-.0013	.0063	.0009
#3	.0167	.0011	.0093	.0001	.0104	.0023	.0030	-.0011	.0005
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Sample Name: CCB Acquired: 5/22/2014 15:00:23 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0018	<.0000	<.0000	.0055	<.0000	.0004
Stddev	.0001	.0028	.0004	.0018	.0095	.0022	.0005
%RSD	160.9	152.5	173.9	319.6	172.1	131.9	126.3
#1	-.0001	.0004	-.0004	-.0005	.0165	.0004	.0000
#2	.0000	.0001	.0002	-.0024	.0004	-.0040	.0002
#3	-.0001	.0051	-.0004	.0012	-.0003	-.0015	.0009
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit							
Low Limit							

Int. Std.	Y_3710
Units	Cts/S
Avg	5622.8
Stddev	35.1
%RSD	.62507
#1	5637.7
#2	5648.1
#3	5582.7

Sample Name: 160-6714-H-5-A Acquired: 5/22/2014 15:04:19 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0132	<.0000	.0284	.3275	.0000	<.0000	162.3	.0002
Stddev	.0001	.0046	.0014	.0013	.0094	.0000	.0017	13.4	.0000
%RSD	28.63	35.06	51.38	4.471	2.874	235.5	146.3	8.233	25.80
#1	-.0003	.0079	-.0042	.0291	.3187	.0000	-.0005	148.5	.0002
#2	-.0002	.0156	-.0026	.0270	.3265	.0000	.0001	163.3	.0001
#3	-.0003	.0162	-.0014	.0293	.3374	.0000	-.0031	175.2	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0009	.0025	<.0000	.0015	5.381	.0703	31.09	.0004	.0003
Stddev	.0003	.0006	.0010	.0014	.137	.0028	1.07	.0002	.0001
%RSD	28.33	25.50	38.21	93.43	2.542	4.042	3.437	64.81	29.15
#1	.0009	.0024	-.0018	.0007	5.300	.0680	30.06	.0004	.0003
#2	.0011	.0019	-.0037	.0031	5.305	.0693	31.03	.0001	.0002
#3	.0006	.0032	-.0022	.0006	5.539	.0735	32.19	.0005	.0004
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	78.17	.0012	<.0000	.0013	.4756	.0040	.0033	2.030	<.0000
Stddev	2.94	.0001	.0015	.0001	.0498	.0015	.0011	.059	.0002
%RSD	3.761	6.766	40.27	10.54	10.48	38.38	33.44	2.927	15.23
#1	74.84	.0012	-.0021	.0013	.4263	.0026	.0026	1.971	-.0016
#2	79.28	.0011	-.0051	.0012	.4746	.0037	.0046	2.029	-.0019
#3	80.39	.0013	-.0037	.0015	.5259	.0056	.0027	2.090	-.0014
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6714-H-5-A Acquired: 5/22/2014 15:04:19 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	3.819	.0048	.0004	<.0000	.0192	<.0000	.0045
Stddev	.112	.0034	.0005	.0007	.0099	.0026	.0003
%RSD	2.924	71.34	118.7	19.31	51.65	211.5	6.726
#1	3.701	.0012	.0009	-.0032	.0276	.0008	.0042
#2	3.833	.0051	.0005	-.0035	.0083	-.0042	.0045
#3	3.923	.0080	-.0001	-.0046	.0218	-.0003	.0048
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5384.2
Stddev	17.8
%RSD	.32998
#1	5404.4
#2	5371.1
#3	5377.2

Sample Name: 160-6714-H-6-A Acquired: 5/22/2014 15:08:26 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0028	<.0000	.0313	.0099	<.0000	<.0000	2.445	.0001
Stddev	.0006	.0014	.0006	.0015	.0001	.0000	.0019	.009	.0001
%RSD	275.1	50.32	81.90	4.723	.9383	100.2	872.5	.3843	209.1
#1	-.0007	.0013	-.0007	.0303	.0098	-.0001	-.0003	2.434	.0002
#2	.0004	.0029	-.0015	.0306	.0100	.0000	-.0021	2.450	.0000
#3	-.0003	.0041	-.0002	.0330	.0098	.0000	.0018	2.451	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	.0027	<.0000	.0017	.7548	.0112	.4422	.0004	.0010
Stddev	.0003	.0009	.0014	.0020	.0227	.0001	.0031	.0003	.0001
%RSD	276.8	33.19	121.5	117.3	3.008	.9943	.7015	92.59	12.42
#1	-.0002	.0030	-.0005	-.0006	.7760	.0113	.4429	.0006	.0010
#2	.0002	.0017	-.0002	.0029	.7309	.0111	.4388	.0000	.0008
#3	.0003	.0034	-.0028	.0029	.7575	.0112	.4449	.0004	.0011
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	12.23	.0008	.0013	.0015	1.517	.0003	.0013	2.254	.0002
Stddev	.14	.0001	.0003	.0006	.004	.0007	.0025	.011	.0004
%RSD	1.152	8.239	20.26	40.92	.2832	230.5	198.8	.4806	218.3
#1	12.37	.0009	.0012	.0011	1.518	.0004	.0036	2.252	-.0001
#2	12.21	.0008	.0011	.0022	1.521	.0009	.0017	2.245	.0007
#3	12.09	.0008	.0016	.0011	1.512	-.0004	-.0014	2.266	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6714-H-6-A Acquired: 5/22/2014 15:08:26 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0653	<.0000	<.0000	<.0000	<.0000	<.0000	.0045
Stddev	.0003	.0024	.0003	.0006	.0182	.0029	.0000
%RSD	.5180	1452.	421.5	33.88	160.0	423.3	.6678
#1	.0657	.0026	-.0003	-.0026	.0091	.0024	.0045
#2	.0651	-.0016	.0003	-.0014	-.0175	-.0033	.0045
#3	.0651	-.0015	-.0002	-.0015	-.0257	-.0011	.0045
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5671.5
Stddev	29.0
%RSD	.51168
#1	5695.3
#2	5680.1
#3	5639.2

Sample Name: 160-6714-H-7-A Acquired: 5/22/2014 15:12:20 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0010	<.0000	.0246	.0057	<.0000	.0004	2.616	.0000
Stddev	.0011	.0076	.0006	.0019	.0000	.0000	.0019	.011	.0001
%RSD	546.1	759.4	122.3	7.834	.5000	175.8	459.1	.4051	343.0
#1	-.0012	-.0077	-.0008	.0233	.0057	.0000	.0026	2.620	.0002
#2	-.0005	.0059	-.0009	.0238	.0057	.0000	-.0009	2.604	.0000
#3	.0010	.0048	.0002	.0268	.0057	.0000	-.0005	2.624	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0002	.0031	<.0000	<.0000	.4905	.0077	.5040	.0002	.0009
Stddev	.0002	.0012	.0003	.0020	.0046	.0006	.0042	.0004	.0001
%RSD	98.37	37.75	13.56	196.3	.9317	7.705	.8406	148.8	12.44
#1	.0005	.0032	-.0021	-.0025	.4883	.0081	.4995	.0004	.0007
#2	.0001	.0019	-.0024	-.0018	.4958	.0070	.5079	-.0002	.0009
#3	.0001	.0043	-.0019	.0012	.4875	.0079	.5047	.0005	.0010
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	8.634	.0007	.0018	.0002	1.017	.0009	.0014	3.342	.0001
Stddev	.049	.0003	.0012	.0002	.005	.0017	.0005	.012	.0001
%RSD	.5711	41.88	64.11	123.6	.4932	185.8	35.74	.3722	125.8
#1	8.581	.0008	.0023	.0004	1.023	.0010	.0008	3.341	.0000
#2	8.642	.0010	.0005	.0002	1.013	.0025	.0018	3.329	.0002
#3	8.679	.0004	.0028	.0000	1.016	-.0008	.0015	3.354	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6714-H-7-A Acquired: 5/22/2014 15:12:20 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0513	<.0000	<.0000	<.0000	.0068	<.0000	.0042
Stddev	.0000	.0006	.0000	.0007	.0162	.0008	.0001
%RSD	.0964	46.06	44.80	21.84	237.6	95.18	1.645
#1	.0513	-.0012	.0000	-.0038	.0005	.0000	.0042
#2	.0514	-.0019	-.0001	-.0031	-.0053	-.0009	.0041
#3	.0513	-.0007	-.0001	-.0025	.0252	-.0016	.0042
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5637.8
Stddev	12.8
%RSD	.22713
#1	5633.0
#2	5652.3
#3	5628.1

Sample Name: 160-6714-H-8-A Acquired: 5/22/2014 15:16:13 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0016	<.0000	.0348	.0065	<.0000	<.0000	2.903	.0001
Stddev	.0003	.0031	.0008	.0019	.0001	.0001	.0011	.021	.0001
%RSD	453.7	197.6	54.91	5.350	.9504	1500.	82.62	.7133	81.51
#1	-.0004	.0044	-.0007	.0358	.0066	.0001	-.0025	2.926	.0000
#2	-.0001	-.0017	-.0022	.0327	.0065	.0000	-.0003	2.896	.0001
#3	.0003	.0020	-.0012	.0360	.0066	-.0001	-.0012	2.887	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0000	.0026	<.0000	<.0000	.8188	.0134	.4676	.0001	.0018
Stddev	.0001	.0006	.0013	.0006	.0222	.0005	.0164	.0001	.0002
%RSD	150.5	21.42	2973.	96.69	2.711	3.373	3.512	58.23	12.98
#1	.0001	.0024	.0015	-.0003	.8429	.0139	.4661	.0000	.0017
#2	.0000	.0022	-.0007	-.0003	.7991	.0133	.4520	.0001	.0017
#3	.0001	.0033	-.0009	-.0013	.8146	.0130	.4847	.0001	.0021
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	13.87	.0006	.0036	.0005	.9828	.0009	.0003	2.129	.0001
Stddev	.08	.0001	.0011	.0003	.0094	.0012	.0010	.002	.0006
%RSD	.5599	12.67	29.68	58.71	.9587	131.8	351.4	.1085	541.6
#1	13.96	.0006	.0025	.0008	.9936	.0018	.0007	2.132	-.0005
#2	13.82	.0006	.0046	.0002	.9780	-.0005	-.0008	2.128	.0002
#3	13.83	.0007	.0038	.0005	.9767	.0015	.0009	2.128	.0006
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6714-H-8-A Acquired: 5/22/2014 15:16:13 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0749	<.0000	<.0000	.0000	<.0000	.0025	.0038
Stddev	.0004	.0019	.0004	.0007	.0078	.0026	.0001
%RSD	.5860	331.4	180.1	10130.	59.66	105.4	2.775
#1	.0752	-.0027	-.0006	.0008	-.0042	.0035	.0038
#2	.0750	.0009	.0001	-.0004	-.0186	-.0005	.0040
#3	.0744	.0000	-.0001	-.0004	-.0167	.0045	.0038
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5635.7
Stddev	36.1
%RSD	.63991
#1	5598.2
#2	5638.8
#3	5670.2

Sample Name: 160-6714-H-9-A Acquired: 5/22/2014 15:20:06 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0001**	**.0031**	**<.0000**	**.0298**	**.3470**	**<.0000**	**<.0000**	**146.4**	**.0001**
Stddev	.0004	.0044	.0007	.0020	.0065	.0000	.0011	6.3	.0001
%RSD	555.5	139.8	109.9	6.831	1.874	621.0	173.7	4.300	134.6
#1	.0001	-.0012	.0001	.0275	.3397	.0000	-.0019	143.6	.0000
#2	-.0003	.0076	-.0013	.0304	.3491	.0000	.0003	142.0	.0001
#3	.0005	.0031	-.0006	.0314	.3522	.0000	-.0004	153.6	.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0007**	**.0015**	**<.0000**	**<.0000**	**5.672**	**.0733**	**33.57**	**.0001**	**.0002**
Stddev	.0001	.0012	.0013	.0027	.081	.0019	.29	.0003	.0001
%RSD	14.93	81.70	39.38	5085.	1.422	2.559	.8525	378.9	31.81
#1	.0007	.0028	-.0039	-.0030	5.579	.0712	33.69	-.0002	.0001
#2	.0005	.0011	-.0040	.0022	5.729	.0746	33.25	.0004	.0002
#3	.0007	.0005	-.0018	.0006	5.707	.0741	33.78	.0000	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**82.01**	**.0008**	**<.0000**	**<.0000**	**.4269**	**.0050**	**.0027**	**2.175**	**<.0000**
Stddev	2.73	.0002	.0015	.0003	.0191	.0016	.0030	.028	.0009
%RSD	3.325	25.95	57.00	212.1	4.472	30.96	109.6	1.266	52.18
#1	79.14	.0007	-.0040	-.0005	.4245	.0038	.0055	2.144	-.0009
#2	82.33	.0008	-.0010	.0002	.4092	.0068	.0029	2.183	-.0016
#3	84.56	.0011	-.0029	-.0002	.4471	.0045	-.0004	2.197	-.0026
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6714-H-9-A Acquired: 5/22/2014 15:20:06 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	4.106	.0067	.0004	<.0000	.0006	<.0000	.0043
Stddev	.102	.0038	.0002	.0014	.0049	.0009	.0002
%RSD	2.492	57.12	53.73	56.64	839.4	24.61	3.627
#1	4.014	.0072	.0004	-.0030	.0048	-.0047	.0042
#2	4.088	.0103	.0002	-.0009	-.0047	-.0028	.0043
#3	4.216	.0027	.0007	-.0034	.0017	-.0039	.0045
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5349.8
Stddev	91.0
%RSD	1.7012
#1	5245.2
#2	5410.5
#3	5393.9

Sample Name: MB 160-122752/1-A Acquired: 5/22/2014 15:24:16 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0004**	**.0113**	**<.0000**	**.0119**	**.0004**	**.0000**	**<.0000**	**.0316**	**.0000**
Stddev	.0001	.0058	.0015	.0005	.0001	.0000	.0020	.0008	.0001
%RSD	26.67	50.87	308.5	4.268	19.83	921.2	220.8	2.537	356.6
#1	.0003	.0122	.0008	.0124	.0004	.0000	.0003	.0309	.0000
#2	.0003	.0052	-.0001	.0117	.0003	.0000	-.0032	.0325	.0001
#3	.0005	.0166	-.0021	.0114	.0004	.0000	.0002	.0313	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0001**	**.0012**	**.0015**	**.0053**	**.0208**	**.0003**	**.0226**	**.0001**	**<.0000**
Stddev	.0002	.0008	.0017	.0017	.0105	.0006	.0133	.0001	.0002
%RSD	147.4	68.20	112.6	32.89	50.40	226.1	58.90	157.6	238.9
#1	.0003	.0003	.0034	.0073	.0200	.0001	.0379	-.0001	-.0002
#2	.0002	.0018	.0005	.0046	.0108	.0009	.0158	.0001	-.0001
#3	-.0001	.0016	.0006	.0040	.0318	-.0002	.0140	.0002	.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0608**	**.0003**	**.0018**	**<.0000**	**.0062**	**.0018**	**.0004**	**.0613**	**.0000**
Stddev	.0006	.0002	.0006	.0001	.0013	.0002	.0022	.0038	.0007
%RSD	1.012	71.16	34.48	23.00	21.44	11.31	519.7	6.189	1324.
#1	.0614	.0002	.0020	-.0005	.0070	.0019	.0028	.0593	-.0003
#2	.0609	.0005	.0011	-.0004	.0047	.0019	.0000	.0589	.0008
#3	.0602	.0002	.0024	-.0006	.0069	.0016	-.0015	.0657	-.0003
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: MB 160-122752/1-A Acquired: 5/22/2014 15:24:16 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	.0024	<.0000	<.0000	.0109	<.0000	.0169
Stddev	.0001	.0054	.0003	.0010	.0149	.0028	.0002
%RSD	55.57	218.9	980.8	21.82	137.6	82.40	1.351
#1	.0001	-.0024	.0002	-.0051	.0243	-.0015	.0170
#2	.0002	.0082	.0001	-.0034	-.0052	-.0066	.0171
#3	.0001	.0016	-.0004	-.0052	.0135	-.0021	.0167
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5635.8
Stddev	25.1
%RSD	.44491
#1	5661.9
#2	5611.8
#3	5633.8

Sample Name: LCSSRM 160-122752/2- Acquired: 5/22/2014 15:28:11 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.3656	37.65	.4916	.4989	1.067	.3026	<.0000	44.99	.8302
Stddev	.0042	.22	.0040	.0025	.004	.0011	.0012	.07	.0002
%RSD	1.140	.5924	.8195	.4951	.3594	.3727	102.0	.1569	.0262
#1	.3703	37.89	.4873	.4988	1.071	.3039	.0001	45.05	.8300
#2	.3641	37.62	.4953	.4965	1.067	.3023	-.0013	45.01	.8304
#3	.3624	37.45	.4921	.5014	1.064	.3018	-.0022	44.91	.8303
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.216	.5087	1.519	58.37	11.83	.0404	13.87	2.313	.5965
Stddev	.004	.0021	.006	.20	.08	.0007	.07	.013	.0029
%RSD	.3076	.4112	.4021	.3423	.6532	1.613	.4898	.5460	.4932
#1	1.213	.5111	1.512	58.59	11.91	.0411	13.94	2.325	.5932
#2	1.215	.5077	1.519	58.29	11.75	.0404	13.85	2.313	.5976
#3	1.220	.5073	1.524	58.22	11.83	.0398	13.81	2.300	.5987
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	5.409	1.437	3.045	.5810	1.310	.4499	.7075	3.182	.8613
Stddev	.040	.002	.012	.0017	.005	.0024	.0052	.004	.0021
%RSD	.7383	.1267	.3879	.2859	.4236	.5402	.7377	.1260	.2494
#1	5.453	1.435	3.032	.5796	1.304	.4489	.7016	3.183	.8594
#2	5.375	1.439	3.052	.5804	1.315	.4481	.7117	3.186	.8636
#3	5.400	1.437	3.052	.5828	1.311	.4526	.7091	3.178	.8608
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: LCSSRM 160-122752/2- Acquired: 5/22/2014 15:28:11 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.8990	.1768	.8828	.9089	.0345	.8102	.7278
Stddev	.0042	.0043	.0045	.0019	.0079	.0012	.0014
%RSD	.4660	2.411	.5107	.2052	22.81	.1443	.1977
#1	.9035	.1791	.8856	.9071	.0373	.8094	.7264
#2	.8985	.1719	.8851	.9088	.0405	.8116	.7277
#3	.8952	.1796	.8776	.9109	.0256	.8097	.7293
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	6060.8
Stddev	27.7
%RSD	.45642
#1	6032.5
#2	6062.2
#3	6087.8

Sample Name: 160-6694-C-1-A Acquired: 5/22/2014 15:31:42 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0005**	**7.683**	**.0032**	**.0028**	**.1143**	**.0003**	**.0005**	**3.918**	**.0006**
Stddev	.0005	.019	.0009	.0014	.0002	.0000	.0008	.024	.0001
%RSD	98.23	.2495	26.87	52.23	.1807	5.803	155.1	.6020	14.76
#1	.0010	7.676	.0040	.0027	.1144	.0003	.0011	3.891	.0005
#2	.0000	7.668	.0034	.0042	.1144	.0002	.0007	3.929	.0006
#3	.0006	7.704	.0023	.0014	.1141	.0003	-.0004	3.933	.0007
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0077**	**.0331**	**.0312**	**12.36**	**.8100**	**.0105**	**3.780**	**.1623**	**.0007**
Stddev	.0003	.0010	.0008	.02	.0200	.0002	.023	.0005	.0001
%RSD	4.431	3.051	2.588	.1436	2.471	2.025	.5967	.3124	13.57
#1	.0076	.0323	.0312	12.34	.8137	.0104	3.756	.1619	.0006
#2	.0080	.0342	.0320	12.37	.7883	.0107	3.800	.1621	.0006
#3	.0074	.0327	.0304	12.37	.8278	.0104	3.785	.1628	.0008
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.1164**	**.0152**	**.5263**	**.0938**	**.3133**	**.0008**	**<.0000**	**.5442**	**.0014**
Stddev	.0017	.0003	.0032	.0010	.0019	.0004	.0025	.0063	.0003
%RSD	1.486	1.690	.6071	1.060	.6135	47.42	176.8	1.166	18.12
#1	.1178	.0155	.5228	.0927	.3125	.0009	-.0039	.5475	.0015
#2	.1145	.0152	.5271	.0942	.3119	.0004	.0012	.5483	.0011
#3	.1171	.0150	.5290	.0946	.3155	.0012	-.0017	.5369	.0016
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6694-C-1-A Acquired: 5/22/2014 15:31:42 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0082	.0304	.5180	<.0000	.0085	.0178	.1288
Stddev	.0000	.0015	.0009	.0005	.0051	.0030	.0006
%RSD	.3455	4.811	.1723	17.51	59.41	16.96	.4578
#1	.0083	.0287	.5182	-.0031	.0056	.0179	.1282
#2	.0082	.0312	.5171	-.0033	.0144	.0147	.1294
#3	.0082	.0312	.5188	-.0024	.0056	.0207	.1290
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5679.5
Stddev	26.5
%RSD	.46664
#1	5709.6
#2	5668.9
#3	5659.9

Sample Name: 160-6694-C-1-A SD Acquired: 5/22/2014 15:35:32 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=50

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	1.445	.0000	.0001	.0214	.0001	<.0000	.7417	.0002
Stddev	.0002	.006	.0009	.0044	.0001	.0000	.0021	.0025	.0000
%RSD	57.20	.4308	2163.	6575.	.3779	12.80	96.66	.3335	25.17
#1	-.0005	1.448	.0004	.0051	.0214	.0001	.0000	.7425	.0002
#2	-.0002	1.438	-.0010	-.0016	.0215	.0001	-.0041	.7437	.0002
#3	-.0002	1.448	.0007	-.0032	.0214	.0001	-.0023	.7389	.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0017	.0073	.0042	2.329	.1387	.0023	.7175	.0303	.0000
Stddev	.0003	.0012	.0005	.008	.0088	.0002	.0109	.0002	.0002
%RSD	16.10	16.36	12.74	.3355	6.350	8.920	1.513	.7980	744.5
#1	.0016	.0078	.0037	2.338	.1481	.0025	.7293	.0303	-.0001
#2	.0014	.0080	.0040	2.325	.1306	.0021	.7153	.0305	-.0001
#3	.0020	.0059	.0048	2.325	.1374	.0023	.7079	.0300	.0003
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0413	.0028	.0993	.0178	.0605	<.0000	<.0000	.1030	.0001
Stddev	.0010	.0002	.0003	.0007	.0017	.0007	.0026	.0029	.0006
%RSD	2.317	6.891	.2990	4.133	2.739	416.8	275.9	2.861	549.8
#1	.0417	.0026	.0993	.0183	.0599	-.0004	.0006	.1009	.0008
#2	.0402	.0030	.0990	.0182	.0592	-.0007	-.0039	.1018	-.0001
#3	.0420	.0029	.0996	.0170	.0623	.0006	.0005	.1064	-.0004
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6694-C-1-A SD Acquired: 5/22/2014 15:35:32 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=50

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0015	.0060	.0961	<.0000	.0079	.0037	.0285
Stddev	.0000	.0045	.0009	.0010	.0107	.0010	.0002
%RSD	3.058	74.57	.8881	37.78	136.0	28.11	.7663
#1	.0015	.0042	.0969	-.0028	.0133	.0049	.0287
#2	.0014	.0111	.0962	-.0034	-.0045	.0029	.0283
#3	.0015	.0027	.0952	-.0015	.0148	.0034	.0283
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5713.8
Stddev	21.9
%RSD	.38327
#1	5689.9
#2	5718.4
#3	5733.0

Sample Name: 160-6694-C-1-B MS Acquired: 5/22/2014 15:39:24 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0216**	**11.49**	**.1061**	**.1922**	**.1970**	**.1013**	**.1080**	**5.233**	**.1090**
Stddev	.0005	.03	.0019	.0047	.0005	.0006	.0020	.013	.0001
%RSD	2.452	.2869	1.818	2.440	.2625	.5594	1.871	.2500	.1225
#1	.0210	11.50	.1080	.1923	.1965	.1008	.1066	5.220	.1090
#2	.0218	11.51	.1060	.1875	.1975	.1011	.1103	5.232	.1088
#3	.0220	11.45	.1042	.1969	.1971	.1019	.1070	5.246	.1091
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.1217**	**.1411**	**.1408**	**14.21**	**2.038**	**.1147**	**4.873**	**.2726**	**.0542**
Stddev	.0002	.0009	.0002	.08	.012	.0004	.039	.0009	.0004
%RSD	.1408	.6112	.1146	.5388	.5858	.3196	.7966	.3412	.7739
#1	.1215	.1401	.1408	14.15	2.047	.1149	4.869	.2715	.0537
#2	.1216	.1415	.1406	14.20	2.043	.1150	4.836	.2728	.0545
#3	.1219	.1416	.1410	14.30	2.024	.1143	4.913	.2733	.0545
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**1.153**	**.1307**	**.6300**	**.1953**	**1.321**	**.0302**	**.0505**	**.8284**	**.1062**
Stddev	.005	.0003	.0022	.0005	.002	.0009	.0018	.0045	.0002
%RSD	.4164	.2171	.3517	.2499	.1829	2.872	3.618	.5491	.2020
#1	1.152	.1303	.6294	.1955	1.319	.0292	.0527	.8327	.1063
#2	1.158	.1308	.6325	.1947	1.319	.0305	.0495	.8237	.1060
#3	1.148	.1308	.6282	.1956	1.323	.0308	.0495	.8289	.1064
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6694-C-1-B MS Acquired: 5/22/2014 15:39:24 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1120	.1366	.7463	.0231	.1171	.1286	.2224
Stddev	.0003	.0009	.0016	.0007	.0134	.0003	.0005
%RSD	.2757	.6373	.2124	3.065	11.45	.2551	.2084
#1	.1116	.1370	.7447	.0225	.1198	.1289	.2222
#2	.1121	.1371	.7463	.0239	.1289	.1283	.2220
#3	.1121	.1356	.7479	.0229	.1026	.1286	.2229
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5727.3
Stddev	21.6
%RSD	.37657
#1	5741.3
#2	5738.2
#3	5702.5

Sample Name: CCV Acquired: 5/22/2014 15:43:10 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**1.028**	**48.81**	**5.164**	**4.896**	**5.051**	**5.091**	**5.157**	**54.24**	**5.220**
Stddev	.004	.14	.010	.008	.061	.053	.019	.24	.018
%RSD	.4257	.2929	.1884	.1581	1.212	1.039	.3770	.4450	.3390
#1	1.023	48.98	5.153	4.901	4.988	5.031	5.135	53.96	5.200
#2	1.031	48.71	5.170	4.887	5.111	5.115	5.161	54.36	5.228
#3	1.031	48.75	5.170	4.900	5.053	5.128	5.173	54.40	5.233
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.339**	**5.300**	**5.173**	**50.37**	**49.79**	**4.900**	**49.65**	**5.028**	**1.058**
Stddev	.025	.035	.020	.17	.32	.048	.35	.015	.005
%RSD	.4666	.6675	.3816	.3404	.6369	.9773	.7030	.2889	.4703
#1	5.310	5.260	5.150	50.17	50.12	4.951	49.25	5.012	1.052
#2	5.354	5.315	5.180	50.48	49.48	4.857	49.89	5.040	1.062
#3	5.353	5.325	5.188	50.45	49.77	4.891	49.82	5.030	1.059
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**49.64**	**5.322**	F **55.05**	**5.364**	**51.55**	**1.030**	**1.029**	**4.888**	**5.339**
Stddev	.39	.021	.28	.020	.19	.002	.008	.013	.021
%RSD	.7882	.3944	.5110	.3759	.3619	.1609	.7499	.2707	.3947
#1	50.04	5.299	54.73	5.341	51.33	1.029	1.021	4.880	5.314
#2	49.25	5.329	55.26	5.374	51.65	1.032	1.029	4.903	5.351
#3	49.63	5.340	55.15	5.378	51.66	1.030	1.036	4.881	5.351
Check ?	Chk Pass	Chk Pass	Chk Fail	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value			50.00						
Range			10.00%						

Sample Name: CCV Acquired: 5/22/2014 15:43:10 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.101**	**5.238**	**5.037**	**1.087**	**5.200**	**5.055**	**5.281**
Stddev	.043	.031	.010	.006	.049	.020	.023
%RSD	.8410	.5886	.1972	.5127	.9353	.3850	.4296
#1	5.052	5.203	5.027	1.081	5.146	5.039	5.255
#2	5.125	5.262	5.047	1.091	5.238	5.051	5.292
#3	5.128	5.248	5.039	1.090	5.217	5.077	5.297
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	**5341.3**
Stddev	32.3
%RSD	.60487
#1	5377.5
#2	5331.2
#3	5315.3

Sample Name: CCB Acquired: 5/22/2014 15:46:59 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0004**	**<.0000**	**<.0000**	**.0066**	**.0001**	**.0001**	**<.0000**	**<.0000**	**.0000**
Stddev	.0008	.0044	.0003	.0024	.0001	.0001	.0020	.0005	.0001
%RSD	186.9	517.6	20.73	36.41	82.96	95.59	1295.	105.6	3781.
#1	-.0001	-.0052	-.0014	.0067	.0001	.0000	-.0008	.0001	.0001
#2	.0000	-.0010	-.0010	.0089	.0001	.0001	-.0018	-.0006	.0000
#3	.0013	.0037	-.0015	.0041	.0002	.0000	.0021	-.0009	-.0001
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0001**	**.0007**	**<.0000**	**.0018**	**<.0000**	**.0005**	**.0040**	**.0002**	**.0001**
Stddev	.0003	.0003	.0007	.0009	.0146	.0008	.0069	.0001	.0001
%RSD	211.5	51.47	67.84	48.71	622.7	162.0	170.9	44.81	181.8
#1	-.0002	.0003	-.0006	.0027	.0129	.0011	.0120	.0003	.0001
#2	.0004	.0006	-.0017	.0018	-.0161	-.0004	.0002	.0002	-.0001
#3	.0002	.0010	-.0006	.0010	-.0039	.0007	-.0001	.0001	.0002
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0078**	**.0001**	**.0008**	**.0008**	**.0020**	**.0006**	**.0015**	**.0000**	**.0002**
Stddev	.0006	.0002	.0010	.0007	.0016	.0004	.0014	.0030	.0007
%RSD	7.667	330.1	114.9	83.02	80.14	61.68	94.39	19660.	438.2
#1	.0075	.0003	.0012	.0016	.0038	.0007	.0019	.0035	-.0002
#2	.0085	-.0001	.0015	.0003	.0016	.0002	.0026	-.0018	-.0003
#3	.0075	-.0001	-.0003	.0006	.0006	.0010	-.0001	-.0016	.0010
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Sample Name: CCB Acquired: 5/22/2014 15:46:59 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	<.0000	<.0000	.0011	.0005	.0022	.0000
Stddev	.0001	.0002	.0001	.0010	.0100	.0011	.0001
%RSD	100.1	11.68	32.82	87.51	2210.	47.61	149.8
#1	.0000	-.0017	-.0004	.0023	.0016	.0035	.0001
#2	.0001	-.0015	-.0003	.0004	-.0101	.0017	.0001
#3	.0001	-.0019	-.0006	.0007	.0098	.0016	.0000
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit							
Low Limit							

Int. Std.	Y_3710
Units	Cts/S
Avg	5608.1
Stddev	21.0
%RSD	.37453
#1	5615.6
#2	5624.4
#3	5584.4

Sample Name: 160-6694-C-1-C MSD Acquired: 5/22/2014 15:50:57 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0211	11.36	.1089	.1953	.1968	.1031	.1053	3.565	.1090
Stddev	.0006	.05	.0026	.0007	.0014	.0007	.0012	.013	.0005
%RSD	2.617	.4145	2.391	.3380	.6933	.7029	1.092	.3664	.4814
#1	.0217	11.32	.1096	.1946	.1956	.1027	.1065	3.574	.1095
#2	.0210	11.36	.1060	.1959	.1965	.1027	.1054	3.550	.1084
#3	.0207	11.41	.1111	.1953	.1983	.1040	.1042	3.571	.1091
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1199	.1349	.1350	12.47	1.944	.1169	4.241	.2385	.0539
Stddev	.0007	.0012	.0014	.01	.021	.0020	.019	.0017	.0006
%RSD	.5965	.9183	1.067	.1036	1.087	1.742	.4563	.7027	1.092
#1	.1207	.1360	.1361	12.48	1.926	.1148	4.251	.2381	.0544
#2	.1196	.1351	.1355	12.45	1.940	.1172	4.218	.2371	.0541
#3	.1195	.1336	.1334	12.47	1.967	.1188	4.252	.2404	.0533
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.152	.1296	.5773	.1794	1.291	.0301	.0531	.7376	.1074
Stddev	.018	.0006	.0027	.0008	.001	.0011	.0015	.0108	.0008
%RSD	1.540	.4588	.4673	.4272	.0901	3.687	2.765	1.460	.7463
#1	1.133	.1301	.5798	.1802	1.292	.0290	.0547	.7490	.1082
#2	1.154	.1289	.5744	.1786	1.290	.0313	.0519	.7276	.1074
#3	1.168	.1297	.5777	.1794	1.291	.0301	.0527	.7362	.1066
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6694-C-1-C MSD Acquired: 5/22/2014 15:50:57 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1130	.1292	.7180	.0239	.1044	.1270	.2037
Stddev	.0008	.0034	.0015	.0022	.0059	.0027	.0003
%RSD	.7498	2.659	.2020	9.080	5.629	2.097	.1518
#1	.1125	.1325	.7170	.0245	.1095	.1300	.2040
#2	.1125	.1296	.7174	.0257	.1057	.1252	.2038
#3	.1140	.1256	.7196	.0215	.0979	.1258	.2034
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5784.1
Stddev	22.6
%RSD	.39135
#1	5759.7
#2	5804.4
#3	5788.2

Sample Name: 160-6694-C-2-A Acquired: 5/22/2014 15:54:42 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0003**	**4.157**	**.0016**	**.0029**	**.0341**	**.0001**	**<.0000**	**21.78**	**.0002**
Stddev	.0002	.130	.0009	.0015	.0011	.0000	.0003	2.29	.0001
%RSD	81.12	3.131	57.45	53.05	3.366	17.51	1563.	10.52	42.10
#1	.0005	4.022	.0010	.0016	.0331	.0001	.0000	19.49	.0001
#2	.0001	4.167	.0026	.0046	.0339	.0001	-.0003	21.80	.0002
#3	.0002	4.282	.0011	.0024	.0353	.0001	.0003	24.07	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0070**	**.0215**	**.0352**	**10.49**	**.8649**	**.0082**	**8.569**	**.1256**	**.0006**
Stddev	.0006	.0017	.0042	.31	.0146	.0002	.246	.0031	.0001
%RSD	8.237	7.795	11.87	2.953	1.685	2.508	2.873	2.441	14.71
#1	.0066	.0201	.0312	10.18	.8707	.0083	8.345	.1223	.0005
#2	.0069	.0211	.0350	10.49	.8483	.0079	8.528	.1260	.0006
#3	.0077	.0234	.0395	10.79	.8756	.0083	8.832	.1284	.0007
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.1178**	**.0136**	**.4249**	**.0593**	**.5283**	**.0026**	**<.0000**	**.2869**	**.0003**
Stddev	.0052	.0014	.0449	.0071	.0602	.0009	.0024	.0065	.0005
%RSD	4.413	10.16	10.56	11.97	11.40	34.27	249.0	2.277	191.0
#1	.1128	.0123	.3802	.0524	.4671	.0020	.0016	.2851	.0006
#2	.1173	.0136	.4247	.0591	.5301	.0037	-.0031	.2815	-.0003
#3	.1232	.0150	.4699	.0666	.5875	.0022	-.0014	.2942	.0006
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6694-C-2-A Acquired: 5/22/2014 15:54:42 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0113	.0303	.2747	<.0000	<.0000	.0118	.1187
Stddev	.0003	.0037	.0079	.0002	.0046	.0031	.0126
%RSD	2.310	12.24	2.890	13.95	31.51	25.89	10.59
#1	.0110	.0325	.2674	-.0017	-.0195	.0092	.1060
#2	.0113	.0260	.2736	-.0013	-.0107	.0110	.1190
#3	.0115	.0324	.2832	-.0013	-.0131	.0152	.1311
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5697.9
Stddev	24.7
%RSD	.43370
#1	5677.0
#2	5691.6
#3	5725.2

Sample Name: 160-6694-C-3-A Acquired: 5/22/2014 15:58:32 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	6.433	.0032	.0037	.0589	.0002	.0003	9.734	.0007
Stddev	.0005	.332	.0007	.0020	.0028	.0000	.0016	1.079	.0002
%RSD	178.1	5.156	20.88	52.81	4.744	18.30	562.2	11.08	25.76
#1	-.0008	6.115	.0030	.0019	.0561	.0001	-.0002	8.637	.0005
#2	.0002	6.408	.0026	.0035	.0587	.0002	-.0010	9.772	.0008
#3	-.0002	6.777	.0039	.0058	.0617	.0002	.0021	10.79	.0009
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0093	.3435	.0802	13.21	.9951	.0089	4.480	.1673	.0015
Stddev	.0012	.0144	.0088	.68	.0451	.0004	.218	.0087	.0001
%RSD	12.61	4.178	11.02	5.114	4.535	4.246	4.864	5.212	8.223
#1	.0082	.3313	.0704	12.54	.9483	.0085	4.273	.1589	.0014
#2	.0091	.3399	.0827	13.18	.9985	.0089	4.460	.1668	.0014
#3	.0105	.3593	.0876	13.89	1.038	.0092	4.708	.1763	.0016
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1020	.0224	.7726	.1624	2.972	.0032	<.0000	.4597	.0023
Stddev	.0066	.0024	.0841	.0184	.338	.0002	.0006	.0248	.0005
%RSD	6.496	10.64	10.88	11.33	11.39	5.730	39.67	5.392	23.57
#1	.1013	.0200	.6853	.1443	2.625	.0032	-.0010	.4328	.0019
#2	.0958	.0224	.7795	.1619	2.991	.0035	-.0023	.4646	.0029
#3	.1090	.0248	.8530	.1811	3.301	.0031	-.0014	.4817	.0020
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6694-C-3-A Acquired: 5/22/2014 15:58:32 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0097	.0405	.4133	<.0000	.0007	.0184	.2412
Stddev	.0004	.0011	.0208	.0007	.0118	.0015	.0268
%RSD	4.016	2.659	5.026	36.10	1589.	8.145	11.11
#1	.0093	.0406	.3930	-.0019	-.0026	.0172	.2138
#2	.0097	.0415	.4124	-.0013	-.0090	.0201	.2425
#3	.0101	.0394	.4346	-.0026	.0139	.0180	.2673
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5847.6
Stddev	8.3
%RSD	.14220
#1	5838.8
#2	5855.4
#3	5848.6

Sample Name: 160-6694-C-4-A Acquired: 5/22/2014 16:02:19 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0000**	**2.624**	**.0075**	**.0019**	**.0292**	**.0001**	**.0027**	**5.049**	**.0010**
Stddev	.0004	.120	.0010	.0023	.0015	.0000	.0016	.600	.0001
%RSD	1776.	4.570	13.29	124.9	4.983	18.21	60.37	11.89	7.460
#1	-.0004	2.503	.0065	.0008	.0277	.0001	.0043	4.436	.0009
#2	.0001	2.626	.0076	.0045	.0291	.0001	.0011	5.076	.0010
#3	.0004	2.743	.0085	.0002	.0306	.0001	.0026	5.636	.0010
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0056**	**.0204**	**.0622**	**8.196**	**.3647**	**.0036**	**2.027**	**.0928**	**.0020**
Stddev	.0007	.0011	.0082	.427	.0174	.0004	.119	.0049	.0002
%RSD	12.56	5.607	13.25	5.211	4.761	10.99	5.863	5.306	11.78
#1	.0049	.0199	.0534	7.770	.3610	.0034	1.909	.0879	.0018
#2	.0055	.0196	.0636	8.194	.3495	.0040	2.026	.0927	.0021
#3	.0063	.0217	.0697	8.624	.3836	.0032	2.147	.0978	.0022
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.2595**	**.0169**	**.3356**	**.1496**	**2.336**	**.0012**	**<.0000**	**.2896**	**.0031**
Stddev	.0077	.0020	.0416	.0172	.284	.0012	.0017	.0197	.0002
%RSD	2.949	11.68	12.38	11.53	12.15	98.43	157.6	6.814	7.786
#1	.2507	.0150	.2932	.1313	2.052	-.0002	.0007	.2683	.0028
#2	.2645	.0169	.3375	.1518	2.335	.0017	-.0013	.2932	.0033
#3	.2634	.0189	.3762	.1656	2.620	.0021	-.0027	.3072	.0032
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6694-C-4-A Acquired: 5/22/2014 16:02:19 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0075	.0258	.1775	.0006	.0150	.0067	.2208
Stddev	.0003	.0016	.0097	.0014	.0020	.0010	.0260
%RSD	4.498	6.153	5.457	210.6	13.62	15.43	11.76
#1	.0072	.0244	.1676	.0004	.0134	.0078	.1942
#2	.0075	.0255	.1778	.0021	.0144	.0067	.2220
#3	.0079	.0275	.1870	-.0006	.0173	.0057	.2461
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5689.9
Stddev	36.7
%RSD	.64427
#1	5729.9
#2	5681.8
#3	5657.9

Sample Name: 160-6694-C-5-A Acquired: 5/22/2014 16:06:09 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	3.209	.0020	.0026	.0123	.0001	.0002	12.52	.0002
Stddev	.0005	.155	.0017	.0009	.0006	.0000	.0012	1.59	.0000
%RSD	110.0	4.816	82.68	32.48	4.855	60.09	783.5	12.71	20.00
#1	.0000	3.061	.0002	.0036	.0118	.0000	-.0001	10.90	.0001
#2	-.0004	3.197	.0035	.0023	.0122	.0001	.0014	12.60	.0002
#3	-.0011	3.369	.0023	.0020	.0129	.0001	-.0009	14.08	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0069	.0140	.0290	11.45	.3258	.0077	4.982	.1015	.0004
Stddev	.0011	.0011	.0030	.60	.0342	.0007	.283	.0052	.0002
%RSD	16.02	8.106	10.34	5.229	10.50	9.438	5.683	5.141	36.95
#1	.0058	.0130	.0255	10.87	.2896	.0074	4.720	.0960	.0003
#2	.0070	.0139	.0305	11.40	.3301	.0071	4.944	.1021	.0005
#3	.0080	.0152	.0309	12.07	.3576	.0085	5.282	.1064	.0006
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0816	.0132	.3355	.0323	.2982	.0021	<.0000	.1555	.0011
Stddev	.0034	.0016	.0434	.0049	.0361	.0016	.0014	.0084	.0005
%RSD	4.226	12.18	12.92	15.20	12.10	74.66	126.8	5.383	44.62
#1	.0824	.0118	.2915	.0268	.2620	.0004	-.0026	.1482	.0006
#2	.0778	.0128	.3369	.0337	.2985	.0026	.0001	.1537	.0015
#3	.0846	.0149	.3782	.0363	.3341	.0034	-.0008	.1646	.0011
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6694-C-5-A Acquired: 5/22/2014 16:06:09 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0072	.0344	.0912	.0001	.0165	.0097	.1010
Stddev	.0002	.0012	.0050	.0013	.0075	.0014	.0128
%RSD	3.258	3.624	5.485	1755.	45.27	14.05	12.70
#1	.0069	.0333	.0873	.0005	.0091	.0113	.0879
#2	.0071	.0342	.0894	.0011	.0163	.0088	.1017
#3	.0074	.0357	.0968	-.0014	.0240	.0091	.1135
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5652.7
Stddev	33.3
%RSD	.58865
#1	5690.2
#2	5640.8
#3	5626.9

Sample Name: 160-6694-C-6-A Acquired: 5/22/2014 16:10:00 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0000**	**6.580**	**.0036**	**.0053**	**.0641**	**.0002**	**.0007**	**18.44**	**.0013**
Stddev	.0006	.407	.0006	.0035	.0041	.0000	.0015	2.29	.0001
%RSD	1604.	6.192	17.88	65.73	6.330	6.102	213.2	12.41	4.054
#1	-.0002	6.157	.0029	.0066	.0599	.0002	.0003	16.12	.0012
#2	.0007	6.613	.0039	.0079	.0644	.0002	-.0006	18.52	.0013
#3	-.0004	6.969	.0041	.0013	.0680	.0002	.0024	20.69	.0013
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0114**	**.3310**	**.1157**	**14.54**	**1.042**	**.0086**	**5.523**	**.1710**	**.0024**
Stddev	.0014	.0216	.0157	1.10	.063	.0005	.419	.0127	.0004
%RSD	12.28	6.517	13.56	7.535	6.009	5.340	7.587	7.424	16.08
#1	.0099	.3095	.1002	13.48	.9810	.0082	5.119	.1581	.0022
#2	.0118	.3309	.1155	14.49	1.038	.0087	5.494	.1713	.0023
#3	.0126	.3527	.1315	15.67	1.106	.0091	5.956	.1835	.0029
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.1117**	**.0248**	**.9425**	**.2520**	**4.596**	**.0034**	**<.0000**	**.4710**	**.0028**
Stddev	.0089	.0033	.1208	.0299	.587	.0012	.0021	.0357	.0003
%RSD	7.928	13.47	12.81	11.87	12.78	34.94	60.04	7.577	10.74
#1	.1087	.0214	.8183	.2216	4.006	.0022	-.0026	.4348	.0025
#2	.1047	.0247	.9497	.2530	4.601	.0045	-.0059	.4721	.0030
#3	.1216	.0281	1.060	.2814	5.180	.0034	-.0020	.5061	.0030
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6694-C-6-A Acquired: 5/22/2014 16:10:00 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0126	.0467	.4192	<.0000	.0261	.0201	.3551
Stddev	.0008	.0055	.0291	.0019	.0171	.0034	.0442
%RSD	6.217	11.80	6.952	1072.	65.47	16.88	12.43
#1	.0118	.0421	.3905	-.0008	.0110	.0163	.3101
#2	.0126	.0451	.4184	-.0017	.0227	.0214	.3568
#3	.0134	.0528	.4488	.0020	.0447	.0228	.3984
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5665.3
Stddev	11.5
%RSD	.20358
#1	5676.0
#2	5666.8
#3	5653.1

Sample Name: 160-6681-D-1-B Acquired: 5/22/2014 16:13:45 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0028	18.45	<.0000	<.0000	.0064	<.0000	<.0000	.5663	<.0000
Stddev	.0002	1.15	.0015	.0016	.0004	.0000	.0005	.0776	.0001
%RSD	8.246	6.231	239.5	1534.	6.145	308.8	30.69	13.71	303.0
#1	.0025	17.37	-.0016	.0017	.0061	.0000	-.0011	.4876	-.0002
#2	.0028	18.32	-.0014	-.0007	.0063	.0000	-.0019	.5685	.0001
#3	.0030	19.66	.0011	-.0013	.0069	.0000	-.0021	.6429	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0159	.1273	.0355	4.761	.0536	.0086	.6860	.0594	.0423
Stddev	.0023	.0081	.0045	.277	.0127	.0006	.0417	.0033	.0060
%RSD	14.21	6.392	12.71	5.823	23.72	6.761	6.072	5.599	14.06
#1	.0135	.1192	.0310	4.492	.0580	.0081	.6495	.0563	.0365
#2	.0162	.1271	.0356	4.745	.0393	.0083	.6771	.0590	.0421
#3	.0179	.1355	.0400	5.046	.0636	.0092	.7314	.0629	.0484
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.7397	.6322	.3123	.0074	.3582	<.0000	.0028	.1487	.0429
Stddev	.0439	.0905	.0467	.0014	.0512	.0010	.0024	.0025	.0060
%RSD	5.933	14.32	14.95	19.48	14.29	36.73	86.67	1.661	13.93
#1	.6968	.5419	.2658	.0060	.3083	-.0031	.0026	.1462	.0371
#2	.7377	.6317	.3121	.0074	.3559	-.0015	.0005	.1511	.0427
#3	.7845	.7229	.3592	.0089	.4106	-.0033	.0053	.1489	.0490
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6681-D-1-B Acquired: 5/22/2014 16:13:45 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0032	.0065	1.809	<.0000	.0476	.7183	.0292
Stddev	.0002	.0020	.107	.0023	.0086	.0460	.0041
%RSD	7.414	30.19	5.923	33.20	18.01	6.404	14.06
#1	.0030	.0055	1.708	-.0066	.0435	.6760	.0252
#2	.0031	.0053	1.798	-.0049	.0574	.7117	.0289
#3	.0035	.0088	1.922	-.0095	.0418	.7673	.0334
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5677.8
Stddev	14.8
%RSD	.25985
#1	5663.5
#2	5693.0
#3	5676.8

Sample Name: LB 160-122248/1-B Acquired: 5/22/2014 16:17:37 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0008	<.0000	.0016	.0002	<.0000	<.0000	.0241	.0001
Stddev	.0006	.0048	.0009	.0021	.0000	.0001	.0008	.0002	.0000
%RSD	871.2	581.9	113.3	133.8	8.539	68950.	51.02	1.005	59.07
#1	-.0001	.0040	.0000	.0040	.0002	.0000	-.0022	.0240	.0001
#2	-.0006	.0031	-.0006	.0007	.0003	.0001	-.0016	.0239	.0001
#3	.0006	-.0047	-.0018	.0000	.0002	.0000	-.0007	.0244	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	.0024	<.0000	.0055	.0101	.0006	<.0000	.0002	<.0000
Stddev	.0003	.0003	.0011	.0015	.0040	.0005	.0075	.0002	.0001
%RSD	178.9	14.51	46.60	26.75	39.66	83.45	318.0	112.9	34.03
#1	.0000	.0026	-.0036	.0044	.0117	.0008	.0060	.0003	-.0003
#2	.0000	.0025	-.0019	.0072	.0056	.0010	-.0047	.0000	-.0002
#3	.0004	.0020	-.0016	.0049	.0131	.0000	-.0083	.0003	-.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	534.2	.0003	.0027	<.0000	.0092	.0010	.0006	.0050	.0004
Stddev	8.1	.0002	.0014	.0006	.0025	.0010	.0021	.0083	.0006
%RSD	1.512	67.64	51.65	133.9	27.66	95.71	373.6	164.3	142.2
#1	526.1	.0006	.0037	-.0007	.0066	.0022	-.0007	-.0037	-.0001
#2	542.2	.0002	.0011	.0002	.0094	.0005	-.0005	.0128	.0011
#3	534.4	.0003	.0034	-.0009	.0117	.0005	.0030	.0060	.0003
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: LB 160-122248/1-B Acquired: 5/22/2014 16:17:37 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0002	.0008	.0001	<.0000	<.0000	.0003	.0086
Stddev	.0000	.0026	.0006	.0017	.0072	.0048	.0001
%RSD	15.35	337.1	465.6	34.19	23.07	1443.	1.013
#1	.0002	.0000	.0003	-.0033	-.0287	-.0029	.0086
#2	.0002	-.0014	.0006	-.0067	-.0254	-.0019	.0086
#3	.0002	.0036	-.0006	-.0048	-.0391	.0058	.0087
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5547.5
Stddev	39.2
%RSD	.70650
#1	5562.3
#2	5577.2
#3	5503.1

Sample Name: LCS 160-122858/2-A Acquired: 5/22/2014 16:21:41 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2062	10.15	1.112	2.029	1.020	1.069	1.004	10.70	1.097
Stddev	.0010	.08	.004	.004	.004	.003	.004	.04	.003
%RSD	.4619	.8207	.3935	.1856	.3727	.2412	.3732	.4010	.2365
#1	.2073	10.14	1.108	2.027	1.021	1.070	.9992	10.72	1.096
#2	.2059	10.07	1.112	2.033	1.015	1.071	1.005	10.73	1.100
#3	.2055	10.23	1.117	2.027	1.023	1.066	1.006	10.65	1.095
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.079	1.074	1.090	10.57	10.26	1.010	9.816	1.045	.5169
Stddev	.005	.007	.003	.03	.10	.018	.074	.003	.0014
%RSD	.4463	.6263	.2501	.3240	.9808	1.771	.7519	.3027	.2702
#1	1.077	1.079	1.087	10.59	10.23	1.010	9.879	1.048	.5155
#2	1.085	1.077	1.092	10.58	10.18	.9918	9.834	1.046	.5183
#3	1.076	1.067	1.091	10.53	10.37	1.028	9.735	1.042	.5168
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	530.3	1.089	1.216	1.050	10.64	.5190	.5753	.0377	1.025
Stddev	10.3	.002	.010	.001	.03	.0045	.0020	.0084	.004
%RSD	1.944	.1531	.8302	.0942	.3018	.8761	.3428	22.19	.3391
#1	536.9	1.087	1.215	1.050	10.62	.5138	.5760	.0326	1.025
#2	535.5	1.091	1.227	1.051	10.68	.5213	.5731	.0330	1.029
#3	518.4	1.089	1.207	1.049	10.63	.5219	.5768	.0473	1.022
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: LCS 160-122858/2-A Acquired: 5/22/2014 16:21:41 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.066	1.047	1.017	.2089	.9799	1.069	1.125
Stddev	.003	.010	.001	.0042	.0100	.006	.004
%RSD	.2476	.9259	.1377	2.019	1.020	.5753	.3386
#1	1.066	1.036	1.018	.2097	.9850	1.076	1.124
#2	1.063	1.054	1.017	.2126	.9863	1.064	1.129
#3	1.068	1.051	1.015	.2043	.9684	1.066	1.122
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5497.9
Stddev	20.7
%RSD	.37609
#1	5483.4
#2	5488.7
#3	5521.6

Sample Name: 160-6629-A-1-C Acquired: 5/22/2014 16:25:17 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	2.133	<.0000	.1645	.0773	.0000	.0015	219.4	.0005
Stddev	.0006	.014	.0011	.0019	.0003	.0000	.0026	.9	.0001
%RSD	121.0	.6589	53.48	1.147	.4450	11160.	176.4	.4185	24.90
#1	.0000	2.143	-.0010	.1627	.0774	.0000	.0045	220.4	.0004
#2	-.0003	2.139	-.0021	.1642	.0775	.0000	.0000	219.1	.0004
#3	-.0012	2.117	-.0033	.1665	.0769	.0000	.0000	218.6	.0006
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0017	.0051	<.0000	.0711	1.815	.0462	.6566	.0854	.0120
Stddev	.0002	.0009	.0010	.0009	.005	.0000	.0083	.0002	.0001
%RSD	9.988	17.11	94.33	1.272	.2853	.0843	1.271	.2335	.8678
#1	.0015	.0045	.0001	.0718	1.820	.0462	.6659	.0853	.0120
#2	.0018	.0048	-.0016	.0713	1.810	.0461	.6544	.0852	.0119
#3	.0018	.0061	-.0015	.0701	1.817	.0461	.6497	.0856	.0121
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	577.3	.0102	.0010	.0015	12.44	.0330	.0017	6.294	<.0000
Stddev	8.8	.0001	.0011	.0009	.05	.0002	.0000	.047	.0011
%RSD	1.528	1.305	113.4	61.67	.3958	.4592	2.283	.7454	152.3
#1	581.7	.0102	.0017	.0012	12.47	.0332	.0018	6.338	-.0012
#2	582.9	.0100	.0016	.0025	12.46	.0330	.0017	6.298	.0005
#3	567.1	.0103	-.0003	.0008	12.38	.0329	.0017	6.245	-.0015
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6629-A-1-C Acquired: 5/22/2014 16:25:17 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.4207	<.0000	.0053	<.0000	.0417	.0063	.3075
Stddev	.0015	.0035	.0005	.0005	.0131	.0022	.0012
%RSD	.3491	1038.	9.035	10.24	31.52	35.44	.3849
#1	.4215	-.0043	.0055	-.0048	.0568	.0088	.3084
#2	.4216	.0011	.0055	-.0055	.0330	.0047	.3079
#3	.4190	.0023	.0047	-.0045	.0352	.0054	.3061
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5498.9
Stddev	12.5
%RSD	.22695
#1	5484.5
#2	5507.3
#3	5504.8

Sample Name: CCV Acquired: 5/22/2014 16:29:16 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**1.017**	**49.27**	**5.072**	**4.859**	**5.068**	**4.956**	**5.124**	**52.78**	**5.148**
Stddev	.004	.37	.028	.023	.027	.031	.023	.14	.020
%RSD	.3557	.7523	.5542	.4694	.5272	.6186	.4542	.2624	.3821
#1	1.020	49.68	5.102	4.885	5.098	4.992	5.148	52.87	5.168
#2	1.013	49.16	5.046	4.850	5.059	4.939	5.101	52.62	5.128
#3	1.018	48.96	5.067	4.842	5.047	4.938	5.124	52.86	5.148
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.226**	**5.196**	**5.142**	**49.02**	**50.77**	**5.123**	**47.84**	**4.899**	**1.041**
Stddev	.016	.014	.031	.12	.47	.059	.19	.017	.006
%RSD	.2964	.2604	.6058	.2467	.9232	1.155	.3879	.3441	.5423
#1	5.235	5.209	5.172	49.16	51.29	5.190	48.05	4.918	1.046
#2	5.208	5.182	5.110	48.96	50.37	5.078	47.71	4.894	1.035
#3	5.235	5.197	5.144	48.94	50.66	5.100	47.76	4.885	1.042
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**50.90**	**5.196**	**54.05**	**5.239**	**50.84**	**1.021**	**1.014**	**4.827**	**5.215**
Stddev	.47	.019	.20	.025	.23	.006	.003	.044	.019
%RSD	.9319	.3738	.3731	.4731	.4466	.6154	.2937	.9180	.3661
#1	51.43	5.217	54.16	5.266	51.07	1.027	1.017	4.874	5.235
#2	50.52	5.179	53.82	5.217	50.61	1.015	1.011	4.821	5.198
#3	50.75	5.191	54.17	5.233	50.85	1.021	1.014	4.786	5.211
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Sample Name: CCV Acquired: 5/22/2014 16:29:16 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.140**	**5.159**	**4.975**	**1.073**	**5.212**	**4.934**	**5.183**
Stddev	.022	.025	.024	.004	.032	.021	.017
%RSD	.4306	.4763	.4756	.4170	.6203	.4307	.3296
#1	5.147	5.182	4.998	1.076	5.238	4.957	5.200
#2	5.158	5.133	4.978	1.067	5.176	4.930	5.166
#3	5.116	5.161	4.950	1.075	5.221	4.915	5.183
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	**5475.0**
Stddev	16.4
%RSD	.30017
#1	5459.5
#2	5492.2
#3	5473.3

Sample Name: CCB Acquired: 5/22/2014 16:33:04 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0005**	**.0001**	**<.0000**	**.0082**	**<.0000**	**.0000**	**.0017**	**.0037**	**.0001**
Stddev	.0002	.0032	.0020	.0036	.0001	.0000	.0002	.0011	.0000
%RSD	48.01	2145.	214.0	44.52	279.2	150.8	11.95	29.86	36.73
#1	.0005	.0010	-.0008	.0072	.0000	.0001	.0020	.0050	.0001
#2	.0007	.0028	.0010	.0122	-.0001	.0000	.0015	.0028	.0001
#3	.0002	-.0034	-.0030	.0051	.0000	.0000	.0017	.0033	.0000
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0002**	**.0007**	**<.0000**	**<.0000**	**.0250**	**.0006**	**.0076**	**.0002**	**.0001**
Stddev	.0002	.0011	.0017	.0015	.0070	.0002	.0159	.0001	.0002
%RSD	134.3	170.2	58.77	503.9	27.94	30.16	209.8	48.52	171.9
#1	.0003	.0005	-.0034	.0003	.0290	.0008	.0061	.0003	.0002
#2	.0004	-.0004	-.0010	-.0020	.0169	.0004	-.0075	.0001	-.0001
#3	-.0001	.0019	-.0043	.0008	.0290	.0006	.0241	.0003	.0002
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0353**	**.0001**	**.0010**	**.0006**	**.0027**	**<.0000**	**<.0000**	**<.0000**	**.0006**
Stddev	.0029	.0001	.0006	.0005	.0015	.0013	.0011	.0035	.0006
%RSD	8.153	191.0	60.18	90.12	56.13	312.6	190.3	121.2	94.20
#1	.0366	.0000	.0014	.0012	.0044	.0011	-.0016	-.0009	.0012
#2	.0320	.0002	.0003	.0002	.0018	-.0015	.0005	-.0008	.0001
#3	.0373	.0000	.0013	.0004	.0018	-.0009	-.0007	-.0069	.0006
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Sample Name: CCB Acquired: 5/22/2014 16:33:04 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0000	<.0000	<.0000	<.0000	.0128	<.0000	.0003
Stddev	.0000	.0021	.0001	.0004	.0130	.0013	.0001
%RSD	71.92	659.8	136.3	14.26	102.0	105.3	20.25
#1	.0000	-.0020	.0000	-.0024	-.0022	.0001	.0004
#2	.0000	.0020	-.0001	-.0030	.0211	-.0013	.0002
#3	.0000	-.0009	-.0001	-.0023	.0194	-.0026	.0003
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit							
Low Limit							

Int. Std.	Y_3710
Units	Cts/S
Avg	5692.9
Stddev	36.7
%RSD	.64534
#1	5693.0
#2	5656.1
#3	5729.6

Sample Name: 160-6629-A-1-C SD Acquired: 5/22/2014 16:37:00 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=5

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0002	.4130	.0003	.0325	.0154	<.0000	<.0000	50.39	.0001
Stddev	.0005	.0085	.0002	.0007	.0002	.0000	.0007	.19	.0001
%RSD	259.4	2.060	79.27	2.249	1.042	78.95	82.89	.3750	79.90
#1	.0000	.4227	.0002	.0325	.0156	.0000	-.0017	50.25	.0002
#2	.0007	.4072	.0006	.0332	.0155	.0000	-.0002	50.31	.0000
#3	-.0002	.4090	.0001	.0317	.0153	-.0001	-.0008	50.60	.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0006	.0034	<.0000	.0155	.3742	.0098	.1269	.0172	.0026
Stddev	.0001	.0003	.0008	.0009	.0265	.0005	.0026	.0002	.0002
%RSD	11.65	7.859	85.10	5.927	7.095	5.523	2.028	1.349	5.924
#1	.0005	.0032	-.0011	.0146	.3512	.0092	.1240	.0173	.0025
#2	.0006	.0038	-.0015	.0164	.4033	.0100	.1275	.0174	.0027
#3	.0007	.0033	.0000	.0153	.3680	.0102	.1291	.0170	.0028
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	119.6	.0022	<.0000	.0006	2.429	.0080	.0004	1.195	<.0000
Stddev	2.0	.0001	.0006	.0004	.009	.0008	.0005	.007	.0001
%RSD	1.636	5.153	90.33	61.29	.3524	9.976	125.0	.5681	7.084
#1	119.1	.0021	-.0009	.0005	2.425	.0086	.0003	1.188	-.0009
#2	121.7	.0023	.0000	.0010	2.423	.0084	.0010	1.198	-.0008
#3	117.9	.0022	-.0012	.0003	2.439	.0071	-.0001	1.200	-.0009
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6629-A-1-C SD Acquired: 5/22/2014 16:37:00 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=5

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0820	<.0000	.0007	<.0000	.0048	.0029	.0661
Stddev	.0001	.0012	.0005	.0014	.0037	.0027	.0002
%RSD	.0722	151.8	66.56	118.5	75.60	90.97	.3488
#1	.0819	.0001	.0013	.0004	.0085	.0035	.0663
#2	.0820	-.0022	.0004	-.0022	.0047	.0000	.0660
#3	.0820	-.0003	.0005	-.0019	.0012	.0052	.0659
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5728.7
Stddev	19.5
%RSD	.34059
#1	5745.8
#2	5733.0
#3	5707.5

Sample Name: 160-6629-A-1-D MS Acquired: 5/22/2014 16:41:00 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.2103**	**11.82**	**1.006**	**2.073**	**1.030**	**.9918**	**.9726**	**227.9**	**1.003**
Stddev	.0013	.02	.002	.005	.004	.0033	.0030	.8	.002
%RSD	.6169	.2001	.1925	.2413	.3762	.3357	.3117	.3640	.1970
#1	.2090	11.84	1.005	2.067	1.033	.9916	.9731	227.0	1.001
#2	.2116	11.79	1.008	2.075	1.031	.9952	.9693	228.2	1.003
#3	.2103	11.82	1.005	2.076	1.025	.9885	.9753	228.5	1.005
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.9727**	**.9874**	**.9903**	**9.731**	**11.49**	**1.007**	**9.591**	**1.042**	**.5103**
Stddev	.0044	.0041	.0035	.029	.06	.008	.093	.006	.0024
%RSD	.4476	.4129	.3533	.2941	.5125	.7560	.9708	.5668	.4760
#1	.9679	.9838	.9863	9.703	11.55	1.016	9.493	1.035	.5075
#2	.9740	.9918	.9917	9.760	11.47	1.003	9.601	1.044	.5113
#3	.9763	.9866	.9928	9.730	11.44	1.003	9.678	1.046	.5121
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**572.7**	**.9715**	**1.139**	**.9386**	**22.63**	**.5386**	**.5179**	**6.246**	**.9680**
Stddev	4.9	.0022	.006	.0034	.06	.0018	.0026	.019	.0024
%RSD	.8585	.2265	.5741	.3638	.2518	.3332	.5019	.2975	.2464
#1	567.1	.9691	1.132	.9352	22.56	.5368	.5192	6.228	.9653
#2	576.1	.9721	1.140	.9386	22.65	.5384	.5150	6.265	.9698
#3	575.0	.9734	1.145	.9421	22.67	.5404	.5197	6.245	.9688
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6629-A-1-D MS Acquired: 5/22/2014 16:41:00 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.394	.9961	1.007	.1862	1.024	1.007	1.324
Stddev	.006	.0072	.002	.0011	.008	.006	.004
%RSD	.4660	.7227	.1967	.5795	.7837	.5762	.3358
#1	1.398	1.001	1.006	.1856	1.015	1.001	1.319
#2	1.398	.9998	1.009	.1856	1.028	1.006	1.327
#3	1.387	.9878	1.005	.1875	1.029	1.013	1.327
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5474.2
Stddev	25.9
%RSD	.47246
#1	5503.6
#2	5464.3
#3	5454.9

Sample Name: 160-6629-A-1-E MSD Acquired: 5/22/2014 16:44:37 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2196	12.60	1.064	2.192	1.093	1.037	1.021	228.5	1.053
Stddev	.0018	.04	.003	.002	.000	.001	.001	.6	.002
%RSD	.8256	.2791	.2843	.1069	.0073	.1202	.0464	.2829	.2098
#1	.2183	12.60	1.065	2.194	1.093	1.036	1.022	228.4	1.054
#2	.2216	12.64	1.066	2.190	1.094	1.039	1.021	229.2	1.054
#3	.2188	12.57	1.060	2.193	1.093	1.037	1.022	227.9	1.050
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.018	1.036	1.043	10.14	12.46	1.111	9.909	1.079	.5337
Stddev	.003	.008	.004	.01	.04	.001	.044	.006	.0012
%RSD	.3161	.7778	.3436	.1286	.3368	.0776	.4441	.5250	.2326
#1	1.022	1.035	1.047	10.13	12.42	1.110	9.909	1.083	.5347
#2	1.017	1.045	1.040	10.14	12.47	1.112	9.953	1.082	.5341
#3	1.015	1.029	1.041	10.15	12.50	1.111	9.865	1.073	.5323
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	590.3	1.018	1.198	.9817	23.28	.5644	.5498	6.336	1.008
Stddev	11.0	.003	.004	.0039	.04	.0009	.0005	.025	.004
%RSD	1.866	.2512	.3262	.4016	.1672	.1575	.0880	.3996	.4355
#1	590.3	1.018	1.202	.9829	23.33	.5651	.5495	6.352	1.011
#2	601.3	1.021	1.194	.9849	23.27	.5646	.5503	6.348	1.009
#3	579.3	1.016	1.197	.9773	23.26	.5634	.5495	6.306	1.003
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6629-A-1-E MSD Acquired: 5/22/2014 16:44:37 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**1.464**	**1.046**	**1.050**	**.1949**	**1.078**	**1.051**	**1.372**
Stddev	.002	.011	.002	.0002	.009	.001	.003
%RSD	.1089	1.023	.1911	.0831	.8110	.1061	.2280
#1	1.462	1.040	1.050	.1951	1.082	1.052	1.375
#2	1.464	1.058	1.052	.1949	1.084	1.052	1.372
#3	1.465	1.039	1.048	.1948	1.068	1.050	1.369
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	**5509.8**
Stddev	18.9
%RSD	.34386
#1	5518.8
#2	5488.0
#3	5522.6

Sample Name: MB 160-123123/1-A Acquired: 5/22/2014 16:48:13 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0002**	**.0135**	**<.0000**	**.0118**	**.0003**	**<.0000**	**<.0000**	**.0395**	**.0002**
Stddev	.0004	.0046	.0009	.0009	.0002	.0000	.0017	.0018	.0001
%RSD	211.4	33.81	53.04	7.510	65.44	538.0	1003.	4.605	55.13
#1	.0001	.0134	-.0007	.0119	.0004	.0000	.0018	.0390	.0001
#2	.0007	.0091	-.0023	.0127	.0002	.0000	-.0011	.0379	.0002
#3	-.0002	.0182	-.0020	.0109	.0001	.0000	-.0012	.0415	.0003
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0002**	**.0016**	**<.0000**	**.0138**	**.0325**	**.0003**	**.0248**	**.0004**	**.0002**
Stddev	.0002	.0005	.0005	.0015	.0143	.0007	.0029	.0003	.0002
%RSD	80.69	28.32	39.76	11.04	44.01	241.7	11.84	75.11	109.2
#1	.0002	.0017	-.0016	.0121	.0488	-.0005	.0231	.0008	.0001
#2	.0001	.0021	-.0007	.0150	.0222	.0007	.0230	.0003	.0000
#3	.0004	.0012	-.0013	.0142	.0264	.0007	.0282	.0002	.0005
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.1246**	**.0004**	**.0023**	**.0006**	**.0086**	**<.0000**	**.0008**	**.0595**	**.0002**
Stddev	.0053	.0002	.0003	.0004	.0022	.0005	.0009	.0044	.0001
%RSD	4.216	59.50	12.49	61.20	25.48	260.3	121.7	7.432	49.62
#1	.1307	.0006	.0025	.0002	.0069	-.0008	.0019	.0643	.0002
#2	.1211	.0002	.0020	.0010	.0111	.0000	.0004	.0587	.0002
#3	.1220	.0002	.0025	.0006	.0078	.0002	.0001	.0556	.0004
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: MB 160-123123/1-A Acquired: 5/22/2014 16:48:13 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	.0004	.0006	<.0000	.0237	.0008	.0129
Stddev	.0000	.0019	.0005	.0023	.0173	.0006	.0002
%RSD	43.01	440.9	73.72	174.0	72.92	78.18	1.519
#1	.0000	-.0015	.0010	-.0039	.0360	.0009	.0130
#2	.0001	.0004	.0001	-.0008	.0312	.0001	.0129
#3	.0001	.0024	.0007	.0007	.0039	.0014	.0126
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5681.3
Stddev	44.1
%RSD	.77572
#1	5641.8
#2	5673.4
#3	5728.9

Sample Name: LCSSRM 160-123123/2- Acquired: 5/22/2014 16:52:08 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.3579	33.19	.4667	.4790	1.075	.2942	.0008	43.50	.7753
Stddev	.0020	.19	.0025	.0013	.003	.0011	.0007	.14	.0033
%RSD	.5524	.5639	.5362	.2800	.2402	.3746	88.86	.3282	.4202
#1	.3595	33.14	.4662	.4801	1.075	.2953	.0017	43.61	.7769
#2	.3557	33.40	.4645	.4775	1.077	.2931	.0006	43.34	.7716
#3	.3585	33.03	.4694	.4792	1.072	.2943	.0003	43.55	.7775
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.169	.4829	1.452	50.29	11.09	.0373	12.54	2.156	.5440
Stddev	.005	.0024	.010	.22	.07	.0008	.04	.005	.0022
%RSD	.4143	.4887	.6781	.4443	.6276	2.030	.3541	.2292	.4078
#1	1.173	.4848	1.455	50.50	11.08	.0375	12.58	2.158	.5454
#2	1.163	.4803	1.441	50.05	11.17	.0380	12.49	2.150	.5414
#3	1.171	.4837	1.460	50.33	11.03	.0365	12.55	2.159	.5451
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	5.455	1.365	3.254	.5501	1.307	.2448	.6757	3.543	.8160
Stddev	.044	.005	.018	.0026	.005	.0024	.0036	.004	.0031
%RSD	.8150	.3699	.5664	.4682	.3731	.9698	.5288	.1237	.3791
#1	5.454	1.369	3.265	.5516	1.311	.2452	.6781	3.539	.8179
#2	5.500	1.359	3.232	.5471	1.302	.2422	.6716	3.548	.8124
#3	5.411	1.367	3.264	.5516	1.310	.2469	.6773	3.543	.8177
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: LCSSRM 160-123123/2- Acquired: 5/22/2014 16:52:08 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.8920	.1439	.7422	.8689	.0356	.7735	.6909
Stddev	.0023	.0037	.0011	.0055	.0111	.0037	.0029
%RSD	.2545	2.558	.1502	.6369	31.14	.4772	.4143
#1	.8932	.1438	.7411	.8728	.0234	.7696	.6924
#2	.8934	.1477	.7433	.8626	.0382	.7739	.6876
#3	.8894	.1403	.7422	.8714	.0451	.7769	.6926
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	6357.0
Stddev	22.1
%RSD	.34732
#1	6347.1
#2	6382.3
#3	6341.7

Sample Name: 160-6669-A-1-E Acquired: 5/22/2014 16:55:39 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0003	10.23	.0031	.0125	.1782	.0002	.0024	7.416	<.0000
Stddev	.0005	.04	.0007	.0045	.0006	.0000	.0016	.026	.0002
%RSD	151.1	.3511	23.60	35.77	.3330	9.873	68.81	.3499	294.5
#1	.0008	10.25	.0027	.0158	.1780	.0002	.0006	7.392	.0001
#2	.0002	10.18	.0027	.0074	.1778	.0002	.0037	7.443	-.0002
#3	-.0001	10.25	.0039	.0143	.1789	.0003	.0029	7.414	-.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0442	.2248	.0652	30.21	.9089	.0111	61.55	.7086	.0014
Stddev	.0002	.0009	.0013	.09	.0191	.0008	.19	.0023	.0002
%RSD	.4684	.3928	2.051	.2884	2.107	7.274	.3090	.3257	16.38
#1	.0443	.2238	.0662	30.11	.9191	.0120	61.38	.7080	.0016
#2	.0440	.2253	.0658	30.22	.9207	.0105	61.76	.7066	.0014
#3	.0444	.2253	.0637	30.29	.8868	.0108	61.51	.7111	.0012
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.7269	.6503	.3070	.0813	.2691	<.0000	<.0000	.6742	1.369
Stddev	.0004	.0052	.0028	.0008	.0059	.0010	.0011	.0101	.009
%RSD	.0553	.7942	.9242	1.021	2.191	149.3	358.7	1.504	.6882
#1	.7273	.6444	.3038	.0822	.2623	-.0009	-.0013	.6679	1.358
#2	.7266	.6541	.3094	.0806	.2723	-.0016	.0009	.6688	1.376
#3	.7267	.6524	.3077	.0810	.2728	.0004	-.0006	.6859	1.372
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6669-A-1-E Acquired: 5/22/2014 16:55:39 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0269	.0821	.6389	<.0000	.0039	.0462	.2015
Stddev	.0001	.0038	.0014	.0016	.0084	.0010	.0016
%RSD	.4547	4.616	.2120	114.5	214.7	2.256	.7982
#1	.0268	.0783	.6375	-.0026	-.0054	.0472	.1997
#2	.0269	.0820	.6388	.0004	.0062	.0451	.2028
#3	.0271	.0859	.6402	-.0019	.0109	.0464	.2020
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5700.4
Stddev	16.5
%RSD	.28975
#1	5718.0
#2	5685.3
#3	5697.9

Sample Name: 160-6669-A-1-E SD Acquired: 5/22/2014 16:59:23 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=50

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	1.983	.0004	.0020	.0349	.0001	.0003	1.437	.0000
Stddev	.0007	.011	.0011	.0014	.0005	.0002	.0008	.011	.0001
%RSD	1110.	.5735	265.8	68.99	1.368	181.1	296.5	.7683	9269.
#1	-.0008	1.986	.0008	.0021	.0348	.0000	.0012	1.444	-.0001
#2	.0006	1.971	.0012	.0032	.0344	.0000	.0000	1.424	.0001
#3	.0000	1.993	-.0008	.0005	.0354	.0003	-.0004	1.442	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0085	.0517	.0118	5.868	.1785	.0026	11.25	.1358	<.0000
Stddev	.0001	.0004	.0011	.055	.0166	.0006	.08	.0017	.0001
%RSD	.9530	.7092	9.336	.9330	9.303	22.92	.6831	1.277	1098.
#1	.0084	.0521	.0127	5.860	.1776	.0021	11.21	.1345	-.0002
#2	.0085	.0514	.0121	5.818	.1623	.0024	11.20	.1351	.0001
#3	.0086	.0517	.0106	5.927	.1955	.0032	11.34	.1378	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1802	.1294	.0572	.0162	.0491	<.0000	<.0000	.1287	.2606
Stddev	.0005	.0009	.0013	.0004	.0011	.0024	.0007	.0084	.0014
%RSD	.2821	.6871	2.254	2.363	2.295	92.63	135.2	6.492	.5214
#1	.1803	.1293	.0579	.0166	.0488	-.0034	-.0006	.1234	.2610
#2	.1806	.1285	.0558	.0159	.0482	-.0045	.0002	.1244	.2590
#3	.1796	.1303	.0580	.0161	.0504	.0001	-.0011	.1384	.2616
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6669-A-1-E SD Acquired: 5/22/2014 16:59:23 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=50

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0054	.0156	.1217	<.0000	<.0000	.0100	.0425
Stddev	.0005	.0028	.0008	.0018	.0045	.0023	.0005
%RSD	9.300	18.06	.6187	117.0	32.95	23.01	1.085
#1	.0052	.0177	.1224	-.0036	-.0120	.0123	.0428
#2	.0050	.0167	.1209	-.0001	-.0103	.0102	.0420
#3	.0060	.0124	.1218	-.0010	-.0188	.0077	.0428
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5800.0
Stddev	31.2
%RSD	.53843
#1	5798.9
#2	5831.7
#3	5769.3

Sample Name: 160-6669-A-2-D Acquired: 5/22/2014 17:03:13 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	10.65	.0044	.0097	.1303	.0003	.0045	11.20	<.0000
Stddev	.0004	.74	.0016	.0013	.0086	.0000	.0009	.84	.0000
%RSD	193.2	6.993	36.70	13.39	6.608	16.99	20.29	7.522	34.58
#1	-.0004	9.902	.0026	.0082	.1218	.0002	.0039	10.31	-.0001
#2	.0002	10.65	.0047	.0101	.1300	.0003	.0040	11.29	-.0001
#3	-.0004	11.39	.0058	.0108	.1390	.0003	.0055	11.99	-.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0678	.3105	.1397	30.91	.7845	.0115	67.29	.7480	.0019
Stddev	.0050	.0137	.0107	2.01	.0553	.0004	4.57	.0496	.0001
%RSD	7.383	4.418	7.679	6.516	7.055	3.295	6.788	6.626	7.232
#1	.0626	.2955	.1292	28.90	.7288	.0111	62.67	.6975	.0018
#2	.0684	.3135	.1391	30.90	.7852	.0115	67.41	.7498	.0019
#3	.0726	.3224	.1507	32.93	.8395	.0119	71.81	.7966	.0021
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5612	1.038	.4445	.0774	.3857	.0021	<.0000	.6305	1.377
Stddev	.0372	.077	.0379	.0067	.0302	.0004	.0027	.0514	.104
%RSD	6.629	7.423	8.524	8.654	7.842	18.22	90.18	8.154	7.546
#1	.5269	.9572	.4046	.0702	.3556	.0019	-.0019	.5796	1.267
#2	.5559	1.047	.4490	.0785	.3854	.0025	-.0010	.6294	1.389
#3	.6007	1.111	.4800	.0835	.4161	.0018	-.0061	.6824	1.474
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6669-A-2-D Acquired: 5/22/2014 17:03:13 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0268	.1063	.6463	<.0000	.0438	.0463	.2303
Stddev	.0017	.0092	.0436	.0008	.0073	.0052	.0184
%RSD	6.452	8.670	6.753	77.09	16.60	11.24	7.983
#1	.0252	.0957	.6029	-.0019	.0510	.0411	.2107
#2	.0267	.1127	.6459	-.0003	.0365	.0462	.2330
#3	.0287	.1105	.6901	-.0009	.0438	.0515	.2471
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5607.7
Stddev	26.3
%RSD	.46842
#1	5612.9
#2	5579.2
#3	5630.9

Sample Name: 160-6669-A-3-D Acquired: 5/22/2014 17:06:57 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0003**	**10.71**	**.0019**	**.0067**	**.1913**	**.0002**	**.0012**	**37.34**	**<.0000**
Stddev	.0004	.58	.0009	.0014	.0099	.0000	.0019	2.70	.0001
%RSD	172.9	5.431	46.91	20.64	5.172	9.253	159.8	7.234	26.47
#1	.0004	10.15	.0009	.0083	.1815	.0002	.0017	34.48	-.0003
#2	-.0002	10.67	.0025	.0062	.1910	.0002	-.0009	37.71	-.0002
#3	.0006	11.31	.0024	.0057	.2013	.0002	.0027	39.84	-.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0510**	**.3042**	**.1266**	**26.39**	**.9262**	**.0100**	**58.45**	**.6565**	**.0002**
Stddev	.0040	.0128	.0092	1.15	.0708	.0006	2.54	.0272	.0001
%RSD	7.831	4.223	7.254	4.338	7.650	6.306	4.354	4.144	34.45
#1	.0468	.2902	.1167	25.24	.8765	.0097	55.89	.6288	.0003
#2	.0514	.3068	.1283	26.41	.8948	.0096	58.48	.6574	.0002
#3	.0547	.3155	.1348	27.53	1.007	.0107	60.98	.6832	.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.7895**	**.8889**	**.4138**	**.0344**	**.3705**	**.0012**	**<.0000**	**.7202**	**.6199**
Stddev	.0461	.0665	.0329	.0025	.0276	.0008	.0021	.0382	.0457
%RSD	5.837	7.480	7.958	7.364	7.443	64.26	692.8	5.300	7.372
#1	.7459	.8183	.3787	.0319	.3409	.0014	.0020	.6924	.5717
#2	.7849	.8981	.4187	.0343	.3753	.0003	-.0021	.7046	.6255
#3	.8377	.9503	.4441	.0369	.3954	.0018	-.0008	.7638	.6625
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6669-A-3-D Acquired: 5/22/2014 17:06:57 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1064	.0895	.3604	<.0000	.0194	.0393	.1092
Stddev	.0053	.0062	.0172	.0002	.0038	.0008	.0081
%RSD	5.003	6.886	4.771	12.54	19.31	2.017	7.388
#1	.1011	.0826	.3431	-.0016	.0221	.0385	.1007
#2	.1062	.0914	.3606	-.0013	.0211	.0393	.1101
#3	.1117	.0945	.3775	-.0014	.0151	.0400	.1168
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5644.2
Stddev	29.8
%RSD	.52831
#1	5618.7
#2	5636.9
#3	5677.0

Sample Name: 160-6669-A-4-D Acquired: 5/22/2014 17:10:41 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	8.586	.0046	.0095	.1408	.0002	.0024	32.25	<.0000
Stddev	.0005	.323	.0006	.0011	.0050	.0000	.0021	2.82	.0001
%RSD	1309.	3.758	12.62	11.87	3.559	4.604	87.44	8.749	71.64
#1	-.0002	8.276	.0040	.0082	.1358	.0002	.0006	29.37	-.0003
#2	-.0005	8.563	.0052	.0100	.1407	.0002	.0018	32.37	-.0002
#3	.0005	8.920	.0046	.0104	.1458	.0002	.0047	35.01	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0517	.2718	.1039	25.67	.8059	.0084	71.58	.5817	.0003
Stddev	.0046	.0116	.0111	.93	.0145	.0003	2.65	.0219	.0004
%RSD	8.970	4.281	10.71	3.632	1.801	3.077	3.697	3.771	131.4
#1	.0468	.2607	.0930	24.78	.7899	.0085	69.04	.5609	-.0001
#2	.0522	.2709	.1034	25.61	.8183	.0087	71.36	.5796	.0005
#3	.0560	.2839	.1152	26.64	.8095	.0082	74.32	.6046	.0004
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.6124	.9897	.3315	.0247	.5805	.0016	<.0000	.3586	.6607
Stddev	.0225	.0851	.0306	.0020	.0518	.0012	.0012	.0108	.0578
%RSD	3.678	8.601	9.234	7.962	8.918	70.31	59.42	3.007	8.754
#1	.5908	.9030	.2997	.0230	.5274	.0007	-.0024	.3462	.6025
#2	.6108	.9930	.3341	.0242	.5833	.0013	-.0031	.3658	.6616
#3	.6357	1.073	.3607	.0268	.6309	.0029	-.0007	.3638	.7181
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6669-A-4-D Acquired: 5/22/2014 17:10:41 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0840	.0894	.3326	<.0000	.0047	.0357	.1372
Stddev	.0030	.0063	.0122	.0005	.0087	.0013	.0124
%RSD	3.596	7.026	3.671	29.69	184.2	3.739	9.061
#1	.0809	.0828	.3204	-.0021	-.0009	.0372	.1245
#2	.0841	.0899	.3325	-.0014	.0147	.0353	.1377
#3	.0870	.0953	.3448	-.0012	.0004	.0346	.1494
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5683.5
Stddev	4.5
%RSD	.07882
#1	5688.6
#2	5681.8
#3	5680.2

Sample Name: CCV Acquired: 5/22/2014 17:14:26 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**1.014**	**49.40**	**5.162**	**4.868**	**4.983**	**5.019**	**5.175**	**53.31**	**5.212**
Stddev	.010	.07	.054	.002	.072	.062	.056	.23	.044
%RSD	.9443	.1495	1.042	.0468	1.453	1.230	1.087	.4361	.8524
#1	1.003	49.38	5.100	4.867	4.911	4.950	5.112	53.06	5.161
#2	1.017	49.48	5.191	4.870	5.056	5.069	5.192	53.52	5.233
#3	1.022	49.34	5.194	4.866	4.982	5.039	5.221	53.34	5.241
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.251**	**5.214**	**5.196**	**49.62**	**50.51**	**5.057**	**48.96**	**4.985**	**1.050**
Stddev	.042	.033	.059	.19	.03	.018	.15	.014	.009
%RSD	.8062	.6394	1.144	.3900	.0576	.3566	.3143	.2833	.8211
#1	5.202	5.176	5.129	49.42	50.54	5.074	48.79	4.970	1.040
#2	5.272	5.236	5.220	49.64	50.49	5.060	49.07	4.998	1.054
#3	5.278	5.231	5.240	49.81	50.49	5.038	49.03	4.987	1.055
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**50.39**	**5.285**	**54.57**	**5.314**	**51.56**	**1.032**	**1.027**	**4.896**	**5.303**
Stddev	.04	.030	.49	.032	.50	.009	.009	.015	.030
%RSD	.0825	.5640	.9059	.6068	.9645	.8635	.8881	.3137	.5742
#1	50.44	5.251	54.01	5.277	50.99	1.022	1.016	4.882	5.268
#2	50.36	5.306	54.80	5.335	51.77	1.037	1.030	4.913	5.324
#3	50.38	5.299	54.91	5.329	51.92	1.037	1.034	4.893	5.317
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Sample Name: CCV Acquired: 5/22/2014 17:14:26 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.093**	**5.116**	**5.021**	**1.075**	**5.164**	**4.973**	**5.237**
Stddev	.069	.042	.014	.009	.042	.009	.040
%RSD	1.357	.8238	.2718	.8649	.8188	.1774	.7684
#1	5.013	5.069	5.007	1.064	5.115	4.964	5.191
#2	5.129	5.129	5.022	1.080	5.190	4.982	5.258
#3	5.135	5.151	5.035	1.081	5.186	4.973	5.263
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	**5453.3**
Stddev	30.7
%RSD	.56326
#1	5488.2
#2	5430.2
#3	5441.5

Sample Name: CCB Acquired: 5/22/2014 17:18:14 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	<.0000	<.0000	.0064	.0000	.0001	.0025	.0020	.0001
Stddev	.0004	.0054	.0012	.0021	.0001	.0000	.0006	.0025	.0001
%RSD	95.65	181.0	140.0	33.17	235.5	7.379	25.73	124.5	150.8
#1	-.0002	-.0019	.0003	.0062	.0001	.0001	.0031	.0045	.0002
#2	-.0009	-.0087	-.0009	.0086	.0000	.0001	.0026	.0022	.0001
#3	-.0002	.0018	-.0020	.0044	.0000	.0001	.0018	-.0006	-.0001
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0005	.0007	<.0000	.0016	.0130	.0006	.0024	.0002	.0001
Stddev	.0001	.0005	.0005	.0008	.0051	.0001	.0035	.0002	.0001
%RSD	24.63	68.65	18.91	46.19	39.05	20.09	143.6	132.7	109.9
#1	.0006	.0011	-.0031	.0022	.0087	.0005	.0018	.0000	.0002
#2	.0004	.0002	-.0032	.0008	.0186	.0006	-.0007	.0000	.0001
#3	.0004	.0008	-.0022	.0019	.0118	.0007	.0062	.0004	.0000
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0217	<.0000	.0015	.0007	.0036	.0009	.0015	<.0000	.0001
Stddev	.0044	.0001	.0015	.0004	.0006	.0006	.0012	.0031	.0004
%RSD	20.10	11250.	101.1	50.93	16.75	75.23	77.64	59.71	592.5
#1	.0168	.0000	.0033	.0005	.0041	.0001	.0026	-.0069	.0006
#2	.0252	-.0001	.0003	.0011	.0038	.0013	.0018	-.0069	-.0002
#3	.0230	.0001	.0010	.0005	.0029	.0011	.0002	-.0016	-.0001
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Sample Name: CCB Acquired: 5/22/2014 17:18:14 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0000	<.0000	<.0000	<.0000	<.0000	<.0000	.0005
Stddev	.0000	.0021	.0002	.0004	.0094	.0037	.0002
%RSD	166.7	458.8	70.92	46.58	65.40	721.8	48.20
#1	.0000	-.0026	.0000	-.0009	-.0087	.0020	.0007
#2	.0000	-.0003	-.0004	-.0004	-.0252	.0012	.0003
#3	.0000	.0016	-.0003	-.0010	-.0091	-.0047	.0004
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit							
Low Limit							

Int. Std.	Y_3710
Units	Cts/S
Avg	5717.2
Stddev	4.6
%RSD	.07987
#1	5721.4
#2	5712.3
#3	5717.8

Sample Name: 160-6669-A-5-D Acquired: 5/22/2014 17:22:10 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	19.97	.0048	.0126	.1401	.0004	.0025	20.88	<.0000
Stddev	.0002	.94	.0018	.0016	.0065	.0000	.0005	1.70	.0000
%RSD	945.4	4.696	38.32	12.40	4.606	2.418	21.57	8.133	13.55
#1	.0001	19.12	.0031	.0116	.1338	.0004	.0031	19.13	-.0002
#2	-.0003	19.82	.0067	.0118	.1397	.0004	.0022	20.99	-.0001
#3	.0001	20.98	.0046	.0144	.1467	.0004	.0022	22.52	-.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0409	.2466	.0578	31.05	.8480	.0220	35.56	.7433	.0005
Stddev	.0034	.0106	.0046	1.40	.0439	.0010	1.57	.0318	.0003
%RSD	8.329	4.300	7.920	4.499	5.172	4.644	4.406	4.280	52.16
#1	.0373	.2349	.0533	29.66	.8042	.0213	34.01	.7117	.0004
#2	.0415	.2492	.0577	31.03	.8478	.0214	35.53	.7429	.0003
#3	.0441	.2556	.0625	32.46	.8919	.0231	37.15	.7753	.0008
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.3153	.4400	.6827	.0139	.8479	.0008	<.0000	.4111	.5464
Stddev	.0207	.0372	.0570	.0017	.0783	.0006	.0009	.0178	.0440
%RSD	6.563	8.456	8.353	12.16	9.236	76.93	22.63	4.319	8.060
#1	.3008	.4016	.6246	.0120	.7675	.0011	-.0035	.3934	.5015
#2	.3061	.4426	.6848	.0151	.8522	.0001	-.0036	.4110	.5483
#3	.3390	.4759	.7386	.0146	.9239	.0011	-.0052	.4289	.5895
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6669-A-5-D Acquired: 5/22/2014 17:22:10 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0653	.1017	1.096	<.0000	.0294	.0604	.0935
Stddev	.0031	.0086	.050	.0017	.0075	.0033	.0079
%RSD	4.739	8.461	4.555	112.5	25.44	5.542	8.491
#1	.0622	.0919	1.047	-.0004	.0275	.0574	.0854
#2	.0652	.1050	1.094	-.0034	.0376	.0598	.0940
#3	.0684	.1082	1.147	-.0007	.0231	.0640	.1013
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5695.5
Stddev	27.1
%RSD	.47614
#1	5668.0
#2	5696.2
#3	5722.2

Sample Name: 160-6669-A-6-D Acquired: 5/22/2014 17:25:54 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0004**	**18.22**	**.0051**	**.0112**	**.1047**	**.0003**	**.0034**	**27.86**	**<.0000**
Stddev	.0004	1.16	.0017	.0034	.0063	.0000	.0016	3.85	.0001
%RSD	97.60	6.359	33.23	29.91	5.980	2.282	47.33	13.82	60.13
#1	.0006	17.07	.0034	.0109	.0985	.0003	.0023	23.97	-.0001
#2	.0005	18.19	.0051	.0081	.1046	.0003	.0027	27.94	-.0003
#3	.0000	19.39	.0068	.0147	.1110	.0003	.0053	31.67	-.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0463**	**.2136**	**.0695**	**26.91**	**.6634**	**.0187**	**30.16**	**.8007**	**.0004**
Stddev	.0061	.0137	.0094	1.67	.0503	.0014	1.95	.0512	.0003
%RSD	13.17	6.432	13.57	6.207	7.589	7.275	6.461	6.398	71.78
#1	.0400	.2005	.0602	25.29	.6055	.0174	28.29	.7516	.0001
#2	.0467	.2124	.0693	26.80	.6967	.0187	30.02	.7968	.0007
#3	.0522	.2279	.0791	28.63	.6881	.0201	32.18	.8538	.0005
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.3853**	**.4615**	**.7123**	**.0125**	**1.221**	**.0011**	**<.0000**	**.3059**	**.6572**
Stddev	.0210	.0647	.1003	.0013	.174	.0010	.0016	.0244	.0918
%RSD	5.445	14.02	14.09	10.66	14.29	95.08	43.17	7.960	13.96
#1	.3644	.3961	.6107	.0116	1.044	-.0001	-.0020	.2781	.5644
#2	.3851	.4631	.7149	.0118	1.226	.0020	-.0039	.3160	.6592
#3	.4064	.5255	.8114	.0140	1.393	.0014	-.0053	.3236	.7479
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6669-A-6-D Acquired: 5/22/2014 17:25:54 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0624	.0866	1.100	<.0000	.0219	.0488	.1175
Stddev	.0037	.0090	.070	.0008	.0179	.0035	.0171
%RSD	5.931	10.35	6.357	41.33	81.48	7.088	14.55
#1	.0587	.0803	1.032	-.0019	.0013	.0448	.1000
#2	.0623	.0828	1.096	-.0013	.0323	.0507	.1183
#3	.0661	.0969	1.172	-.0030	.0321	.0509	.1342
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5872.7
Stddev	24.2
%RSD	.41229
#1	5850.4
#2	5898.5
#3	5869.3

Sample Name: 160-6669-A-7-D Acquired: 5/22/2014 17:29:39 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0003**	**19.13**	**.0062**	**.0143**	**.1237**	**.0004**	**.0046**	**18.83**	**<.0000**
Stddev	.0003	1.08	.0026	.0025	.0064	.0000	.0005	1.95	.0001
%RSD	104.6	5.627	41.45	17.68	5.215	.4326	10.01	10.35	29.32
#1	.0000	18.05	.0033	.0124	.1171	.0004	.0044	16.82	-.0003
#2	.0005	19.15	.0073	.0134	.1239	.0004	.0051	18.96	-.0002
#3	.0002	20.20	.0080	.0172	.1300	.0004	.0043	20.71	-.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0574**	**.4323**	**.1053**	**32.68**	**.8760**	**.0223**	**52.05**	**.8679**	**.0007**
Stddev	.0062	.0246	.0109	1.85	.0404	.0011	3.22	.0506	.0001
%RSD	10.84	5.695	10.38	5.647	4.608	4.720	6.184	5.826	20.05
#1	.0509	.4073	.0939	30.87	.8389	.0211	48.97	.8197	.0007
#2	.0579	.4332	.1064	32.61	.8700	.0226	51.79	.8635	.0005
#3	.0633	.4565	.1157	34.56	.9190	.0232	55.40	.9205	.0008
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.8102**	**.7719**	**.5987**	**.0210**	**1.180**	**.0027**	**<.0000**	**.3071**	**.6468**
Stddev	.0409	.0789	.0631	.0006	.121	.0009	.0008	.0197	.0653
%RSD	5.042	10.22	10.55	2.718	10.28	32.64	29.14	6.412	10.09
#1	.7682	.6898	.5341	.0206	1.056	.0037	-.0035	.2892	.5790
#2	.8128	.7787	.6017	.0217	1.184	.0026	-.0019	.3040	.6523
#3	.8498	.8471	.6603	.0207	1.299	.0019	-.0028	.3282	.7092
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6669-A-7-D Acquired: 5/22/2014 17:29:39 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0702	.1124	1.066	<.0000	.0179	.0533	.1056
Stddev	.0034	.0078	.059	.0016	.0051	.0047	.0110
%RSD	4.879	6.903	5.523	61.77	28.60	8.906	10.42
#1	.0668	.1053	1.008	-.0022	.0123	.0496	.0942
#2	.0702	.1112	1.065	-.0013	.0194	.0516	.1064
#3	.0737	.1207	1.126	-.0044	.0222	.0587	.1162
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5663.0
Stddev	17.9
%RSD	.31566
#1	5681.7
#2	5661.4
#3	5646.0

Sample Name: 160-6669-A-8-D Acquired: 5/22/2014 17:33:23 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	16.37	.0088	.0085	.1227	.0004	.0035	18.25	<.0000
Stddev	.0001	.72	.0004	.0029	.0050	.0001	.0006	1.68	.0000
%RSD	285.7	4.410	4.776	34.80	4.034	14.86	17.76	9.184	28.84
#1	-.0002	15.66	.0088	.0061	.1176	.0004	.0038	16.54	-.0002
#2	.0001	16.33	.0084	.0118	.1229	.0003	.0028	18.33	-.0001
#3	.0000	17.10	.0093	.0075	.1275	.0004	.0039	19.89	-.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0568	.2570	.1044	33.02	.9557	.0206	50.05	.9787	.0003
Stddev	.0054	.0133	.0094	1.65	.0341	.0010	2.74	.0519	.0001
%RSD	9.490	5.177	9.046	5.008	3.569	4.649	5.482	5.304	33.98
#1	.0513	.2433	.0946	31.34	.9263	.0197	47.31	.9280	.0003
#2	.0570	.2578	.1052	33.06	.9477	.0205	50.04	.9762	.0003
#3	.0620	.2699	.1134	34.65	.9931	.0216	52.79	1.032	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.9764	.6269	.7045	.0261	.6126	<.0000	<.0000	.3975	.7139
Stddev	.0347	.0570	.0645	.0024	.0587	.0011	.0013	.0262	.0647
%RSD	3.551	9.095	9.153	9.369	9.582	123.0	50.36	6.580	9.057
#1	.9412	.5683	.6384	.0237	.5534	-.0021	-.0028	.3699	.6471
#2	.9774	.6303	.7077	.0261	.6136	.0001	-.0037	.4006	.7185
#3	1.010	.6822	.7672	.0286	.6708	-.0008	-.0011	.4220	.7762
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6669-A-8-D Acquired: 5/22/2014 17:33:23 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0574	.1047	1.074	<.0000	.0033	.0585	.1195
Stddev	.0024	.0060	.053	.0015	.0084	.0044	.0108
%RSD	4.108	5.732	4.939	67.92	250.8	7.518	9.068
#1	.0550	.0982	1.020	-.0007	.0114	.0556	.1084
#2	.0575	.1061	1.075	-.0025	.0039	.0562	.1200
#3	.0597	.1100	1.126	-.0037	-.0053	.0635	.1301
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5786.9
Stddev	54.2
%RSD	.93603
#1	5840.5
#2	5788.0
#3	5732.2

Sample Name: 160-6669-A-9-D Acquired: 5/22/2014 17:37:06 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0009**	**16.52**	**.0067**	**.0061**	**.2602**	**.0003**	**.0037**	**12.74**	**.0007**
Stddev	.0009	.37	.0012	.0033	.0054	.0000	.0012	1.13	.0001
%RSD	101.0	2.221	17.60	54.14	2.069	7.548	33.70	8.875	16.81
#1	.0002	16.26	.0054	.0025	.2565	.0003	.0051	11.62	.0007
#2	.0005	16.35	.0071	.0070	.2578	.0004	.0029	12.72	.0007
#3	.0018	16.94	.0077	.0089	.2664	.0003	.0031	13.88	.0009
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0513**	**.3268**	**1.400**	**35.71**	**.8436**	**.0179**	**46.60**	**.8777**	**.0009**
Stddev	.0051	.0107	.128	.91	.0193	.0005	1.45	.0270	.0002
%RSD	9.976	3.288	9.154	2.554	2.283	2.674	3.113	3.074	18.78
#1	.0460	.3162	1.274	34.85	.8643	.0178	45.17	.8526	.0007
#2	.0515	.3267	1.398	35.60	.8263	.0176	46.55	.8742	.0011
#3	.0563	.3377	1.530	36.67	.8401	.0185	48.07	.9063	.0010
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.1896**	**.7326**	**.5657**	**.2532**	**.4145**	**.0007**	**<.0000**	**.4774**	**.3930**
Stddev	.0056	.0658	.0524	.0228	.0339	.0011	.0017	.0130	.0354
%RSD	2.934	8.983	9.264	8.988	8.178	170.9	64.45	2.719	9.018
#1	.1855	.6672	.5124	.2304	.3816	.0004	-.0008	.4639	.3575
#2	.1959	.7318	.5675	.2532	.4127	-.0003	-.0031	.4786	.3931
#3	.1874	.7988	.6171	.2759	.4493	.0019	-.0042	.4898	.4284
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6669-A-9-D Acquired: 5/22/2014 17:37:06 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0399	.1126	.8920	<.0000	.0139	.0649	.5807
Stddev	.0008	.0069	.0224	.0010	.0042	.0013	.0540
%RSD	1.926	6.098	2.509	36.10	30.02	2.068	9.306
#1	.0395	.1053	.8728	-.0019	.0114	.0637	.5270
#2	.0396	.1138	.8867	-.0037	.0115	.0648	.5800
#3	.0408	.1188	.9166	-.0024	.0187	.0663	.6351
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5691.4
Stddev	4.3
%RSD	.07559
#1	5686.5
#2	5694.5
#3	5693.3

Sample Name: 160-6669-A-10-D Acquired: 5/22/2014 17:40:49 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0002**	**14.22**	**.0118**	**.0032**	**.1789**	**.0003**	**.0035**	**27.52**	**.0003**
Stddev	.0005	.46	.0012	.0021	.0062	.0001	.0014	2.21	.0001
%RSD	274.6	3.212	9.803	65.72	3.489	20.13	41.22	8.042	46.05
#1	.0000	13.76	.0109	.0046	.1724	.0002	.0044	25.27	.0002
#2	-.0002	14.25	.0131	.0041	.1795	.0003	.0043	27.61	.0002
#3	.0007	14.67	.0113	.0008	.1849	.0003	.0018	29.69	.0005
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0397**	**.2214**	**.6483**	**27.90**	**.8830**	**.0130**	**34.90**	**.7316**	**.0004**
Stddev	.0028	.0071	.0526	.88	.0418	.0008	.95	.0203	.0002
%RSD	6.973	3.198	8.120	3.158	4.730	6.385	2.729	2.780	42.90
#1	.0369	.2142	.5939	27.01	.8559	.0121	33.96	.7112	.0002
#2	.0396	.2216	.6522	27.92	.8620	.0136	34.88	.7316	.0006
#3	.0425	.2283	.6989	28.77	.9311	.0133	35.86	.7519	.0004
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.3428**	**.4687**	**.4862**	**.1010**	**.3403**	**.0008**	**<.0000**	**.2648**	**.5261**
Stddev	.0093	.0383	.0388	.0081	.0279	.0008	.0010	.0085	.0426
%RSD	2.702	8.179	7.981	8.039	8.184	91.01	42.19	3.208	8.093
#1	.3324	.4293	.4480	.0933	.3136	.0005	-.0037	.2564	.4821
#2	.3462	.4709	.4849	.1002	.3381	.0017	-.0020	.2646	.5290
#3	.3500	.5058	.5256	.1095	.3692	.0003	-.0018	.2734	.5671
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6669-A-10-D Acquired: 5/22/2014 17:40:49 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0706	.0833	.9558	<.0000	.0095	.0521	.2704
Stddev	.0024	.0051	.0295	.0010	.0009	.0021	.0223
%RSD	3.437	6.160	3.089	48.04	9.888	4.001	8.251
#1	.0681	.0773	.9261	-.0028	.0106	.0507	.2476
#2	.0709	.0863	.9562	-.0009	.0088	.0510	.2715
#3	.0730	.0861	.9851	-.0022	.0092	.0545	.2922
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5894.5
Stddev	1.7
%RSD	.02812
#1	5893.5
#2	5896.4
#3	5893.6

Sample Name: 160-6669-A-11-D Acquired: 5/22/2014 17:44:33 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	13.43	.0030	.0066	.1191	.0003	.0049	23.20	<.0000
Stddev	.0003	.80	.0012	.0016	.0072	.0000	.0016	2.23	.0000
%RSD	116.1	5.943	39.62	24.41	6.056	10.85	32.74	9.636	13.99
#1	-.0004	12.71	.0016	.0072	.1122	.0003	.0068	20.88	-.0003
#2	-.0005	13.31	.0037	.0047	.1184	.0003	.0039	23.38	-.0002
#3	.0001	14.29	.0038	.0078	.1266	.0003	.0041	25.34	-.0003
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0691	.3080	.0485	29.74	.7888	.0134	68.69	.7554	.0001
Stddev	.0066	.0200	.0057	1.92	.0359	.0004	4.76	.0498	.0002
%RSD	9.606	6.490	11.67	6.458	4.557	2.866	6.929	6.587	159.1
#1	.0622	.2875	.0432	27.80	.7850	.0131	63.99	.7065	-.0001
#2	.0697	.3089	.0479	29.78	.7549	.0132	68.56	.7537	.0002
#3	.0755	.3274	.0545	31.64	.8265	.0138	73.51	.8060	.0003
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.4368	1.070	.5158	.0153	.7555	<.0000	<.0000	.2114	.4683
Stddev	.0214	.101	.0542	.0013	.0728	.0001	.0021	.0124	.0461
%RSD	4.889	9.452	10.50	8.426	9.639	4.847	102.4	5.849	9.841
#1	.4165	.9645	.4602	.0141	.6797	-.0019	-.0026	.1992	.4208
#2	.4347	1.079	.5188	.0153	.7621	-.0018	.0003	.2112	.4712
#3	.4591	1.166	.5685	.0167	.8249	-.0019	-.0038	.2239	.5128
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6669-A-11-D Acquired: 5/22/2014 17:44:33 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0539	.1065	.7690	<.0000	.0237	.0436	.0839
Stddev	.0033	.0055	.0487	.0017	.0058	.0037	.0083
%RSD	6.146	5.136	6.338	54.89	24.49	8.404	9.843
#1	.0507	.1002	.7213	-.0030	.0185	.0415	.0754
#2	.0536	.1092	.7669	-.0048	.0300	.0414	.0844
#3	.0573	.1101	.8187	-.0014	.0227	.0478	.0919
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5653.2
Stddev	20.9
%RSD	.36930
#1	5676.9
#2	5637.5
#3	5645.2

Sample Name: 160-6669-A-12-D Acquired: 5/22/2014 17:48:17 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0000**	**13.91**	**.0023**	**.0073**	**.1454**	**.0002**	**.0007**	**15.83**	**<.0000**
Stddev	.0004	.48	.0014	.0011	.0045	.0000	.0013	1.28	.0001
%RSD	2687.	3.469	61.00	15.36	3.078	12.80	175.5	8.109	63.77
#1	-.0002	13.43	.0008	.0085	.1413	.0002	.0019	14.55	-.0001
#2	-.0002	13.90	.0036	.0062	.1449	.0003	.0010	15.83	-.0002
#3	.0005	14.39	.0026	.0072	.1502	.0002	-.0006	17.12	-.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0616**	**.3281**	**.0507**	**31.71**	**.8108**	**.0152**	**70.26**	**.8651**	**<.0000**
Stddev	.0050	.0107	.0033	1.02	.0217	.0009	2.52	.0294	.0002
%RSD	8.167	3.267	6.560	3.214	2.672	5.652	3.591	3.394	215.6
#1	.0565	.3174	.0472	30.79	.7887	.0152	67.89	.8370	-.0003
#2	.0615	.3281	.0511	31.54	.8116	.0143	69.96	.8627	.0000
#3	.0666	.3388	.0538	32.80	.8320	.0161	72.91	.8955	.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.4387**	**.9524**	**.4978**	**.0115**	**.3883**	**.0006**	**<.0000**	**.2038**	**.3039**
Stddev	.0108	.0765	.0451	.0009	.0363	.0018	.0036	.0068	.0241
%RSD	2.472	8.032	9.059	8.116	9.353	301.6	398.8	3.341	7.941
#1	.4266	.8752	.4521	.0105	.3522	.0026	.0002	.1960	.2798
#2	.4423	.9538	.4990	.0120	.3878	-.0001	.0020	.2067	.3040
#3	.4474	1.028	.5423	.0121	.4248	-.0008	-.0049	.2087	.3281
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6669-A-12-D Acquired: 5/22/2014 17:48:17 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0518	.1066	.8486	<.0000	.0053	.0476	.0745
Stddev	.0016	.0067	.0278	.0013	.0097	.0037	.0062
%RSD	3.148	6.251	3.274	61.94	183.1	7.787	8.309
#1	.0502	.0989	.8223	-.0007	-.0059	.0443	.0684
#2	.0516	.1111	.8457	-.0023	.0103	.0468	.0744
#3	.0535	.1097	.8777	-.0032	.0115	.0516	.0808
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5704.7
Stddev	13.6
%RSD	.23842
#1	5696.7
#2	5720.4
#3	5697.0

Sample Name: 160-6669-A-13-D Acquired: 5/22/2014 17:52:01 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	20.34	.0002	.0131	.2578	.0004	.0046	24.57	<.0000
Stddev	.0003	1.02	.0010	.0027	.0122	.0000	.0019	2.11	.0002
%RSD	83.94	4.990	588.4	20.27	4.717	5.908	39.93	8.604	265.1
#1	.0000	19.36	.0012	.0148	.2463	.0004	.0027	22.42	.0001
#2	-.0007	20.27	.0001	.0100	.2568	.0003	.0064	24.65	-.0003
#3	-.0005	21.38	-.0008	.0145	.2705	.0004	.0048	26.65	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0532	.2582	.0976	38.72	.9557	.0138	43.38	.7976	.0004
Stddev	.0044	.0118	.0084	1.80	.0536	.0020	2.04	.0390	.0002
%RSD	8.207	4.561	8.601	4.650	5.608	14.59	4.700	4.892	41.35
#1	.0487	.2471	.0889	37.02	.8971	.0123	41.44	.7604	.0004
#2	.0535	.2571	.0982	38.53	.9680	.0131	43.20	.7943	.0005
#3	.0574	.2705	.1057	40.60	1.002	.0161	45.50	.8382	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.474	.5690	.5294	.0163	1.135	<.0000	<.0000	.3587	1.069
Stddev	.068	.0482	.0460	.0014	.093	.0012	.0020	.0122	.091
%RSD	4.591	8.478	8.697	8.507	8.232	899.2	144.1	3.407	8.526
#1	1.407	.5196	.4833	.0147	1.039	.0010	.0008	.3449	.9758
#2	1.472	.5715	.5296	.0171	1.139	.0000	-.0019	.3628	1.075
#3	1.543	.6160	.5754	.0171	1.226	-.0013	-.0030	.3683	1.158
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6669-A-13-D Acquired: 5/22/2014 17:52:01 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0698	.1212	1.619	<.0000	.0299	.0792	.1203
Stddev	.0032	.0010	.076	.0003	.0083	.0049	.0100
%RSD	4.580	.8191	4.670	13.29	27.63	6.207	8.302
#1	.0667	.1201	1.546	-.0022	.0219	.0757	.1102
#2	.0696	.1216	1.614	-.0021	.0295	.0770	.1206
#3	.0731	.1219	1.697	-.0026	.0384	.0848	.1302
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5845.5
Stddev	9.1
%RSD	.15508
#1	5845.8
#2	5854.4
#3	5836.3

Sample Name: 160-6669-A-14-D Acquired: 5/22/2014 17:55:44 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0000**	**17.95**	**.0075**	**.0090**	**.1301**	**.0004**	**.0043**	**20.20**	**<.0000**
Stddev	.0003	.80	.0015	.0024	.0061	.0000	.0029	2.06	.0001
%RSD	2903.	4.467	20.55	26.60	4.714	8.818	67.06	10.20	53.24
#1	-.0003	17.18	.0057	.0115	.1242	.0003	.0011	18.05	-.0002
#2	.0000	17.90	.0084	.0087	.1296	.0004	.0051	20.38	-.0001
#3	.0003	18.78	.0085	.0067	.1365	.0004	.0066	22.16	-.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0478**	**.2343**	**.1332**	**35.26**	**1.001**	**.0218**	**36.28**	**.9610**	**.0005**
Stddev	.0048	.0120	.0133	1.69	.039	.0010	1.69	.0422	.0003
%RSD	10.00	5.125	9.988	4.778	3.886	4.523	4.662	4.389	48.24
#1	.0428	.2215	.1193	33.65	.9639	.0213	34.63	.9198	.0007
#2	.0482	.2360	.1346	35.13	.9984	.0210	36.21	.9593	.0002
#3	.0523	.2453	.1458	37.01	1.042	.0229	38.01	1.004	.0007
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**1.342**	**.5167**	**.7012**	**.0332**	**.8142**	**.0020**	**<.0000**	**.4410**	**.8401**
Stddev	.059	.0529	.0743	.0029	.0856	.0019	.0039	.0202	.0854
%RSD	4.401	10.24	10.59	8.681	10.52	96.11	89.85	4.590	10.17
#1	1.286	.4618	.6242	.0302	.7234	.0002	-.0032	.4215	.7517
#2	1.335	.5210	.7069	.0335	.8257	.0017	-.0088	.4394	.8465
#3	1.403	.5674	.7724	.0359	.8935	.0040	-.0012	.4619	.9222
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6669-A-14-D Acquired: 5/22/2014 17:55:44 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0626	.1118	1.069	<.0000	.0338	.0632	.1376
Stddev	.0029	.0043	.050	.0017	.0097	.0013	.0146
%RSD	4.669	3.885	4.689	54.46	28.60	2.046	10.59
#1	.0600	.1079	1.021	-.0017	.0361	.0617	.1224
#2	.0622	.1111	1.065	-.0027	.0422	.0640	.1388
#3	.0658	.1165	1.121	-.0051	.0233	.0638	.1515
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5718.6
Stddev	24.7
%RSD	.43162
#1	5705.4
#2	5703.3
#3	5747.1

Sample Name: CCV Acquired: 5/22/2014 17:59:28 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**1.025**	**50.05**	**5.103**	**4.941**	**5.048**	**5.006**	**5.140**	**52.98**	**5.149**
Stddev	.004	.09	.018	.019	.006	.030	.018	.11	.012
%RSD	.3899	.1879	.3467	.3892	.1206	.5966	.3605	.2108	.2262
#1	1.020	50.14	5.123	4.919	5.054	5.014	5.161	52.86	5.160
#2	1.027	49.95	5.098	4.957	5.042	4.973	5.133	53.02	5.150
#3	1.028	50.06	5.089	4.946	5.046	5.031	5.126	53.07	5.137
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.262**	**5.214**	**5.146**	**49.50**	**51.82**	**5.252**	**48.29**	**4.944**	**1.045**
Stddev	.004	.013	.021	.16	.26	.032	.15	.005	.002
%RSD	.0679	.2411	.4101	.3178	.5079	.5990	.3196	.0946	.2284
#1	5.264	5.201	5.169	49.32	51.97	5.275	48.20	4.940	1.048
#2	5.258	5.213	5.138	49.58	51.52	5.216	48.21	4.942	1.045
#3	5.264	5.227	5.129	49.60	51.99	5.264	48.47	4.949	1.043
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**52.12**	**5.204**	**54.64**	**5.255**	**51.15**	**1.023**	**1.023**	**4.880**	**5.230**
Stddev	.24	.004	.04	.005	.14	.004	.001	.002	.003
%RSD	.4594	.0867	.0732	.1053	.2808	.4305	.0651	.0460	.0475
#1	52.20	5.207	54.63	5.258	51.32	1.028	1.023	4.882	5.232
#2	51.86	5.206	54.60	5.258	51.07	1.023	1.023	4.879	5.231
#3	52.32	5.198	54.68	5.249	51.07	1.019	1.024	4.878	5.227
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Sample Name: CCV Acquired: 5/22/2014 17:59:28 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.110**	**5.214**	**5.021**	**1.078**	**5.198**	**4.996**	**5.198**
Stddev	.047	.012	.007	.004	.021	.021	.008
%RSD	.9184	.2197	.1373	.3427	.4114	.4304	.1537
#1	5.074	5.201	5.013	1.078	5.189	4.982	5.207
#2	5.093	5.220	5.025	1.082	5.182	4.985	5.193
#3	5.163	5.222	5.026	1.074	5.222	5.020	5.194
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	**5498.6**
Stddev	11.7
%RSD	.21207
#1	5511.1
#2	5496.7
#3	5488.0

Sample Name: CCB Acquired: 5/22/2014 18:03:16 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0001**	**.0003**	**<.0000**	**.0079**	**<.0000**	**.0000**	**.0022**	**.0006**	**.0001**
Stddev	.0002	.0042	.0011	.0009	.0000	.0000	.0003	.0010	.0001
%RSD	227.0	1202.	130.7	11.65	38.23	745.7	12.65	180.9	72.31
#1	.0001	.0042	.0004	.0071	-.0001	.0000	.0023	-.0002	.0000
#2	-.0001	-.0040	-.0017	.0077	-.0001	.0000	.0019	.0002	.0001
#3	.0002	.0008	-.0013	.0089	-.0001	.0000	.0023	.0017	.0002
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0001**	**.0018**	**<.0000**	**.0016**	**.0271**	**.0006**	**<.0000**	**.0003**	**.0002**
Stddev	.0001	.0006	.0013	.0002	.0056	.0003	.0043	.0000	.0001
%RSD	48.50	31.17	78.92	15.37	20.73	47.99	51.82	11.83	47.26
#1	.0001	.0015	-.0002	.0015	.0318	.0004	-.0069	.0004	.0004
#2	.0002	.0025	-.0020	.0015	.0209	.0004	-.0132	.0003	.0002
#3	.0001	.0015	-.0028	.0019	.0285	.0009	-.0049	.0003	.0002
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0158**	**.0003**	**.0010**	**<.0000**	**.0042**	**.0005**	**<.0000**	**<.0000**	**<.0000**
Stddev	.0028	.0001	.0008	.0008	.0024	.0005	.0024	.0029	.0002
%RSD	17.62	31.28	81.53	443.0	57.23	96.76	4867.	220.0	86.38
#1	.0190	.0002	.0019	.0000	.0053	.0005	-.0027	-.0020	-.0006
#2	.0147	.0004	.0008	-.0010	.0014	.0000	.0017	.0018	-.0001
#3	.0138	.0003	.0003	.0005	.0057	.0010	.0008	-.0038	-.0002
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Sample Name: CCB Acquired: 5/22/2014 18:03:16 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0000	.0027	<.0000	.0001	.0004	.0012	.0002
Stddev	.0000	.0026	.0007	.0001	.0061	.0006	.0001
%RSD	148.5	98.17	264.4	175.2	1584.	49.67	49.98
#1	.0000	.0002	-.0001	.0001	.0074	.0008	.0002
#2	.0001	.0025	-.0010	-.0001	-.0023	.0018	.0003
#3	.0000	.0054	.0003	.0001	-.0039	.0009	.0001
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit							
Low Limit							

Int. Std.	Y_3710
Units	Cts/S
Avg	5703.6
Stddev	37.5
%RSD	.65831
#1	5732.7
#2	5716.8
#3	5661.2

Sample Name: 160-6669-A-15-D Acquired: 5/22/2014 18:07:12 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	20.62	.0063	.0097	.0885	.0005	.0048	18.22	<.0000
Stddev	.0004	.68	.0005	.0020	.0025	.0000	.0013	2.26	.0001
%RSD	436.7	3.275	7.796	20.66	2.838	8.219	26.79	12.40	52.78
#1	.0003	19.93	.0058	.0075	.0858	.0004	.0041	15.97	-.0001
#2	-.0003	20.66	.0063	.0104	.0889	.0005	.0063	18.20	-.0001
#3	-.0003	21.28	.0068	.0114	.0907	.0005	.0041	20.49	-.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0381	.1961	.0543	33.95	.9219	.0305	34.33	.9188	.0001
Stddev	.0051	.0090	.0084	1.20	.0169	.0008	1.41	.0363	.0001
%RSD	13.36	4.614	15.46	3.543	1.832	2.537	4.099	3.950	72.56
#1	.0329	.1879	.0466	32.71	.9025	.0297	32.94	.8841	.0001
#2	.0383	.1946	.0532	34.03	.9332	.0306	34.30	.9157	.0001
#3	.0431	.2058	.0633	35.11	.9300	.0312	35.75	.9565	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5295	.3743	.7147	.0218	.5158	.0021	<.0000	.3179	1.256
Stddev	.0070	.0466	.0907	.0025	.0693	.0007	.0009	.0102	.155
%RSD	1.327	12.45	12.69	11.60	13.43	35.10	72.27	3.195	12.30
#1	.5215	.3275	.6244	.0189	.4467	.0021	-.0022	.3066	1.100
#2	.5323	.3746	.7138	.0231	.5153	.0013	-.0009	.3209	1.258
#3	.5348	.4207	.8058	.0235	.5853	.0028	-.0005	.3263	1.409
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6669-A-15-D Acquired: 5/22/2014 18:07:12 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0447	.1041	.7627	<.0000	.0308	.0581	.0995
Stddev	.0012	.0048	.0254	.0009	.0070	.0033	.0129
%RSD	2.614	4.565	3.325	43.28	22.67	5.705	13.00
#1	.0434	.1018	.7361	-.0027	.0331	.0552	.0865
#2	.0449	.1010	.7654	-.0011	.0229	.0575	.0996
#3	.0457	.1096	.7866	-.0027	.0363	.0617	.1124
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5869.1
Stddev	23.9
%RSD	.40691
#1	5891.9
#2	5871.1
#3	5844.3

Sample Name: 160-6669-A-16-D Acquired: 5/22/2014 18:10:55 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0004	19.33	.0059	.0138	.1459	.0004	.0037	16.90	<.0000
Stddev	.0006	.20	.0013	.0019	.0012	.0000	.0005	.94	.0000
%RSD	180.6	1.052	21.86	13.62	.8120	5.856	13.99	5.545	41.00
#1	-.0003	19.14	.0051	.0135	.1448	.0003	.0042	15.99	-.0001
#2	.0004	19.31	.0053	.0158	.1457	.0004	.0036	16.84	-.0001
#3	.0010	19.54	.0074	.0121	.1472	.0003	.0032	17.86	-.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0346	.2022	.0394	32.32	.9400	.0241	39.67	.9620	.0003
Stddev	.0020	.0019	.0013	.23	.0204	.0008	.26	.0066	.0001
%RSD	5.728	.9625	3.324	.7138	2.166	3.525	.6605	.6867	41.91
#1	.0330	.2002	.0387	32.12	.9268	.0237	39.42	.9569	.0002
#2	.0340	.2023	.0386	32.25	.9634	.0235	39.64	.9596	.0003
#3	.0368	.2040	.0409	32.57	.9298	.0250	39.94	.9695	.0004
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.6430	.3951	.5580	.0081	.3796	.0002	.0008	.6155	.3578
Stddev	.0096	.0231	.0314	.0003	.0213	.0012	.0026	.0091	.0207
%RSD	1.486	5.850	5.629	4.025	5.603	825.5	332.3	1.479	5.774
#1	.6344	.3736	.5287	.0084	.3611	-.0005	.0039	.6152	.3390
#2	.6413	.3921	.5540	.0078	.3750	-.0006	-.0007	.6065	.3545
#3	.6533	.4196	.5911	.0080	.4028	.0016	-.0008	.6247	.3799
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6669-A-16-D Acquired: 5/22/2014 18:10:55 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0645	.0862	.9734	<.0000	.0134	.0556	.0712
Stddev	.0005	.0029	.0080	.0013	.0094	.0044	.0041
%RSD	.7873	3.342	.8230	48.54	69.98	7.953	5.767
#1	.0641	.0853	.9668	-.0014	.0192	.0587	.0675
#2	.0643	.0839	.9712	-.0028	.0185	.0505	.0704
#3	.0651	.0894	.9823	-.0040	.0026	.0576	.0756
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5780.0
Stddev	9.7
%RSD	.16786
#1	5770.6
#2	5790.0
#3	5779.4

Sample Name: 160-6669-A-17-D Acquired: 5/22/2014 18:14:40 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0003**	**14.53**	**.0070**	**.0102**	**.0829**	**.0003**	**.0006**	**17.17**	**<.0000**
Stddev	.0007	.40	.0004	.0023	.0020	.0000	.0011	1.71	.0001
%RSD	279.1	2.756	6.119	22.85	2.450	10.04	183.3	9.964	124.4
#1	.0005	14.15	.0073	.0129	.0811	.0003	.0001	15.42	.0000
#2	-.0006	14.50	.0065	.0087	.0826	.0003	.0019	17.25	-.0002
#3	.0008	14.95	.0072	.0090	.0851	.0003	-.0002	18.84	-.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0310**	**.1279**	**.0407**	**26.62**	**.7895**	**.0210**	**25.39**	**.7898**	**.0004**
Stddev	.0030	.0053	.0037	.60	.0194	.0007	.55	.0188	.0001
%RSD	9.765	4.119	9.045	2.238	2.459	3.217	2.169	2.378	22.86
#1	.0279	.1229	.0364	26.08	.7763	.0210	24.87	.7714	.0003
#2	.0311	.1275	.0427	26.51	.7805	.0204	25.33	.7890	.0003
#3	.0339	.1334	.0430	27.26	.8118	.0217	25.97	.8089	.0005
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.5303**	**.3028**	**.5484**	**.0113**	**.3203**	**.0007**	**<.0000**	**.5129**	**.5297**
Stddev	.0140	.0299	.0536	.0004	.0331	.0007	.0005	.0078	.0512
%RSD	2.635	9.876	9.781	3.910	10.34	103.1	19.33	1.516	9.662
#1	.5165	.2719	.4933	.0111	.2872	.0000	-.0025	.5047	.4771
#2	.5301	.3049	.5516	.0118	.3203	.0006	-.0022	.5136	.5327
#3	.5445	.3316	.6004	.0111	.3534	.0014	-.0033	.5202	.5794
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6669-A-17-D Acquired: 5/22/2014 18:14:40 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0617	.0735	.5694	<.0000	.0095	.0454	.0665
Stddev	.0014	.0026	.0123	.0008	.0085	.0007	.0064
%RSD	2.199	3.526	2.152	37.59	89.44	1.642	9.589
#1	.0606	.0763	.5584	-.0029	.0066	.0457	.0599
#2	.0614	.0729	.5674	-.0015	.0191	.0446	.0668
#3	.0632	.0712	.5826	-.0017	.0029	.0460	.0727
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5810.9
Stddev	2.0
%RSD	.03386
#1	5813.2
#2	5809.6
#3	5810.0

Sample Name: 160-6669-A-18-D Acquired: 5/22/2014 18:18:25 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	28.91	.0108	.0110	.1875	.0005	.0046	23.90	<.0000
Stddev	.0003	.69	.0006	.0019	.0040	.0000	.0010	1.95	.0000
%RSD	238.0	2.374	5.770	17.64	2.111	5.841	21.89	8.145	8.271
#1	.0002	28.29	.0103	.0091	.1839	.0005	.0053	21.96	-.0003
#2	-.0003	28.81	.0105	.0130	.1868	.0005	.0034	23.88	-.0003
#3	-.0003	29.65	.0115	.0109	.1918	.0005	.0050	25.85	-.0003
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0571	.4488	.0554	42.10	.9566	.0363	78.01	1.027	.0005
Stddev	.0049	.0125	.0027	.65	.0267	.0012	1.31	.018	.0000
%RSD	8.647	2.796	4.832	1.554	2.788	3.413	1.674	1.748	7.020
#1	.0520	.4380	.0535	41.49	.9295	.0353	76.84	1.010	.0005
#2	.0574	.4459	.0541	42.03	.9574	.0358	77.78	1.025	.0006
#3	.0619	.4626	.0584	42.79	.9828	.0377	79.42	1.045	.0005
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2811	.8416	.6244	.0124	1.171	.0021	<.0000	.5023	.4854
Stddev	.0051	.0674	.0534	.0010	.097	.0004	.0033	.0085	.0409
%RSD	1.827	8.005	8.551	8.064	8.292	16.74	611.2	1.683	8.434
#1	.2782	.7737	.5709	.0115	1.073	.0019	-.0017	.4936	.4451
#2	.2780	.8428	.6247	.0122	1.173	.0025	.0032	.5028	.4840
#3	.2870	.9085	.6777	.0134	1.267	.0020	-.0031	.5105	.5270
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6669-A-18-D Acquired: 5/22/2014 18:18:25 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1074	.1273	1.418	<.0000	.0341	.0723	.1026
Stddev	.0021	.0071	.028	.0006	.0066	.0020	.0088
%RSD	1.963	5.614	1.952	27.37	19.45	2.836	8.576
#1	.1054	.1246	1.392	-.0028	.0277	.0716	.0936
#2	.1072	.1219	1.415	-.0017	.0409	.0707	.1029
#3	.1096	.1354	1.447	-.0018	.0337	.0746	.1112
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5732.9
Stddev	20.5
%RSD	.35787
#1	5711.0
#2	5751.7
#3	5736.0

Sample Name: 160-6669-A-19-D Acquired: 5/22/2014 18:22:09 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0004**	**10.14**	**.0087**	**.0071**	**.1893**	**.0003**	**.0009**	**9.200**	**.0032**
Stddev	.0006	.21	.0025	.0005	.0036	.0000	.0011	.861	.0002
%RSD	144.2	2.077	29.00	6.815	1.879	9.378	120.9	9.362	7.255
#1	.0009	9.921	.0063	.0073	.1859	.0003	.0013	8.343	.0030
#2	.0007	10.15	.0084	.0065	.1890	.0002	.0017	9.191	.0031
#3	-.0003	10.34	.0113	.0074	.1930	.0003	-.0003	10.07	.0034
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0185**	**.2300**	**3.051**	**26.84**	**.7006**	**.0122**	**10.08**	**.6313**	**.0017**
Stddev	.0019	.0060	.302	.48	.0183	.0003	.20	.0126	.0002
%RSD	10.16	2.616	9.914	1.786	2.618	2.798	2.017	1.988	15.02
#1	.0169	.2240	2.745	26.38	.6796	.0125	9.860	.6192	.0015
#2	.0180	.2302	3.059	26.81	.7087	.0118	10.11	.6304	.0015
#3	.0206	.2360	3.350	27.33	.7136	.0123	10.26	.6443	.0019
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.1819**	**.1240**	**.4832**	**.3901**	**.2695**	**.0062**	**.0022**	**.4910**	**1.751**
Stddev	.0071	.0122	.0495	.0374	.0286	.0010	.0014	.0108	.168
%RSD	3.911	9.810	10.25	9.591	10.63	15.84	64.16	2.204	9.568
#1	.1751	.1118	.4336	.3523	.2384	.0052	.0010	.4822	1.582
#2	.1814	.1242	.4835	.3909	.2753	.0072	.0019	.4876	1.755
#3	.1893	.1361	.5326	.4271	.2948	.0062	.0037	.5031	1.917
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6669-A-19-D Acquired: 5/22/2014 18:22:09 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0258	.0759	.5369	<.0000	.0088	.0463	2.021
Stddev	.0004	.0022	.0112	.0005	.0063	.0024	.201
%RSD	1.644	2.936	2.090	44.08	71.47	5.106	9.926
#1	.0254	.0760	.5252	-.0007	.0036	.0446	1.820
#2	.0257	.0736	.5378	-.0017	.0157	.0453	2.024
#3	.0262	.0780	.5476	-.0013	.0069	.0490	2.221
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5808.7
Stddev	6.3
%RSD	.10847
#1	5814.1
#2	5801.8
#3	5810.2

Sample Name: 160-6669-A-20-D Acquired: 5/22/2014 18:25:51 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0003	26.39	.0023	.0170	.2363	.0003	.0007	30.43	<.0000
Stddev	.0002	.52	.0012	.0013	.0047	.0001	.0017	3.59	.0001
%RSD	66.51	1.980	50.96	7.612	1.979	20.88	234.3	11.81	45.77
#1	.0001	25.89	.0032	.0185	.2323	.0002	.0016	26.82	-.0001
#2	.0004	26.35	.0010	.0165	.2353	.0003	-.0012	30.46	-.0003
#3	.0005	26.93	.0026	.0160	.2414	.0003	.0018	34.01	-.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0501	.1728	.0652	35.66	.6798	.0252	35.95	.8354	.0002
Stddev	.0059	.0049	.0081	.74	.0165	.0002	.79	.0177	.0001
%RSD	11.86	2.850	12.50	2.067	2.424	.8773	2.192	2.113	80.84
#1	.0441	.1676	.0571	34.96	.6657	.0254	35.13	.8164	.0001
#2	.0502	.1734	.0650	35.60	.6757	.0250	36.02	.8384	.0003
#3	.0560	.1774	.0734	36.43	.6979	.0253	36.70	.8513	.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2482	.3344	.5911	.0061	.7000	<.0000	<.0000	.3211	.6106
Stddev	.0094	.0397	.0694	.0019	.0860	.0024	.0024	.0053	.0726
%RSD	3.786	11.88	11.74	31.88	12.28	97.55	210.7	1.637	11.89
#1	.2387	.2944	.5236	.0046	.6135	-.0012	.0006	.3159	.5378
#2	.2484	.3351	.5874	.0054	.7010	-.0010	-.0001	.3210	.6109
#3	.2575	.3738	.6622	.0083	.7855	-.0053	-.0038	.3264	.6830
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6669-A-20-D Acquired: 5/22/2014 18:25:51 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0885	.1007	1.690	<.0000	.0215	.0618	.0977
Stddev	.0016	.0054	.035	.0005	.0052	.0027	.0124
%RSD	1.835	5.391	2.057	27.60	24.30	4.383	12.70
#1	.0872	.0948	1.657	-.0016	.0185	.0606	.0853
#2	.0881	.1020	1.686	-.0013	.0184	.0599	.0976
#3	.0903	.1054	1.726	-.0022	.0275	.0649	.1101
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5820.7
Stddev	18.1
%RSD	.31171
#1	5812.8
#2	5808.0
#3	5841.5

Sample Name: MB 160-122573/1-A Acquired: 5/22/2014 18:29:35 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0125	<.0000	.0104	.0004	<.0000	.0005	.0548	.0001
Stddev	.0002	.0102	.0011	.0016	.0001	.0000	.0019	.0031	.0001
%RSD	67.94	81.28	93.67	15.15	25.10	21.59	352.3	5.570	66.50
#1	-.0003	.0102	-.0006	.0120	.0004	-.0001	.0023	.0532	.0001
#2	-.0004	.0037	-.0024	.0102	.0003	-.0001	.0006	.0583	.0001
#3	-.0001	.0237	-.0004	.0088	.0005	.0000	-.0014	.0529	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0000	.0006	<.0000	.0146	<.0000	.0001	.0236	.0004	.0000
Stddev	.0001	.0010	.0014	.0013	.0100	.0001	.0088	.0002	.0001
%RSD	1467.	152.3	244.9	8.650	204.5	144.9	37.27	58.92	1504.
#1	.0000	.0003	-.0006	.0132	-.0030	.0002	.0153	.0005	.0000
#2	-.0001	.0017	-.0020	.0150	-.0157	.0000	.0328	.0005	-.0001
#3	.0001	-.0001	.0008	.0155	.0041	.0001	.0227	.0001	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0378	.0005	.0019	.0008	.0048	.0005	<.0000	.0538	<.0000
Stddev	.0043	.0002	.0015	.0011	.0008	.0008	.0013	.0021	.0003
%RSD	11.36	36.87	79.16	145.1	17.51	169.7	621.3	3.988	849.1
#1	.0406	.0005	.0035	.0001	.0046	.0014	-.0013	.0535	.0003
#2	.0400	.0006	.0019	.0002	.0057	.0003	.0012	.0519	-.0003
#3	.0329	.0003	.0004	.0020	.0041	-.0002	-.0006	.0561	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: MB 160-122573/1-A Acquired: 5/22/2014 18:29:35 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0000	<.0000	.0002	<.0000	<.0000	.0014	.0056
Stddev	.0000	.0026	.0005	.0006	.0119	.0006	.0001
%RSD	88.23	146.6	286.8	88.36	127.7	39.60	1.683
#1	.0000	-.0032	.0008	-.0006	.0042	.0018	.0056
#2	.0000	-.0033	-.0002	-.0014	-.0181	.0008	.0055
#3	.0000	.0012	-.0001	-.0002	-.0141	.0017	.0056
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5862.0
Stddev	6.5
%RSD	.11029
#1	5869.3
#2	5859.5
#3	5857.2

Sample Name: LCSSRM 160-122573/2- Acquired: 5/22/2014 18:33:29 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.3608**	**36.47**	**.4823**	**.5139**	**1.088**	**.3037**	**.0008**	**43.32**	**.8109**
Stddev	.0013	.30	.0038	.0015	.003	.0010	.0005	.09	.0023
%RSD	.3579	.8171	.7877	.2917	.2728	.3353	55.85	.2119	.2873
#1	.3610	36.70	.4847	.5156	1.090	.3032	.0012	43.42	.8130
#2	.3620	36.13	.4842	.5132	1.084	.3049	.0003	43.31	.8115
#3	.3595	36.57	.4779	.5128	1.089	.3030	.0010	43.24	.8084
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**1.185**	**.4963**	**1.516**	**59.26**	**11.95**	**.0409**	**13.18**	**2.268**	**.5969**
Stddev	.004	.0019	.006	.24	.16	.0007	.04	.008	.0019
%RSD	.3327	.3735	.4204	.4042	1.345	1.756	.3191	.3552	.3225
#1	1.189	.4983	1.520	59.25	12.05	.0414	13.17	2.276	.5988
#2	1.185	.4960	1.520	59.51	11.77	.0400	13.22	2.269	.5968
#3	1.181	.4947	1.509	59.03	12.05	.0412	13.14	2.260	.5950
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.665**	**1.419**	**3.149**	**.5631**	**1.368**	**.4927**	**.7096**	**7.926**	**.8275**
Stddev	.076	.003	.015	.0017	.003	.0046	.0020	.025	.0023
%RSD	1.340	.2221	.4611	.3071	.2180	.9364	.2875	.3172	.2829
#1	5.716	1.422	3.164	.5651	1.372	.4977	.7080	7.953	.8301
#2	5.578	1.419	3.145	.5617	1.367	.4919	.7119	7.921	.8255
#3	5.701	1.416	3.136	.5626	1.366	.4885	.7090	7.903	.8269
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: LCSSRM 160-122573/2- Acquired: 5/22/2014 18:33:29 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.9261	.1751	.9242	.8648	.0265	.8093	.7170
Stddev	.0009	.0023	.0007	.0029	.0101	.0060	.0018
%RSD	.0973	1.340	.0768	.3333	38.02	.7358	.2520
#1	.9271	.1726	.9235	.8651	.0375	.8110	.7186
#2	.9259	.1772	.9243	.8674	.0241	.8027	.7174
#3	.9253	.1756	.9249	.8617	.0178	.8142	.7150
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	6499.8
Stddev	7.9
%RSD	.12117
#1	6491.3
#2	6501.2
#3	6506.8

Sample Name: 160-6651-H-1-A Acquired: 5/22/2014 18:36:59 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0000**	**39.83**	**.0192**	**.0050**	**.0835**	**.0007**	**.0037**	**.3590**	**<.0000**
Stddev	.0004	.31	.0010	.0031	.0004	.0000	.0016	.0008	.0000
%RSD	2453.	.7790	5.265	62.12	.4739	2.585	42.65	.2226	5.742
#1	-.0002	40.02	.0191	.0085	.0837	.0007	.0047	.3592	-.0002
#2	-.0002	39.47	.0182	.0040	.0830	.0007	.0019	.3581	-.0002
#3	.0005	40.00	.0203	.0025	.0837	.0008	.0046	.3596	-.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0071**	**.0801**	**.0369**	**54.36**	**.9563**	**.0257**	**1.128**	**.1019**	**.0019**
Stddev	.0004	.0008	.0006	.16	.0056	.0003	.023	.0002	.0001
%RSD	6.213	.9449	1.711	.2873	.5854	1.359	2.014	.2324	5.371
#1	.0076	.0804	.0364	54.40	.9624	.0258	1.154	.1018	.0020
#2	.0069	.0807	.0376	54.19	.9549	.0254	1.111	.1017	.0018
#3	.0068	.0792	.0368	54.49	.9515	.0261	1.121	.1021	.0019
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0468**	**.0242**	**.3634**	**.0302**	**.2516**	**.0014**	**.0007**	**6.337**	**.0025**
Stddev	.0052	.0005	.0010	.0012	.0016	.0004	.0008	.033	.0006
%RSD	11.08	2.218	.2726	3.957	.6432	28.45	119.1	.5163	25.17
#1	.0441	.0242	.3629	.0314	.2497	.0016	-.0001	6.354	.0026
#2	.0528	.0236	.3627	.0301	.2526	.0016	.0015	6.299	.0018
#3	.0435	.0247	.3645	.0290	.2524	.0009	.0006	6.357	.0030
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6651-H-1-A Acquired: 5/22/2014 18:36:59 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0054	.1680	.3173	<.0000	.0305	.1146	.0388
Stddev	.0001	.0009	.0001	.0014	.0005	.0016	.0000
%RSD	1.552	.5521	.0401	312.2	1.523	1.370	.0705
#1	.0055	.1674	.3173	-.0014	.0308	.1128	.0388
#2	.0054	.1675	.3175	-.0012	.0300	.1157	.0388
#3	.0054	.1691	.3172	.0012	.0306	.1152	.0387
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	6034.0
Stddev	26.8
%RSD	.44399
#1	6032.2
#2	6061.7
#3	6008.2

Sample Name: 160-6651-H-1-A SD Acquired: 5/22/2014 18:40:51 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	8.322	.0024	<.0000	.0174	.0002	.0002	.0771	<.0000
Stddev	.0004	.039	.0005	.0013	.0000	.0000	.0004	.0004	.0001
%RSD	269.7	.4700	21.52	620.4	.2298	9.809	257.3	.4700	1620.
#1	-.0005	8.361	.0021	-.0012	.0174	.0002	-.0001	.0774	-.0001
#2	-.0003	8.322	.0021	-.0007	.0175	.0001	.0007	.0767	.0001
#3	.0003	8.282	.0030	.0013	.0174	.0002	-.0001	.0772	-.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0017	.0171	.0078	11.30	.2062	.0060	.2384	.0209	.0005
Stddev	.0003	.0003	.0009	.06	.0142	.0001	.0106	.0001	.0002
%RSD	15.73	1.555	12.01	.5039	6.888	1.632	4.438	.6931	32.02
#1	.0017	.0171	.0087	11.35	.2208	.0061	.2496	.0210	.0007
#2	.0015	.0173	.0068	11.32	.1924	.0060	.2286	.0211	.0005
#3	.0020	.0168	.0078	11.24	.2055	.0060	.2369	.0208	.0003
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0245	.0048	.0742	.0066	.0566	.0008	<.0000	1.295	.0005
Stddev	.0058	.0001	.0017	.0001	.0004	.0009	.0013	.010	.0003
%RSD	23.73	3.025	2.299	1.631	.7571	105.5	92.71	.8055	67.11
#1	.0298	.0050	.0760	.0067	.0563	.0002	-.0003	1.304	.0007
#2	.0183	.0049	.0737	.0066	.0565	.0018	-.0028	1.284	.0001
#3	.0254	.0047	.0727	.0065	.0571	.0004	-.0011	1.298	.0005
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6651-H-1-A SD Acquired: 5/22/2014 18:40:51 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0012	.0333	.0649	<.0000	<.0000	.0225	.0129
Stddev	.0000	.0054	.0010	.0009	.0054	.0017	.0002
%RSD	3.224	16.29	1.591	25.63	111.3	7.607	1.173
#1	.0012	.0395	.0661	-.0025	-.0066	.0224	.0131
#2	.0012	.0300	.0645	-.0039	.0012	.0208	.0129
#3	.0011	.0303	.0642	-.0042	-.0090	.0242	.0128
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5958.1
Stddev	25.8
%RSD	.43359
#1	5933.9
#2	5954.9
#3	5985.3

Sample Name: CCV Acquired: 5/22/2014 18:44:46 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**1.020**	**50.34**	**5.116**	**4.923**	**5.183**	**5.037**	**5.100**	**52.81**	**5.165**
Stddev	.002	.17	.032	.016	.052	.037	.051	.24	.020
%RSD	.1516	.3296	.6204	.3190	1.010	.7306	1.008	.4569	.3935
#1	1.020	50.33	5.142	4.906	5.209	4.997	5.152	52.57	5.181
#2	1.019	50.52	5.126	4.936	5.219	5.046	5.097	53.05	5.171
#3	1.022	50.19	5.081	4.927	5.123	5.069	5.050	52.80	5.142
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.182**	**5.206**	**5.132**	**49.69**	**51.23**	**5.199**	**48.99**	**5.014**	**1.040**
Stddev	.019	.022	.041	.16	.23	.041	.27	.027	.003
%RSD	.3636	.4214	.8047	.3243	.4496	.7856	.5542	.5389	.3176
#1	5.187	5.181	5.172	49.50	51.44	5.233	48.67	4.985	1.042
#2	5.198	5.216	5.133	49.78	51.27	5.211	49.12	5.038	1.042
#3	5.161	5.222	5.090	49.79	50.98	5.154	49.16	5.020	1.036
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**51.21**	**5.254**	**53.78**	**5.271**	**50.87**	**1.022**	**1.016**	**4.952**	**5.265**
Stddev	.25	.018	.24	.017	.33	.010	.009	.015	.018
%RSD	.4812	.3346	.4473	.3207	.6539	.9442	.8796	.3067	.3455
#1	51.45	5.248	54.01	5.264	51.19	1.030	1.022	4.946	5.254
#2	51.22	5.274	53.81	5.290	50.89	1.025	1.020	4.970	5.286
#3	50.96	5.240	53.53	5.258	50.53	1.011	1.006	4.941	5.255
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Sample Name: CCV Acquired: 5/22/2014 18:44:46 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.174**	**5.116**	**5.064**	**1.058**	**5.237**	**4.996**	**5.184**
Stddev	.029	.022	.014	.006	.026	.037	.019
%RSD	.5646	.4368	.2815	.5597	.5021	.7461	.3604
#1	5.141	5.097	5.048	1.056	5.210	4.971	5.196
#2	5.193	5.112	5.075	1.065	5.237	5.038	5.194
#3	5.190	5.141	5.069	1.053	5.263	4.977	5.163
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	**5522.9**
Stddev	25.3
%RSD	.45735
#1	5549.0
#2	5498.6
#3	5521.1

Sample Name: CCB Acquired: 5/22/2014 18:48:34 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0002**	**<.0000**	**<.0000**	**.0050**	**.0001**	**.0001**	**<.0000**	**.0012**	**.0001**
Stddev	.0004	.0050	.0006	.0002	.0002	.0000	.0015	.0002	.0001
%RSD	193.5	213.5	115.7	3.645	165.0	53.19	85.82	14.90	117.9
#1	-.0003	-.0081	-.0011	.0048	-.0001	.0000	-.0029	.0012	.0001
#2	.0004	-.0004	.0001	.0051	.0003	.0001	.0000	.0010	.0001
#3	.0005	.0014	-.0005	.0051	.0002	.0001	-.0023	.0014	.0000
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0003**	**.0001**	**<.0000**	**.0020**	**<.0000**	**.0002**	**<.0000**	**.0004**	**.0002**
Stddev	.0004	.0001	.0013	.0019	.0135	.0008	.0057	.0002	.0001
%RSD	114.2	150.2	1102.	96.82	8076.	342.1	2447.	41.82	47.18
#1	.0006	.0001	.0013	.0012	-.0041	.0012	.0048	.0002	.0002
#2	.0006	.0002	-.0012	.0041	-.0113	-.0004	-.0063	.0004	.0001
#3	-.0001	-.0001	-.0005	.0006	.0149	.0000	.0008	.0006	.0003
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0177**	**.0003**	**.0006**	**.0005**	**.0026**	**.0003**	**.0017**	**.0014**	**.0002**
Stddev	.0029	.0002	.0005	.0004	.0022	.0006	.0011	.0061	.0000
%RSD	16.11	58.90	80.82	74.28	85.09	199.4	63.44	438.8	16.27
#1	.0147	.0002	.0011	.0005	.0001	-.0003	.0030	.0010	.0002
#2	.0204	.0002	.0001	.0002	.0033	.0008	.0011	.0076	.0002
#3	.0180	.0005	.0007	.0009	.0043	.0004	.0011	-.0045	.0003
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Sample Name: CCB Acquired: 5/22/2014 18:48:34 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	<.0000	.0001	<.0000	<.0000	.0002	.0002
Stddev	.0000	.0047	.0002	.0007	.0117	.0026	.0001
%RSD	65.80	381.8	174.3	32.61	2131.	1170.	62.92
#1	.0000	-.0052	.0000	-.0023	.0113	-.0003	.0003
#2	.0001	.0039	.0004	-.0014	-.0008	.0031	.0001
#3	.0001	-.0025	.0000	-.0029	-.0120	-.0021	.0001
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit							
Low Limit							

Int. Std.	Y_3710
Units	Cts/S
Avg	5805.0
Stddev	16.0
%RSD	.27503
#1	5788.5
#2	5806.4
#3	5820.3

Sample Name: 160-6651-H-3-A Acquired: 5/22/2014 18:52:31 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	35.23	.0127	.0066	.0979	.0009	.0019	.5294	<.0000
Stddev	.0002	.14	.0011	.0021	.0002	.0000	.0015	.0018	.0000
%RSD	421.0	.3919	8.931	32.20	.2525	1.540	77.54	.3315	34.92
#1	.0001	35.35	.0122	.0053	.0978	.0009	.0002	.5279	-.0001
#2	.0000	35.27	.0119	.0055	.0982	.0009	.0025	.5290	-.0001
#3	-.0003	35.08	.0140	.0091	.0978	.0009	.0030	.5313	-.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0113	.0628	.0230	47.17	1.127	.0264	1.709	.2364	.0016
Stddev	.0001	.0007	.0013	.15	.010	.0005	.018	.0014	.0003
%RSD	1.146	1.042	5.612	.3154	.8986	1.739	1.049	.5989	16.71
#1	.0112	.0635	.0239	47.02	1.116	.0269	1.692	.2348	.0019
#2	.0114	.0622	.0215	47.19	1.128	.0261	1.708	.2372	.0015
#3	.0113	.0629	.0236	47.32	1.136	.0261	1.728	.2372	.0014
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0512	.0221	.3993	.0318	.3505	.0012	.0009	6.125	.0023
Stddev	.0048	.0002	.0016	.0004	.0023	.0013	.0007	.019	.0009
%RSD	9.355	.8783	.4040	1.290	.6555	107.4	73.44	.3074	37.83
#1	.0549	.0219	.3975	.0314	.3491	.0014	.0015	6.118	.0025
#2	.0528	.0220	.3997	.0317	.3492	.0023	.0002	6.146	.0014
#3	.0458	.0223	.4006	.0322	.3531	-.0002	.0011	6.110	.0032
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6651-H-3-A Acquired: 5/22/2014 18:52:31 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0061	.1442	.4223	.0001	.0124	.0898	.0523
Stddev	.0000	.0027	.0012	.0003	.0106	.0029	.0001
%RSD	.6673	1.873	.2750	318.5	85.15	3.283	.1062
#1	.0061	.1425	.4209	.0001	.0246	.0888	.0522
#2	.0061	.1429	.4228	.0004	.0072	.0875	.0523
#3	.0060	.1474	.4231	-.0002	.0055	.0931	.0522
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5988.3
Stddev	12.7
%RSD	.21167
#1	5998.0
#2	5992.9
#3	5973.9

Sample Name: 160-6672-A-8-A Acquired: 5/22/2014 18:56:20 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	<.0000	.0121	<.0000	.0017	.0006	.0182	.0188	<.0000
Stddev	.0001	.0040	.0017	.0011	.0001	.0001	.0026	.0018	.0007
%RSD	3.260	71.77	14.27	35.81	7.506	12.87	14.51	9.770	13.95
#1	-.0032	-.0021	.0103	-.0045	.0018	.0005	.0157	.0170	-.0042
#2	-.0031	-.0047	.0138	-.0023	.0016	.0007	.0178	.0186	-.0048
#3	-.0033	-.0100	.0123	-.0028	.0018	.0006	.0210	.0207	-.0056
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0125	.1600	.2115	8.146	.0365	.0033	<.0000	.0568	.0231
Stddev	.0015	.0029	.0230	.159	.0044	.0007	.0102	.0007	.0024
%RSD	11.91	1.808	10.86	1.947	12.10	19.78	4.976	1.255	10.28
#1	.0109	.1577	.1894	7.980	.0330	.0041	-.2169	.0561	.0206
#2	.0126	.1592	.2098	8.163	.0415	.0031	-.1966	.0569	.0233
#3	.0139	.1633	.2353	8.296	.0349	.0028	-.2041	.0575	.0254
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	47.63	.6271	.0430	.0168	.7327	<.0000	<.0000	.0485	.0097
Stddev	1.28	.0710	.0053	.0073	.0843	.0009	.0030	.0043	.0007
%RSD	2.687	11.31	12.31	43.17	11.51	24.28	24.79	8.785	6.851
#1	46.43	.5582	.0372	.0089	.6531	-.0027	-.0121	.0531	.0093
#2	47.49	.6231	.0443	.0183	.7240	-.0044	-.0090	.0477	.0093
#3	48.98	.6999	.0476	.0232	.8210	-.0043	-.0149	.0447	.0104
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6672-A-8-A Acquired: 5/22/2014 18:56:20 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0015	.3741	.0196	<.0000	57.02	.0200	.0085
Stddev	.0001	.0109	.0002	.0038	1.50	.0007	.0008
%RSD	3.610	2.914	1.203	18.84	2.626	3.528	8.983
#1	.0015	.3615	.0197	-.0168	55.70	.0199	.0078
#2	.0015	.3796	.0193	-.0189	56.71	.0194	.0084
#3	.0016	.3811	.0197	-.0241	58.65	.0208	.0094
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5830.1
Stddev	17.8
%RSD	.30546
#1	5847.1
#2	5831.8
#3	5811.6

Sample Name: 160-6672-A-9-A Acquired: 5/22/2014 19:00:08 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	<.0000	.0327	<.0000	.0058	.0021	.0593	.0752	<.0000
Stddev	.0018	.0050	.0044	.0021	.0001	.0000	.0077	.0069	.0017
%RSD	217.4	2.606	13.58	66.59	1.542	1.961	12.92	9.140	9.203
#1	.0011	-.1946	.0290	-.0036	.0057	.0021	.0522	.0696	-.0164
#2	-.0012	-.1873	.0314	-.0051	.0059	.0021	.0582	.0730	-.0179
#3	-.0024	-.1969	.0376	-.0009	.0059	.0022	.0674	.0828	-.0197
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0381	.6140	.8128	7.487	.0414	.0117	<.0000	.0746	.0657
Stddev	.0035	.0133	.0755	.106	.0303	.0011	.0182	.0009	.0057
%RSD	9.308	2.161	9.290	1.412	73.15	9.571	2.159	1.260	8.676
#1	.0348	.6058	.7436	7.404	.0511	.0104	-.8628	.0743	.0601
#2	.0378	.6069	.8015	7.451	.0075	.0123	-.8291	.0740	.0654
#3	.0418	.6293	.8933	7.606	.0658	.0124	-.8342	.0757	.0715
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	48.36	1.383	.1577	.0660	.2847	<.0000	<.0000	.0918	.0377
Stddev	.50	.122	.0160	.0269	.0264	.0012	.0033	.0006	.0037
%RSD	1.031	8.832	10.13	40.81	9.283	7.635	12.19	.6927	9.908
#1	47.80	1.267	.1429	.0397	.2586	-.0147	-.0231	.0919	.0339
#2	48.75	1.372	.1556	.0649	.2838	-.0167	-.0282	.0923	.0377
#3	48.54	1.511	.1746	.0935	.3115	-.0147	-.0292	.0911	.0414
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6672-A-9-A Acquired: 5/22/2014 19:00:08 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0060	1.384	.0952	<.0000	227.1	.0822	.0279
Stddev	.0001	.032	.0014	.0067	4.1	.0032	.0025
%RSD	2.311	2.324	1.420	8.899	1.786	3.910	8.831
#1	.0059	1.364	.0952	-.0673	223.5	.0799	.0256
#2	.0059	1.367	.0938	-.0773	226.4	.0859	.0276
#3	.0061	1.421	.0965	-.0799	231.5	.0808	.0305
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5632.8
Stddev	28.5
%RSD	.50573
#1	5627.1
#2	5663.7
#3	5607.6

Sample Name: 160-6672-A-10-A Acquired: 5/22/2014 19:03:52 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0012	.1516	.0443	<.0000	.0051	.0003	.0064	.9951	<.0000
Stddev	.0002	.0106	.0063	.0049	.0001	.0000	.0023	.1161	.0003
%RSD	17.16	6.984	14.32	333.9	2.791	5.985	35.78	11.66	12.07
#1	.0009	.1477	.0371	.0013	.0050	.0004	.0040	.8838	-.0020
#2	.0013	.1435	.0465	-.0071	.0050	.0003	.0085	.9861	-.0024
#3	.0013	.1636	.0492	.0014	.0052	.0003	.0069	1.115	-.0025
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0134	.5078	2.558	1.397	.0832	.0030	<.0000	.0306	.0020
Stddev	.0014	.0174	.294	.032	.0124	.0007	.0081	.0003	.0002
%RSD	10.19	3.433	11.49	2.304	14.93	22.99	13.29	1.137	12.21
#1	.0120	.4918	2.272	1.369	.0691	.0024	-.0584	.0304	.0017
#2	.0135	.5052	2.543	1.390	.0926	.0038	-.0543	.0303	.0021
#3	.0147	.5263	2.859	1.433	.0879	.0029	-.0699	.0310	.0021
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	54.56	.8845	.0495	.0281	.1343	<.0000	<.0000	.5688	.0106
Stddev	.71	.1010	.0072	.0066	.0137	.0015	.0020	.0039	.0008
%RSD	1.303	11.42	14.58	23.55	10.23	70.28	16.98	.6942	7.538
#1	53.89	.7862	.0416	.0212	.1213	-.0039	-.0098	.5644	.0097
#2	54.47	.8794	.0511	.0287	.1329	-.0011	-.0112	.5704	.0112
#3	55.31	.9880	.0558	.0344	.1487	-.0015	-.0137	.5718	.0110
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6672-A-10-A Acquired: 5/22/2014 19:03:52 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0028	.3611	.0472	<.0000	50.45	.0132	.0783
Stddev	.0001	.0115	.0013	.0015	1.58	.0029	.0089
%RSD	2.640	3.178	2.777	7.802	3.122	22.27	11.43
#1	.0028	.3503	.0470	-.0173	49.00	.0166	.0696
#2	.0029	.3597	.0460	-.0202	50.22	.0117	.0777
#3	.0029	.3732	.0486	-.0193	52.12	.0113	.0874
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5746.0
Stddev	20.2
%RSD	.35154
#1	5746.9
#2	5765.8
#3	5725.4

Sample Name: 160-6672-A-11-A Acquired: 5/22/2014 19:07:35 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.3838	.0559	<.0000	.0077	.0008	.0436	.6148	<.0000
Stddev	.0011	.0157	.0090	.0014	.0003	.0000	.0068	.0885	.0013
%RSD	567.0	4.103	16.07	31.68	4.195	3.906	15.64	14.39	13.64
#1	-.0012	.3739	.0468	-.0053	.0074	.0008	.0374	.5277	-.0080
#2	-.0004	.3755	.0560	-.0028	.0076	.0009	.0425	.6123	-.0095
#3	.0010	.4019	.0648	-.0050	.0081	.0008	.0510	.7045	-.0106
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0488	2.341	1.729	20.00	.0605	.0080	<.0000	.1874	.0160
Stddev	.0069	.087	.241	.56	.0093	.0005	.0032	.0058	.0023
%RSD	14.11	3.725	13.93	2.797	15.40	5.676	1.482	3.111	14.32
#1	.0417	2.258	1.486	19.46	.0500	.0083	-.2154	.1818	.0137
#2	.0493	2.334	1.733	19.97	.0635	.0075	-.2153	.1870	.0159
#3	.0555	2.432	1.968	20.58	.0678	.0081	-.2209	.1934	.0183
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	40.25	3.972	.0501	.1127	.1941	<.0000	<.0000	.3020	.0295
Stddev	1.32	.548	.0070	.0317	.0280	.0031	.0014	.0131	.0041
%RSD	3.279	13.79	13.97	28.10	14.43	74.03	7.554	4.335	13.92
#1	39.28	3.425	.0434	.0812	.1666	-.0046	-.0174	.2873	.0259
#2	39.71	3.972	.0496	.1124	.1931	-.0071	-.0201	.3065	.0286
#3	41.75	4.520	.0574	.1445	.2226	-.0009	-.0198	.3123	.0340
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6672-A-11-A Acquired: 5/22/2014 19:07:35 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0047	.7823	.1800	<.0000	124.0	.0277	.0616
Stddev	.0001	.0259	.0047	.0070	3.8	.0068	.0088
%RSD	1.927	3.307	2.586	15.97	3.040	24.60	14.34
#1	.0047	.7552	.1751	-.0391	120.4	.0226	.0530
#2	.0047	.7850	.1807	-.0400	123.7	.0250	.0612
#3	.0048	.8068	.1843	-.0516	127.9	.0354	.0706
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5752.5
Stddev	24.4
%RSD	.42492
#1	5728.5
#2	5751.6
#3	5777.4

Sample Name: MB 160-122574/1-A Acquired: 5/22/2014 19:11:16 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	.0407	<.0000	.0197	.0005	<.0000	.0007	.0697	.0001
Stddev	.0003	.0020	.0005	.0019	.0000	.0000	.0016	.0012	.0001
%RSD	197.4	4.915	29.09	9.887	7.200	922.4	235.1	1.679	64.59
#1	-.0002	.0430	-.0018	.0203	.0005	.0000	.0012	.0694	.0000
#2	.0002	.0395	-.0014	.0175	.0005	.0000	.0020	.0710	.0002
#3	.0004	.0396	-.0025	.0213	.0005	.0000	-.0011	.0687	.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0002	.0011	<.0000	.0129	.0170	.0003	.0347	.0005	<.0000
Stddev	.0001	.0006	.0008	.0006	.0024	.0005	.0047	.0001	.0001
%RSD	72.00	58.14	57.70	4.858	14.06	169.7	13.46	24.19	379.1
#1	.0001	.0015	-.0015	.0132	.0178	.0004	.0338	.0005	.0001
#2	.0001	.0004	-.0020	.0134	.0143	-.0003	.0306	.0005	-.0001
#3	.0003	.0013	-.0005	.0122	.0189	.0007	.0398	.0003	-.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0603	.0007	.0023	.0005	.0023	.0016	.0022	.0778	.0008
Stddev	.0092	.0002	.0007	.0004	.0013	.0007	.0024	.0043	.0001
%RSD	15.17	23.94	29.96	86.92	55.24	44.70	109.2	5.479	8.546
#1	.0692	.0005	.0026	.0003	.0018	.0017	.0029	.0753	.0007
#2	.0509	.0009	.0028	.0002	.0014	.0023	.0041	.0754	.0007
#3	.0609	.0006	.0015	.0010	.0038	.0008	-.0005	.0827	.0008
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: MB 160-122574/1-A Acquired: 5/22/2014 19:11:16 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	<.0000	.0009	.0001	.0028	<.0000	.0058
Stddev	.0001	.0027	.0004	.0004	.0047	.0011	.0000
%RSD	149.7	2973.	42.06	326.7	169.8	1058.	.5220
#1	.0002	-.0030	.0006	.0003	-.0027	-.0007	.0058
#2	.0000	.0005	.0014	.0004	.0052	-.0008	.0058
#3	.0000	.0022	.0008	-.0003	.0059	.0012	.0058
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5809.9
Stddev	14.3
%RSD	.24588
#1	5826.3
#2	5802.9
#3	5800.3

Sample Name: LCSSRM 160-122574/2- Acquired: 5/22/2014 19:15:11 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.3616**	**38.55**	**.4924**	**.5155**	**1.114**	**.3078**	**.0012**	**44.23**	**.8350**
Stddev	.0001	.15	.0095	.0019	.006	.0011	.0008	.20	.0113
%RSD	.0328	.3902	1.927	.3644	.5023	.3653	69.84	.4455	1.354
#1	.3617	38.41	.4844	.5134	1.109	.3067	.0006	44.00	.8245
#2	.3617	38.71	.4899	.5167	1.120	.3089	.0009	44.36	.8336
#3	.3615	38.54	.5029	.5166	1.114	.3077	.0021	44.32	.8470
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**1.204**	**.5055**	**1.540**	**62.87**	**12.40**	**.0423**	**13.70**	**2.328**	**.6073**
Stddev	.017	.0017	.029	.19	.03	.0004	.06	.010	.0092
%RSD	1.441	.3392	1.888	.3096	.2581	.9901	.4656	.4290	1.522
#1	1.187	.5049	1.516	62.68	12.37	.0426	13.63	2.317	.5997
#2	1.202	.5043	1.532	63.07	12.43	.0423	13.72	2.336	.6047
#3	1.222	.5075	1.573	62.86	12.39	.0418	13.75	2.331	.6176
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.763**	**1.440**	**3.219**	**.5702**	**1.345**	**.5601**	**.7259**	**4.932**	**.8679**
Stddev	.003	.016	.050	.0067	.024	.0086	.0120	.018	.0106
%RSD	.0474	1.111	1.550	1.183	1.810	1.540	1.656	.3640	1.220
#1	5.763	1.425	3.177	.5638	1.325	.5513	.7171	4.912	.8564
#2	5.760	1.440	3.207	.5695	1.339	.5605	.7210	4.940	.8703
#3	5.765	1.457	3.274	.5773	1.372	.5685	.7396	4.945	.8772
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: LCSSRM 160-122574/2- Acquired: 5/22/2014 19:15:11 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.9432	.1910	.9301	.8936	.0199	.8075	.7313
Stddev	.0046	.0048	.0048	.0098	.0037	.0084	.0100
%RSD	.4842	2.517	.5190	1.101	18.55	1.045	1.366
#1	.9397	.1880	.9258	.8850	.0239	.7994	.7221
#2	.9484	.1966	.9354	.8915	.0166	.8068	.7298
#3	.9416	.1885	.9292	.9043	.0191	.8163	.7420
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	6362.8
Stddev	21.0
%RSD	.32977
#1	6386.7
#2	6347.1
#3	6354.7

Sample Name: 160-6672-A-1-A Acquired: 5/22/2014 19:18:43 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0016	<.0000	.0854	.0015	.0031	.0008	.0172	.0453	<.0000
Stddev	.0011	.0026	.0021	.0008	.0000	.0000	.0008	.0005	.0000
%RSD	70.89	3.418	2.501	52.28	.4909	5.458	4.459	1.051	.3674
#1	.0027	-.0804	.0877	.0014	.0031	.0009	.0163	.0455	-.0064
#2	.0017	-.0757	.0853	.0007	.0031	.0008	.0175	.0456	-.0065
#3	.0004	-.0760	.0834	.0023	.0031	.0008	.0178	.0447	-.0064
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0197	1.042	.8314	2.014	.1463	.0062	<.0000	.0447	.0058
Stddev	.0002	.004	.0041	.004	.0064	.0010	.0086	.0004	.0001
%RSD	1.256	.3436	.4914	.1790	4.341	15.82	2.104	.9149	2.169
#1	.0199	1.046	.8351	2.018	.1529	.0065	-.4036	.0447	.0059
#2	.0196	1.040	.8270	2.011	.1460	.0070	-.4197	.0442	.0058
#3	.0195	1.040	.8322	2.015	.1402	.0051	-.4064	.0450	.0056
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	58.73	1.415	.0137	.0041	.1615	<.0000	<.0000	.0592	.0160
Stddev	.38	.005	.0004	.0005	.0005	.0018	.0008	.0037	.0005
%RSD	.6533	.3227	2.900	12.09	.3286	21.16	8.379	6.184	3.328
#1	59.05	1.420	.0135	.0041	.1611	-.0101	-.0098	.0603	.0166
#2	58.83	1.413	.0134	.0045	.1621	-.0084	-.0111	.0551	.0156
#3	58.31	1.411	.0141	.0035	.1612	-.0066	-.0095	.0621	.0157
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6672-A-1-A Acquired: 5/22/2014 19:18:43 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0030	.6937	.0938	<.0000	104.7	.0404	.0187
Stddev	.0001	.0132	.0005	.0003	.5	.0008	.0002
%RSD	2.041	1.900	.5185	.9696	.4530	2.050	.9709
#1	.0029	.7089	.0937	-.0284	105.3	.0395	.0188
#2	.0030	.6853	.0943	-.0289	104.3	.0405	.0185
#3	.0031	.6869	.0934	-.0287	104.6	.0411	.0189
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5818.6
Stddev	15.0
%RSD	.25800
#1	5801.4
#2	5829.2
#3	5825.3

Sample Name: 160-6672-A-1-A SD Acquired: 5/22/2014 19:22:30 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=100

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	<.0000	.0154	<.0000	.0006	.0001	.0044	.0110	<.0000
Stddev	.0002	.0019	.0019	.0031	.0001	.0000	.0017	.0007	.0001
%RSD	11.43	10.99	12.50	167.5	15.17	5.065	37.84	6.731	5.945
#1	-.0014	-.0156	.0168	-.0007	.0005	.0001	.0049	.0117	-.0015
#2	-.0017	-.0191	.0162	-.0054	.0007	.0001	.0057	.0102	-.0014
#3	-.0017	-.0162	.0132	.0005	.0005	.0001	.0025	.0109	-.0013
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0037	.1986	.1609	.3779	.0082	.0020	<.0000	.0083	.0008
Stddev	.0003	.0008	.0014	.0011	.0061	.0001	.0151	.0002	.0001
%RSD	7.308	.3940	.8444	.2848	74.84	5.987	19.96	1.994	12.38
#1	.0040	.1983	.1594	.3786	.0019	.0019	-.0783	.0082	.0007
#2	.0036	.1995	.1620	.3766	.0141	.0021	-.0891	.0085	.0009
#3	.0034	.1980	.1614	.3783	.0085	.0021	-.0593	.0084	.0008
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	11.05	.2738	.0024	.0006	.0334	<.0000	<.0000	.0077	.0028
Stddev	.14	.0018	.0008	.0005	.0036	.0012	.0020	.0014	.0008
%RSD	1.224	.6705	33.10	82.06	10.78	109.0	183.7	17.73	27.56
#1	11.08	.2724	.0031	.0012	.0331	-.0016	-.0003	.0079	.0037
#2	10.91	.2759	.0026	.0003	.0371	-.0019	.0004	.0062	.0021
#3	11.17	.2733	.0015	.0004	.0299	.0003	-.0034	.0089	.0027
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6672-A-1-A SD Acquired: 5/22/2014 19:22:30 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=100

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0006	.1341	.0170	<.0000	20.08	.0059	.0085
Stddev	.0000	.0004	.0007	.0014	.11	.0004	.0001
%RSD	7.437	.3228	3.865	17.19	.5461	6.249	1.447
#1	.0005	.1336	.0171	-.0071	20.07	.0058	.0084
#2	.0006	.1344	.0176	-.0081	20.20	.0056	.0086
#3	.0005	.1342	.0163	-.0099	19.98	.0063	.0085
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5831.8
Stddev	30.5
%RSD	.52223
#1	5841.8
#2	5797.6
#3	5855.9

Sample Name: 160-6672-A-1-B MS Acquired: 5/22/2014 19:26:19 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0123	.4431	.1324	.0957	.0569	.0530	.0690	.5826	.0476
Stddev	.0003	.0059	.0017	.0011	.0001	.0001	.0002	.0042	.0003
%RSD	2.566	1.339	1.285	1.164	.1484	.2828	.3415	.7257	.5737
#1	.0126	.4402	.1339	.0970	.0570	.0530	.0692	.5859	.0479
#2	.0120	.4392	.1328	.0949	.0570	.0529	.0687	.5779	.0474
#3	.0123	.4499	.1306	.0952	.0568	.0532	.0689	.5841	.0476
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0759	1.255	.8038	2.569	.6819	.0638	.0404	.1012	.0311
Stddev	.0005	.008	.0046	.015	.0030	.0006	.0046	.0006	.0004
%RSD	.6987	.6664	.5677	.5830	.4459	.9108	11.36	.5502	1.151
#1	.0765	1.261	.8085	2.582	.6846	.0632	.0381	.1018	.0307
#2	.0756	1.245	.8037	2.553	.6825	.0644	.0374	.1010	.0311
#3	.0756	1.258	.7994	2.571	.6786	.0637	.0457	.1007	.0313
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	66.26	1.284	.0708	.0637	.6758	.0170	.0146	.0492	.0725
Stddev	.40	.005	.0005	.0017	.0008	.0015	.0010	.0087	.0009
%RSD	.6047	.4279	.6848	2.714	.1210	8.571	7.145	17.75	1.207
#1	65.81	1.290	.0703	.0636	.6750	.0153	.0153	.0429	.0732
#2	66.59	1.279	.0713	.0654	.6757	.0181	.0150	.0455	.0715
#3	66.38	1.284	.0707	.0619	.6767	.0176	.0134	.0591	.0726
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6672-A-1-B MS Acquired: 5/22/2014 19:26:19 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0586	.8195	.1575	<.0000	117.4	.0975	.0728
Stddev	.0001	.0076	.0011	.0022	.9	.0039	.0003
%RSD	.1578	.9299	.7260	9.371	.7256	3.974	.3694
#1	.0586	.8154	.1585	-.0214	117.3	.0973	.0731
#2	.0587	.8148	.1562	-.0256	116.7	.1015	.0727
#3	.0585	.8283	.1577	-.0226	118.4	.0938	.0727
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5777.8
Stddev	24.4
%RSD	.42284
#1	5760.1
#2	5805.7
#3	5767.7

Sample Name: CCV Acquired: 5/22/2014 19:30:03 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**1.024**	**50.99**	**5.178**	**4.980**	**5.140**	**5.097**	**5.219**	**52.71**	**5.244**
Stddev	.003	.08	.011	.020	.085	.017	.019	.14	.019
%RSD	.2620	.1475	.2115	.4023	1.656	.3233	.3694	.2561	.3600
#1	1.021	51.07	5.169	4.962	5.043	5.082	5.207	52.57	5.225
#2	1.026	50.92	5.190	4.976	5.199	5.115	5.242	52.72	5.263
#3	1.025	50.96	5.176	5.002	5.179	5.095	5.209	52.84	5.244
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.201**	**5.218**	**5.262**	**50.12**	**52.04**	**5.317**	**49.44**	**5.055**	**1.049**
Stddev	.006	.009	.021	.07	.33	.039	.16	.019	.004
%RSD	.1193	.1800	.4070	.1483	.6370	.7359	.3285	.3759	.3823
#1	5.194	5.208	5.246	50.05	52.17	5.338	49.39	5.049	1.046
#2	5.206	5.226	5.287	50.10	51.66	5.272	49.63	5.076	1.054
#3	5.202	5.219	5.255	50.20	52.28	5.342	49.32	5.039	1.048
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**51.94**	**5.282**	**54.35**	**5.299**	**51.69**	**1.044**	**1.034**	**5.026**	**5.297**
Stddev	.46	.014	.14	.017	.22	.007	.001	.018	.014
%RSD	.8892	.2660	.2551	.3121	.4287	.6965	.0863	.3481	.2639
#1	52.02	5.266	54.22	5.280	51.49	1.036	1.034	5.044	5.281
#2	51.45	5.293	54.49	5.307	51.93	1.051	1.035	5.024	5.308
#3	52.36	5.288	54.33	5.311	51.64	1.045	1.033	5.010	5.302
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Sample Name: CCV Acquired: 5/22/2014 19:30:03 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.192**	**5.101**	**5.116**	**1.066**	**5.284**	**4.988**	**5.237**
Stddev	.087	.010	.007	.003	.039	.028	.016
%RSD	1.668	.1955	.1452	.3085	.7326	.5662	.3047
#1	5.101	5.113	5.123	1.063	5.274	4.957	5.222
#2	5.273	5.093	5.108	1.070	5.326	5.013	5.254
#3	5.204	5.099	5.115	1.065	5.251	4.994	5.235
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	**5510.5**
Stddev	11.3
%RSD	.20422
#1	5523.4
#2	5505.5
#3	5502.7

Sample Name: CCB Acquired: 5/22/2014 19:33:52 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	<.0000	<.0000	.0067	.0001	.0001	.0008	.0015	.0002
Stddev	.0005	.0088	.0016	.0012	.0001	.0000	.0005	.0014	.0002
%RSD	418.4	375.3	130.1	17.86	61.76	36.34	61.28	91.27	72.67
#1	.0002	-.0072	.0006	.0069	.0002	.0001	.0014	.0030	.0003
#2	-.0007	.0078	-.0023	.0055	.0001	.0001	.0005	.0009	.0000
#3	.0002	-.0076	-.0019	.0078	.0001	.0001	.0006	.0005	.0003
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0002	.0002	.0002	.0019	<.0000	.0007	.0102	.0005	.0001
Stddev	.0002	.0009	.0008	.0011	.0203	.0003	.0082	.0003	.0001
%RSD	90.72	423.5	336.6	59.93	126.6	43.32	79.71	70.72	77.68
#1	.0005	-.0007	-.0006	.0030	-.0230	.0009	.0075	.0004	.0002
#2	.0001	.0003	.0003	.0018	-.0319	.0008	.0194	.0002	.0000
#3	.0002	.0010	.0010	.0008	.0068	.0003	.0038	.0009	.0002
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0179	.0002	.0010	<.0000	.0032	.0011	.0001	<.0000	.0000
Stddev	.0056	.0003	.0022	.0005	.0031	.0007	.0017	.0010	.0004
%RSD	31.30	162.5	214.3	93.45	97.39	62.74	1841.	94.32	1456.
#1	.0212	.0004	.0032	-.0006	.0059	.0005	.0008	-.0010	.0000
#2	.0211	.0003	.0013	-.0009	-.0002	.0018	-.0018	-.0022	.0005
#3	.0114	-.0002	-.0013	.0000	.0038	.0008	.0013	-.0001	-.0004
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Sample Name: CCB Acquired: 5/22/2014 19:33:52 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	.0008	.0003	.0000	<.0000	<.0000	.0003
Stddev	.0001	.0053	.0004	.0006	.0047	.0021	.0002
%RSD	57.28	662.3	117.0	15490.	79.70	627.1	43.17
#1	.0002	.0053	.0006	-.0003	-.0027	-.0022	.0005
#2	.0001	-.0050	-.0001	-.0003	-.0037	.0019	.0002
#3	.0001	.0020	.0005	.0007	-.0114	-.0006	.0004
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit							
Low Limit							

Int. Std.	Y_3710
Units	Cts/S
Avg	5745.3
Stddev	14.3
%RSD	.24839
#1	5748.7
#2	5757.5
#3	5729.6

Sample Name: 160-6672-A-1-C MSD Acquired: 5/22/2014 19:37:47 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0123	.4386	.1480	.0981	.0562	.0529	.0676	.5873	.0479
Stddev	.0013	.0036	.0015	.0021	.0002	.0004	.0010	.0025	.0004
%RSD	10.73	.8141	1.007	2.176	.3083	.7247	1.447	.4283	.8365
#1	.0107	.4350	.1496	.1003	.0560	.0533	.0686	.5899	.0484
#2	.0132	.4422	.1468	.0961	.0563	.0527	.0667	.5871	.0478
#3	.0128	.4386	.1474	.0979	.0562	.0526	.0675	.5849	.0476
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0744	1.083	.9030	2.645	.7298	.0627	.0658	.0964	.0329
Stddev	.0008	.008	.0110	.018	.0218	.0013	.0220	.0007	.0004
%RSD	1.050	.7704	1.218	.6669	2.982	2.117	33.51	.7246	1.354
#1	.0753	1.093	.9152	2.664	.7062	.0616	.0652	.0972	.0329
#2	.0739	1.079	.9002	2.641	.7491	.0642	.0440	.0961	.0333
#3	.0739	1.077	.8937	2.629	.7342	.0625	.0881	.0959	.0324
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	63.62	1.211	.0724	.0630	.7088	.0185	.0175	.0570	.0723
Stddev	.84	.008	.0011	.0028	.0077	.0023	.0036	.0059	.0011
%RSD	1.315	.6279	1.482	4.436	1.081	12.60	20.70	10.36	1.493
#1	63.22	1.219	.0734	.0639	.7174	.0204	.0213	.0566	.0734
#2	64.58	1.209	.0725	.0653	.7062	.0159	.0141	.0632	.0722
#3	63.05	1.204	.0713	.0599	.7028	.0193	.0171	.0514	.0712
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6672-A-1-C MSD Acquired: 5/22/2014 19:37:47 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0580	.7771	.1452	<.0000	111.5	.0953	.0745
Stddev	.0002	.0067	.0010	.0019	.6	.0016	.0008
%RSD	.3081	.8565	.7088	8.711	.5144	1.628	1.056
#1	.0582	.7740	.1462	-.0236	112.1	.0937	.0753
#2	.0580	.7726	.1452	-.0199	111.2	.0953	.0745
#3	.0578	.7848	.1441	-.0226	111.0	.0968	.0737
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5703.7
Stddev	36.9
%RSD	.64740
#1	5662.3
#2	5715.4
#3	5733.3

Sample Name: 160-6672-A-2-A Acquired: 5/22/2014 19:41:30 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0032	<.0000	.0680	<.0000	.0033	.0008	.0286	.0369	<.0000
Stddev	.0006	.0079	.0057	.0038	.0002	.0000	.0034	.0029	.0009
%RSD	17.73	9.063	8.435	448.6	5.373	1.856	11.89	7.853	10.61
#1	.0036	-.0842	.0632	-.0049	.0031	.0008	.0253	.0341	-.0080
#2	.0026	-.0812	.0665	-.0004	.0034	.0008	.0284	.0368	-.0088
#3	.0035	-.0962	.0744	.0027	.0034	.0008	.0321	.0399	-.0099
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0281	1.256	1.050	2.323	.0844	.0064	<.0000	.0569	.0024
Stddev	.0032	.038	.120	.052	.0072	.0003	.0114	.0013	.0003
%RSD	11.49	3.010	11.46	2.247	8.565	4.975	2.655	2.320	12.10
#1	.0249	1.219	.9334	2.267	.0852	.0063	-.4215	.0558	.0022
#2	.0282	1.255	1.042	2.330	.0768	.0067	-.4429	.0565	.0024
#3	.0313	1.295	1.174	2.371	.0912	.0061	-.4254	.0583	.0028
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	57.81	2.314	.0130	.0362	.1373	<.0000	<.0000	.0506	.0210
Stddev	1.43	.257	.0015	.0155	.0153	.0014	.0010	.0047	.0018
%RSD	2.468	11.12	11.34	42.92	11.14	18.72	4.694	9.344	8.745
#1	56.25	2.066	.0114	.0216	.1215	-.0074	-.0209	.0548	.0197
#2	58.12	2.297	.0134	.0344	.1383	-.0065	-.0208	.0455	.0203
#3	59.05	2.580	.0143	.0525	.1521	-.0093	-.0226	.0515	.0231
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6672-A-2-A Acquired: 5/22/2014 19:41:30 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0031	.7405	.1020	<.0000	115.6	.0384	.0202
Stddev	.0000	.0159	.0016	.0050	2.9	.0074	.0020
%RSD	1.510	2.149	1.562	12.24	2.472	19.20	9.662
#1	.0031	.7236	.1002	-.0361	112.7	.0375	.0184
#2	.0031	.7427	.1026	-.0399	115.7	.0315	.0200
#3	.0032	.7552	.1032	-.0459	118.4	.0461	.0223
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5681.0
Stddev	34.3
%RSD	.60405
#1	5711.4
#2	5687.9
#3	5643.8

Sample Name: 160-6672-A-3-A Acquired: 5/22/2014 19:45:17 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0015	.0086	<.0000	.0016	.0005	.0163	.0331	<.0000
Stddev	.0017	.0062	.0008	.0012	.0001	.0000	.0012	.0033	.0005
%RSD	61.46	419.8	9.519	20.89	5.893	5.892	7.516	9.910	10.28
#1	-.0028	-.0040	.0084	-.0051	.0016	.0005	.0171	.0303	-.0043
#2	-.0045	.0002	.0095	-.0049	.0016	.0005	.0149	.0322	-.0048
#3	-.0011	.0082	.0079	-.0071	.0017	.0006	.0170	.0367	-.0053
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0094	.2038	.0531	2.207	.0086	.0030	<.0000	.0215	.0180
Stddev	.0013	.0057	.0057	.047	.0027	.0003	.0064	.0003	.0020
%RSD	13.47	2.792	10.77	2.117	31.33	11.08	3.235	1.527	10.98
#1	.0082	.1991	.0479	2.169	.0065	.0032	-.2048	.0211	.0160
#2	.0093	.2022	.0523	2.192	.0116	.0026	-.1920	.0215	.0181
#3	.0108	.2101	.0592	2.259	.0077	.0032	-.1971	.0218	.0200
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	50.34	.2099	.0360	.0187	.7977	<.0000	<.0000	.0931	.0094
Stddev	1.01	.0225	.0054	.0082	.0820	.0005	.0042	.0039	.0011
%RSD	2.014	10.74	15.12	43.67	10.28	18.43	37.43	4.192	11.70
#1	49.71	.1881	.0304	.0103	.7200	-.0030	-.0072	.0976	.0082
#2	49.79	.2085	.0363	.0193	.7897	-.0034	-.0107	.0909	.0096
#3	51.51	.2331	.0413	.0266	.8834	-.0023	-.0155	.0908	.0104
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6672-A-3-A Acquired: 5/22/2014 19:45:17 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0016	.3578	.0216	<.0000	57.05	.0177	.0104
Stddev	.0001	.0069	.0007	.0026	1.32	.0022	.0009
%RSD	3.285	1.935	3.092	11.92	2.321	12.59	8.431
#1	.0016	.3504	.0209	-.0206	55.94	.0176	.0095
#2	.0015	.3590	.0220	-.0198	56.69	.0156	.0103
#3	.0016	.3641	.0220	-.0246	58.51	.0200	.0113
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5704.6
Stddev	31.7
%RSD	.55615
#1	5677.0
#2	5739.3
#3	5697.6

Sample Name: 160-6672-A-4-A Acquired: 5/22/2014 19:49:05 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0023	.1299	.0008	.0002	.0045	<.0000	<.0000	.3929	.0077
Stddev	.0005	.0046	.0011	.0017	.0001	.0000	.0006	.0402	.0008
%RSD	20.52	3.579	134.5	828.6	2.510	180.6	8.220	10.22	10.58
#1	.0022	.1249	.0019	-.0006	.0044	.0000	-.0061	.3526	.0069
#2	.0019	.1305	.0007	.0022	.0045	-.0001	-.0069	.3932	.0076
#3	.0028	.1342	-.0002	-.0010	.0046	.0000	-.0071	.4329	.0085
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0118	.0829	13.09	1.679	.0852	.0010	.0619	.0269	.0007
Stddev	.0013	.0024	1.37	.037	.0214	.0003	.0120	.0009	.0001
%RSD	11.24	2.861	10.45	2.184	25.14	26.96	19.46	3.199	14.35
#1	.0105	.0810	11.75	1.650	.0606	.0014	.0630	.0259	.0008
#2	.0118	.0821	13.05	1.667	.0954	.0008	.0733	.0272	.0006
#3	.0132	.0855	14.48	1.720	.0997	.0009	.0493	.0275	.0008
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	69.71	1.496	.1435	.0287	.1030	.0014	.0004	.1543	.0033
Stddev	1.79	.150	.0148	.0010	.0124	.0010	.0007	.0038	.0005
%RSD	2.562	10.05	10.29	3.476	12.01	69.21	197.3	2.445	15.18
#1	67.80	1.348	.1288	.0277	.0909	.0005	.0006	.1499	.0029
#2	70.00	1.493	.1434	.0296	.1024	.0013	.0009	.1568	.0031
#3	71.34	1.649	.1584	.0289	.1156	.0024	-.0004	.1560	.0038
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6672-A-4-A Acquired: 5/22/2014 19:49:05 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0009	.0070	.0042	<.0000	.2344	.0013	.2465
Stddev	.0000	.0021	.0004	.0011	.0164	.0032	.0247
%RSD	1.722	30.30	8.565	33.02	7.000	242.7	10.02
#1	.0009	.0051	.0047	-.0021	.2203	.0045	.2221
#2	.0008	.0067	.0040	-.0041	.2305	.0012	.2459
#3	.0009	.0093	.0041	-.0039	.2524	-.0018	.2715
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5768.9
Stddev	21.2
%RSD	.36774
#1	5747.3
#2	5789.7
#3	5769.8

Sample Name: 160-6672-A-5-A Acquired: 5/22/2014 19:53:00 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	<.0000	.0019	<.0000	.0019	.0006	.0136	.0444	<.0000
Stddev	.0006	.0061	.0018	.0026	.0000	.0001	.0019	.0010	.0001
%RSD	23.24	12.26	91.45	38.50	.5226	10.41	13.76	2.257	1.961
#1	-.0031	-.0432	.0025	-.0051	.0019	.0006	.0114	.0456	-.0038
#2	-.0020	-.0504	.0000	-.0099	.0019	.0006	.0148	.0437	-.0037
#3	-.0022	-.0552	.0034	-.0055	.0019	.0007	.0146	.0440	-.0039
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0082	.0141	.0079	.6734	.0002	.0037	<.0000	.0090	.0217
Stddev	.0001	.0015	.0006	.0022	.0033	.0003	.0190	.0001	.0002
%RSD	1.039	10.59	7.205	.3265	1820.	7.865	8.969	.8162	.8348
#1	.0081	.0126	.0081	.6722	.0035	.0034	-.2268	.0091	.0218
#2	.0083	.0143	.0083	.6720	-.0031	.0040	-.1906	.0091	.0218
#3	.0081	.0156	.0073	.6759	.0002	.0037	-.2187	.0089	.0215
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	5.316	.0276	.0424	.0010	.0892	<.0000	<.0000	.0197	.0091
Stddev	.030	.0002	.0006	.0016	.0034	.0016	.0014	.0068	.0005
%RSD	.5599	.7478	1.475	169.8	3.825	72.23	35.21	34.61	5.372
#1	5.351	.0278	.0429	.0005	.0927	-.0028	-.0047	.0276	.0087
#2	5.300	.0276	.0426	.0028	.0889	-.0034	-.0047	.0157	.0097
#3	5.299	.0274	.0417	-.0004	.0859	-.0004	-.0023	.0159	.0089
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6672-A-5-A Acquired: 5/22/2014 19:53:00 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0017	.3379	.0181	<.0000	56.73	.0275	.0087
Stddev	.0000	.0054	.0003	.0024	.46	.0022	.0001
%RSD	2.404	1.588	1.576	13.62	.8029	8.009	1.685
#1	.0018	.3438	.0184	-.0170	57.25	.0278	.0088
#2	.0018	.3368	.0178	-.0207	56.42	.0295	.0087
#3	.0017	.3332	.0180	-.0161	56.53	.0251	.0086
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5788.5
Stddev	7.7
%RSD	.13359
#1	5797.0
#2	5781.8
#3	5786.8

Sample Name: 160-6672-A-6-A Acquired: 5/22/2014 19:56:51 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.1969	.0589	<.0000	.0071	.0013	.0419	.3004	<.0000
Stddev	.0016	.0026	.0024	.0031	.0002	.0000	.0023	.0158	.0006
%RSD	56.86	1.329	4.146	87.39	2.507	.6015	5.413	5.249	5.618
#1	-.0020	.1978	.0566	-.0010	.0073	.0013	.0396	.2849	-.0104
#2	-.0018	.1939	.0587	-.0027	.0069	.0013	.0441	.2998	-.0108
#3	-.0046	.1989	.0615	-.0069	.0072	.0013	.0421	.3164	-.0116
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0337	1.304	.1749	7.067	.0943	.0105	<.0000	.1053	.0195
Stddev	.0018	.007	.0102	.033	.0123	.0008	.0235	.0009	.0013
%RSD	5.378	.5214	5.848	.4654	13.10	7.230	3.942	.8903	6.607
#1	.0320	1.304	.1661	7.037	.0802	.0103	-.5849	.1052	.0182
#2	.0333	1.297	.1725	7.063	.1034	.0113	-.5820	.1044	.0196
#3	.0356	1.311	.1862	7.102	.0991	.0099	-.6241	.1063	.0207
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	40.26	.8758	.0611	.0603	.2599	<.0000	<.0000	.2268	.0297
Stddev	.15	.0466	.0038	.0133	.0101	.0015	.0017	.0093	.0024
%RSD	.3818	5.322	6.137	21.97	3.889	13.40	8.535	4.093	8.161
#1	40.23	.8332	.0569	.0474	.2488	-.0098	-.0181	.2162	.0276
#2	40.12	.8686	.0622	.0597	.2624	-.0128	-.0215	.2303	.0290
#3	40.42	.9256	.0642	.0739	.2686	-.0110	-.0204	.2337	.0323
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6672-A-6-A Acquired: 5/22/2014 19:56:51 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0060	1.132	.1857	<.0000	176.7	.0561	.0509
Stddev	.0000	.007	.0009	.0037	.8	.0041	.0028
%RSD	.6520	.6601	.4841	7.371	.4378	7.335	5.484
#1	.0060	1.124	.1863	-.0460	176.3	.0556	.0482
#2	.0059	1.139	.1847	-.0512	176.2	.0605	.0507
#3	.0060	1.133	.1862	-.0532	177.6	.0523	.0538
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5666.4
Stddev	15.6
%RSD	.27616
#1	5650.0
#2	5681.1
#3	5668.2

Sample Name: 160-6672-A-7-A Acquired: 5/22/2014 20:00:36 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	.0372	.0035	<.0000	.0012	.0001	.0012	.1104	<.0000
Stddev	.0003	.0055	.0009	.0020	.0001	.0000	.0019	.0176	.0001
%RSD	193.8	14.91	25.24	147.8	4.183	13.39	164.8	15.94	15.18
#1	.0000	.0318	.0034	.0009	.0013	.0001	.0026	.0932	-.0004
#2	-.0005	.0429	.0026	-.0021	.0013	.0001	-.0010	.1095	-.0005
#3	.0000	.0370	.0044	-.0029	.0012	.0001	.0019	.1284	-.0005
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0062	.1567	.3688	1.254	.0088	.0011	<.0000	.0157	<.0000
Stddev	.0013	.0066	.0575	.041	.0103	.0002	.0044	.0006	.0003
%RSD	21.73	4.210	15.58	3.304	117.2	16.00	12.30	3.660	1566.
#1	.0047	.1502	.3118	1.212	-.0019	.0011	-.0308	.0151	-.0003
#2	.0064	.1566	.3679	1.254	.0185	.0010	-.0386	.0159	.0003
#3	.0074	.1634	.4267	1.295	.0097	.0013	-.0382	.0162	-.0001
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	65.06	.5309	.0090	.0154	.1112	<.0000	<.0000	.0911	.0043
Stddev	2.92	.0809	.0007	.0058	.0195	.0010	.0025	.0096	.0009
%RSD	4.483	15.23	7.764	37.56	17.56	340.8	111.8	10.49	20.23
#1	62.01	.4491	.0084	.0104	.0912	-.0015	.0003	.0801	.0034
#2	65.33	.5329	.0087	.0142	.1121	.0005	-.0022	.0960	.0043
#3	67.83	.6108	.0097	.0218	.1302	.0001	-.0047	.0973	.0052
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6672-A-7-A Acquired: 5/22/2014 20:00:36 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=20

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0005	.1256	.0134	<.0000	15.86	.0043	.0205
Stddev	.0000	.0062	.0007	.0012	.64	.0021	.0029
%RSD	8.140	4.897	4.962	12.93	4.060	48.56	14.18
#1	.0005	.1192	.0128	-.0090	15.14	.0044	.0177
#2	.0006	.1262	.0141	-.0077	16.03	.0021	.0204
#3	.0006	.1315	.0134	-.0100	16.40	.0063	.0235
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5789.4
Stddev	27.9
%RSD	.48131
#1	5796.7
#2	5758.6
#3	5812.9

Sample Name: MB 160-123259/1-A Acquired: 5/22/2014 20:04:28 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0002	.0081	<.0000	.0103	.0001	<.0000	<.0000	.0338	.0001
Stddev	.0005	.0005	.0007	.0008	.0001	.0000	.0021	.0005	.0001
%RSD	343.0	6.566	60.04	7.311	55.48	113.2	87.46	1.602	112.7
#1	.0001	.0087	-.0019	.0103	.0001	.0000	.0000	.0334	.0001
#2	.0007	.0080	-.0011	.0096	.0002	.0000	-.0036	.0337	.0002
#3	-.0004	.0076	-.0005	.0111	.0002	.0000	-.0035	.0344	.0000
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0002	.0009	<.0000	.0071	<.0000	.0006	.0296	.0003	.0001
Stddev	.0002	.0006	.0003	.0004	.0025	.0008	.0062	.0002	.0001
%RSD	118.7	65.22	246.2	5.553	160.8	125.6	20.85	54.58	45.01
#1	.0004	.0012	.0001	.0073	-.0014	-.0001	.0368	.0005	.0002
#2	.0000	.0012	-.0005	.0067	.0009	.0005	.0256	.0002	.0001
#3	.0001	.0002	.0000	.0074	-.0040	.0015	.0266	.0002	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0505	.0004	.0011	.0007	.0054	.0013	<.0000	.0476	.0003
Stddev	.0104	.0001	.0015	.0009	.0014	.0007	.0015	.0100	.0002
%RSD	20.66	22.58	142.8	132.2	24.97	53.89	1127.	21.04	53.44
#1	.0385	.0005	.0009	.0006	.0039	.0020	.0015	.0392	.0002
#2	.0576	.0003	-.0004	.0016	.0059	.0012	-.0004	.0450	.0002
#3	.0553	.0003	.0026	-.0002	.0065	.0006	-.0014	.0587	.0005
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: MB 160-123259/1-A Acquired: 5/22/2014 20:04:28 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0000	.0005	<.0000	<.0000	<.0000	<.0000	.0082
Stddev	.0000	.0022	.0006	.0005	.0089	.0034	.0001
%RSD	237.9	463.5	242.5	16.44	37.80	14910.	1.369
#1	.0000	.0009	-.0001	-.0025	-.0244	-.0026	.0081
#2	.0000	.0025	-.0008	-.0034	-.0322	-.0013	.0083
#3	.0000	-.0019	.0003	-.0028	-.0144	.0038	.0083
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5864.9
Stddev	48.2
%RSD	.82119
#1	5920.5
#2	5837.5
#3	5836.7

Sample Name: LCSSRM 160-123259/2- Acquired: 5/22/2014 20:08:22 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.3256**	**34.84**	**.4305**	**.4373**	**.9840**	**.2688**	**.0011**	**39.09**	**.7321**
Stddev	.0026	.08	.0026	.0031	.0033	.0012	.0013	.17	.0013
%RSD	.8050	.2251	.6047	.7159	.3397	.4319	117.9	.4319	.1786
#1	.3286	34.93	.4302	.4342	.9875	.2700	.0010	39.28	.7336
#2	.3236	34.81	.4280	.4404	.9836	.2688	-.0002	38.99	.7312
#3	.3246	34.79	.4332	.4373	.9809	.2676	.0025	38.99	.7315
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**1.058**	**.4474**	**1.372**	**55.00**	**11.26**	**.0391**	**11.95**	**2.074**	**.5411**
Stddev	.005	.0019	.003	.16	.04	.0006	.03	.007	.0028
%RSD	.4612	.4333	.1911	.2974	.3321	1.606	.2441	.3258	.5173
#1	1.063	.4497	1.374	55.19	11.29	.0398	11.97	2.081	.5439
#2	1.057	.4461	1.374	54.93	11.27	.0389	11.96	2.067	.5410
#3	1.054	.4466	1.369	54.89	11.22	.0386	11.91	2.075	.5383
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.188**	**1.274**	**2.609**	**.5069**	**1.228**	**.5075**	**.6215**	**2.417**	**.7652**
Stddev	.015	.004	.013	.0035	.004	.0018	.0019	.022	.0027
%RSD	.2879	.3237	.4784	.6924	.2981	.3477	.3095	.9198	.3484
#1	5.200	1.279	2.623	.5106	1.227	.5094	.6228	2.432	.7682
#2	5.194	1.272	2.604	.5063	1.233	.5072	.6193	2.391	.7635
#3	5.171	1.272	2.600	.5037	1.225	.5060	.6225	2.426	.7638
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: LCSSRM 160-123259/2- Acquired: 5/22/2014 20:08:22 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.8317	.1673	.7777	.7833	.0230	.7103	.6478
Stddev	.0035	.0022	.0014	.0021	.0043	.0034	.0019
%RSD	.4208	1.337	.1783	.2654	18.65	.4818	.2890
#1	.8350	.1667	.7775	.7853	.0279	.7106	.6495
#2	.8319	.1653	.7792	.7833	.0209	.7068	.6481
#3	.8280	.1697	.7764	.7812	.0201	.7136	.6458
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	6322.9
Stddev	20.8
%RSD	.32914
#1	6299.6
#2	6329.3
#3	6339.7

Sample Name: 160-6698-D-1-B Acquired: 5/22/2014 20:11:53 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0002**	**44.85**	**.0339**	**.0062**	**.7447**	**.0026**	**.0031**	**7.405**	**.0004**
Stddev	.0002	.14	.0007	.0009	.0025	.0000	.0004	.021	.0001
%RSD	89.90	.3105	1.965	14.67	.3344	.5157	14.14	.2822	29.28
#1	.0002	45.00	.0343	.0058	.7467	.0026	.0031	7.397	.0004
#2	.0000	44.73	.0343	.0072	.7455	.0026	.0027	7.429	.0003
#3	.0005	44.82	.0331	.0054	.7419	.0026	.0035	7.389	.0005
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0471**	**.0691**	**.0414**	**63.51**	**4.587**	**.0302**	**8.680**	**4.067**	**.0021**
Stddev	.0001	.0010	.0005	.15	.018	.0002	.010	.004	.0003
%RSD	.3120	1.456	1.271	.2412	.3857	.8191	.1108	.1087	15.09
#1	.0472	.0702	.0410	63.45	4.605	.0305	8.681	4.068	.0024
#2	.0469	.0687	.0420	63.68	4.584	.0300	8.690	4.072	.0021
#3	.0471	.0683	.0411	63.39	4.570	.0301	8.670	4.063	.0017
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.3320**	**.0735**	**1.146**	**.1057**	**.2077**	**.0055**	**.0010**	**1.224**	**.0018**
Stddev	.0025	.0003	.005	.0004	.0018	.0002	.0021	.013	.0007
%RSD	.7474	.3681	.4584	.3858	.8768	3.093	201.3	1.091	37.41
#1	.3310	.0735	1.143	.1057	.2064	.0053	-.0009	1.237	.0011
#2	.3301	.0738	1.152	.1054	.2098	.0056	.0032	1.211	.0019
#3	.3348	.0733	1.143	.1062	.2070	.0056	.0007	1.223	.0025
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6698-D-1-B Acquired: 5/22/2014 20:11:53 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0316	.1927	.5240	<.0000	.0199	.1011	.2589
Stddev	.0001	.0057	.0010	.0005	.0046	.0006	.0011
%RSD	.4215	2.949	.1904	8.600	23.18	.6083	.4125
#1	.0316	.1989	.5237	-.0067	.0165	.1004	.2590
#2	.0318	.1878	.5232	-.0064	.0181	.1014	.2600
#3	.0315	.1914	.5251	-.0057	.0252	.1016	.2579
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	6740.5
Stddev	15.4
%RSD	.22839
#1	6743.7
#2	6723.8
#3	6754.1

Sample Name: CCV Acquired: 5/22/2014 20:15:38 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**1.048**	**52.23**	**5.342**	**5.136**	**5.294**	**5.257**	**5.364**	**54.36**	**5.396**
Stddev	.009	.03	.019	.011	.069	.010	.022	.07	.014
%RSD	.8147	.0526	.3542	.2146	1.302	.1867	.4081	.1230	.2652
#1	1.046	52.20	5.335	5.124	5.349	5.253	5.347	54.33	5.383
#2	1.058	52.25	5.328	5.146	5.217	5.249	5.357	54.43	5.394
#3	1.041	52.24	5.364	5.137	5.315	5.268	5.389	54.30	5.412
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.371**	**5.367**	**5.402**	**51.71**	**53.18**	**5.410**	**51.07**	**5.232**	**1.084**
Stddev	.001	.020	.021	.22	.15	.024	.10	.012	.001
%RSD	.0256	.3656	.3953	.4231	.2750	.4507	.2043	.2245	.0420
#1	5.372	5.369	5.389	51.57	53.34	5.434	51.01	5.221	1.084
#2	5.371	5.385	5.391	51.96	53.06	5.385	51.19	5.244	1.084
#3	5.369	5.346	5.427	51.59	53.14	5.410	51.01	5.229	1.084
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**53.02**	**5.445**	F **56.03**	**5.450**	**53.21**	**1.072**	**1.070**	**5.200**	**5.457**
Stddev	.23	.008	.03	.006	.21	.005	.005	.019	.004
%RSD	.4278	.1537	.0621	.1022	.3943	.4463	.4720	.3675	.0661
#1	53.27	5.437	56.07	5.444	53.06	1.072	1.064	5.186	5.453
#2	52.84	5.446	56.01	5.452	53.13	1.068	1.070	5.221	5.460
#3	52.94	5.454	56.01	5.455	53.45	1.077	1.074	5.192	5.459
Check ?	Chk Pass	Chk Pass	Chk Fail	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value			50.00						
Range			10.00%						

Sample Name: CCV Acquired: 5/22/2014 20:15:38 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	5.376	5.251	5.250	1.094	5.399	5.172	5.394
Stddev	.046	.037	.016	.001	.048	.026	.006
%RSD	.8476	.7028	.3111	.1048	.8899	.5029	.1032
#1	5.324	5.236	5.234	1.093	5.427	5.189	5.389
#2	5.401	5.293	5.267	1.094	5.427	5.186	5.392
#3	5.404	5.224	5.248	1.095	5.344	5.142	5.400
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	5526.9
Stddev	7.2
%RSD	.13099
#1	5528.1
#2	5519.1
#3	5533.4

Sample Name: CCB Acquired: 5/22/2014 20:19:26 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	<.0000	.0002	.0055	.0000	.0001	<.0000	.0136	.0010
Stddev	.0001	.0043	.0016	.0018	.0001	.0000	.0035	.0169	.0015
%RSD	23.95	75.55	671.9	33.68	1835.	4.971	638.7	124.5	155.5
#1	-.0002	-.0008	.0021	.0075	-.0001	.0001	.0035	.0330	.0028
#2	-.0003	-.0089	-.0009	.0040	.0000	.0001	-.0024	.0034	.0000
#3	-.0004	-.0071	-.0005	.0049	.0001	.0001	-.0028	.0042	.0002
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0012	.0013	.0001	.0026	.0004	.0012	.0059	.0003	.0004
Stddev	.0018	.0004	.0024	.0010	.0174	.0005	.0099	.0003	.0004
%RSD	154.8	30.59	2162.	40.03	4313.	40.10	168.0	86.06	105.7
#1	.0032	.0018	.0023	.0020	-.0194	.0007	.0172	.0001	.0008
#2	.0002	.0013	-.0025	.0020	.0133	.0017	-.0010	.0007	.0001
#3	.0001	.0009	.0006	.0038	.0073	.0011	.0014	.0003	.0001
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0190	.0011	.0109	.0010	.0132	.0014	<.0000	<.0000	.0010
Stddev	.0042	.0014	.0165	.0013	.0174	.0012	.0029	.0035	.0008
%RSD	22.19	125.7	151.2	124.8	131.5	85.89	200.0	91.38	82.15
#1	.0230	.0027	.0299	.0024	.0333	.0001	.0014	-.0066	.0019
#2	.0146	.0002	.0000	.0001	.0032	.0017	-.0013	-.0050	.0004
#3	.0195	.0004	.0029	.0005	.0031	.0024	-.0044	.0001	.0007
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Sample Name: CCB Acquired: 5/22/2014 20:19:26 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	<.0000	<.0000	.0005	.0063	<.0000	.0014
Stddev	.0001	.0008	.0003	.0006	.0069	.0031	.0015
%RSD	78.97	105.6	296.3	120.5	109.0	263.9	105.6
#1	.0001	-.0014	-.0001	.0012	.0044	-.0021	.0031
#2	.0002	.0001	.0002	.0000	.0006	.0023	.0005
#3	.0000	-.0011	-.0004	.0004	.0140	-.0037	.0006
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit							
Low Limit							

Int. Std.	Y_3710
Units	Cts/S
Avg	5984.1
Stddev	9.8
%RSD	.16371
#1	5974.3
#2	5984.2
#3	5993.8

Sample Name: 160-6698-D-1-B SD Acquired: 5/22/2014 20:23:22 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	<.0000	9.668	.0077	.0016	.1606	.0006	.0011	1.681	.0001
Stddev	.0004	.026	.0009	.0017	.0006	.0000	.0016	.002	.0000
%RSD	538.2	.2650	12.04	102.5	.3981	3.075	147.9	.1392	37.87
#1	.0002	9.654	.0067	.0014	.1605	.0006	.0030	1.683	.0001
#2	-.0006	9.652	.0081	.0034	.1600	.0006	.0000	1.679	.0001
#3	.0001	9.697	.0084	.0001	.1613	.0006	.0004	1.682	.0002
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0109	.0157	.0089	14.28	.9613	.0063	1.922	.9164	.0002
Stddev	.0003	.0005	.0009	.01	.0133	.0002	.002	.0016	.0001
%RSD	2.633	3.168	9.868	.1022	1.385	3.047	.0958	.1707	49.23
#1	.0108	.0156	.0089	14.28	.9475	.0061	1.924	.9150	.0001
#2	.0112	.0162	.0097	14.26	.9625	.0065	1.922	.9181	.0002
#3	.0106	.0152	.0080	14.29	.9740	.0063	1.921	.9162	.0004
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0856	.0167	.2537	.0244	.0601	.0017	.0023	.2600	.0002
Stddev	.0025	.0002	.0022	.0010	.0014	.0007	.0022	.0050	.0005
%RSD	2.913	.9172	.8757	3.940	2.328	41.41	96.62	1.918	297.0
#1	.0827	.0166	.2543	.0253	.0594	.0013	.0001	.2650	.0004
#2	.0869	.0166	.2556	.0234	.0591	.0013	.0045	.2601	.0005
#3	.0872	.0169	.2512	.0246	.0617	.0026	.0022	.2550	-.0004
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6698-D-1-B SD Acquired: 5/22/2014 20:23:22 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=10

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0069	.0422	.1142	.0001	<.0000	.0241	.0645
Stddev	.0000	.0042	.0005	.0009	.0128	.0008	.0004
%RSD	.5454	9.913	.4159	1262.	105.2	3.458	.5674
#1	.0069	.0397	.1147	-.0008	.0026	.0237	.0650
#2	.0069	.0470	.1139	-.0001	-.0188	.0250	.0644
#3	.0070	.0399	.1139	.0011	-.0203	.0235	.0643
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	6046.0
Stddev	7.2
%RSD	.11894
#1	6040.0
#2	6043.9
#3	6054.0

Sample Name: 160-6698-D-1-C MS Acquired: 5/22/2014 20:27:12 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0828**	**89.47**	**.4387**	**.7410**	**1.203**	**.4161**	**.4193**	**11.99**	**.4226**
Stddev	.0007	.20	.0042	.0054	.004	.0013	.0012	.04	.0023
%RSD	.7987	.2259	.9664	.7328	.3194	.3027	.2879	.3593	.5381
#1	.0820	89.71	.4390	.7446	1.207	.4175	.4180	11.97	.4212
#2	.0833	89.38	.4344	.7348	1.202	.4154	.4197	11.95	.4213
#3	.0830	89.33	.4428	.7436	1.199	.4153	.4204	12.04	.4252
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.4643**	**.5173**	**.4752**	**78.30**	**12.16**	**.5033**	**15.82**	**4.536**	**.2052**
Stddev	.0024	.0001	.0020	.20	.05	.0024	.05	.019	.0010
%RSD	.5107	.0180	.4179	.2590	.4281	.4705	.3193	.4107	.4633
#1	.4630	.5174	.4739	78.48	12.18	.5045	15.78	4.539	.2049
#2	.4628	.5172	.4743	78.08	12.20	.5048	15.80	4.516	.2044
#3	.4670	.5173	.4775	78.33	12.10	.5006	15.87	4.553	.2063
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**4.666**	**.5272**	**1.664**	**.5268**	**4.223**	**.1007**	**.2013**	**1.528**	**.4123**
Stddev	.021	.0022	.008	.0023	.022	.0021	.0014	.015	.0025
%RSD	.4493	.4086	.4640	.4340	.5325	2.130	.6721	1.003	.6037
#1	4.681	.5262	1.662	.5256	4.224	.1032	.2029	1.544	.4106
#2	4.675	.5257	1.657	.5254	4.199	.0995	.2007	1.528	.4111
#3	4.642	.5297	1.672	.5294	4.244	.0995	.2004	1.513	.4152
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6698-D-1-C MS Acquired: 5/22/2014 20:27:12 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.4888	.6292	1.240	.0817	.4582	.5472	.7381
Stddev	.0016	.0034	.003	.0016	.0070	.0034	.0027
%RSD	.3172	.5430	.2298	1.969	1.531	.6219	.3627
#1	.4904	.6300	1.244	.0836	.4651	.5490	.7372
#2	.4888	.6255	1.238	.0809	.4585	.5433	.7359
#3	.4873	.6322	1.239	.0808	.4511	.5494	.7411
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	6835.3
Stddev	23.5
%RSD	.34394
#1	6845.0
#2	6852.3
#3	6808.4

Sample Name: 160-6698-D-1-D MSD Acquired: 5/22/2014 20:30:46 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0899**	**80.04**	**.4765**	**.7927**	**1.283**	**.4442**	**.4515**	**12.85**	**.4570**
Stddev	.0005	.22	.0006	.0037	.004	.0012	.0014	.03	.0003
%RSD	.5455	.2691	.1327	.4691	.3206	.2637	.3195	.2560	.0715
#1	.0895	80.13	.4772	.7959	1.287	.4453	.4518	12.81	.4571
#2	.0904	80.19	.4762	.7886	1.283	.4442	.4528	12.88	.4566
#3	.0898	79.79	.4760	.7935	1.279	.4430	.4499	12.85	.4573
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.5272**	**.5443**	**.5121**	**79.56**	**11.47**	**.5077**	**15.55**	**7.632**	**.2245**
Stddev	.0004	.0038	.0017	.10	.07	.0049	.04	.018	.0004
%RSD	.0808	.7048	.3394	.1222	.5819	.9578	.2307	.2426	.1746
#1	.5270	.5405	.5125	79.51	11.47	.5095	15.52	7.616	.2249
#2	.5270	.5482	.5102	79.67	11.54	.5114	15.59	7.627	.2241
#3	.5277	.5443	.5135	79.50	11.40	.5022	15.55	7.652	.2245
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**4.771**	**.5657**	**1.791**	**.5764**	**4.516**	**.1317**	**.2162**	**2.189**	**.4538**
Stddev	.041	.0008	.004	.0017	.009	.0012	.0033	.011	.0005
%RSD	.8553	.1449	.2284	.2935	.1999	.9152	1.521	.5043	.1140
#1	4.782	.5647	1.793	.5745	4.526	.1331	.2128	2.197	.4538
#2	4.805	.5663	1.786	.5770	4.509	.1311	.2162	2.192	.4544
#3	4.725	.5660	1.793	.5777	4.514	.1310	.2194	2.176	.4533
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6698-D-1-D MSD Acquired: 5/22/2014 20:30:46 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5074	.6634	1.224	.0862	.4831	.5738	.7700
Stddev	.0019	.0028	.003	.0001	.0105	.0085	.0006
%RSD	.3689	.4235	.2593	.1205	2.170	1.476	.0811
#1	.5092	.6611	1.225	.0862	.4794	.5652	.7705
#2	.5075	.6665	1.227	.0863	.4949	.5821	.7702
#3	.5054	.6626	1.221	.0861	.4749	.5740	.7693
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	6543.0
Stddev	12.3
%RSD	.18736
#1	6556.8
#2	6533.3
#3	6538.9

Sample Name: 160-6698-D-2-B Acquired: 5/22/2014 20:34:20 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0013**	**41.44**	**.0387**	**.0100**	**1.204**	**.0029**	**.0035**	**7.883**	**.0014**
Stddev	.0004	.05	.0010	.0024	.003	.0000	.0012	.045	.0000
%RSD	31.87	.1221	2.582	23.98	.2589	1.182	34.17	.5714	2.469
#1	.0017	41.47	.0378	.0072	1.207	.0029	.0032	7.857	.0014
#2	.0014	41.46	.0398	.0114	1.201	.0029	.0026	7.935	.0013
#3	.0009	41.38	.0386	.0113	1.204	.0029	.0049	7.857	.0014
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0673**	**.0704**	**.0494**	**68.60**	**4.112**	**.0272**	**8.305**	**7.676**	**.0037**
Stddev	.0005	.0002	.0022	.21	.017	.0003	.081	.051	.0001
%RSD	.6802	.2530	4.440	.2994	.4010	1.040	.9716	.6638	1.795
#1	.0669	.0702	.0475	68.52	4.122	.0274	8.283	7.658	.0038
#2	.0678	.0705	.0518	68.83	4.093	.0268	8.395	7.733	.0038
#3	.0671	.0705	.0489	68.44	4.120	.0273	8.238	7.636	.0037
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.3142**	**.0870**	**1.303**	**.1079**	**.2175**	**.0022**	**<.0000**	**1.291**	**.0016**
Stddev	.0003	.0007	.013	.0010	.0018	.0016	.0013	.009	.0005
%RSD	.0956	.8610	1.002	.9701	.8388	71.18	641.5	.6942	32.76
#1	.3139	.0868	1.304	.1075	.2189	.0040	.0013	1.292	.0020
#2	.3145	.0878	1.315	.1091	.2154	.0020	-.0010	1.282	.0017
#3	.3142	.0864	1.289	.1071	.2181	.0008	-.0009	1.300	.0010
Check ?	None	None	None	None	None	None	None	None	None
Value									
Range									

Sample Name: 160-6698-D-2-B Acquired: 5/22/2014 20:34:20 Type: Unk
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment: DF=2

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0317	.2105	.5374	<.0000	.0153	.1200	.2836
Stddev	.0000	.0033	.0009	.0004	.0058	.0025	.0021
%RSD	.0517	1.563	.1603	4.471	38.13	2.100	.7228
#1	.0317	.2103	.5379	-.0087	.0096	.1227	.2828
#2	.0317	.2138	.5379	-.0090	.0150	.1177	.2859
#3	.0317	.2072	.5364	-.0095	.0213	.1196	.2821
Check ?	None	None	None	None	None	None	None
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	6614.0
Stddev	48.6
%RSD	.73408
#1	6637.3
#2	6558.1
#3	6646.4

Sample Name: CCV Acquired: 5/22/2014 20:38:06 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**1.041**	**52.41**	**5.368**	**5.114**	**5.245**	**5.268**	**5.341**	F **55.02**	**5.431**
Stddev	.007	.13	.023	.004	.051	.053	.035	.30	.030
%RSD	.7101	.2474	.4226	.0837	.9630	.9998	.6610	.5429	.5480
#1	1.048	52.42	5.387	5.119	5.303	5.328	5.370	55.36	5.459
#2	1.033	52.27	5.343	5.111	5.219	5.237	5.302	54.82	5.400
#3	1.041	52.53	5.375	5.112	5.213	5.238	5.352	54.88	5.436
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Fail	Chk Pass
Value								50.00	
Range								10.00%	

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.377**	**5.398**	**5.398**	**52.31**	**53.36**	**5.405**	**52.17**	**5.307**	**1.087**
Stddev	.020	.026	.036	.13	.41	.051	.31	.030	.005
%RSD	.3762	.4906	.6604	.2475	.7728	.9370	.5949	.5629	.4487
#1	5.399	5.425	5.426	52.46	53.14	5.377	52.47	5.339	1.091
#2	5.360	5.372	5.358	52.23	53.11	5.375	52.19	5.300	1.082
#3	5.372	5.395	5.411	52.24	53.84	5.464	51.85	5.281	1.087
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value									
Range									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**52.80**	F **5.517**	F **55.98**	F **5.514**	**53.19**	**1.075**	**1.062**	**5.262**	F **5.527**
Stddev	.46	.030	.27	.032	.35	.006	.009	.013	.028
%RSD	.8665	.5517	.4911	.5855	.6518	.5395	.8451	.2521	.5055
#1	52.51	5.550	56.26	5.550	53.48	1.078	1.067	5.272	5.558
#2	52.57	5.490	55.71	5.487	52.81	1.068	1.051	5.247	5.505
#3	53.33	5.512	55.96	5.506	53.29	1.079	1.067	5.267	5.517
Check ?	Chk Pass	Chk Fail	Chk Fail	Chk Fail	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Fail
Value		5.000	50.00	5.000					5.000
Range		10.00%	10.00%	10.00%					10.00%

Sample Name: CCV Acquired: 5/22/2014 20:38:06 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**5.364**	**5.178**	**5.305**	**1.098**	**5.402**	**5.164**	**5.427**
Stddev	.046	.044	.013	.005	.022	.021	.030
%RSD	.8515	.8560	.2497	.4565	.4108	.3986	.5533
#1	5.372	5.228	5.317	1.101	5.427	5.188	5.458
#2	5.314	5.145	5.290	1.092	5.384	5.156	5.398
#3	5.405	5.160	5.307	1.100	5.394	5.149	5.424
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
Value							
Range							

Int. Std.	Y_3710
Units	Cts/S
Avg	**5455.5**
Stddev	26.5
%RSD	.48560
#1	5425.0
#2	5472.7
#3	5468.8

Sample Name: CCB Acquired: 5/22/2014 20:41:54 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Ag3280	Al3961	As1890	B_2496	Ba4554	Be3130	Bi2230	Ca1840	Cd2288
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0002**	**<.0000**	**.0004**	**.0099**	**.0001**	**.0001**	**<.0000**	**.0040**	**.0003**
Stddev	.0004	.0064	.0015	.0016	.0001	.0000	.0015	.0003	.0000
%RSD	163.9	141.4	373.9	16.12	51.75	27.93	165.8	8.562	18.88
#1	-.0002	.0014	.0021	.0100	.0001	.0001	-.0019	.0041	.0003
#2	.0004	-.0113	-.0006	.0083	.0001	.0001	.0008	.0036	.0002
#3	.0005	-.0037	-.0003	.0115	.0002	.0002	-.0017	.0042	.0003
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Co2286	Cr2835	Cu2178	Fe2599	K_7664	Li6707	Mg2798	Mn2576	Mo2020
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0002**	**.0010**	**<.0000**	**.0037**	**.0123**	**.0004**	**.0071**	**.0006**	**.0002**
Stddev	.0003	.0004	.0012	.0007	.0146	.0007	.0065	.0003	.0002
%RSD	118.0	36.12	146.7	19.95	117.9	199.0	91.70	43.20	127.9
#1	.0003	.0006	.0003	.0034	.0172	.0010	.0025	.0009	.0004
#2	-.0001	.0011	-.0022	.0031	.0239	-.0004	.0043	.0004	.0000
#3	.0005	.0012	-.0007	.0045	-.0040	.0005	.0145	.0006	.0001
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Elem	Na5895	Ni2216	P_1774	Pb2203	S_1820	Sb2068	Se1960	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	**.0099**	**.0002**	**.0026**	**<.0000**	**.0053**	**.0007**	**.0004**	**<.0000**	**.0006**
Stddev	.0011	.0002	.0015	.0007	.0004	.0023	.0011	.0061	.0001
%RSD	10.82	97.76	59.21	663.6	8.387	337.9	264.3	243.4	13.67
#1	.0090	.0003	.0037	-.0008	.0057	.0014	.0008	-.0076	.0005
#2	.0097	.0000	.0033	.0006	.0048	-.0019	-.0008	-.0042	.0006
#3	.0111	.0003	.0008	-.0001	.0054	.0026	.0013	.0043	.0007
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit									
Low Limit									

Sample Name: CCB Acquired: 5/22/2014 20:41:54 Type: QC
Method: 2014v3(v93) Mode: CONC Corr. Factor: 1.000000
User: metals Custom ID1: Custom ID2: Custom ID3:
Comment:

Elem	Sr4077	Th2832	Ti3349	Tl1908	U_3670	V_2908	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	<.0000	.0000	<.0000	<.0000	<.0000	.0005
Stddev	.0000	.0026	.0004	.0003	.0097	.0026	.0002
%RSD	32.67	608.8	2049.	69.98	62.79	117.9	32.56
#1	.0002	.0015	.0004	-.0007	-.0066	-.0026	.0006
#2	.0001	-.0033	-.0001	-.0001	-.0259	-.0045	.0003
#3	.0001	.0005	-.0002	-.0007	-.0139	.0006	.0005
Check ?	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass	Chk Pass
High Limit							
Low Limit							

Int. Std.	Y_3710
Units	Cts/S
Avg	5781.5
Stddev	9.7
%RSD	.16707
#1	5792.0
#2	5773.0
#3	5779.4

HAA052214C1

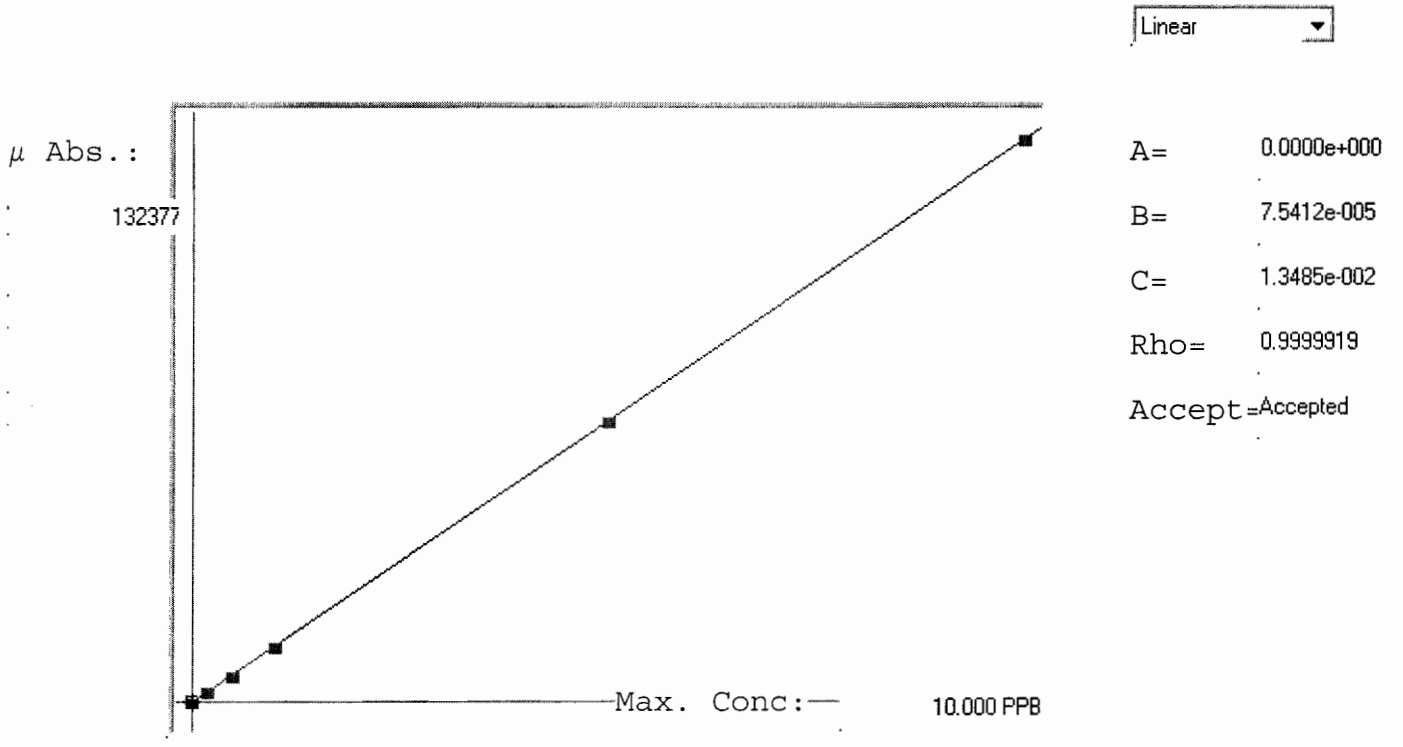
Method: Hg LLC Operator: Admin Date of Analysis: 27 May 2014 10:09:45

Seq ID	Type	Sample ID	Extended ID	Date	Stats Data	Mean	Units	Stnd Conc	Method	Chapter
5556	STND RECALC	CALIBRATION BLANK		27 May 2014 10:10:24	79, 81, 76,	79	PPB	0.0000	Hg LLC	HAA052214C1
5557	STND RECALC	CALIBRATION 1		27 May 2014 10:10:27	2584, 2591, 2598,	2591	PPB	0.2000	Hg LLC	HAA052214C1
5558	STND RECALC	CALIBRATION 2		27 May 2014 10:10:30	6172, 6198, 6218,	6196	PPB	0.5000	Hg LLC	HAA052214C1
5559	STND RECALC	CALIBRATION 3		27 May 2014 10:10:33	12805, 12854, 12890,	12850	PPB	1.0000	Hg LLC	HAA052214C1
5560	STND RECALC	CALIBRATION 4		27 May 2014 10:10:36	66043, 66308, 66501,	66284	PPB	5.0000	Hg LLC	HAA052214C1
5561	STND RECALC	CALIBRATION 5		27 May 2014 10:10:39	132132, 132412, 132588,	132377	PPB	10.0000	Hg LLC	HAA052214C1
5562	CK STD RECALC	ICV		27 May 2014 10:10:43	4.9914, 5.0175, 5.0375,	5.0155	PPB		Hg LLC	HAA052214C1
5563	CK STD RECALC	ICB		27 May 2014 10:10:46	-0.0282, -0.0286, -0.0288,	-0.0285	PPB		Hg LLC	HAA052214C1
5564	SMPL RECALC	MB 160-123407/1-A		27 May 2014 10:12:27	0.0207, 0.0222, 0.0221,	0.0217	PPB		Hg LLC	HAA052214C1
5565	SMPL RECALC	LCS 160-123407/2-A		27 May 2014 10:12:30	4.7176, 4.7381, 4.7532,	4.7363	PPB		Hg LLC	HAA052214C1
5566	SMPL RECALC	160-6694-F-7-C		27 May 2014 10:12:33	-0.0140, -0.0131, -0.0127,	-0.0133	PPB		Hg LLC	HAA052214C1
5567	SMPL RECALC	160-6694-F-7-C SD	5x	27 May 2014 10:12:36	0.0173, 0.0184, 0.0197,	0.0185	PPB		Hg LLC	HAA052214C1
5568	SMPL RECALC	160-6694-F-7-D MS		27 May 2014 10:12:39	5.0983, 5.1072, 5.1116,	5.1057	PPB		Hg LLC	HAA052214C1
5569	SMPL RECALC	160-6694-F-7-E MSD		27 May 2014 10:12:42	5.0343, 5.0525, 5.0655,	5.0507	PPB		Hg LLC	HAA052214C1
5570	SMPL RECALC	160-6725-B-1-A		27 May 2014 10:12:45	-0.0315, -0.0324, -0.0325,	-0.0321	PPB		Hg LLC	HAA052214C1
5571	SMPL RECALC	160-6725-B-2-A		27 May 2014 10:12:48	0.0226, 0.0223, 0.0223,	0.0224	PPB		Hg LLC	HAA052214C1
5572	SMPL RECALC	160-6725-B-3-A		27 May 2014 10:12:51	0.0196, 0.0184, 0.0183,	0.0188	PPB		Hg LLC	HAA052214C1
5573	SMPL RECALC	160-6725-B-4-A		27 May 2014 10:12:54	0.0143, 0.0144, 0.0141,	0.0143	PPB		Hg LLC	HAA052214C1
5574	CK STD RECALC	CCV		27 May 2014 10:12:57	4.8940, 4.9123, 4.9252,	4.9105	PPB		Hg LLC	HAA052214C1
5575	CK STD RECALC	CCB		27 May 2014 10:13:00	-0.0249, -0.0252, -0.0247,	-0.0250	PPB		Hg LLC	HAA052214C1
5576	SMPL RECALC	160-6725-B-5-A		27 May 2014 10:13:03	0.0213, 0.0214, 0.0213,	0.0213	PPB		Hg LLC	HAA052214C1
5577	SMPL RECALC	160-6725-B-6-A		27 May 2014 10:13:06	0.0211, 0.0219, 0.0225,	0.0218	PPB		Hg LLC	HAA052214C1
5578	SMPL RECALC	160-6725-B-7-A		27 May 2014 10:13:09	0.0181, 0.0181, 0.0179,	0.0180	PPB		Hg LLC	HAA052214C1
5579	SMPL RECALC	160-6725-B-8-A		27 May 2014 10:13:12	0.0191, 0.0195, 0.0206,	0.0197	PPB		Hg LLC	HAA052214C1
5580	SMPL RECALC	160-6725-C-1-A		27 May 2014 10:13:15	0.0143, 0.0139, 0.0133,	0.0138	PPB		Hg LLC	HAA052214C1
5581	SMPL RECALC	160-6725-C-2-A		27 May 2014 10:13:18	0.0156, 0.0156, 0.0154,	0.0155	PPB		Hg LLC	HAA052214C1
5582	SMPL RECALC	160-6725-C-3-A		27 May 2014 10:13:21	0.0193, 0.0196, 0.0195,	0.0195	PPB		Hg LLC	HAA052214C1
5583	SMPL RECALC	160-6725-C-4-A		27 May 2014 10:13:25	0.0110, 0.0109, 0.0112,	0.0110	PPB		Hg LLC	HAA052214C1
5584	SMPL RECALC	160-6725-C-5-A		27 May 2014 10:13:28	0.0189, 0.0189, 0.0193,	0.0190	PPB		Hg LLC	HAA052214C1
5585	SMPL RECALC	160-6725-C-6-A		27 May 2014 10:13:31	0.0124, 0.0127, 0.0126,	0.0125	PPB		Hg LLC	HAA052214C1
5586	CK STD RECALC	CCV		27 May 2014 10:13:34	4.9461, 4.9702, 4.9882,	4.9682	PPB		Hg LLC	HAA052214C1
5587	CK STD RECALC	CCB		27 May 2014 10:13:37	-0.0223, -0.0236, -0.0251,	-0.0237	PPB		Hg LLC	HAA052214C1
5588	SMPL RECALC	160-6725-C-7-A		27 May 2014 10:13:40	0.0090, 0.0092, 0.0091,	0.0091	PPB		Hg LLC	HAA052214C1
5589	SMPL RECALC	160-6725-C-8-A		27 May 2014 10:13:43	0.0175, 0.0183, 0.0179,	0.0179	PPB		Hg LLC	HAA052214C1
5590	CK STD RECALC	CCV		27 May 2014 10:13:46	4.9584, 4.9762, 4.9886,	4.9744	PPB		Hg LLC	HAA052214C1
5591	CK STD RECALC	CCB		27 May 2014 10:13:49	-0.0428, -0.0433,	-0.0428	PPB		Hg LLC	HAA052214C1

Hg

HAA052214C1
MTS 5/27/14
7470A
A. Batch: 123936

Hg LLC



Std ID	Conc.	Calc.	Dev.	Mean	SD or %RSD	Rep 1	Rep 2	Rep 3	Rep 4
CALIBRATION BLANK	0.000	0.019	0.019	78	2.055	79	81	76	
CALIBRATION 1	0.200	0.209	0.009	2591	0.2 %	2584	2591	2598	
CALIBRATION 2	0.500	0.481	-0.019	6196	0.3 %	6172	6198	6218	
CALIBRATION 3	1.000	0.983	-0.017	12849	0.3 %	12805	12854	12890	
CALIBRATION 4	5.000	5.012	0.012	66284	0.3 %	66043	66308	66501	
CALIBRATION 5	10.000	9.996	-0.004	132377	0.1 %	132132	132412	132588	

HAA052214C1
MTS 5/27/14
7470A
A. Batch 123936

HAA052814A

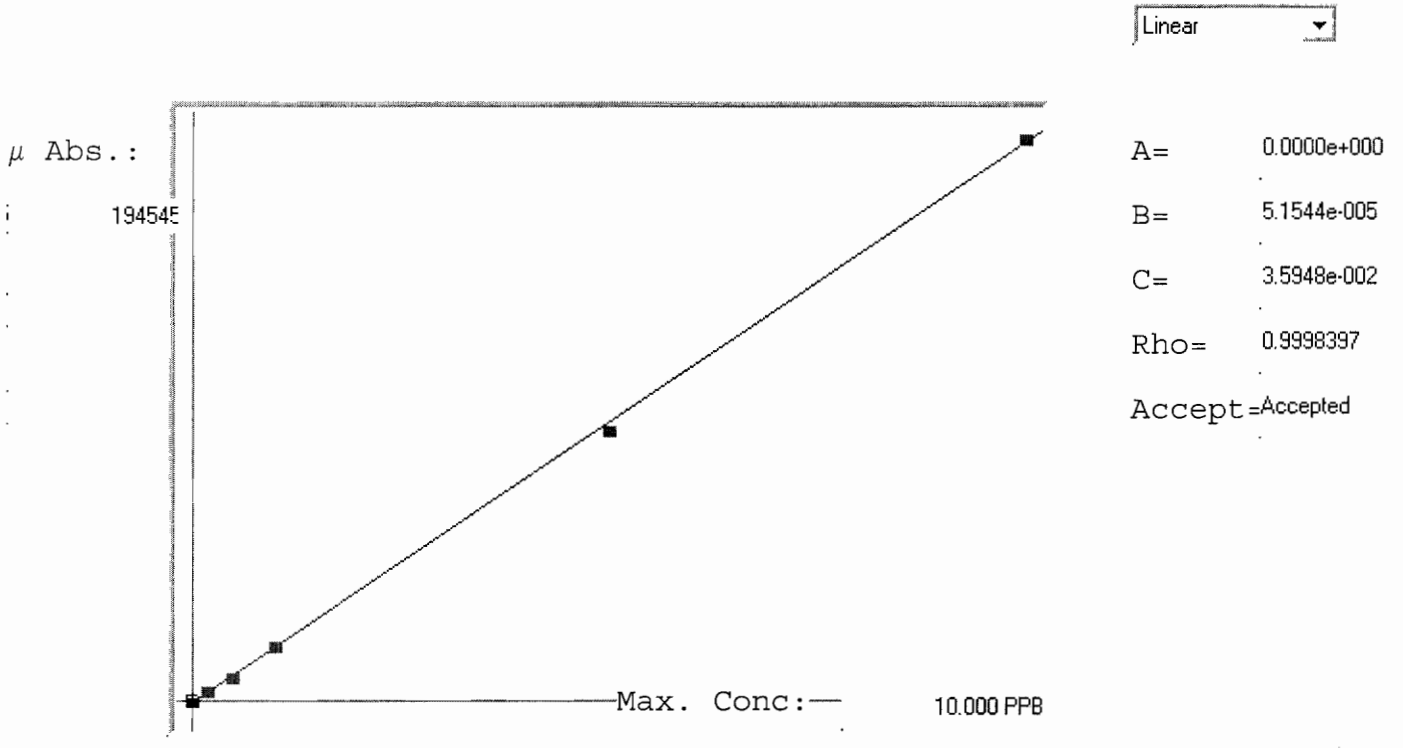
Method: Hg LLC Operator: Admin Date of Analysis: 28 May 2014 09:01:35

Seq ID	Type	Sample ID	Extended ID	Date	Stats Data	Mean	Units	Stnd Conc	Method	Chapter
5665	Std	CALIBRATION BLANK		28 May 2014 09:02:13	71, 76, 70,	72	PPB	0.0000	Hg LLC	HAA052814A
5666	Std	CALIBRATION 1		28 May 2014 09:04:05	3623, 3640, 3656,	3640	PPB	0.2000	Hg LLC	HAA052814A
5667	Std	CALIBRATION 2		28 May 2014 09:05:57	8704, 8744, 8771,	8740	PPB	0.5000	Hg LLC	HAA052814A
5668	Std	CALIBRATION 3		28 May 2014 09:07:56	19107, 19165, 19197,	19156	PPB	1.0000	Hg LLC	HAA052814A
5669	Std	CALIBRATION 4		28 May 2014 09:10:08	93390, 93683, 93894,	93656	PPB	5.0000	Hg LLC	HAA052814A
5670	Std	CALIBRATION 5		28 May 2014 09:12:21	194118, 194586, 194931,	194545	PPB	10.0000	Hg LLC	HAA052814A
5671	CK STND	ICV		28 May 2014 09:14:53	5.1367, 5.1492, 5.1553,	5.1471	PPB		Hg LLC	HAA052814A
5672	CK STND	ICB		28 May 2014 09:17:42	0.0059, 0.0060, 0.0059,	0.0060	PPB		Hg LLC	HAA052814A
5673	SMPL	MB 160-123919/1-A		28 May 2014 09:31:27	0.0351, 0.0351, 0.0352,	0.0352	PPB		Hg LLC	HAA052814A
5674	SMPL	LCSSRM 160-123919/2-A	10x	28 May 2014 09:33:17	5.0386, 5.0696, 5.0916,	5.0666	PPB		Hg LLC	HAA052814A
5675	SMPL	160-6694-C-1-D		28 May 2014 09:35:08	0.4708, 0.4720, 0.4730,	0.4719	PPB		Hg LLC	HAA052814A
5676	SMPL	160-6694-C-2-B		28 May 2014 09:37:41	0.1694, 0.1700, 0.1703,	0.1699	PPB		Hg LLC	HAA052814A
5677	SMPL	160-6694-C-3-B		28 May 2014 09:39:41	0.5931, 0.5933, 0.5927,	0.5930	PPB		Hg LLC	HAA052814A
5678	SMPL	160-6694-C-4-B		28 May 2014 09:41:33	0.0847, 0.0850, 0.0848,	0.0848	PPB		Hg LLC	HAA052814A
5679	SMPL	160-6694-C-5-B		28 May 2014 09:43:27	0.5850, 0.5880, 0.5900,	0.5877	PPB		Hg LLC	HAA052814A
5680	SMPL	160-6694-C-6-B		28 May 2014 09:45:18	0.8562, 0.8497, 0.8436,	0.8498	PPB		Hg LLC	HAA052814A
5681	SMPL	160-6694-C-6-B SD	5x	28 May 2014 09:47:18	0.1400, 0.1398, 0.1396,	0.1398	PPB		Hg LLC	HAA052814A
5682	SMPL	160-6694-C-6-C MS		28 May 2014 09:49:19	5.3986, 5.4244, 5.4448,	5.4226	PPB		Hg LLC	HAA052814A
5683	CK STND	CCV		28 May 2014 09:51:13	4.9866, 5.0097, 5.0265,	5.0076	PPB		Hg LLC	HAA052814A
5684	CK STND	CCB		28 May 2014 09:53:38	0.0072, 0.0072, 0.0070,	0.0072	PPB		Hg LLC	HAA052814A
5685	SMPL	160-6694-C-6-D MSD		28 May 2014 09:56:15	5.0985, 5.1247, 5.1434,	5.1222	PPB		Hg LLC	HAA052814A
5686	CK STND	CCV		28 May 2014 09:58:07	4.9976, 5.0255, 5.0444,	5.0225	PPB		Hg LLC	HAA052814A
5687	CK STND	CCB		28 May 2014 10:00:35	0.0078, 0.0073,	0.0074	PPB		Hg LLC	HAA052814A

All

FC
5/28/14
7471B

Hg LLC



Std ID	Conc.	Calc.	Dev.	Mean	SD or %RSD	Rep 1	Rep 2	Rep 3	Rep 4
CALIBRATION BLANK	0.000	0.040	0.040	72	2.625	71	76	70	
CALIBRATION 1	0.200	0.224	0.024	3639	0.4 %	3623	3640	3656	
CALIBRATION 2	0.500	0.486	-0.014	8739	0.3 %	8704	8744	8771	
CALIBRATION 3	1.000	1.023	0.023	19156	0.2 %	19107	19165	19197	
CALIBRATION 4	5.000	4.863	-0.137	93655	0.2 %	93390	93683	93894	
CALIBRATION 5	10.000	10.064	0.064	194545	0.2 %	194118	194586	194931	

FC
5/28/14
74713
File: HAA052814A

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122752 Batch Start Date: 05/19/14 08:37 Batch Analyst: Taddeo, Louis J

Batch Method: 3050B Batch End Date: 05/19/14 14:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	PR_LCSSRM 00004	PREP 1 and 2 00002		
MB 160-122752/1		3050B, 6010C		0.5661 g	50 mL				
LCSSRM 160-122752/2		3050B, 6010C		0.5603 g	50 mL	0.5603 g			
160-6694-C-1	2222-SD01	3050B, 6010C	T	0.5210 g	50 mL				
160-6694-C-1 MS	2222-SD01	3050B, 6010C	T	0.5764 g	50 mL		0.25 mL		
160-6694-C-1 MSD	2222-SD01	3050B, 6010C	T	0.5070 g	50 mL		0.25 mL		
160-6694-C-2	2222-SD02	3050B, 6010C	T	0.5838 g	50 mL				
160-6694-C-3	2222-SD03	3050B, 6010C	T	0.5380 g	50 mL				
160-6694-C-4	2222-SD04	3050B, 6010C	T	0.5054 g	50 mL				
160-6694-C-5	2222-SD05	3050B, 6010C	T	0.5003 g	50 mL				
160-6694-C-6	2222-SD06	3050B, 6010C	T	0.5887 g	50 mL				

Batch Notes	
Balance ID	27150548
Batch Comment	(HOT BLOCK 1)
Hydrogen peroxide lot number	361073
Lot # of hydrochloric acid	358674
Lot # of Nitric Acid	362481
Hot Block ID number	1
Oven, Bath or Block Temperature 1	92.7 Degrees C
Pipette ID	M-PREP-2
ID number of the thermometer	111815886
Digestion Tube/Cup Lot #	175919

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.

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122863 Batch Start Date: 05/19/14 10:57 Batch Analyst: Taddeo, Louis J

Batch Method: 3010A Batch End Date: 05/20/14 09:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	PREP 1 and 2 00002			
MB 160-122863/1		3010A, 6010C		50 mL	50 mL				
LCS 160-122863/2		3010A, 6010C		50 mL	50 mL	0.25 mL			
160-6694-F-7	2222-RIN-01	3010A, 6010C	T	50 mL	50 mL				

Batch Notes	
Balance ID	27150548
Lot # of hydrochloric acid	353918
Lot # of Nitric Acid	327704
Hot Block ID number	1
Oven, Bath or Block Temperature 1	92.2 Degrees C
Pipette ID	m-prep-2
ID number of the thermometer	111815886
Digestion Tube/Cup Lot #	175919

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.

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123407 Batch Start Date: 05/21/14 11:00 Batch Analyst: Souris, Matthew T

Batch Method: 7470A Batch End Date: 05/21/14 13:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	Hg Curve Int. 00401			
MB 160-123407/1		7470A, 7470A		30 mL	30 mL				
LCS 160-123407/2		7470A, 7470A		30 mL	30 mL	1.5 mL			
160-6694-F-7	2222-RIN-01	7470A, 7470A	T	30 mL	30 mL				
160-6694-F-7 MS	2222-RIN-01	7470A, 7470A	T	30 mL	30 mL	1.5 mL			
160-6694-F-7 MSD	2222-RIN-01	7470A, 7470A	T	30 mL	30 mL	1.5 mL			

Batch Notes	
Hydroxylamine Sulfate Lot Number	326592
Digestion End Time	1300
Digestion Start Time	1100
Sulfuric Acid Lot Number	348390
Lot # of hydrochloric acid	361062
Lot # of Nitric Acid	348392
Hood ID or number	HOOD2
Hot Block ID number	HG1
Potassium Persulfate Lot Number	326595
Potassium Permanganate Lot Number	361055
NaCl Lot #	166068
Oven, Bath or Block Temperature 1	95.7 Celsius
Oven, Bath or Block Temperature 2	95.7 Celsius
Pipette ID	HG6ANDMET12ANDMET10
Stannous Chloride Lot Number	362989
SOP Number	ST-MT-0005
ID number of the thermometer	111815895
Digestion Tube/Cup Lot #	179718

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.

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123919 Batch Start Date: 05/27/14 10:17 Batch Analyst: Souris, Matthew T

Batch Method: 7471B Batch End Date: 05/27/14 10:17

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	Hg QC Int. 00388	PR_LCSSRM 00006		
MB 160-123919/1		7471B, 7471B		0.6630 g	100 mL				
LCSSRM 160-123919/2		7471B, 7471B		0.6576 g	100 mL		0.6576 g		
160-6694-C-1	2222-SD01	7471B, 7471B	T	0.6750 g	100 mL				
160-6694-C-2	2222-SD02	7471B, 7471B	T	0.5543 g	100 mL				
160-6694-C-3	2222-SD03	7471B, 7471B	T	0.6151 g	100 mL				
160-6694-C-4	2222-SD04	7471B, 7471B	T	0.6591 g	100 mL				
160-6694-C-5	2222-SD05	7471B, 7471B	T	0.6784 g	100 mL				
160-6694-C-6	2222-SD06	7471B, 7471B	T	0.6474 g	100 mL				
160-6694-C-6 MS	2222-SD06	7471B, 7471B	T	0.6210 g	100 mL	5 mL			
160-6694-C-6 MSD	2222-SD06	7471B, 7471B	T	0.6881 g	100 mL	5 mL			

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

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123919 Batch Start Date: 05/27/14 10:17 Batch Analyst: Souris, Matthew T

Batch Method: 7471B Batch End Date: 05/27/14 10:17

Batch Notes	
Hydroxylamine Sulfate Lot Number	326592
Balance ID	27150548
Digestion End Time	1100
Digestion Start Time	1030
Sulfuric Acid Lot Number	348390
Lot # of hydrochloric acid	361062
Lot # of Nitric Acid	348392
Hood ID or number	HOOD2
Hot Block ID number	HG2
Potassium Persulfate Lot Number	326595
Potassium Permanganate Lot Number	361055
NaCl Lot #	166068
Oven, Bath or Block Temperature 1	93.7 Celsius
Oven, Bath or Block Temperature 2	93.7 Celsius
Pipette ID	HG6ANDMET12ANDMET10
Stannous Chloride Lot Number	362989
SOP Number	ST-MT-0007
ID number of the thermometer	111815895
Digestion Tube/Cup Lot #	177748

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.

GENERAL CHEMISTRY

COVER PAGE
GENERAL CHEMISTRY

Lab Name: TestAmerica St. Louis Job Number: 160-6694-1

SDG No.:

Project: EPA Region 5 START 3 Contract

Client Sample ID	Lab Sample ID
2222-SD01	160-6694-1
2222-SD02	160-6694-2
2222-SD03	160-6694-3
2222-SD04	160-6694-4
2222-SD05	160-6694-5
2222-SD06	160-6694-6

Comments:

9-IN
DETECTION LIMITS
GENERAL CHEMISTRY

Lab Name: TestAmerica St. Louis Job Number: 160-6694-1

SDG Number:

Matrix: Solid Instrument ID: NOEQUIP

Method: Moisture RL Date: 01/28/2011 14:43

Analyte	Wavelength/ Mass	RL (%)	
Percent Moisture		0.1	
Percent Solids		0.1	

9-IN
CALIBRATION BLANK DETECTION LIMITS
GENERAL CHEMISTRY

Lab Name: TestAmerica St. Louis Job Number: 160-6694-1

SDG Number:

Matrix: Solid Instrument ID: NOEQUIP

Method: Moisture XRL Date: 01/28/2011 14:42

Analyte	Wavelength/ Mass	XRL (%)	
Percent Moisture		0.1	
Percent Solids		0.1	

13-IN
ANALYSIS RUN LOG
GENERAL CHEMISTRY

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Instrument ID: NOEQUIP Analysis Method: Moisture

Start Date: 05/17/2014 08:15 End Date: 05/17/2014 08:34

Lab Sample Id	D/F	Type	Time	Analytes																										
				% Sol	Moist																									
ZZZZZZ			08:15																											
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160-6694-1	1	T	08:15	X	X																									
160-6694-2	1	T	08:15	X	X																									
160-6694-3	1	T	08:15	X	X																									
160-6694-4	1	T	08:15	X	X																									
160-6694-5	1	T	08:15	X	X																									
160-6694-6	1	T	08:15	X	X																									
ZZZZZZ			08:15																											
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FORM XIII-IN

13-IN
ANALYSIS RUN LOG
GENERAL CHEMISTRY

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Instrument ID: NOEQUIP Analysis Method: Moisture

Start Date: 05/17/2014 08:15 End Date: 05/17/2014 08:34

Lab Sample Id	D/F	Type	Time	Analytes																								
				% Sol	Moist																							
ZZZZZZ			08:34																									

Prep Types:
T = Total/NA

FORM XIII-IN

GENERAL CHEMISTRY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122677 Batch Start Date: 05/17/14 09:00 Batch Analyst: Braatz, Steve D

Batch Method: Moisture Batch End Date: 05/18/14 06:55

Lab Sample ID	Client Sample ID	Method Chain	Basis	DISH#	DishWeight	SampleMassWet	SampleMassDry		
160-6694-A-1	2222-SD01	Moisture	T	8	1.3139 g	12.7566 g	9.5871 g		
160-6694-A-2	2222-SD02	Moisture	T	9	1.3248 g	12.2013 g	9.1457 g		
160-6694-A-3	2222-SD03	Moisture	T	10	1.3355 g	11.4280 g	6.6273 g		
160-6694-A-4	2222-SD04	Moisture	T	11	1.3088 g	10.5395 g	3.9517 g		
160-6694-A-5	2222-SD05	Moisture	T	12	1.3265 g	13.6247 g	10.7836 g		
160-6694-A-6	2222-SD06	Moisture	T	13	1.3119 g	15.1661 g	8.9212 g		

Batch Notes	
Balance ID	27050421 No Unit
Batch Comment	TRAY A
Date samples were placed in the oven	5-17-14
Oven Temp when samples are put in oven	103 Degrees C
Time samples were place in the oven	09:00
Date samples were removed from oven	5-18-14
Oven Temp when samples removed from oven	103 Degrees C
Time Samples were removed from oven	06:55
Oven ID	OA

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.

ALPHA SPECTROSCOPY

Method A-01-R Th

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123197 Batch Start Date: 05/20/14 13:36 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	Th-230 00023			
MB 160-123197/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123197/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123276 Batch Start Date: 05/21/14 09:37 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:50

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-123276/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123276/2		ExtChrom, A-01-R		0.4993 g	0.2 mL	0.4993 g			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123197 Batch Start Date: 05/20/14 13:36 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	Th-230 00023			
MB 160-123197/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123197/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123276 Batch Start Date: 05/21/14 09:37 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:50

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-123276/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123276/2		ExtChrom, A-01-R		0.4993 g	0.2 mL	0.4993 g			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123197 Batch Start Date: 05/20/14 13:36 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	Th-230 00023			
MB 160-123197/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123197/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123276 Batch Start Date: 05/21/14 09:37 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:50

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-123276/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123276/2		ExtChrom, A-01-R		0.4993 g	0.2 mL	0.4993 g			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123197 Batch Start Date: 05/20/14 13:36 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	Th-230 00023			
MB 160-123197/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123197/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123276 Batch Start Date: 05/21/14 09:37 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:50

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-123276/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123276/2		ExtChrom, A-01-R		0.4993 g	0.2 mL	0.4993 g			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123197 Batch Start Date: 05/20/14 13:36 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	Th-230 00023			
MB 160-123197/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123197/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123276 Batch Start Date: 05/21/14 09:37 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:50

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-123276/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123276/2		ExtChrom, A-01-R		0.4993 g	0.2 mL	0.4993 g			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

Prep Batch: 123197

, Extraction Chromatography Resin Actinide

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 123197

Lab ID: MB 160-123197/1-A
Client ID:
Sigma: 2
Analyzed: 05/21/14 19:04
Detector: AV43
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.02379	0.0476	0.0476	U	pCi/L	1.00	0.0714	123332
Thorium-230	0.2388	0.151	0.152		pCi/L	1.00	0.0714	123332
Thorium-232	0.04293	0.0676	0.0677	U	pCi/L	1.00	0.108	123332

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	10.03	0.885	1.22		pCi/L	0.101	12.2	81.9	30 - 110

Lab ID: LCS 160-123197/2-A
Client ID:
Sigma: 2
Analyzed: 05/21/14 19:04
Detector: AV44
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	9.421	0.925	1.22		pCi/L	1.00	0.103	123333

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	10.28	0.886	1.24		pCi/L	0.108	12.2	84.0	30 - 110

Lab ID: 160-6694-7
Client ID: 2222-RIN-01
Sigma: 2
Analyzed: 05/21/14 19:04
Detector: AV48
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.0369	0.0789	0.0789	U	pCi/L	1.00	0.156	123337
Thorium-230	0.132	0.108	0.108		pCi/L	1.00	0.0717	123337
Thorium-232	-0.00817	0.0116	0.0116	U	pCi/L	1.00	0.113	123337

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	10.9	0.922	1.30		pCi/L	0.0892	12.3	89.0	30 - 110

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-123197/1-A	Thorium-228			0.02379	U	pCi/L							
MB 160-123197/1-A	Thorium-230			0.2388		pCi/L							
MB 160-123197/1-A	Thorium-232			0.04293	U	pCi/L							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-123197/2-A	Thorium-230		8.64	9.421		pCi/L	109	81 - 125					

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 123197

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123197 Batch Start Date: 05/20/14 13:36 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	Th-230 00023			
MB 160-123197/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123197/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123276 Batch Start Date: 05/21/14 09:37 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:50

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-123276/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123276/2		ExtChrom, A-01-R		0.4993 g	0.2 mL	0.4993 g			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:05:56PM 5/21/2014

Sample

Sample Name: MB 160-123197/1-A
SampleType: Blank
: MB 160-123197/1-A
Sample Collection Date: 5/20/2014 2:14:00PM

Spectrum #1 Analysis #1
Sample Volume : 0.5000L
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123197
AnalysisID: 608362

Analyst: 60040

Tracer

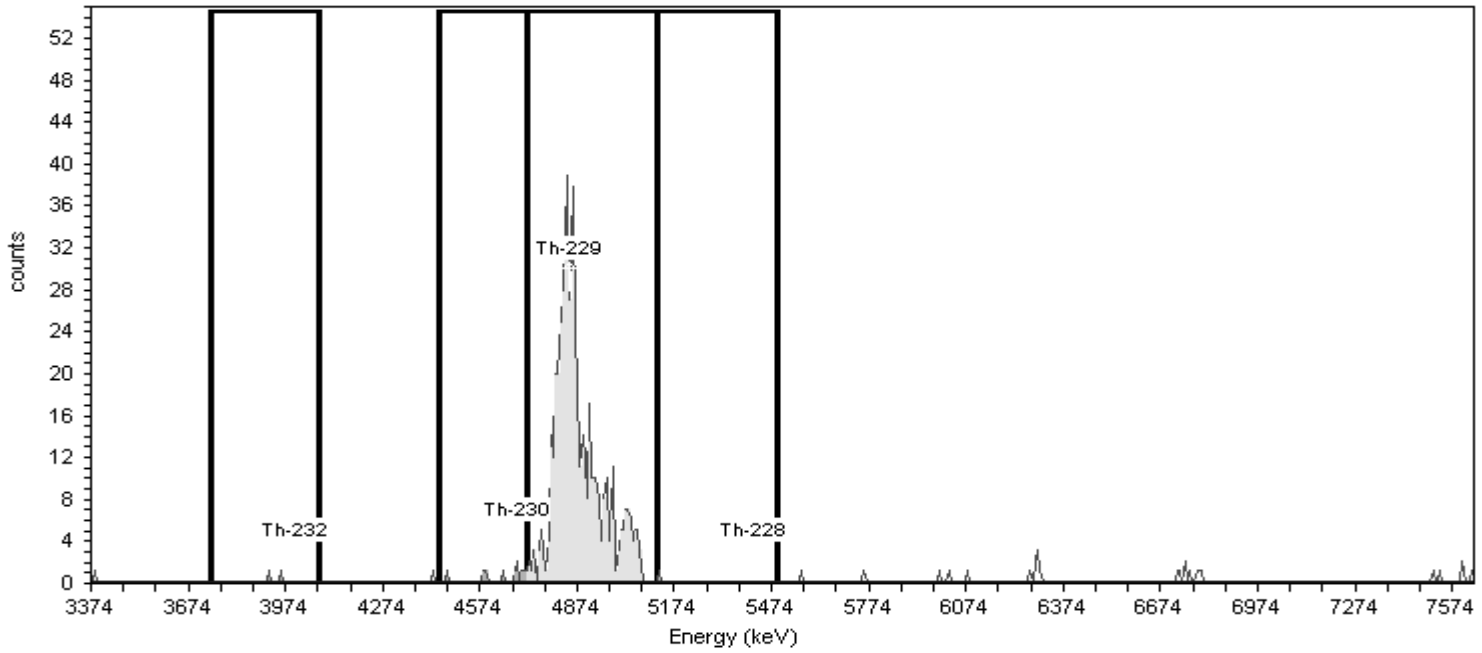
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 81.94%

Acquisition

Detector: AV43
Serial Number: 49-190X4
Acquisition Start Date: 5/21/2014 7:04:03PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 5/15/2014 1:18:19AM
Background Info: Sample: ICB;AV43; Det: AV43; Spectrum #1; May-15-2014 01:18

Calibration Name: IC-9794;AV43-20140505
Calibration Date: 5/5/2014 10:09:47PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.74% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 5/21/2014 7:01:45PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	53.8	100.2	2	0.1875	1.81	0.043	pCi/L
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	13.7	99.7	10	0.0000	10.03	0.239	pCi/L
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	73.3	99.6	514	0.3750	513.66	10.029	pCi/L
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	23.6	99.8	1	0.0000	1.00	0.024	pCi/L

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:06:09PM 5/21/2014

Sample

Sample Name: LCS 160-123197/2-A
SampleType: Control
: LCS 160-123197/2-A
Sample Collection Date: 5/20/2014 2:14:00PM

Spectrum #1 Analysis #1
Sample Volume : 0.5000L
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123197
AnalysisID: 608363

Analyst: 60040

Tracer

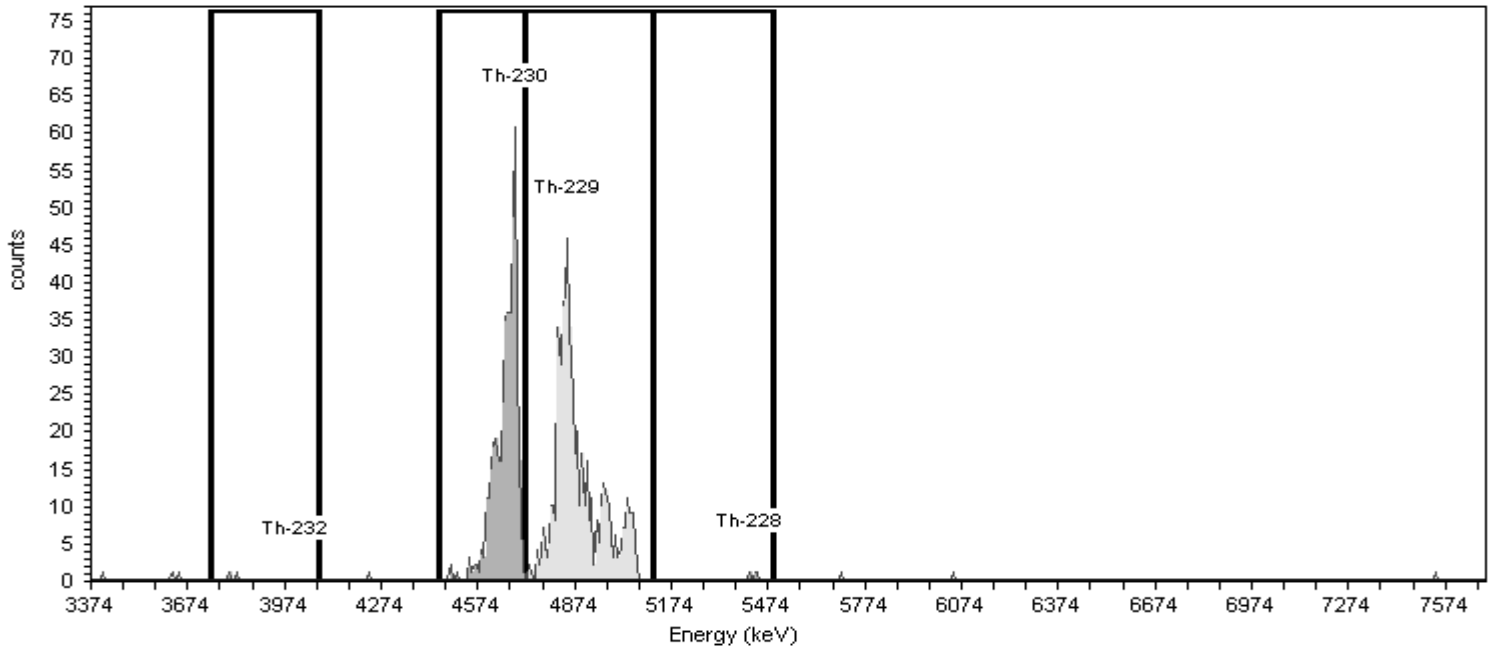
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 83.98%

Acquisition

Detector: AV44
Serial Number: 50-051JJ1
Acquisition Start Date: 5/21/2014 7:04:05PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 5/15/2014 1:18:20AM
Background Info: Sample: ICB;AV44; Det: AV44; Spectrum #1; May-15-2014 01:18

Calibration Name: IC-9795;AV44-20140505
Calibration Date: 5/5/2014 10:09:57PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.32% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 5/21/2014 7:01:44PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	40.5	100.2	2	0.1875	1.81	0.041	pCi/L
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	30.2	99.7	415	0.1817	414.82	9.421	pCi/L
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	62.6	99.6	539	0.5567	538.44	10.279	pCi/L
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	41.8	99.8	3	2.2500	0.75	0.017	pCi/L

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:06:20PM 5/21/2014

Sample

Sample Name: 160-6694-C-7-A
SampleType: Sample
: 160-6694-C-7-A
Sample Collection Date: 5/15/2014 8:10:00AM

Spectrum #1 Analysis #1
Sample Volume : 0.4995L
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123197
AnalysisID: 608365

Analyst: 60040

Tracer

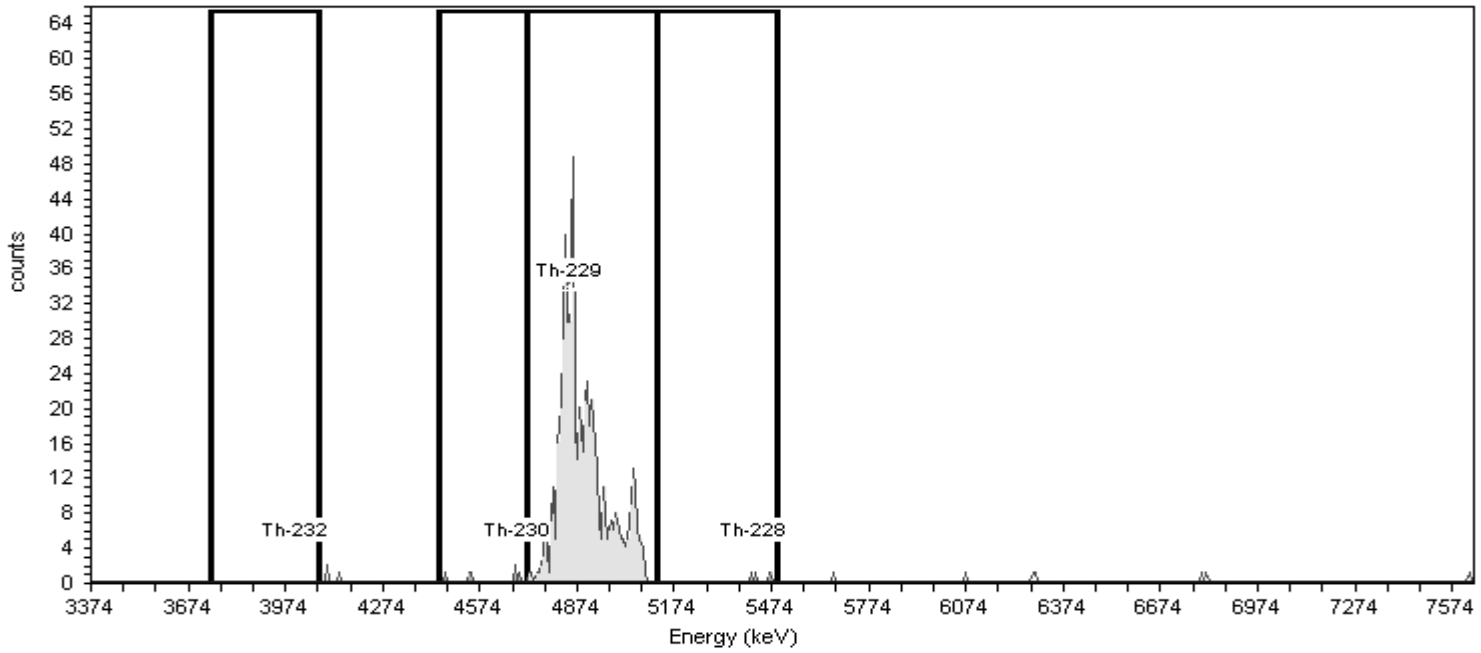
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 88.97%

Acquisition

Detector: AV48
Serial Number: 50-051JJ4
Acquisition Start Date: 5/21/2014 7:04:09PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 5/15/2014 1:18:23AM
Background Info: Sample: ICB;AV48; Det: AV48; Spectrum #1; May-15-2014 01:18

Calibration Name: IC-9886;AV48-20140505
Calibration Date: 5/5/2014 10:10:22PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.78% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 5/21/2014 7:01:44PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	.0	100.2	0	0.3750	-0.38	-0.008	pCi/L
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	10.1	99.7	6	0.0058	6.03	0.132	pCi/L
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	76.9	99.6	559	0.1933	558.84	10.901	pCi/L
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	10.7	99.8	3	1.3125	1.69	0.037	pCi/L

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123197 Batch Start Date: 05/20/14 13:36 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	Th-230 00023			
MB 160-123197/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123197/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123276 Batch Start Date: 05/21/14 09:37 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:50

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-123276/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123276/2		ExtChrom, A-01-R		0.4993 g	0.2 mL	0.4993 g			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

Prep Batch: 123276

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Alpha Spectroscopy Analysis Detail Report
Prep Batch: 123276

Lab ID: MB 160-123276/1-A
Client ID:
Sigma: 2
Analyzed: 05/23/14 19:02
Detector: AV45
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.01892	0.0362	0.0362	U	pCi/g	1.00	0.0686	123806
Thorium-230	0.04828	0.0452	0.0454		pCi/g	1.00	0.0460	123806
Thorium-232	0.008162	0.0204	0.0205	U	pCi/g	1.00	0.0457	123806

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.835	0.474	0.682		pCi/g	0.0501	6.12	95.4	30 - 110

Lab ID: LCS 160-123276/2-A
Client ID:
Sigma: 2
Analyzed: 05/23/14 19:02
Detector: AV46
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	23.35	1.37	2.39		pCi/g	1.00	0.115	123807

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	11.40	0.926	1.33		pCi/g	0.0975	12.3	93.1	30 - 110

Lab ID: 160-6694-1
Client ID: 2222-SD01
Sigma: 2
Analyzed: 05/23/14 19:02
Detector: AV57
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.320	0.133	0.136		pCi/g	1.00	0.115	123811
Thorium-230	0.578	0.169	0.176		pCi/g	1.00	0.0779	123811
Thorium-232	0.333	0.127	0.130		pCi/g	1.00	0.0545	123811

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.79	0.425	0.586		pCi/g	0.0575	6.13	78.2	30 - 110

Lab ID: 160-6694-2
Client ID: 2222-SD02
Sigma: 2
Analyzed: 05/23/14 19:02
Detector: AV58
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.314	0.123	0.126		pCi/g	1.00	0.0840	123812
Thorium-230	0.417	0.139	0.143		pCi/g	1.00	0.0593	123812
Thorium-232	0.321	0.123	0.125		pCi/g	1.00	0.0693	123812

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 123276

Lab ID: 160-6694-2 | Analyzed: 05/23/14 19:02 | Decay Corrected: No
Client ID: 2222-SD02 | Detector: AV58 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.09	0.440	0.613		pCi/g	0.0576	6.13	83.0	30 - 110

Lab ID: 160-6694-3 | Analyzed: 05/23/14 19:02 | Decay Corrected: No
Client ID: 2222-SD03 | Detector: AV59 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.07	0.235	0.251		pCi/g	1.00	0.0898	123813
Thorium-230	0.745	0.194	0.204		pCi/g	1.00	0.0379	123813
Thorium-232	0.604	0.174	0.181		pCi/g	1.00	0.0377	123813

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.40	0.401	0.546		pCi/g	0.0474	6.10	72.2	30 - 110

Lab ID: 160-6694-4 | Analyzed: 05/23/14 19:02 | Decay Corrected: No
Client ID: 2222-SD04 | Detector: AV60 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.561	0.165	0.172		pCi/g	1.00	0.103	123815
Thorium-230	0.695	0.178	0.188		pCi/g	1.00	0.0520	123815
Thorium-232	0.445	0.143	0.148		pCi/g	1.00	0.0562	123815

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.13	0.443	0.618		pCi/g	0.0544	6.13	83.6	30 - 110

Lab ID: 160-6694-5 | Analyzed: 05/23/14 19:02 | Decay Corrected: No
Client ID: 2222-SD05 | Detector: AV61 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.296	0.117	0.120		pCi/g	1.00	0.0829	123816
Thorium-230	0.296	0.115	0.118		pCi/g	1.00	0.0662	123816
Thorium-232	0.282	0.111	0.113		pCi/g	1.00	0.0523	123816

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.40	0.454	0.642		pCi/g	0.0495	6.15	87.9	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 123276

Lab ID:	160-6694-6	Analyzed:	05/23/14 19:02	Decay Corrected:	No
Client ID:	2222-SD06	Detector:	AV62	Yield Truncated:	No
Sigma:	2	Dil Fac:	1	Ts:	180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.520	0.157	0.163		pCi/g	1.00	0.0666	123817
Thorium-230	0.548	0.161	0.167		pCi/g	1.00	0.0533	123817
Thorium-232	0.586	0.166	0.173		pCi/g	1.00	0.0530	123817

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.95	0.434	0.601		pCi/g	0.0494	6.10	81.1	30 - 110

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-123276/1-A	Thorium-228			0.01892	U	pCi/g							
MB 160-123276/1-A	Thorium-230			0.04828		pCi/g							
MB 160-123276/1-A	Thorium-232			0.008162	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-123276/2-A	Thorium-230		24.5	23.35		pCi/g	95	81 - 118					

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123197 Batch Start Date: 05/20/14 13:36 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	Th-230 00023			
MB 160-123197/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123197/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123276 Batch Start Date: 05/21/14 09:37 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:50

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-123276/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123276/2		ExtChrom, A-01-R		0.4993 g	0.2 mL	0.4993 g			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:02:33PM 5/23/2014

Sample

Sample Name: MB 160-123276/1-A
SampleType: Blank
: MB 160-123276/1-A
Sample Collection Date: 5/21/2014 10:07:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0000g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123276
AnalysisID: 608735

Analyst: 60040

Tracer

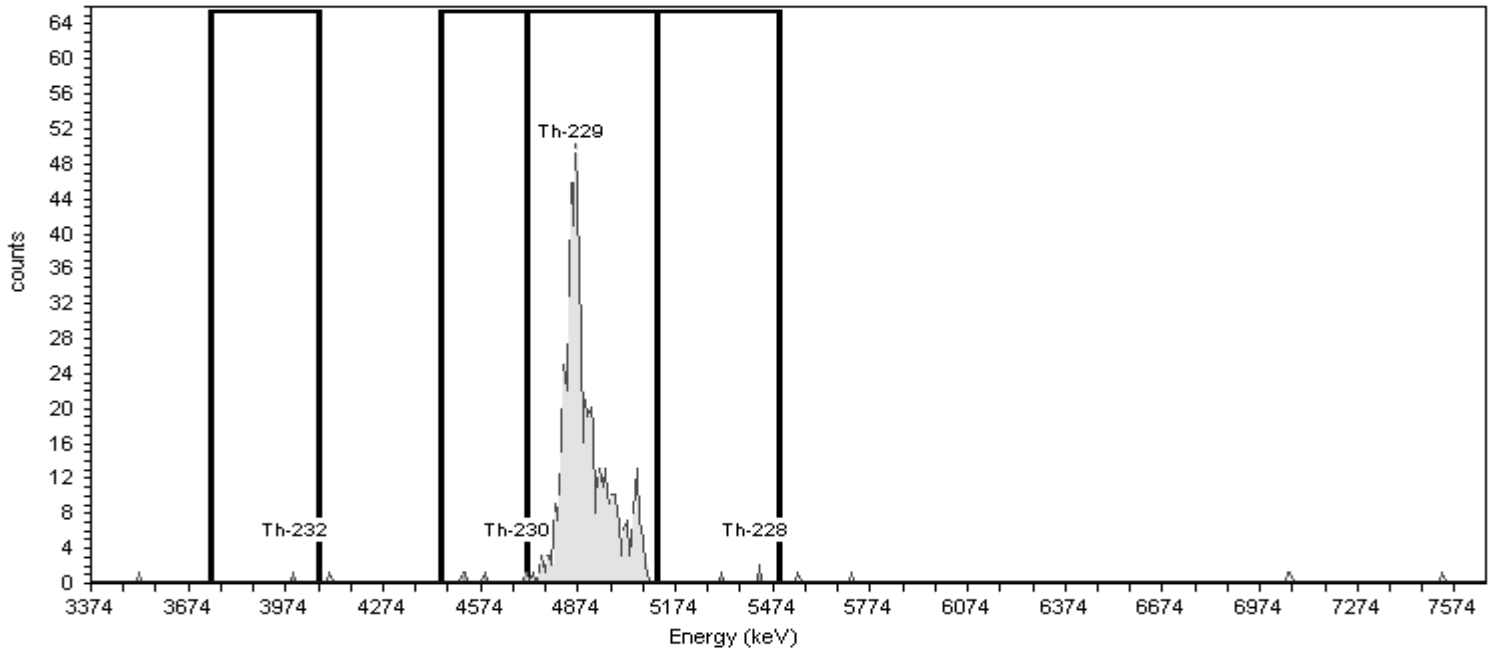
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 95.39%

Acquisition

Detector: AV45
Serial Number: 48-158FF2
Acquisition Start Date: 5/23/2014 7:02:44PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 5/15/2014 1:18:21AM
Background Info: Sample: ICB;AV45; Det: AV45; Spectrum #1; May-15-2014 01:18

Calibration Name: IC-9817;AV45-20140505
Calibration Date: 5/5/2014 10:10:03PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.06% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 5/23/2014 6:58:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	44.5	100.2	1	0.1875	0.81	0.008	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	.3	99.7	5	0.1875	4.78	0.048	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	68.5	99.6	606	0.3750	605.59	5.837	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	139.5	99.8	3	1.1250	1.88	0.019	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:02:48PM 5/23/2014

Sample

Sample Name: LCS 160-123276/2-A
SampleType: Control
: LCS 160-123276/2-A
Sample Collection Date: 5/21/2014 10:07:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.4993g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123276
AnalysisID: 608736

Analyst: 60040

Tracer

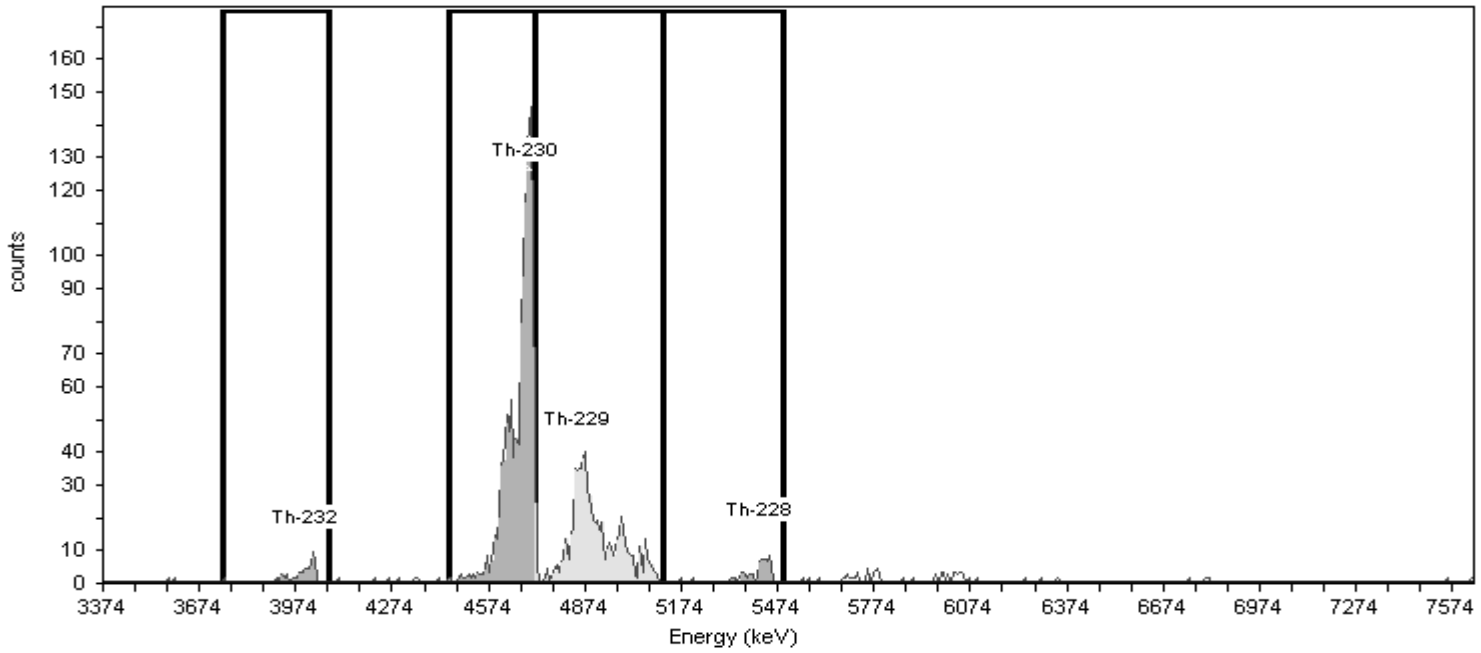
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 99.62%

Acquisition

Detector: AV46
Serial Number: 49-202GG2
Acquisition Start Date: 5/23/2014 7:02:45PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 5/15/2014 1:18:22AM
Background Info: Sample: ICB;AV46; Det: AV46; Spectrum #1; May-15-2014 01:18

Calibration Name: IC-9884;AV46-20140505
Calibration Date: 5/5/2014 10:10:09PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.80% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 5/23/2014 6:58:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	26.6	100.2	47	0.1875	47.24	0.885	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	45.5	99.7	1152	0.3808	1152.10	21.691	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	.0	99.6	651	0.3808	650.41	12.211	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	16.6	99.8	58	2.0625	55.94	1.053	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:57:46PM 5/26/2014

Sample

Sample Name: LCS 160-123276/2-A
SampleType: Control
: LCS 160-123276/2-A
Sample Collection Date: 5/21/2014 10:07:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.4993g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123276
AnalysisID: 608749

Analyst: 60040

Tracer

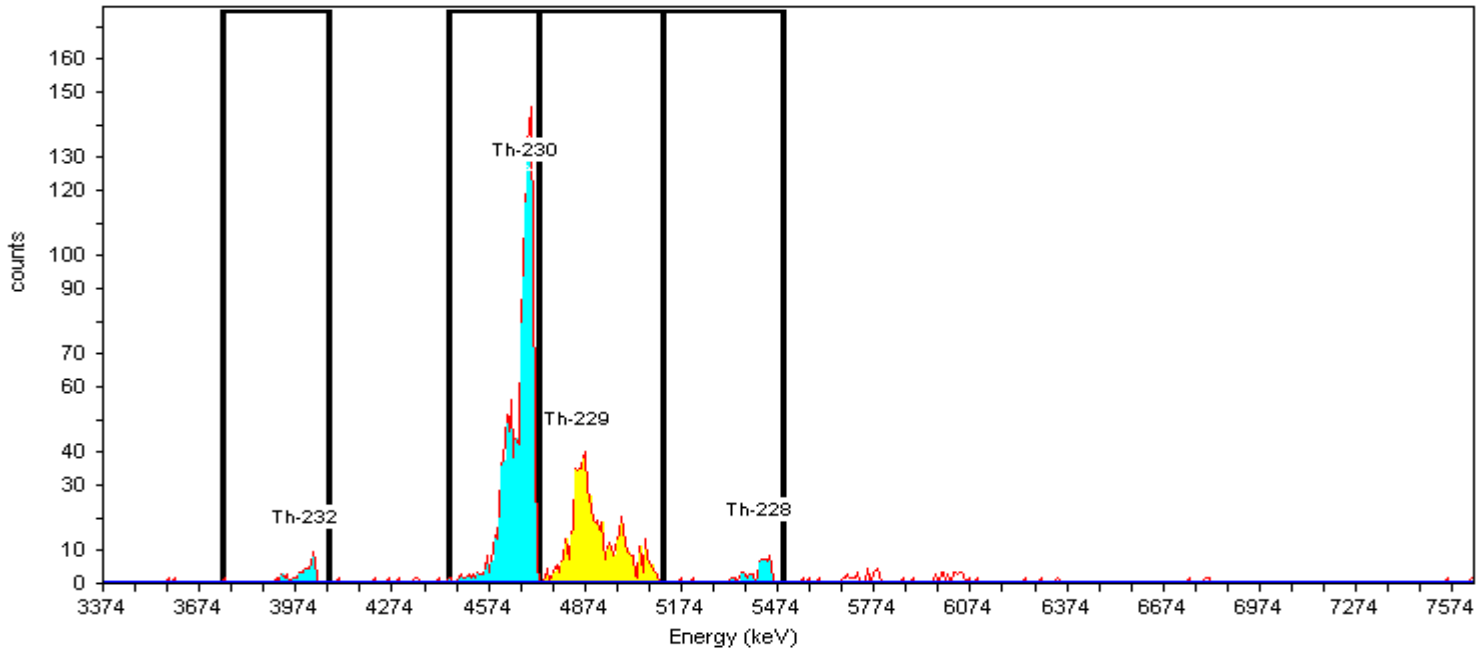
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 93.07%

Acquisition

Detector: AV46
Serial Number: 49-202GG2
Acquisition Start Date: 5/23/2014 7:02:45PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 5/15/2014 1:18:22AM
Background Info: Sample: ICB;AV46; Det: AV46; Spectrum #1; May-15-2014 01:18

Calibration Name: IC-9884;AV46-20140505
Calibration Date: 5/5/2014 10:10:09PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.80% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 5/23/2014 6:58:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing
RTM 5/26/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	26.6	100.2	47	0.1875	47.24	0.947	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	25.5	99.7	1159	0.5625	1158.44	23.346	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	73.9	99.6	608	0.3750	607.63	11.407	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	16.6	99.8	58	2.0625	55.94	1.127	pCi/g

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:03:12PM 5/23/2014

Sample

Sample Name: 160-6694-A-1-B
SampleType: Sample
: 160-6694-A-1-B
Sample Collection Date: 5/15/2014 8:25:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9977g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123276
AnalysisID: 608740

Analyst: 60040

Tracer

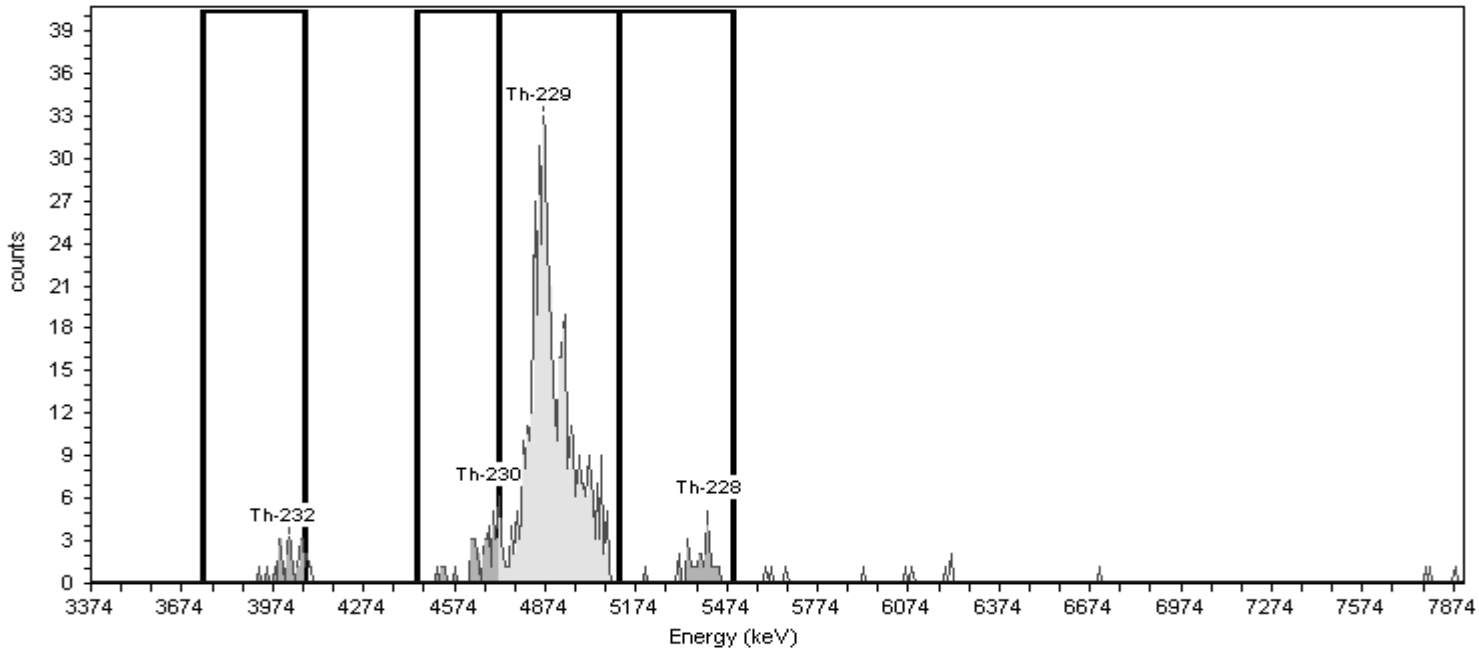
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 79.56%

Acquisition

Detector: AV57
Serial Number: 48-158EE3
Acquisition Start Date: 5/23/2014 7:02:51PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 5/15/2014 1:18:35AM
Background Info: Sample: ICB;AV57; Det: AV57; Spectrum #1; May-15-2014 01:18

Calibration Name: IC-9793;AV57-20140504
Calibration Date: 5/5/2014 6:53:40PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.74% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 5/23/2014 6:58:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	.0	100.2	22	0.1875	21.73	0.256	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	45.8	99.7	42	0.9375	40.97	0.485	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	74.6	99.6	519	0.7500	518.16	4.880	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	83.2	99.8	30	3.3750	26.63	0.315	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:50:46PM 5/26/2014

Sample

Sample Name: 160-6694-A-1-B
SampleType: Sample
: 160-6694-A-1-B
Sample Collection Date: 5/15/2014 8:25:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9977g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123276
AnalysisID: 608746

Analyst: 60040

Tracer

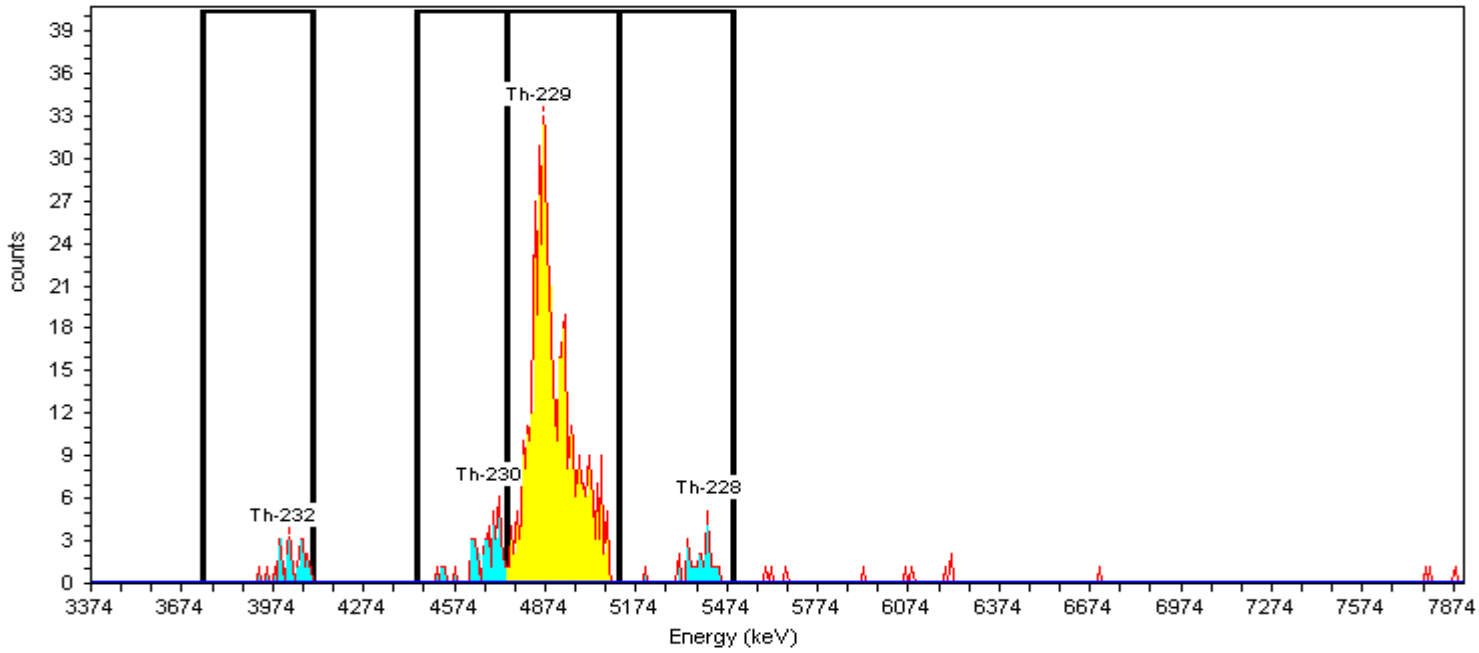
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 78.19%

Acquisition

Detector: AV57
Serial Number: 48-158EE3
Acquisition Start Date: 5/23/2014 7:02:51PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 5/15/2014 1:18:35AM
Background Info: Sample: ICB;AV57; Det: AV57; Spectrum #1; May-15-2014 01:18

Calibration Name: IC-9793;AV57-20140504
Calibration Date: 5/5/2014 6:53:40PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.74% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 5/23/2014 6:58:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing
RTM 5/26/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3739.8	4105.3	26.0	100.2	28	0.1875	27.81	0.333	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4746.6	23.1	99.7	49	0.9375	48.06	0.578	pCi/g
Th-229	4848.0	4,845.3	2.7	4746.6	5119.5	74.6	99.6	510	0.7500	509.25	4.796	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	83.2	99.8	30	3.3750	26.63	0.320	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:03:18PM 5/23/2014

Sample

Sample Name: 160-6694-A-2-B
SampleType: Sample
: 160-6694-A-2-B
Sample Collection Date: 5/15/2014 9:45:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9979g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123276
AnalysisID: 608741

Analyst: 60040

Tracer

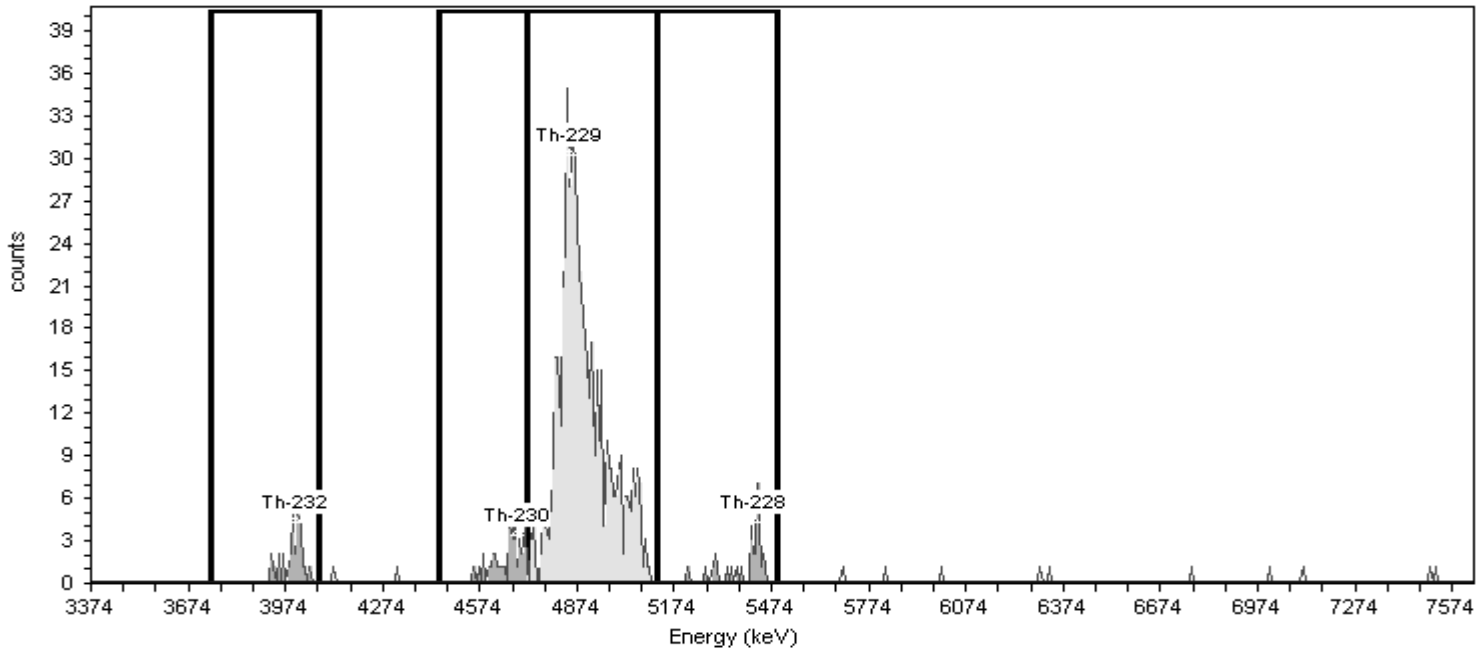
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 83.04%

Acquisition

Detector: AV58
Serial Number: 52-102 C5
Acquisition Start Date: 5/23/2014 7:02:53PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 5/15/2014 1:18:36AM
Background Info: Sample: ICB;AV58; Det: AV58; Spectrum #1; May-15-2014 01:18

Calibration Name: IC-9794;AV58-20140504
Calibration Date: 5/5/2014 6:53:46PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.56% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 5/23/2014 6:58:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	55.3	100.2	29	0.7500	28.25	0.321	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	17.4	99.7	37	0.3750	36.59	0.417	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	88.8	99.6	538	0.7380	537.23	5.093	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	47.9	99.8	29	1.4880	27.51	0.314	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:03:24PM 5/23/2014

Sample

Sample Name: 160-6694-A-3-B
SampleType: Sample
: 160-6694-A-3-B
Sample Collection Date: 5/15/2014 8:50:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0026g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123276
AnalysisID: 608742

Analyst: 60040

Tracer

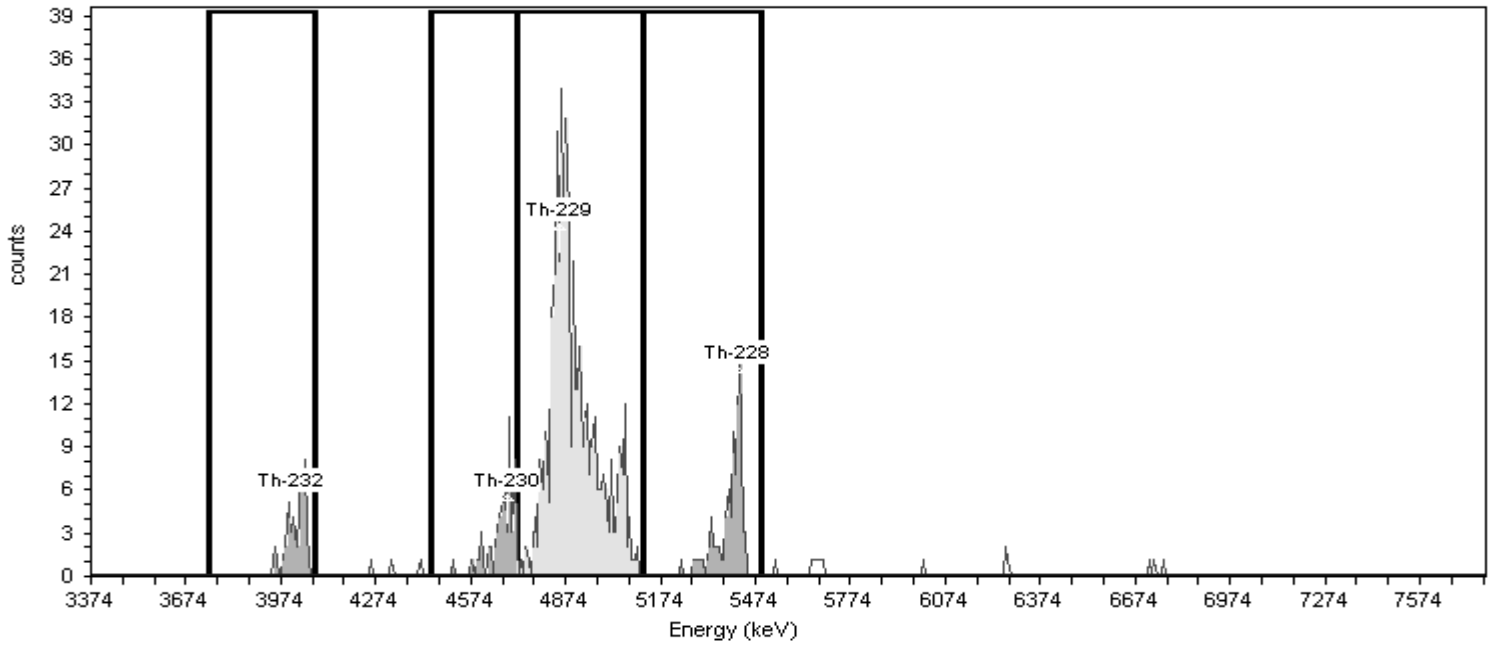
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 72.19%

Acquisition

Detector: AV59
Serial Number: 49-155M7
Acquisition Start Date: 5/23/2014 7:02:54PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 5/15/2014 1:18:38AM
Background Info: Sample: ICB;AV59; Det: AV59; Spectrum #1; May-15-2014 01:18

Calibration Name: IC-9795;AV59-20140504
Calibration Date: 5/5/2014 6:53:53PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.44% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 5/23/2014 6:58:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	28.3	100.2	48	0.0000	48.00	0.604	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	86.2	99.7	59	0.0000	58.94	0.745	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	77.9	99.6	483	0.3750	482.56	4.406	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	47.7	99.8	86	1.3125	84.69	1.070	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:03:29PM 5/23/2014

Sample

Sample Name: 160-6694-A-4-B
SampleType: Sample
: 160-6694-A-4-B
Sample Collection Date: 5/15/2014 9:05:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9979g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123276
AnalysisID: 608743

Analyst: 60040

Tracer

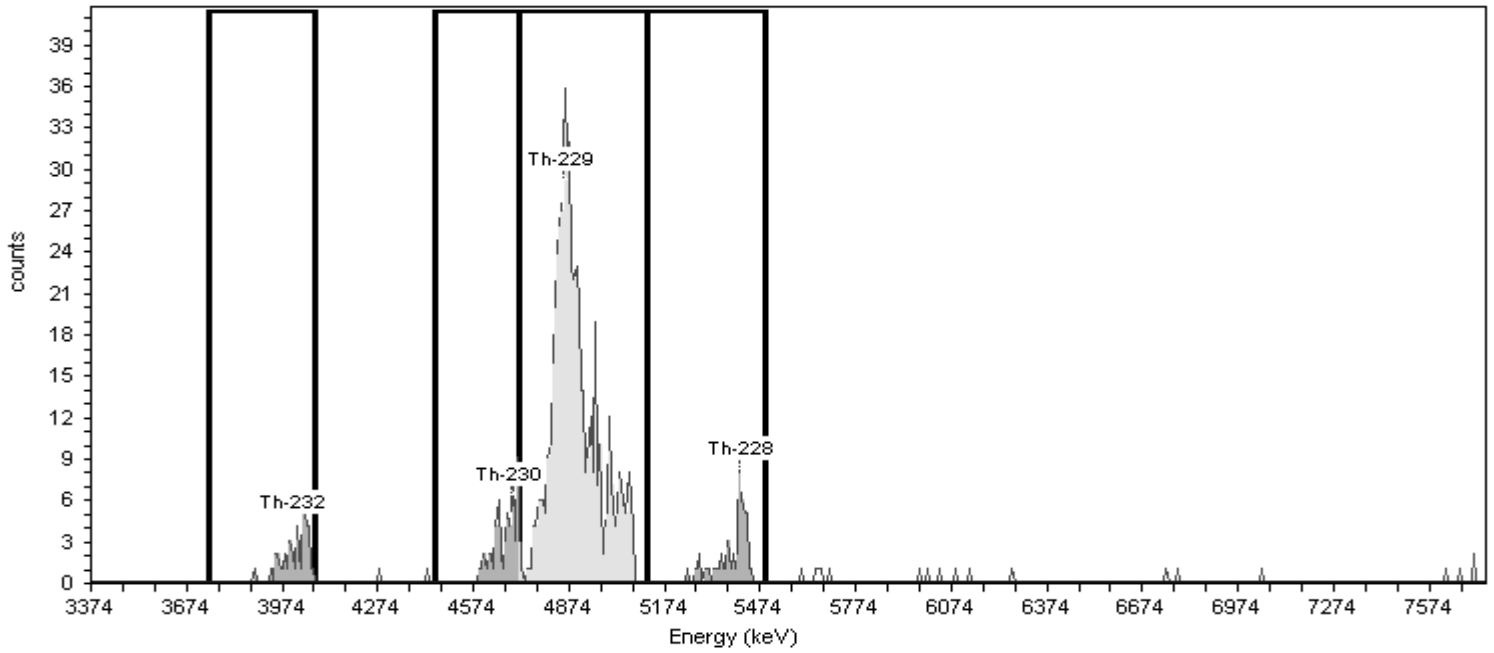
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 84.40%

Acquisition

Detector: AV60
Serial Number: 49-027117
Acquisition Start Date: 5/23/2014 7:02:55PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 5/15/2014 1:18:40AM
Background Info: Sample: ICB;AV60; Det: AV60; Spectrum #1; May-15-2014 01:18

Calibration Name: IC-9817;AV60-20140504
Calibration Date: 5/5/2014 6:53:59PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.33% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 5/23/2014 6:58:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	26.4	100.2	39	0.2953	39.16	0.441	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	29.8	99.7	60	0.1875	59.69	0.676	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	88.1	99.6	542	0.5625	541.31	5.176	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.4	99.8	52	2.8125	49.19	0.556	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:05PM 5/26/2014

Sample

Sample Name: 160-6694-A-4-B
SampleType: Sample
: 160-6694-A-4-B
Sample Collection Date: 5/15/2014 9:05:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9979g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123276
AnalysisID: 608747

Analyst: 60040

Tracer

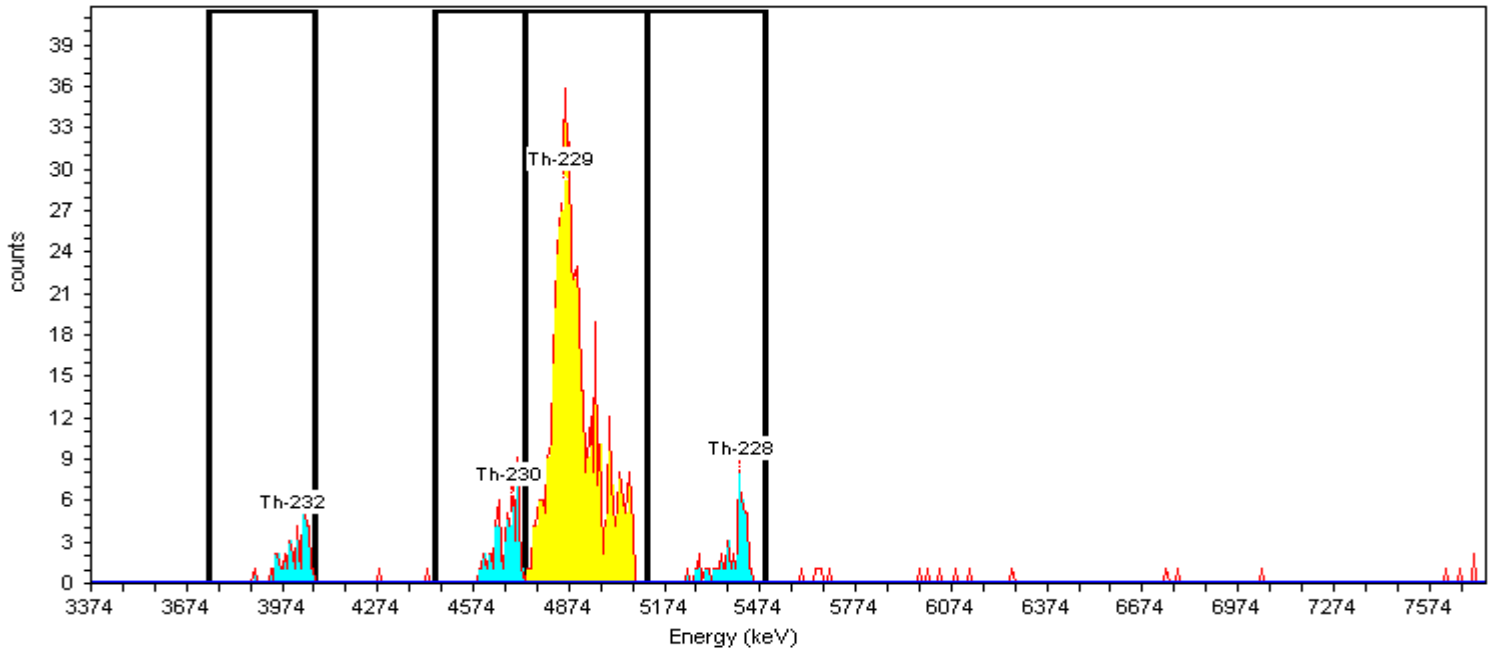
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 83.64%

Acquisition

Detector: AV60
Serial Number: 49-027117
Acquisition Start Date: 5/23/2014 7:02:55PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 5/15/2014 1:18:40AM
Background Info: Sample: ICB;AV60; Det: AV60; Spectrum #1; May-15-2014 01:18

Calibration Name: IC-9817;AV60-20140504
Calibration Date: 5/5/2014 6:53:59PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.33% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 5/23/2014 6:58:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing
RTM 5/26/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	26.4	100.2	39	0.2953	39.16	0.445	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	30.3	99.7	61	0.1875	60.81	0.695	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	88.1	99.6	537	0.5625	536.44	5.129	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.4	99.8	52	2.8125	49.19	0.561	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:03:35PM 5/23/2014

Sample

Sample Name: 160-6694-A-5-B
SampleType: Sample
: 160-6694-A-5-B
Sample Collection Date: 5/15/2014 9:15:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9957g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123276
AnalysisID: 608744

Analyst: 60040

Tracer

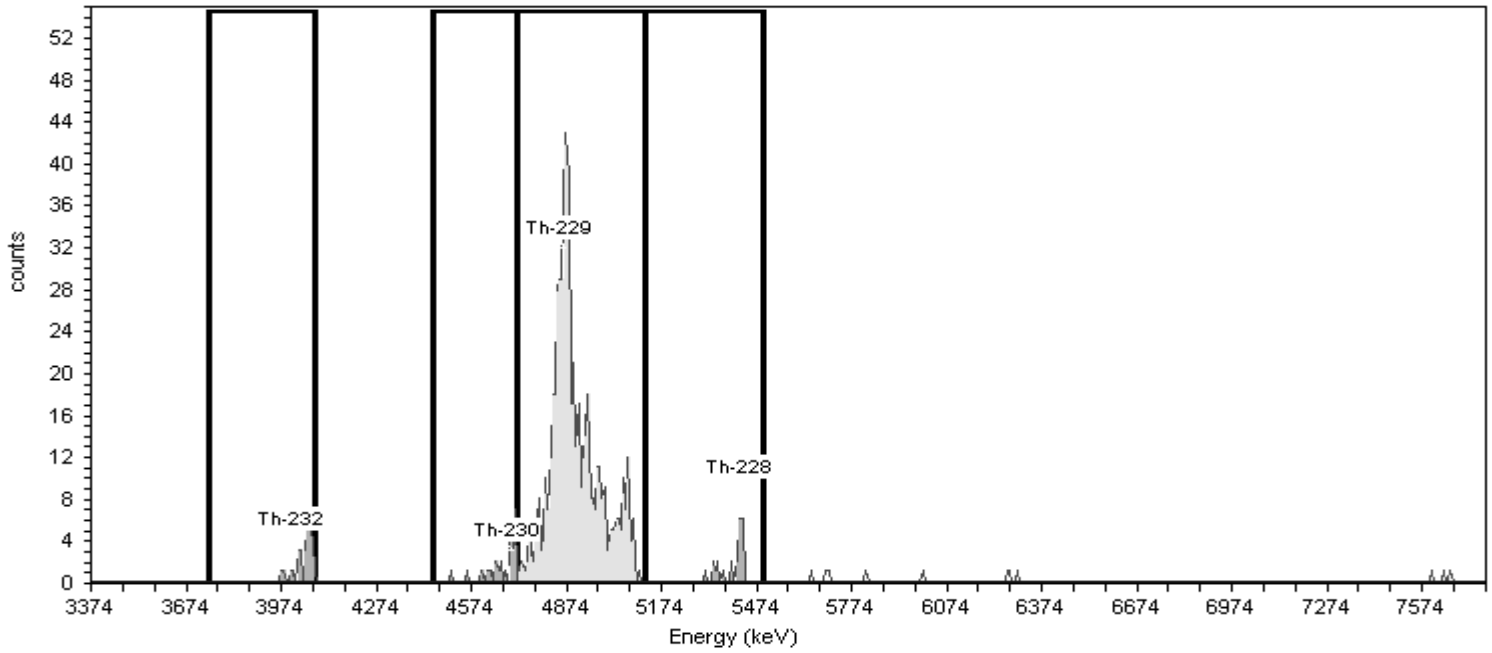
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 87.91%

Acquisition

Detector: AV61
Serial Number: 5-051JJ3
Acquisition Start Date: 5/23/2014 7:02:58PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 5/15/2014 1:18:42AM
Background Info: Sample: ICB;AV61; Det: AV61; Spectrum #1; May-15-2014 01:18

Calibration Name: IC-9884;AV61-20140504
Calibration Date: 5/5/2014 6:54:06PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.46% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 5/23/2014 6:58:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	27.6	100.2	26	0.2672	26.11	0.282	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	11.0	99.7	28	0.7500	27.28	0.296	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	67.4	99.6	567	0.3750	566.66	5.403	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	44.3	99.8	29	1.6875	27.31	0.296	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:03:40PM 5/23/2014

Sample

Sample Name: 160-6694-A-6-B
SampleType: Sample
: 160-6694-A-6-B
Sample Collection Date: 5/15/2014 8:45:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0029g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123276
AnalysisID: 608745

Analyst: 60040

Tracer

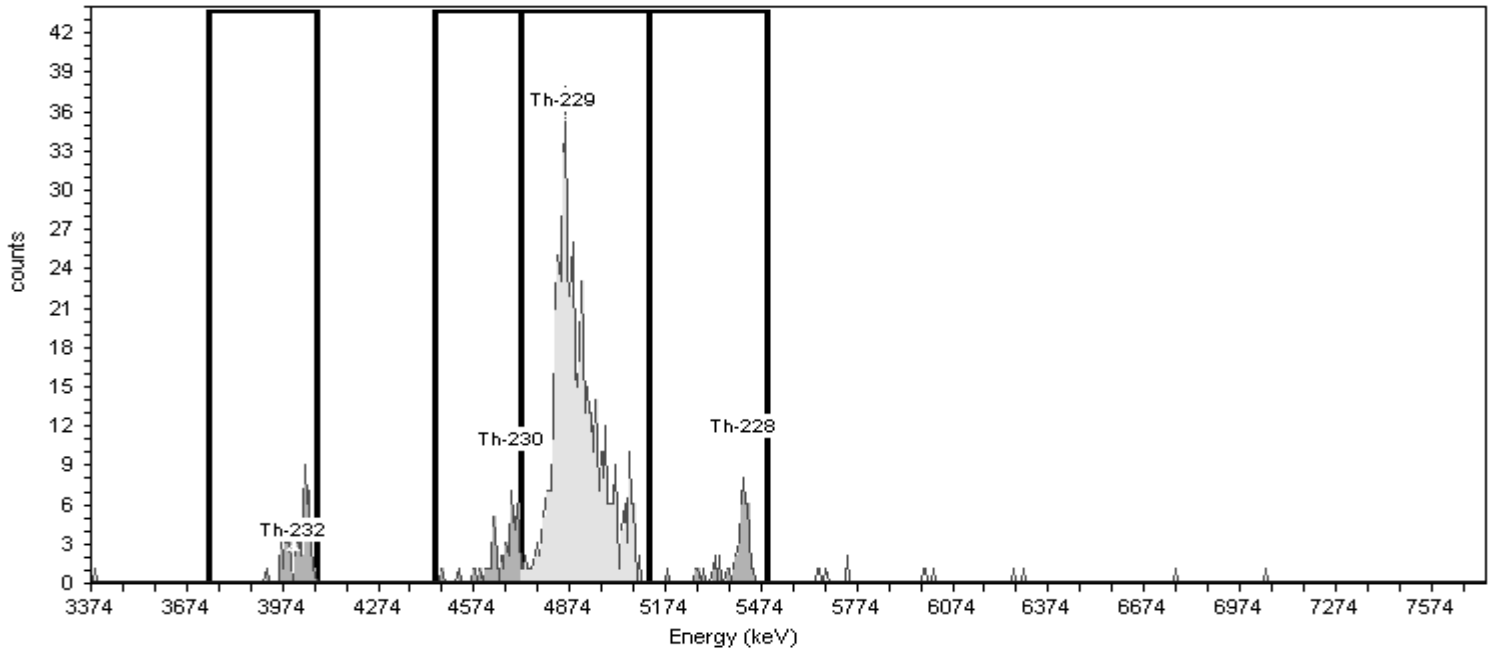
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 81.15%

Acquisition

Detector: AV62
Serial Number: 52-060FF2
Acquisition Start Date: 5/23/2014 7:02:59PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 5/15/2014 1:18:43AM
Background Info: Sample: ICB;AV62; Det: AV62; Spectrum #1; May-15-2014 01:18

Calibration Name: IC-9885;AV62-20140504
Calibration Date: 5/5/2014 6:54:13PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 5/23/2014 6:58:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	28.8	100.2	50	0.1875	50.27	0.586	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	380.2	99.7	47	0.1875	46.81	0.548	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	92.7	99.6	521	0.3750	520.63	4.952	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.6	99.8	45	0.5625	44.44	0.520	pCi/g

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123197 Batch Start Date: 05/20/14 13:36 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	Th-230 00023			
MB 160-123197/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123197/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123276 Batch Start Date: 05/21/14 09:37 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:50

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-123276/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123276/2		ExtChrom, A-01-R		0.4993 g	0.2 mL	0.4993 g			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123197 Batch Start Date: 05/20/14 13:36 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	Th-230 00023			
MB 160-123197/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123197/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123276 Batch Start Date: 05/21/14 09:37 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:50

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-123276/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123276/2		ExtChrom, A-01-R		0.4993 g	0.2 mL	0.4993 g			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123197 Batch Start Date: 05/20/14 13:36 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	Th-230 00023			
MB 160-123197/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123197/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123276 Batch Start Date: 05/21/14 09:37 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:50

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-123276/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123276/2		ExtChrom, A-01-R		0.4993 g	0.2 mL	0.4993 g			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123197 Batch Start Date: 05/20/14 13:36 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	Th-230 00023			
MB 160-123197/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123197/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123276 Batch Start Date: 05/21/14 09:37 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:50

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-123276/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123276/2		ExtChrom, A-01-R		0.4993 g	0.2 mL	0.4993 g			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

Method A-01-R U

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123200 Batch Start Date: 05/20/14 13:40 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00025	UNAT Spike 00001			
MB 160-123200/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123200/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123278 Batch Start Date: 05/21/14 10:03 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:49

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00026	UNAT Spike 00001			
MB 160-123278/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123278/2		ExtChrom, A-01-R		1.0 g	0.2 mL	0.2 mL			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123200 Batch Start Date: 05/20/14 13:40 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00025	UNAT Spike 00001			
MB 160-123200/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123200/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123278 Batch Start Date: 05/21/14 10:03 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:49

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00026	UNAT Spike 00001			
MB 160-123278/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123278/2		ExtChrom, A-01-R		1.0 g	0.2 mL	0.2 mL			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123200 Batch Start Date: 05/20/14 13:40 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00025	UNAT Spike 00001			
MB 160-123200/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123200/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123278 Batch Start Date: 05/21/14 10:03 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:49

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00026	UNAT Spike 00001			
MB 160-123278/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123278/2		ExtChrom, A-01-R		1.0 g	0.2 mL	0.2 mL			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123200 Batch Start Date: 05/20/14 13:40 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00025	UNAT Spike 00001			
MB 160-123200/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123200/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123278 Batch Start Date: 05/21/14 10:03 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:49

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00026	UNAT Spike 00001			
MB 160-123278/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123278/2		ExtChrom, A-01-R		1.0 g	0.2 mL	0.2 mL			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123200 Batch Start Date: 05/20/14 13:40 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00025	UNAT Spike 00001			
MB 160-123200/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123200/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123278 Batch Start Date: 05/21/14 10:03 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:49

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00026	UNAT Spike 00001			
MB 160-123278/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123278/2		ExtChrom, A-01-R		1.0 g	0.2 mL	0.2 mL			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123200 Batch Start Date: 05/20/14 13:40 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00025	UNAT Spike 00001			
MB 160-123200/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123200/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123278 Batch Start Date: 05/21/14 10:03 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:49

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00026	UNAT Spike 00001			
MB 160-123278/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123278/2		ExtChrom, A-01-R		1.0 g	0.2 mL	0.2 mL			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

Prep Batch: 123200

, Extraction Chromatography Resin Actinide

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 123200

Lab ID: MB 160-123200/1-A
Client ID:
Sigma: 2
Analyzed: 05/21/14 17:20
Detector: AV78
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-233/234	0.01901	0.0646	0.0646	U	pCi/L	1.00	0.148	123362
Uranium-235/236	0.0000	0.0101	0.0101	U	pCi/L	1.00	0.0811	123362
Uranium-238	0.1301	0.106	0.107		pCi/L	1.00	0.0650	123362

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	12.96	1.00	1.48		pCi/L	0.119	14.8	89.8	30 - 110

Lab ID: LCS 160-123200/2-A
Client ID:
Sigma: 2
Analyzed: 05/21/14 17:20
Detector: AV79
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-233/234	13.22	1.11	1.57		pCi/L	1.00	0.150	123363
Uranium-238	13.79	1.13	1.62		pCi/L	1.00	0.0696	123363

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	11.52	0.924	1.34		pCi/L	0.120	14.8	79.8	30 - 110

Lab ID: 160-6694-7
Client ID: 2222-RIN-01
Sigma: 2
Analyzed: 05/21/14 17:20
Detector: AV82
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180.008333333333

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-233/234	0.147	0.118	0.118		pCi/L	1.00	0.115	123366
Uranium-235/236	0.0275	0.0551	0.0551	U	pCi/L	1.00	0.0826	123366
Uranium-238	0.0842	0.0887	0.0890	U	pCi/L	1.00	0.101	123366

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	12.7	0.995	1.46		pCi/L	0.101	14.8	88.0	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 123200

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 160-123200/1-A	Uranium-233/234			0.01901	U	pCi/L							
MB 160-123200/1-A	Uranium-235/236			0.0000	U	pCi/L							
MB 160-123200/1-A	Uranium-238			0.1301		pCi/L							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-123200/2-A	Uranium-233/234		12.7	13.22		pCi/L	104	84 - 120					
LCS 160-123200/2-A	Uranium-238		13.0	13.79		pCi/L	106	83 - 121					

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123200 Batch Start Date: 05/20/14 13:40 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00025	UNAT Spike 00001			
MB 160-123200/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123200/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123278 Batch Start Date: 05/21/14 10:03 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:49

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00026	UNAT Spike 00001			
MB 160-123278/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123278/2		ExtChrom, A-01-R		1.0 g	0.2 mL	0.2 mL			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:07:46PM 5/21/2014

Sample

Sample Name: MB 160-123200/1-A
SampleType: Blank
: MB 160-123200/1-A
Sample Collection Date: 5/20/2014 2:14:00PM

Spectrum #1 Analysis #1
Sample Volume : 0.5000L
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123200
AnalysisID: 608354

Analyst: 60040

Tracer

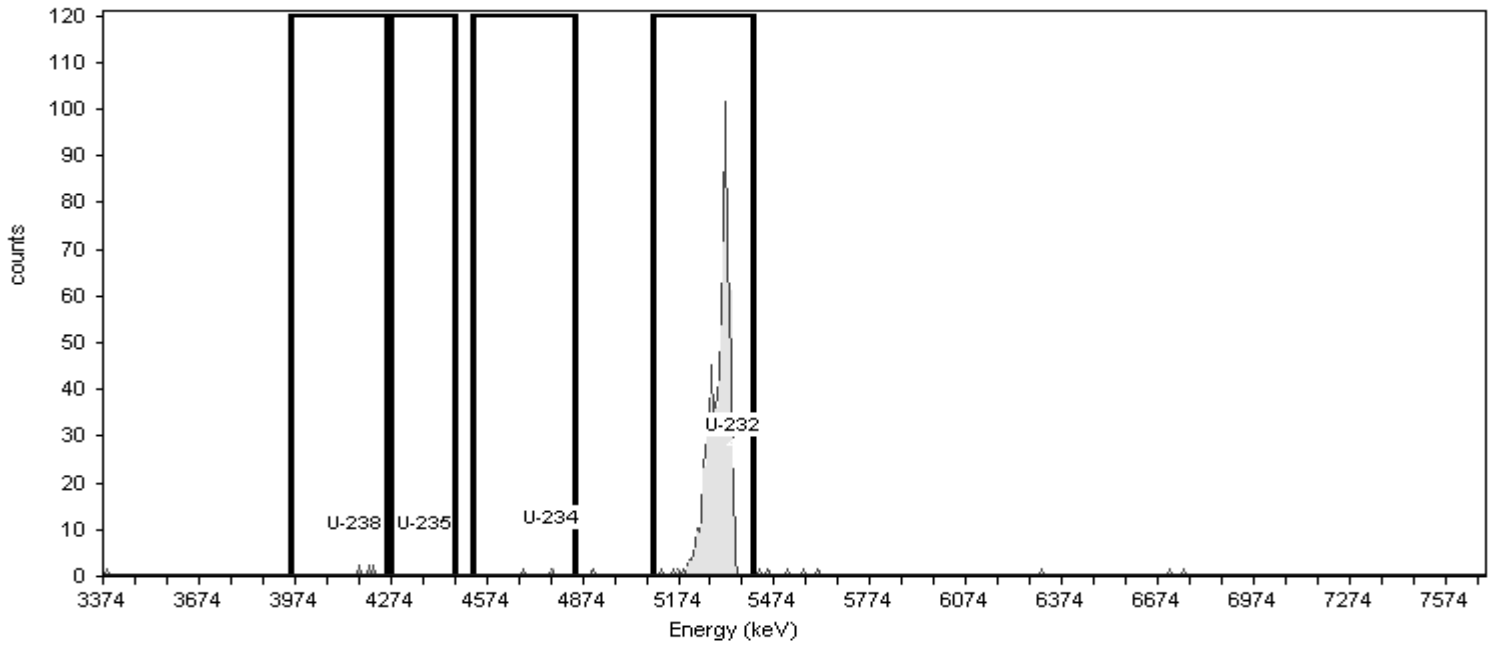
Tracer Name: U-232_00025
Tracer Activity: 82.25 DPM/mL x (Vol.)0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:00:30AM

Tracer Nuclide: U-232
Tracer Recovery: 89.78%

Acquisition

Detector: AV78
Serial Number: 46-033FF4
Acquisition Start Date: 5/21/2014 5:20:08PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 5/15/2014 1:19:14AM
Background Info: Sample: ICB;AV78; Det: AV78; Spectrum #1; May-15-2014 01:19

Calibration Name: IC-9886;AV78-20140504
Calibration Date: 5/4/2014 8:45:34PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.71% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 5/21/2014 5:17:36PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	58.4	100.0	6	0.0000	6.00	0.130	pCi/L
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	.0	80.2	0	0.0000	0.00	0.000	pCi/L
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	44.5	99.8	2	1.1250	0.88	0.019	pCi/L
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	59.3	100.1	667	0.7500	666.25	13.305	pCi/L

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:07:52PM 5/21/2014

Sample

Sample Name: LCS 160-123200/2-A
SampleType: Control
: LCS 160-123200/2-A
Sample Collection Date: 5/20/2014 2:14:00PM

Spectrum #1 Analysis #1
Sample Volume : 0.5000L
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123200
AnalysisID: 608355

Analyst: 60040

Tracer

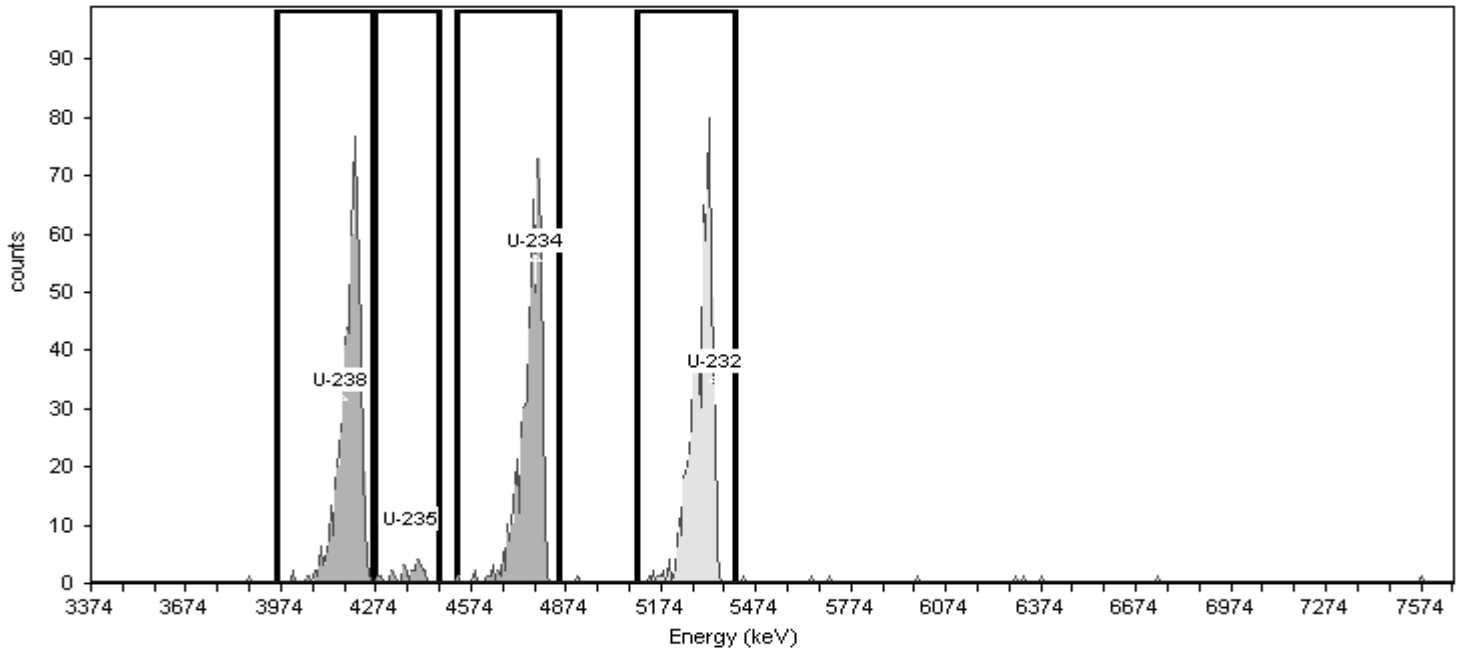
Tracer Name: U-232_00025
Tracer Activity: 82.25 DPM/mL x (Vol.)0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:00:30AM

Tracer Nuclide: U-232
Tracer Recovery: 79.82%

Acquisition

Detector: AV79
Serial Number: 46-033Q5
Acquisition Start Date: 5/21/2014 5:20:09PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 5/15/2014 1:19:16AM
Background Info: Sample: ICB;AV79; Det: AV79; Spectrum #1; May-15-2014 01:19

Calibration Name: IC-7107;AV79-20140501
Calibration Date: 5/4/2014 5:31:27PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.05% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 5/21/2014 5:17:35PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	58.8	100.0	595	0.0000	595.00	13.794	pCi/L
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	68.2	80.2	27	0.0000	27.00	0.781	pCi/L
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	61.2	99.8	570	0.9375	569.06	13.220	pCi/L
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	65.8	100.1	624	0.9375	623.06	11.829	pCi/L

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:08:09PM 5/21/2014

Sample

Sample Name: 160-6694-C-7-B
SampleType: Sample
: 160-6694-C-7-B
Sample Collection Date: 5/15/2014 8:10:00AM

Spectrum #1 Analysis #1
Sample Volume : 0.4995L
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123200
AnalysisID: 608358

Analyst: 60040

Tracer

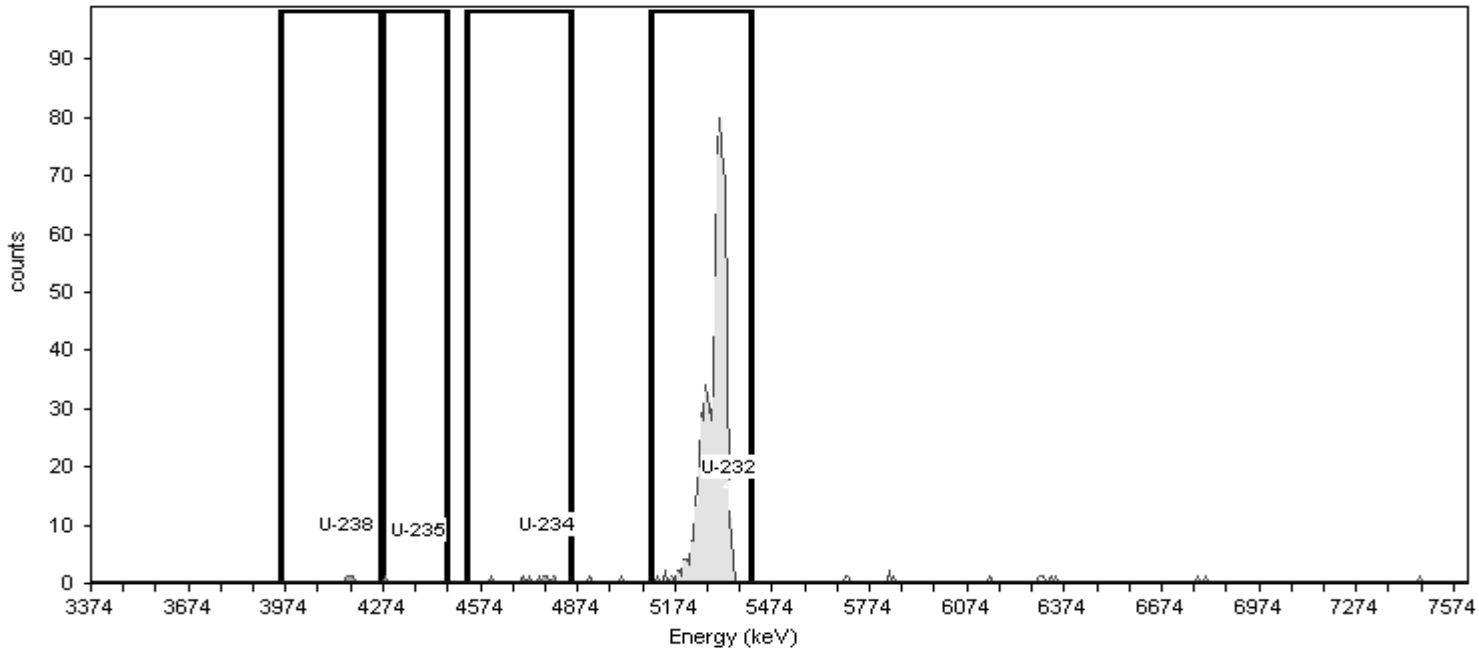
Tracer Name: U-232_00025
Tracer Activity: 82.25 DPM/mL x (Vol.)0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:00:30AM

Tracer Nuclide: U-232
Tracer Recovery: 88.04%

Acquisition

Detector: AV82
Serial Number: 46-032EE5
Acquisition Start Date: 5/21/2014 5:20:14PM
Live Time: 180.01 min.
Real Time: 180.01 min.
Background Date: 5/15/2014 1:19:21AM
Background Info: Sample: ICB;AV82; Det: AV82; Spectrum #1; May-15-2014 01:19

Calibration Name: IC-8876;AV82-20140501
Calibration Date: 5/4/2014 5:31:49PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.76% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 5/21/2014 5:17:35PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	42.3	100.0	4	0.1875	3.81	0.084	pCi/L
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	12.7	80.2	1	0.0000	1.00	0.028	pCi/L
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	97.8	99.8	7	0.3750	6.62	0.147	pCi/L
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	57.7	100.1	655	0.3750	654.62	13.059	pCi/L

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123200 Batch Start Date: 05/20/14 13:40 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00025	UNAT Spike 00001			
MB 160-123200/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123200/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123278 Batch Start Date: 05/21/14 10:03 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:49

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00026	UNAT Spike 00001			
MB 160-123278/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123278/2		ExtChrom, A-01-R		1.0 g	0.2 mL	0.2 mL			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

Prep Batch: 123278

, Extraction Chromatography Resin Actinide

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 123278

Lab ID: MB 160-123278/1-A
Client ID:
Sigma: 2
Analyzed: 05/28/14 15:45
Detector: AV1
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-233/234	0.004946	0.0488	0.0488	U	pCi/g	1.00	0.110	124262
Uranium-235/236	-0.01407	0.0450	0.0451	U	pCi/g	1.00	0.130	124262
Uranium-238	0.01551	0.0478	0.0478	U	pCi/g	1.00	0.0994	124262

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.086	0.482	0.702		pCi/g	0.0615	7.41	84.3	30 - 110

Lab ID: LCS 160-123278/2-A
Client ID:
Sigma: 2
Analyzed: 05/23/14 18:57
Detector: AV11
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-233/234	6.226	0.513	0.733		pCi/g	1.00	0.0683	123762
Uranium-238	6.834	0.537	0.786		pCi/g	1.00	0.0681	123762

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.380	0.488	0.725		pCi/g	0.0633	7.41	88.4	30 - 110

Lab ID: 160-6694-1
Client ID: 2222-SD01
Sigma: 2
Analyzed: 05/23/14 18:57
Detector: AV15
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-233/234	0.585	0.199	0.205		pCi/g	1.00	0.111	123793
Uranium-235/236	0.0165	0.0413	0.0413	U	pCi/g	1.00	0.0924	123793
Uranium-238	0.352	0.153	0.156		pCi/g	1.00	0.0846	123793

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	4.35	0.413	0.552		pCi/g	0.0695	7.43	60.1	30 - 110

Lab ID: 160-6694-2
Client ID: 2222-SD02
Sigma: 2
Analyzed: 05/23/14 18:57
Detector: AV16
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-233/234	0.369	0.131	0.134		pCi/g	1.00	0.0647	123794
Uranium-235/236	0.0230	0.0407	0.0408	U	pCi/g	1.00	0.0735	123794
Uranium-238	0.459	0.145	0.151		pCi/g	1.00	0.0645	123794

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 123278

Lab ID: 160-6694-2 | Analyzed: 05/23/14 18:57 | Decay Corrected: No
Client ID: 2222-SD02 | Detector: AV16 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	5.90	0.467	0.681		pCi/g	0.0629	7.43	81.5	30 - 110

Lab ID: 160-6694-3 | Analyzed: 05/23/14 18:57 | Decay Corrected: No
Client ID: 2222-SD03 | Detector: AV17 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-233/234	0.666	0.172	0.181		pCi/g	1.00	0.0706	123795
Uranium-235/236	0.0110	0.0276	0.0276	U	pCi/g	1.00	0.0618	123795
Uranium-238	0.591	0.162	0.169		pCi/g	1.00	0.0665	123795

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.33	0.494	0.726		pCi/g	0.0917	7.39	88.0	30 - 110

Lab ID: 160-6694-4 | Analyzed: 05/23/14 18:57 | Decay Corrected: No
Client ID: 2222-SD04 | Detector: AV18 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-233/234	1.15	0.234	0.253		pCi/g	1.00	0.0672	123796
Uranium-235/236	0.0854	0.0722	0.0726		pCi/g	1.00	0.0669	123796
Uranium-238	1.08	0.226	0.244		pCi/g	1.00	0.0537	123796

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.04	0.488	0.704		pCi/g	0.0669	7.43	83.5	30 - 110

Lab ID: 160-6694-5 | Analyzed: 05/23/14 18:57 | Decay Corrected: No
Client ID: 2222-SD05 | Detector: AV19 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-233/234	0.289	0.120	0.122		pCi/g	1.00	0.0831	123797
Uranium-235/236	-0.00545	0.00771	0.00773	U	pCi/g	1.00	0.0756	123797
Uranium-238	0.243	0.107	0.109		pCi/g	1.00	0.0531	123797

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.16	0.495	0.716		pCi/g	0.0830	7.44	85.0	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 123278

Lab ID:	160-6694-6	Analyzed:	05/23/14 18:57	Decay Corrected:	No
Client ID:	2222-SD06	Detector:	AV20	Yield Truncated:	No
Sigma:	2	Dil Fac:	1	Ts:	180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-233/234	0.859	0.198	0.211		pCi/g	1.00	0.0796	123798
Uranium-235/236	-0.00784	0.00906	0.00908	U	pCi/g	1.00	0.0793	123798
Uranium-238	0.588	0.163	0.170		pCi/g	1.00	0.0581	123798

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.28	0.496	0.724		pCi/g	0.0631	7.39	87.3	30 - 110

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-123278/1-A	Uranium-233/234			0.004946	U	pCi/g							
MB 160-123278/1-A	Uranium-235/236			-0.01407	U	pCi/g							
MB 160-123278/1-A	Uranium-238			0.01551	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-123278/2-A	Uranium-233/234		6.37	6.226		pCi/g	98	84 - 120					
LCS 160-123278/2-A	Uranium-238		6.51	6.834		pCi/g	105	82 - 122					

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123200 Batch Start Date: 05/20/14 13:40 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00025	UNAT Spike 00001			
MB 160-123200/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123200/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123278 Batch Start Date: 05/21/14 10:03 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:49

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00026	UNAT Spike 00001			
MB 160-123278/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123278/2		ExtChrom, A-01-R		1.0 g	0.2 mL	0.2 mL			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:46:49PM 5/28/2014

Sample

Sample Name: MB 160-123278/1-A
SampleType: Blank
: MB 160-123278/1-A
Sample Collection Date: 5/21/2014 10:10:00AM

Spectrum #2 Analysis #1
Sample Weight : 1.0000g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123278
AnalysisID: 609150

Analyst: 60040

Tracer

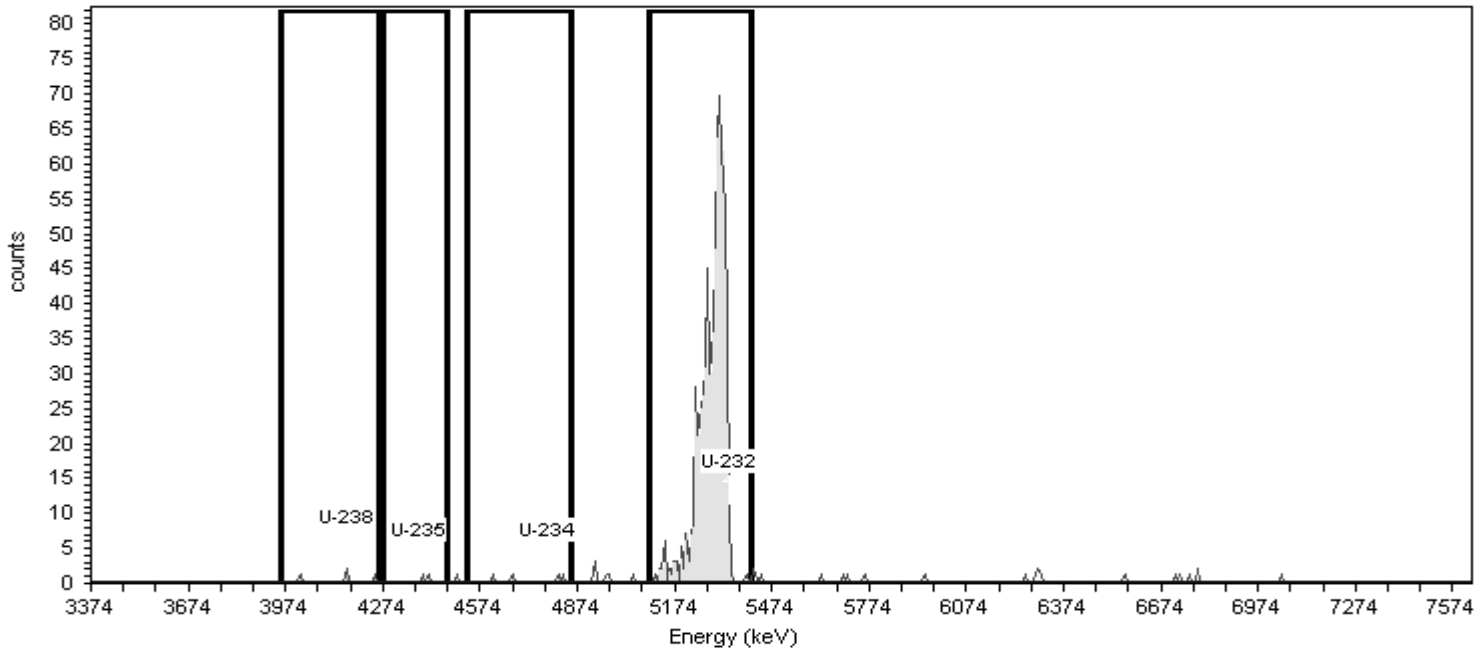
Tracer Name: U-232_00026
Tracer Activity: 82.25 DPM/mL x (Vol.)0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:00:51AM

Tracer Nuclide: U-232
Tracer Recovery: 84.35%

Acquisition

Detector: AV1
Serial Number: 49-188 AA4
Acquisition Start Date: 5/28/2014 3:45:56PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 5/15/2014 1:20:59AM
Background Info: Sample: ICB;AV1; Det: AV1; Spectrum #1; May-15-2014 01:20

Calibration Name: IC-7107;AV1-20140505
Calibration Date: 5/6/2014 5:38:14PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.30% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 5/23/2014 6:54:36PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	10.7	100.0	4	2.6250	1.38	0.016	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	29.8	80.2	2	3.0000	-1.00	-0.014	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	25.0	99.8	4	3.5625	0.44	0.005	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	74.2	100.1	641	0.9375	640.06	6.250	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:58:24PM 5/23/2014

Sample

Sample Name: LCS 160-123278/2-A
SampleType: Control
: LCS 160-123278/2-A
Sample Collection Date: 5/21/2014 10:10:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0000g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123278
AnalysisID: 608727

Analyst: 60040

Tracer

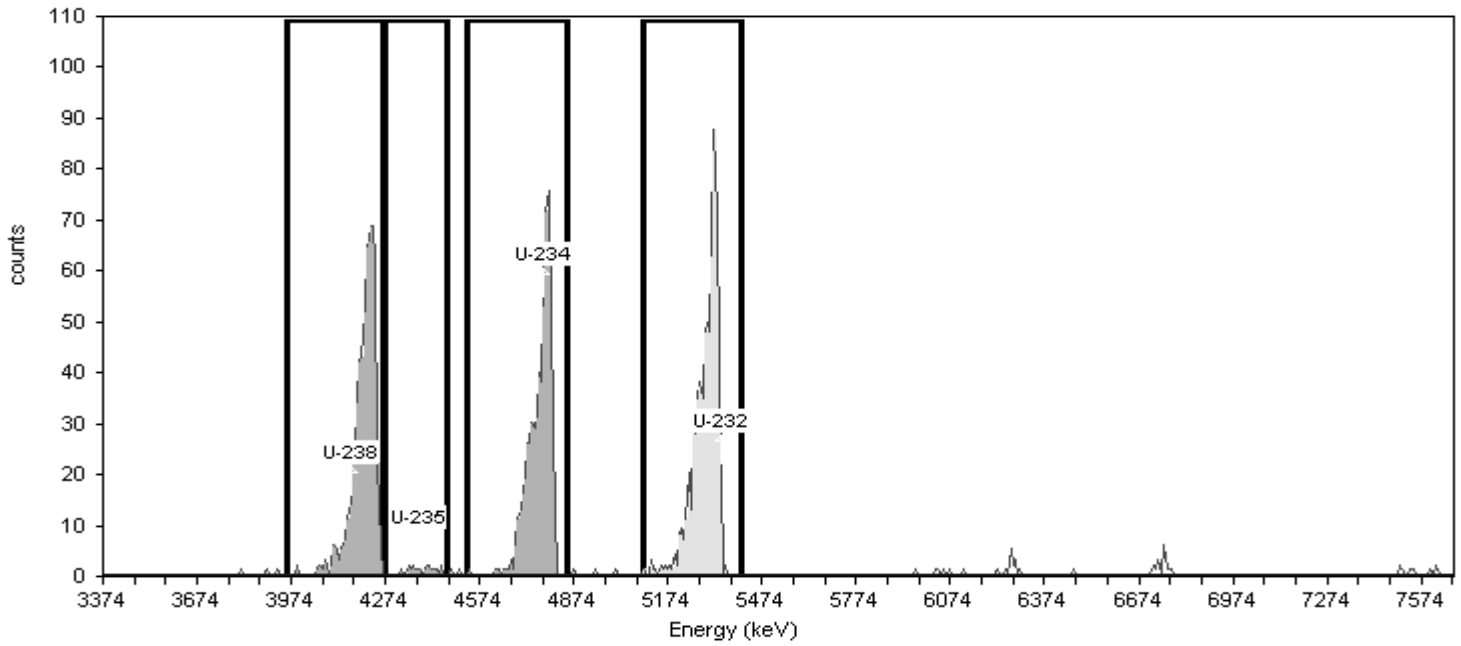
Tracer Name: U-232_00026
Tracer Activity: 82.25 DPM/mL x (Vol.)0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:00:51AM

Tracer Nuclide: U-232
Tracer Recovery: 88.41%

Acquisition

Detector: AV11
Serial Number: 49-155dd2
Acquisition Start Date: 5/23/2014 6:57:10PM
Live Time: 180.00 min.
Real Time: 180.46 min.
Background Date: 5/15/2014 1:18:01AM
Background Info: Sample: ICB;AV11; Det: AV11; Spectrum #1; May-15-2014 01:18

Calibration Name: IC-9795;AV11-20140505
Calibration Date: 5/6/2014 5:39:16PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.88% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 5/23/2014 6:54:35PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	27.4	100.0	650	0.9375	649.06	6.834	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	83.3	80.2	19	0.3750	18.63	0.245	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	66.1	99.8	591	0.9375	590.06	6.226	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	73.0	100.1	687	1.1250	685.88	6.551	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:58:06PM 5/23/2014

Sample

Sample Name: 160-6694-A-1-C
SampleType: Sample
: 160-6694-A-1-C
Sample Collection Date: 5/15/2014 8:25:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9977g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123278
AnalysisID: 608724

Analyst: 60040

Tracer

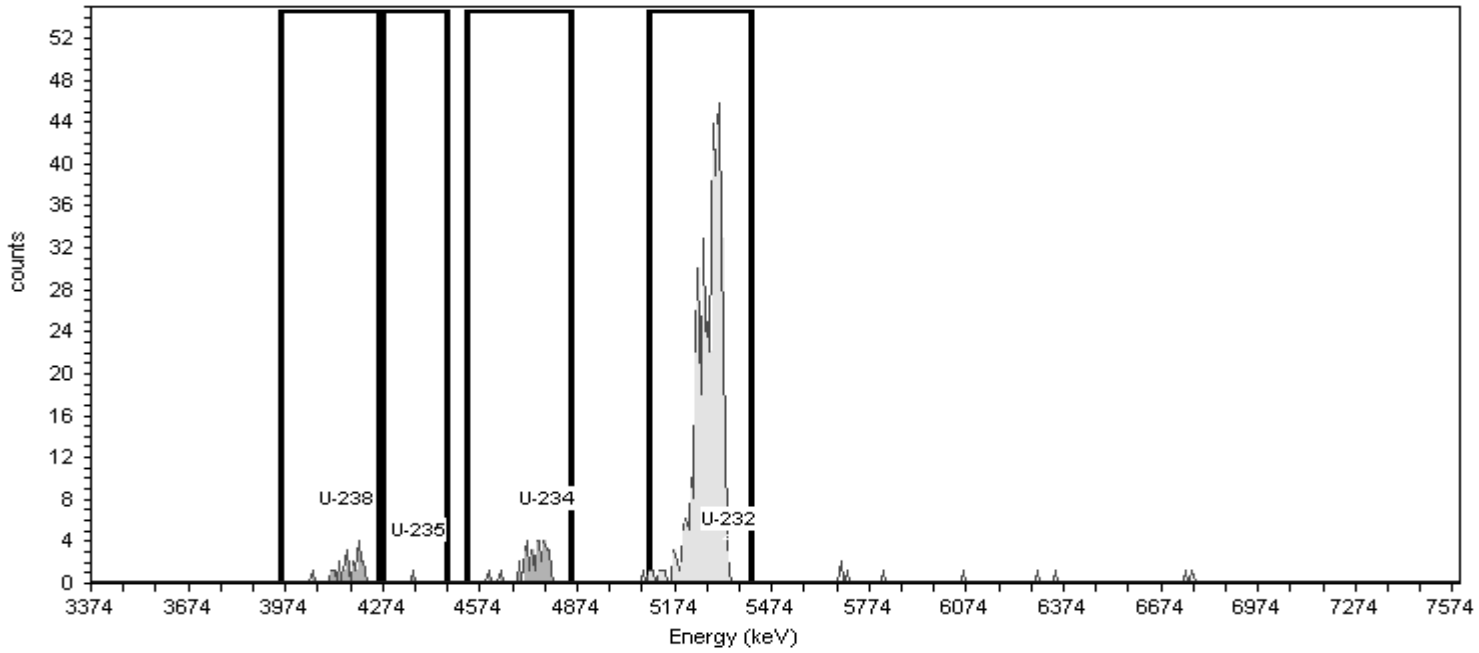
Tracer Name: U-232_00026
Tracer Activity: 82.25 DPM/mL x (Vol.)0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:00:51AM

Tracer Nuclide: U-232
Tracer Recovery: 60.14%

Acquisition

Detector: AV15
Serial Number: 41-172C5
Acquisition Start Date: 5/23/2014 6:57:32PM
Live Time: 180.00 min.
Real Time: 180.46 min.
Background Date: 5/15/2014 1:17:55AM
Background Info: Sample: ICB;AV15; Det: AV15; Spectrum #1; May-15-2014 01:17

Calibration Name: IC-9886;AV15-20140505
Calibration Date: 5/6/2014 5:39:42PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.62% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 5/23/2014 6:54:35PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	89.0	100.0	22	0.3750	21.63	0.352	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	18.3	80.2	1	0.1875	0.81	0.016	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	83.3	99.8	37	1.1250	35.88	0.585	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	85.9	100.1	446	1.3125	444.69	4.466	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:58:13PM 5/23/2014

Sample

Sample Name: 160-6694-A-2-C
SampleType: Sample
: 160-6694-A-2-C
Sample Collection Date: 5/15/2014 9:45:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9979g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123278
AnalysisID: 608725

Analyst: 60040

Tracer

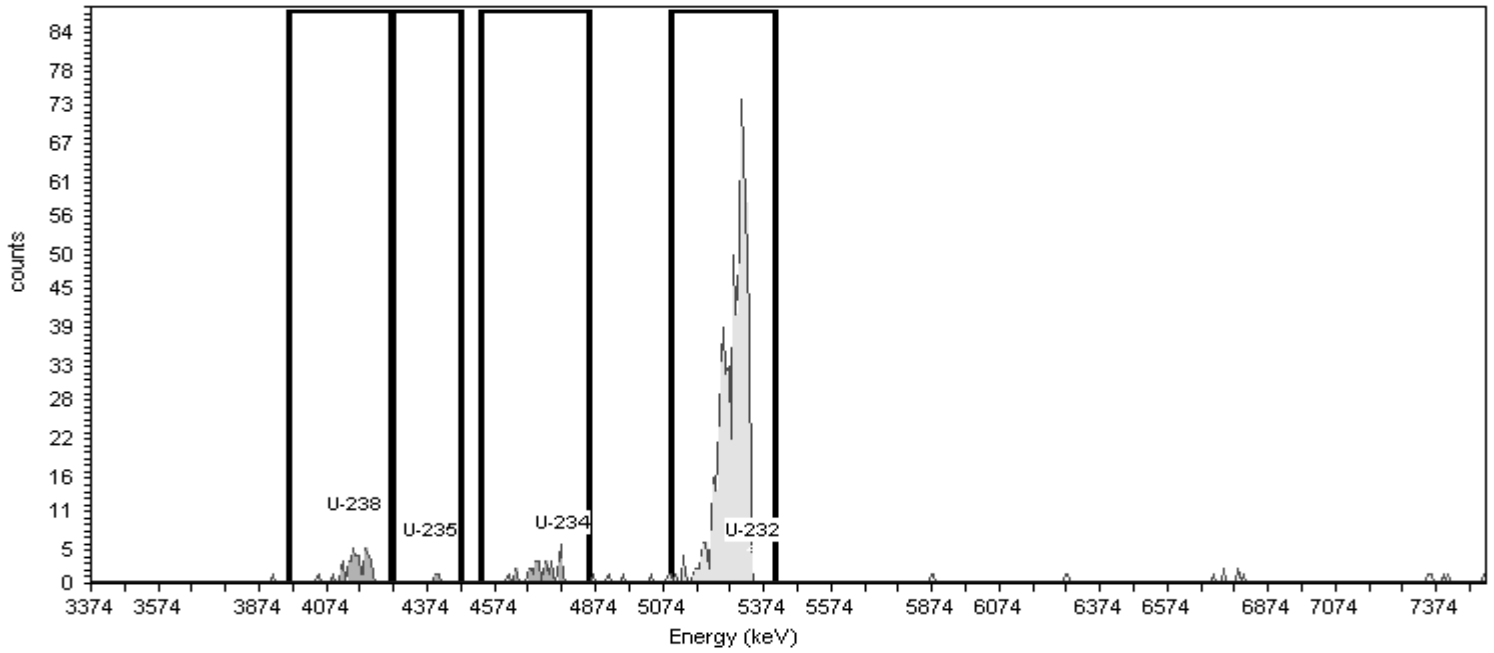
Tracer Name: U-232_00026
Tracer Activity: 82.25 DPM/mL x (Vol.)0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:00:51AM

Tracer Nuclide: U-232
Tracer Recovery: 81.53%

Acquisition

Detector: AV16
Serial Number: 51-082B6
Acquisition Start Date: 5/23/2014 6:57:33PM
Live Time: 180.00 min.
Real Time: 180.46 min.
Background Date: 5/15/2014 1:17:57AM
Background Info: Sample: ICB;AV16; Det: AV16; Spectrum #1; May-15-2014 01:17

Calibration Name: IC-7107;AV16-20140505
Calibration Date: 5/5/2014 10:08:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.11% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 5/23/2014 6:54:35PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	88.6	100.0	41	0.5625	40.44	0.459	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	17.4	80.2	2	0.3750	1.63	0.023	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	113.7	99.8	33	0.5625	32.44	0.369	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	80.0	100.1	639	1.1250	637.88	6.054	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:57:02PM 5/23/2014

Sample

Sample Name: 160-6694-A-3-C
SampleType: Sample
: 160-6694-A-3-C
Sample Collection Date: 5/15/2014 8:50:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0026g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123278
AnalysisID: 608718

Analyst: 60040

Tracer

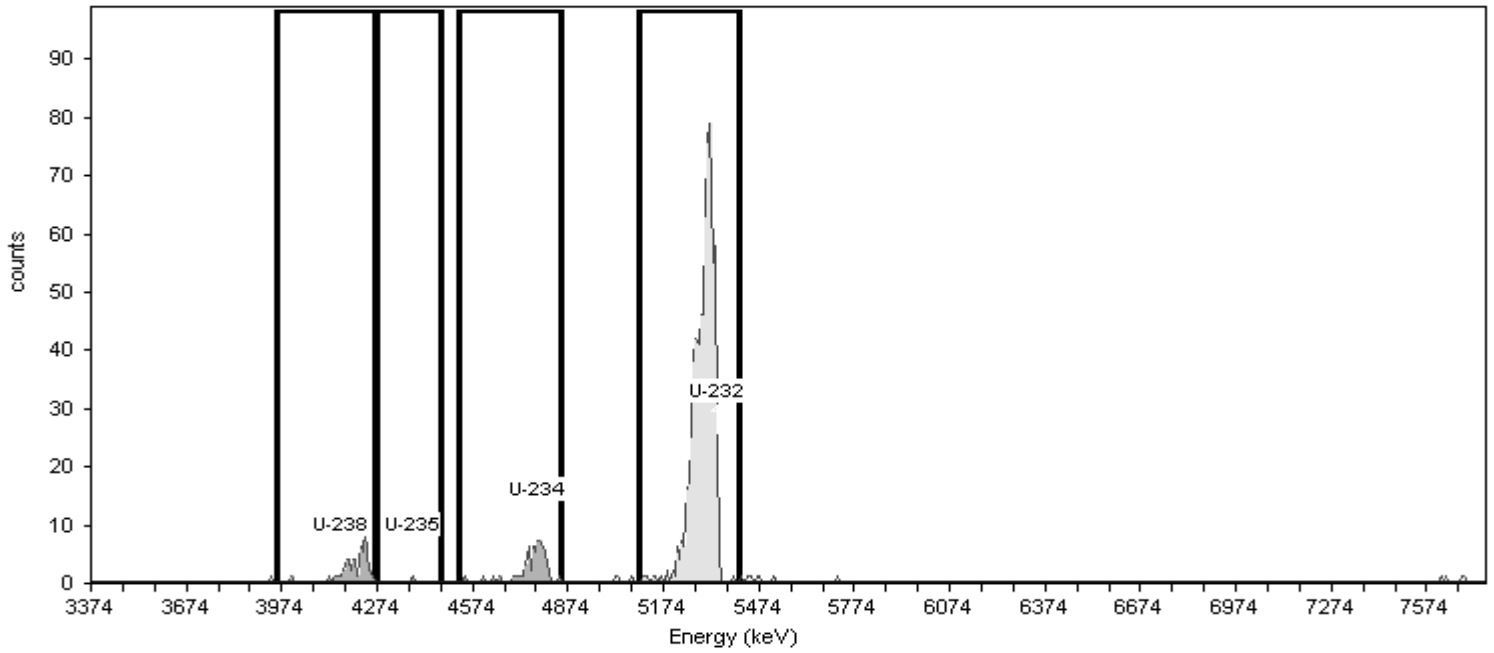
Tracer Name: U-232_00026
Tracer Activity: 82.25 DPM/mL x (Vol.)0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:00:51AM

Tracer Nuclide: U-232
Tracer Recovery: 87.95%

Acquisition

Detector: AV17
Serial Number: 50-051C4
Acquisition Start Date: 5/23/2014 6:57:34PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 5/15/2014 1:17:59AM
Background Info: Sample: ICB;AV17; Det: AV17; Spectrum #1; May-15-2014 01:17

Calibration Name: IC-8874;AV17-20140505
Calibration Date: 5/5/2014 10:08:49PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.07% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 5/23/2014 6:54:35PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	22.4	100.0	55	0.7500	54.25	0.591	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	18.3	80.2	1	0.1875	0.81	0.011	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	72.5	99.8	62	0.9375	61.06	0.666	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	69.7	100.1	665	3.3750	661.63	6.500	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:57:15PM 5/23/2014

Sample

Sample Name: 160-6694-A-4-C
SampleType: Sample
: 160-6694-A-4-C
Sample Collection Date: 5/15/2014 9:05:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9979g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123278
AnalysisID: 608719

Analyst: 60040

Tracer

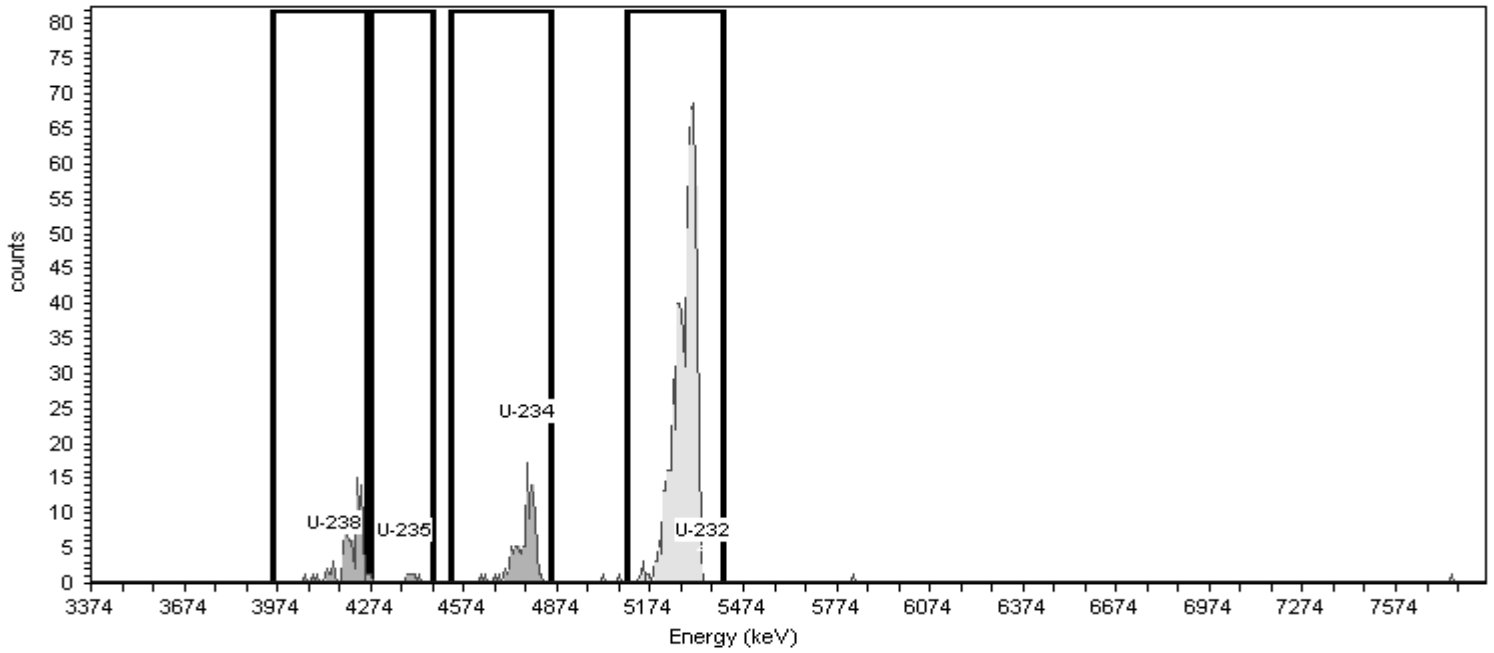
Tracer Name: U-232_00026
Tracer Activity: 82.25 DPM/mL x (Vol.)0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:00:51AM

Tracer Nuclide: U-232
Tracer Recovery: 83.53%

Acquisition

Detector: AV18
Serial Number: 51-082C5
Acquisition Start Date: 5/23/2014 6:57:35PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 5/15/2014 1:18:01AM
Background Info: Sample: ICB;AV18; Det: AV18; Spectrum #1; May-15-2014 01:18

Calibration Name: IC-8875;AV18-20140505
Calibration Date: 5/5/2014 10:09:08PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.46% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 5/23/2014 6:54:35PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	29.9	100.0	92	0.1875	91.81	1.082	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	33.5	80.2	6	0.1875	5.81	0.085	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	55.5	99.8	98	0.5625	97.44	1.151	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	69.9	100.1	615	1.1250	613.88	6.203	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:57:33PM 5/23/2014

Sample

Sample Name: 160-6694-A-5-C
SampleType: Sample
: 160-6694-A-5-C
Sample Collection Date: 5/15/2014 9:15:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9957g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123278
AnalysisID: 608720

Analyst: 60040

Tracer

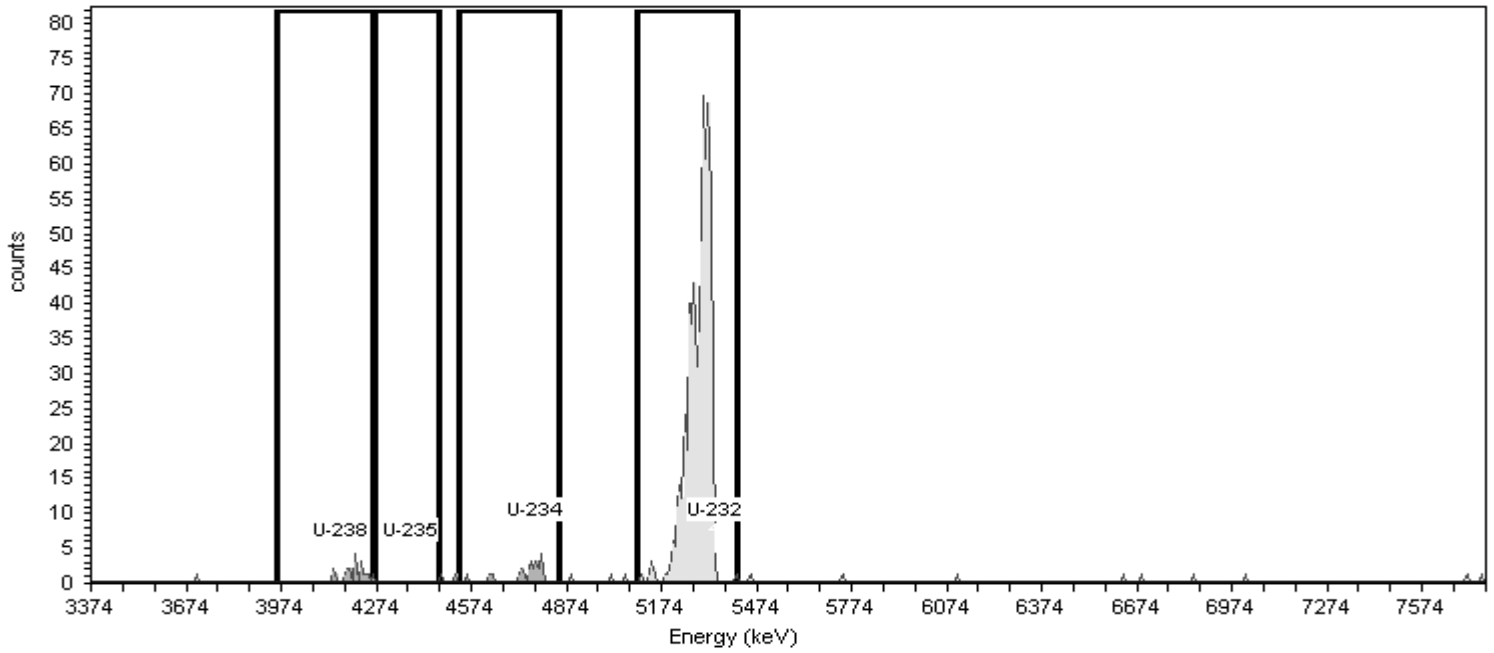
Tracer Name: U-232_00026
Tracer Activity: 82.25 DPM/mL x (Vol.)0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:00:51AM

Tracer Nuclide: U-232
Tracer Recovery: 85.03%

Acquisition

Detector: AV19
Serial Number: 50-025FF5
Acquisition Start Date: 5/23/2014 6:57:36PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 5/15/2014 1:18:02AM
Background Info: Sample: ICB;AV19; Det: AV19; Spectrum #1; May-15-2014 01:18

Calibration Name: IC-8876;AV19-20140505
Calibration Date: 5/5/2014 10:09:02PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.34% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 5/23/2014 6:54:35PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	13.7	100.0	21	0.1875	20.81	0.243	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	.0	80.2	0	0.3750	-0.38	-0.005	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	57.9	99.8	26	1.3125	24.69	0.289	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	75.5	100.1	624	2.2500	621.75	6.327	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:57:50PM 5/23/2014

Sample

Sample Name: 160-6694-A-6-C
SampleType: Sample
: 160-6694-A-6-C
Sample Collection Date: 5/15/2014 8:45:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0029g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 123278
AnalysisID: 608721

Analyst: 60040

Tracer

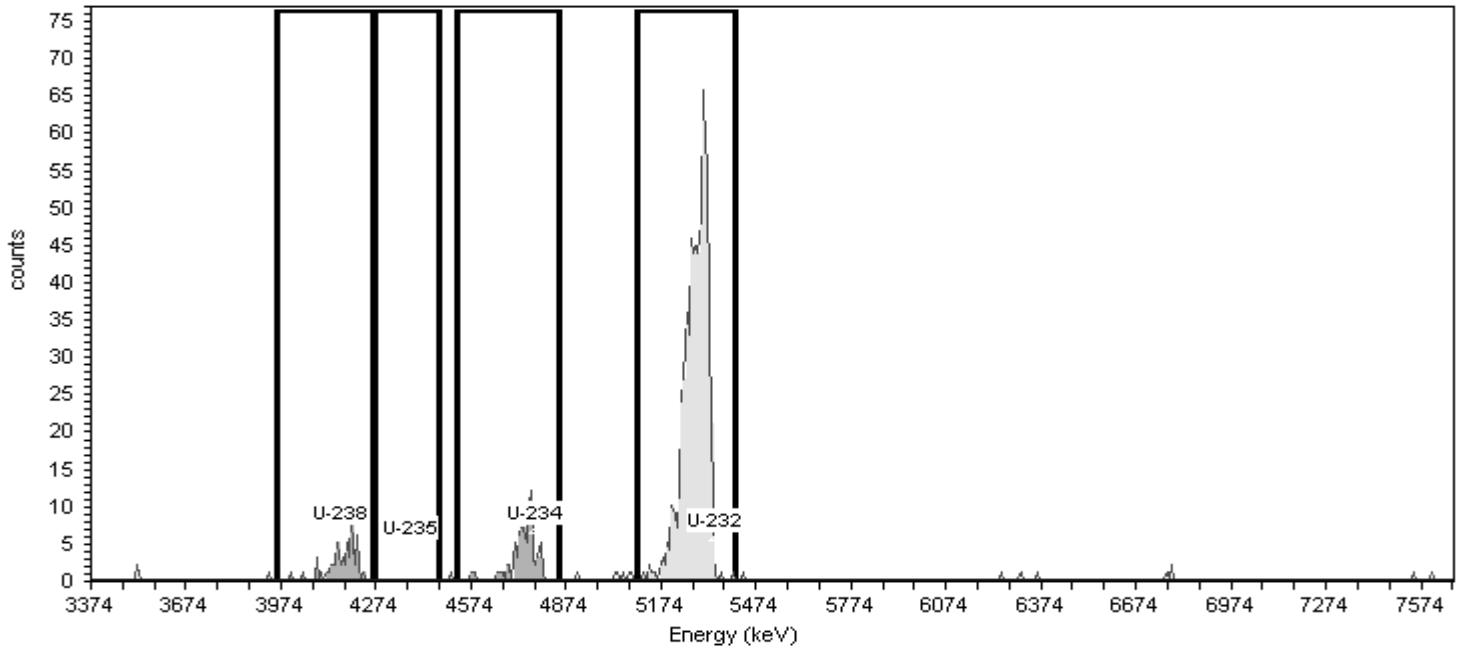
Tracer Name: U-232_00026
Tracer Activity: 82.25 DPM/mL x (Vol.)0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:00:51AM

Tracer Nuclide: U-232
Tracer Recovery: 87.31%

Acquisition

Detector: AV20
Serial Number: 48-121A7
Acquisition Start Date: 5/23/2014 6:57:37PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 5/15/2014 1:18:04AM
Background Info: Sample: ICB;AV20; Det: AV20; Spectrum #1; May-15-2014 01:18

Calibration Name: IC-8877;AV20-20140505
Calibration Date: 5/5/2014 10:09:21PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.56% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 5/23/2014 6:54:35PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	82.2	100.0	53	0.3750	52.63	0.588	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	.0	80.2	0	0.5625	-0.56	-0.008	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	68.0	99.8	78	1.3125	76.69	0.859	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	84.6	100.1	645	0.9375	644.06	6.451	pCi/g

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123200 Batch Start Date: 05/20/14 13:40 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00025	UNAT Spike 00001			
MB 160-123200/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123200/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123278 Batch Start Date: 05/21/14 10:03 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:49

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00026	UNAT Spike 00001			
MB 160-123278/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123278/2		ExtChrom, A-01-R		1.0 g	0.2 mL	0.2 mL			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123200 Batch Start Date: 05/20/14 13:40 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00025	UNAT Spike 00001			
MB 160-123200/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123200/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123278 Batch Start Date: 05/21/14 10:03 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:49

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00026	UNAT Spike 00001			
MB 160-123278/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123278/2		ExtChrom, A-01-R		1.0 g	0.2 mL	0.2 mL			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123200 Batch Start Date: 05/20/14 13:40 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 05/21/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00025	UNAT Spike 00001			
MB 160-123200/1		ExtChrom, A-01-R		500 mL	0.2 mL				
LCS 160-123200/2		ExtChrom, A-01-R		500 mL	0.2 mL	0.2 mL			
160-6694-C-7	2222-RIN-01	ExtChrom, A-01-R	T	499.50 mL	0.2 mL				

Batch Notes	
Balance ID	1125353055
Column Analyst	mlb
Column Date	05/21/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/21/14
Person's name who witnessed reagent drop	MLB PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

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

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123278 Batch Start Date: 05/21/14 10:03 Batch Analyst: Bramblett, Megan L

Batch Method: ExtChrom Batch End Date: 05/23/14 13:49

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00026	UNAT Spike 00001			
MB 160-123278/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-123278/2		ExtChrom, A-01-R		1.0 g	0.2 mL	0.2 mL			
160-6694-A-1-A	2222-SD01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
160-6694-A-2-A	2222-SD02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-3-A	2222-SD03	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
160-6694-A-4-A	2222-SD04	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
160-6694-A-5-A	2222-SD05	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
160-6694-A-6-A	2222-SD06	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Column Analyst	mlb for nmn
Column Date	05/23/14
CoPrecipitation Analyst	mlb
CoPrecipitation Date	05/23/14
Person's name who witnessed reagent drop	mlb for scb
Analyst who added reagent	mlb
SOP Number	st-rc-0100, st-rc-0003, st-rc-0004, st-rc-0242

Basis	Basis Description
T	Total/NA

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

Daily Checks

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 05/21/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV43	05/21/14 16:01	7450	7041.9 - 7783.1	Pass	11.7	10 - 20	Pass	221.0	216.9 - 226.9	Pass	5015	4982.0 - 5062.0	Pass
AV44	05/21/14 16:01	7512	7220.7 - 7980.8	Pass	11.6	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.1 - 5055.1	Pass
AV48	05/21/14 16:02	7618	7068.1 - 7812.1	Pass	13.5	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4989.8 - 5069.8	Pass
AV55	05/21/14 16:01	7164	6899.4 - 7625.7	Pass	10.9	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.9 - 5084.9	Pass
AV78	05/21/14 16:01	7551	7170.6 - 7925.4	Pass	13.5	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5038	4997.5 - 5077.5	Pass
AV79	05/21/14 16:01	7433	7146.3 - 7898.6	Pass	13.1	10 - 20	Pass	222.0	217.0 - 227.0	Pass	5023	4982.6 - 5062.6	Pass
AV82	05/21/14 16:02	7539	7160.6 - 7914.3	Pass	14.3	10 - 20	Pass	223.1	218.0 - 228.0	Pass	5031	4990.4 - 5070.4	Pass
AV84	05/21/14 16:02	7488	7145.0 - 7897.1	Pass	12.6	10 - 20	Pass	226.0	221.0 - 231.0	Pass	5053	5012.6 - 5092.6	Pass

Analysis Date: 05/23/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV11	05/23/14 08:54	7720	7322.5 - 8093.3	Pass	13.5	10 - 20	Pass	226.0	221.1 - 231.1	Pass	5053	5012.8 - 5092.8	Pass
AV13	05/23/14 08:54	7595	7244.9 - 8007.5	Pass	17.8	10 - 20	Pass	222.8	219.1 - 229.1	Pass	5029	4998.3 - 5078.3	Pass
AV15	05/23/14 08:54	7706	7313.8 - 8083.7	Pass	14.7	10 - 20	Pass	225.1	219.2 - 229.2	Pass	5046	4998.9 - 5078.9	Pass
AV16	05/23/14 08:54	7516	7055.7 - 7798.4	Pass	12.3	10 - 20	Pass	222.0	215.9 - 225.9	Pass	5023	4974.6 - 5054.6	Pass
AV17	05/23/14 08:54	7561	7224.6 - 7985.1	Pass	11.9	10 - 20	Pass	227.0	221.0 - 231.0	Pass	5060	5012.5 - 5092.5	Pass
AV18	05/23/14 08:55	7591	7204.8 - 7963.1	Pass	12.0	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.9 - 5084.9	Pass
AV19	05/23/14 08:55	7628	7231.9 - 7993.2	Pass	11.4	10 - 20	Pass	226.0	221.0 - 231.0	Pass	5052	5012.3 - 5092.3	Pass
AV20	05/23/14 08:55	7669	7255.1 - 8018.8	Pass	15.7	10 - 20	Pass	223.1	217.9 - 227.9	Pass	5031	4989.0 - 5069.0	Pass
AV45	05/23/14 08:55	7583	7219.6 - 7979.6	Pass	16.6	10 - 20	Pass	224.0	219.7 - 229.7	Pass	5037	5003.0 - 5083.0	Pass
AV46	05/23/14 08:55	7463	7134.7 - 7885.7	Pass	12.5	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.8 - 5084.8	Pass
AV48	05/23/14 08:55	7614	7068.1 - 7812.1	Pass	13.3	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4989.8 - 5069.8	Pass
AV57	05/23/14 08:55	7227	6901.7 - 7628.2	Pass	17.7	10 - 20	Pass	229.0	224.0 - 234.0	Pass	5075	5034.9 - 5114.9	Pass
AV58	05/23/14 08:55	6966	6766.5 - 7478.7	Pass	12.6	10 - 20	Pass	222.9	219.0 - 229.0	Pass	5030	4997.2 - 5077.2	Pass
AV59	05/23/14 08:55	7180	6885.8 - 7610.6	Pass	17.6	10 - 20	Pass	222.9	217.9 - 227.9	Pass	5029	4989.1 - 5069.1	Pass
AV60	05/23/14 08:55	7234	6867.8 - 7590.7	Pass	15.5	10 - 20	Pass	222.1	216.2 - 226.2	Pass	5024	4976.7 - 5056.7	Pass
AV61	05/23/14 08:55	7251	6682.3 - 7385.7	Pass	14.0	10 - 20	Pass	224.1	219.0 - 229.0	Pass	5038	4997.8 - 5077.8	Pass
AV62	05/23/14 08:55	7213	6875.3 - 7599.0	Pass	17.7	10 - 20	Pass	222.1	217.1 - 227.1	Pass	5023	4983.0 - 5063.0	Pass

Analysis Date: 05/28/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV1	05/28/14 09:33	7282	6814.5 - 7531.8	Pass	12.8	10 - 20	Pass	223.0	216.9 - 226.9	Pass	5030	4982.0 - 5062.0	Pass

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:37:00AM 5/28/2014

Sample

Sample Name: Pulser;AV1 Spectrum #6 Analysis #1
Comment:

Batch

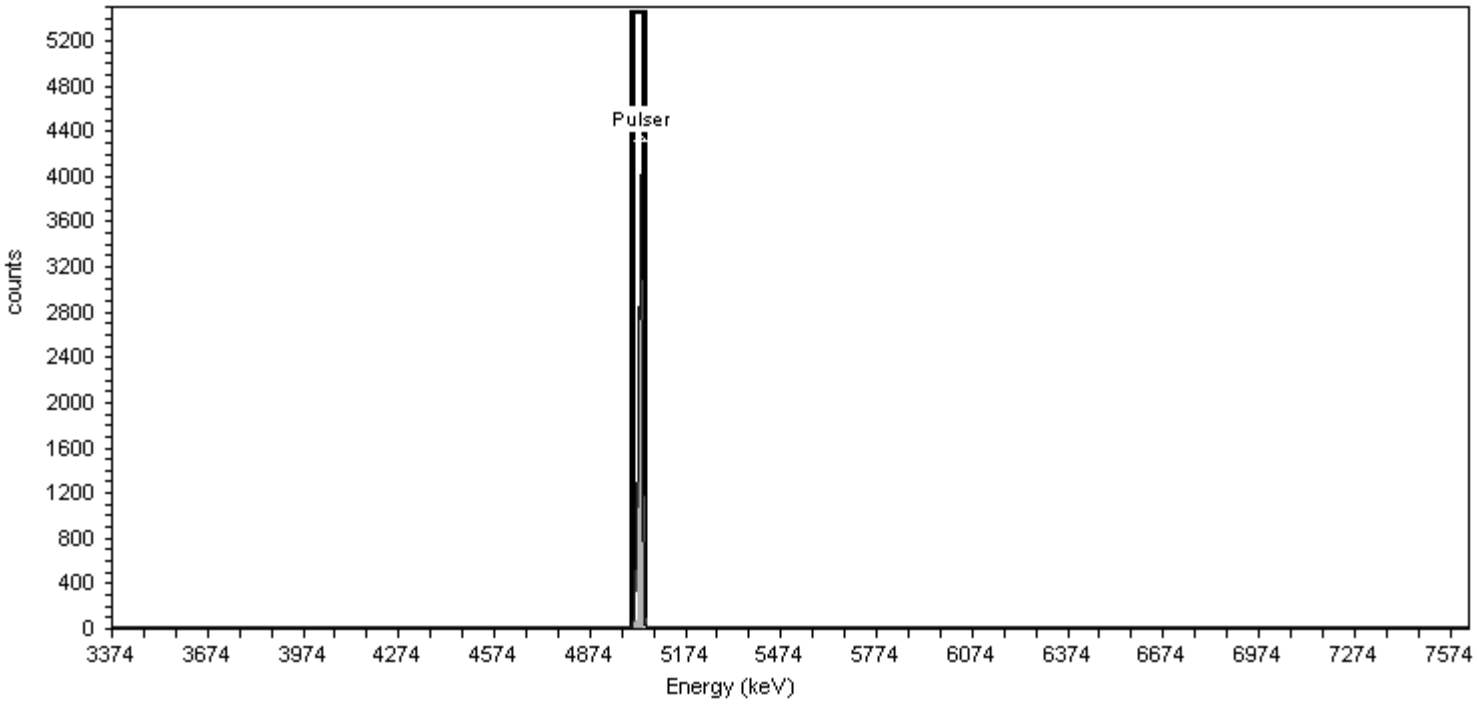
Batch Name: May2014aa Analyst: 60040
Description:

Acquisition

Detector: AV1 , SN: 49-188 AA4
Acquisition Start Date: 5/28/2014 9:33:02AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-7107;AV1-20140505
Calibration Date: 5/6/2014 5:38:14PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.30% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.702	5007.986	5051.418	12.76	7,338.30	7,281.61

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:00:31AM 5/23/2014

Sample

Sample Name: Pulser;AV11 Spectrum #4 Analysis #1
Comment:

Batch

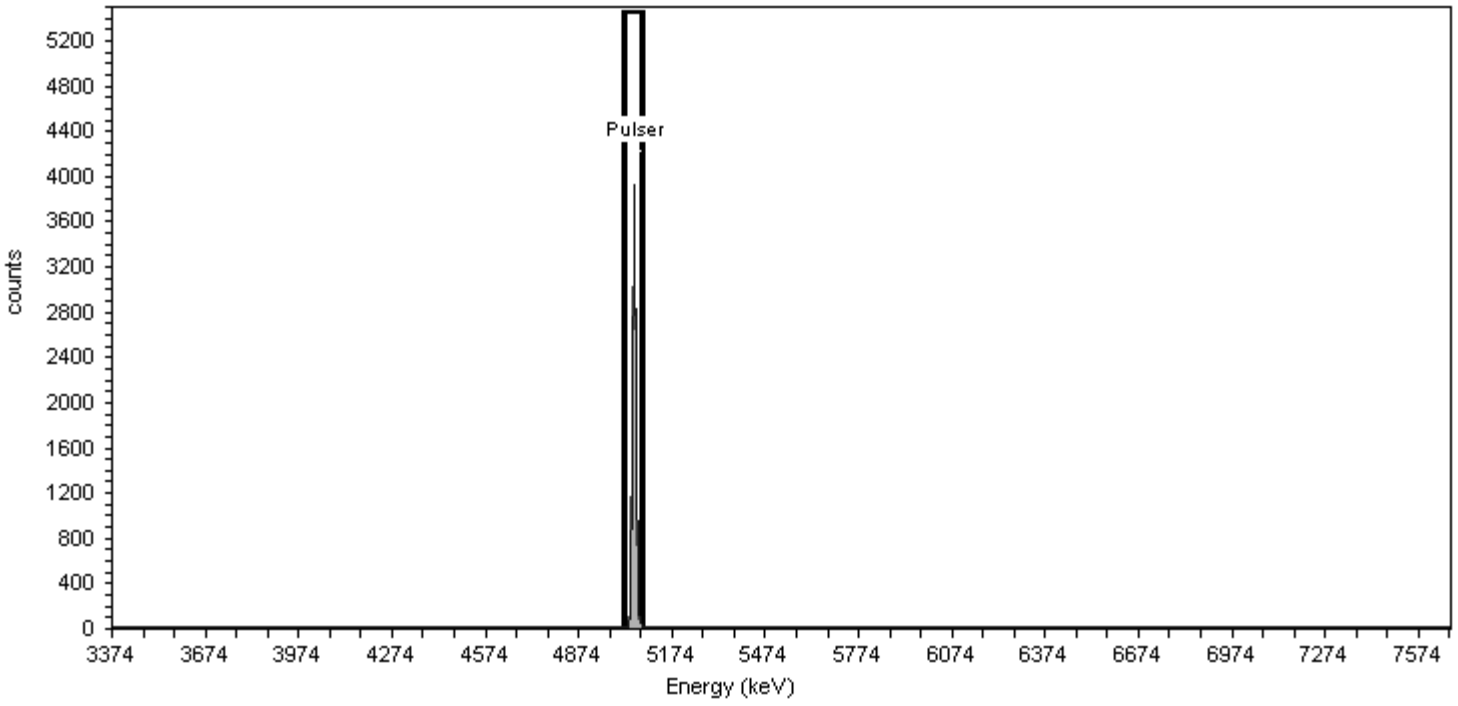
Batch Name: May2014aa Analyst: 60040
Description:

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 5/23/2014 8:54:54AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9795;AV11-20140505
Calibration Date: 5/6/2014 5:39:16PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.88% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5052.549	5029.654	5075.444	13.45	7,559.68	7,719.77

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:00:48AM 5/23/2014

Sample

Sample Name: Pulser;AV13
Comment:

Spectrum #4 Analysis #1

Batch

Batch Name: May2014aa
Description:

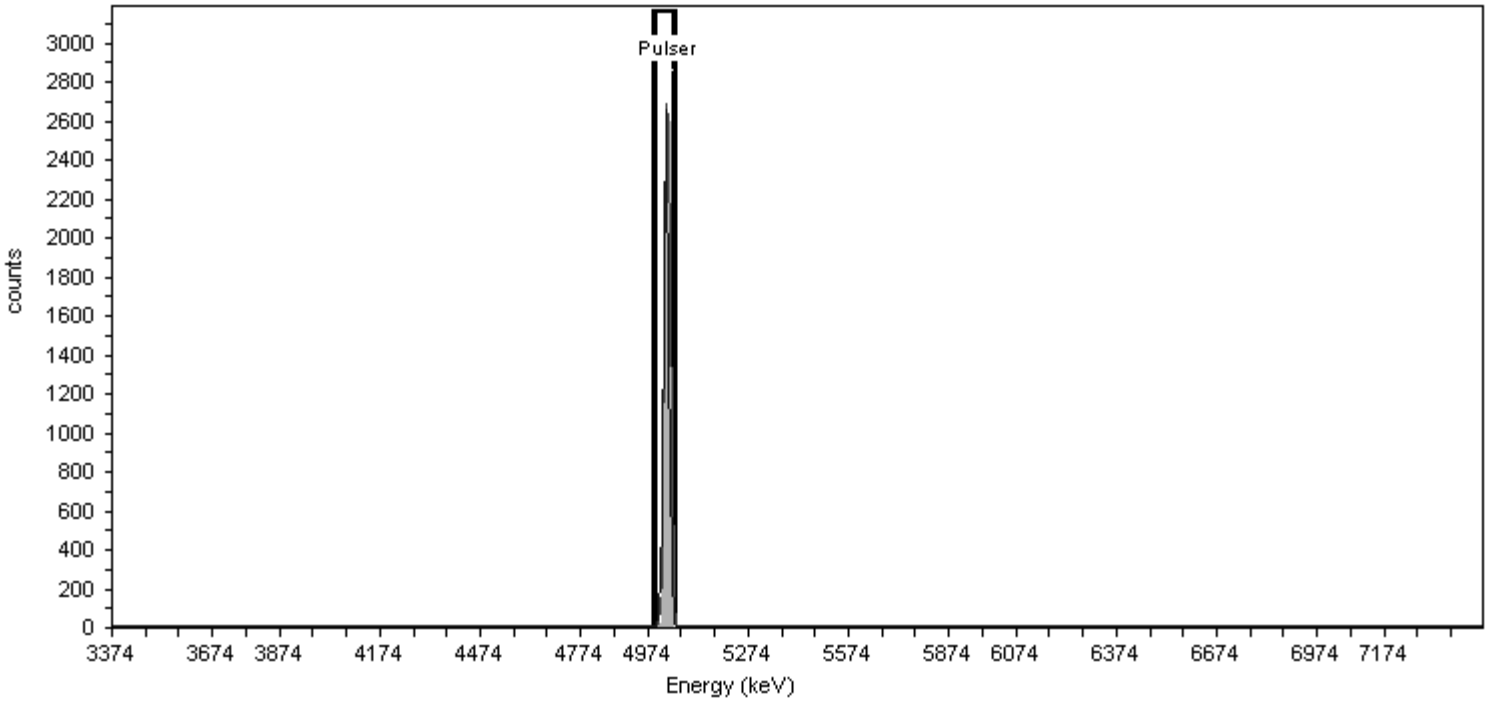
Analyst: 60040

Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 5/23/2014 8:54:55AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9884;AV13-20140505
Calibration Date: 5/6/2014 5:39:28PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.99% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5028.785	4998.405	5059.165	17.85	6,886.36	7,595.02

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:00:59AM 5/23/2014

Sample

Sample Name: Pulser;AV15 Spectrum #4 Analysis #1
Comment:

Batch

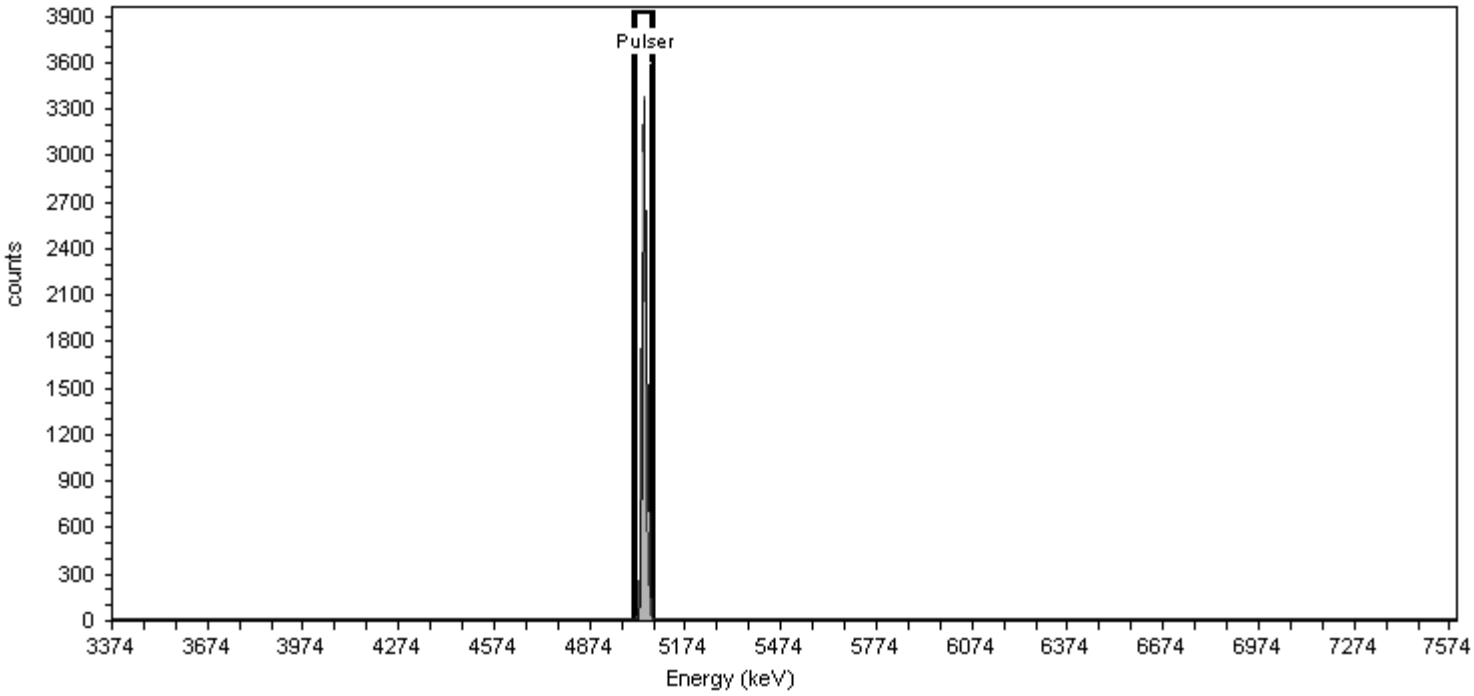
Batch Name: May2014aa Analyst: 60040
Description:

Acquisition

Detector: AV15 , SN: 41-172C5
Acquisition Start Date: 5/23/2014 8:54:57AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9886;AV15-20140505
Calibration Date: 5/6/2014 5:39:42PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.62% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5045.753	5020.708	5070.798	14.71	7,135.32	7,706.11

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:01:05AM 5/23/2014

Sample

Sample Name: Pulser;AV16
Comment:

Spectrum #4 Analysis #1

Batch

Batch Name: May2014aa
Description:

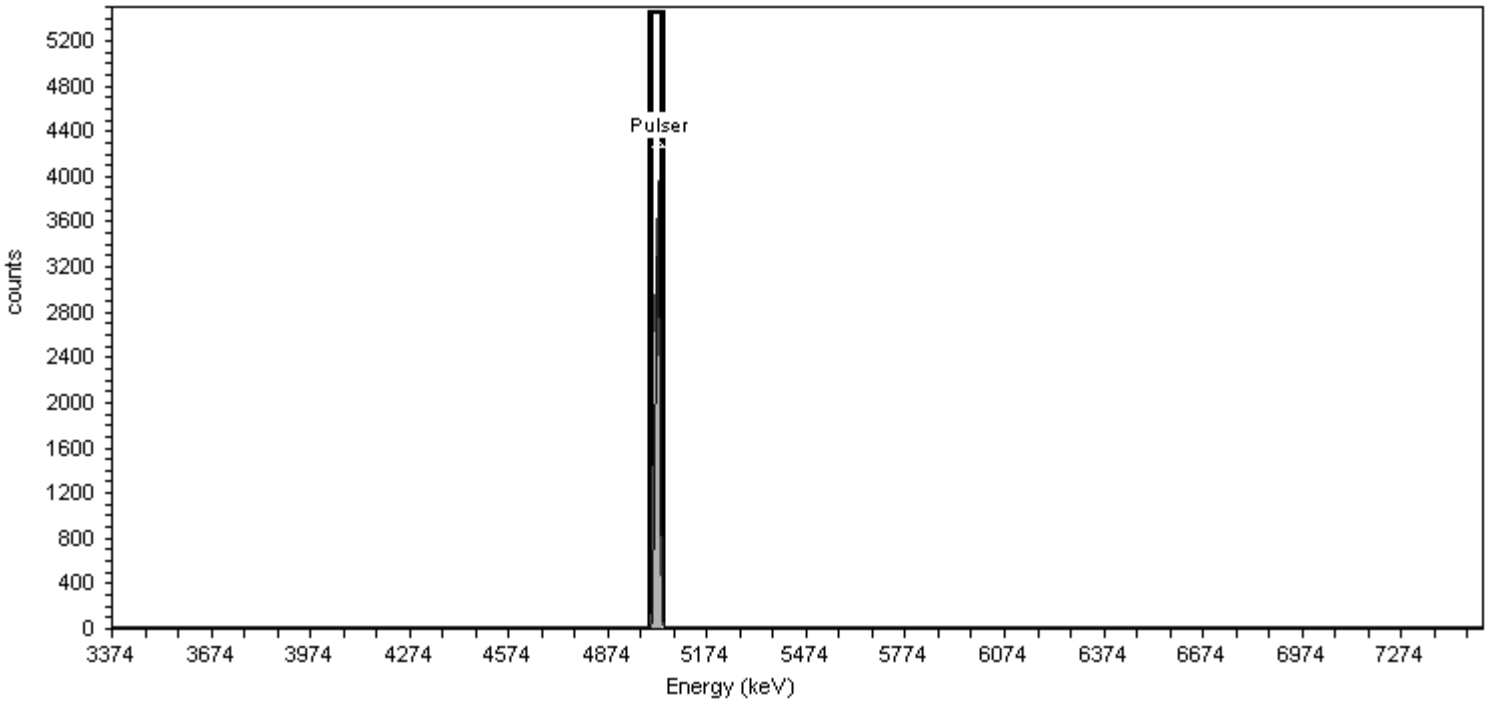
Analyst: 60040

Acquisition

Detector: AV16 , SN: 51-082B6
Acquisition Start Date: 5/23/2014 8:54:58AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-7107;AV16-20140505
Calibration Date: 5/5/2014 10:08:41PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.11% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5022.837	5001.918	5043.756	12.29	6,968.59	7,516.26

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:01:11AM 5/23/2014

Sample

Sample Name: Pulser;AV17
Comment:

Spectrum #5 Analysis #1

Batch

Batch Name: May2014aa
Description:

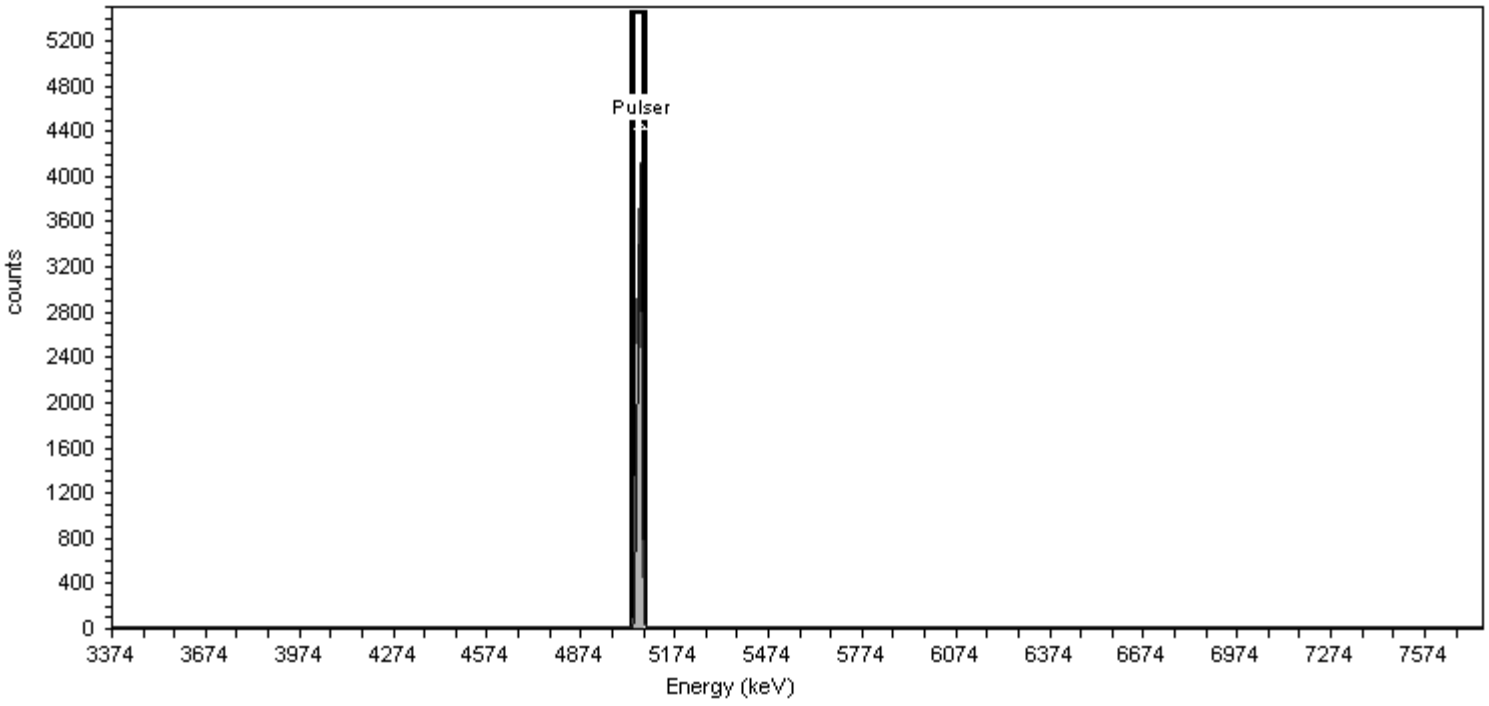
Analyst: 60040

Acquisition

Detector: AV17 , SN: 50-051C4
Acquisition Start Date: 5/23/2014 8:54:59AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8874;AV17-20140505
Calibration Date: 5/5/2014 10:08:49PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.07% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5060.086	5039.915	5080.258	11.85	6,990.91	7,560.99

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:01:17AM 5/23/2014

Sample

Sample Name: Pulser;AV18 Spectrum #4 Analysis #1
Comment:

Batch

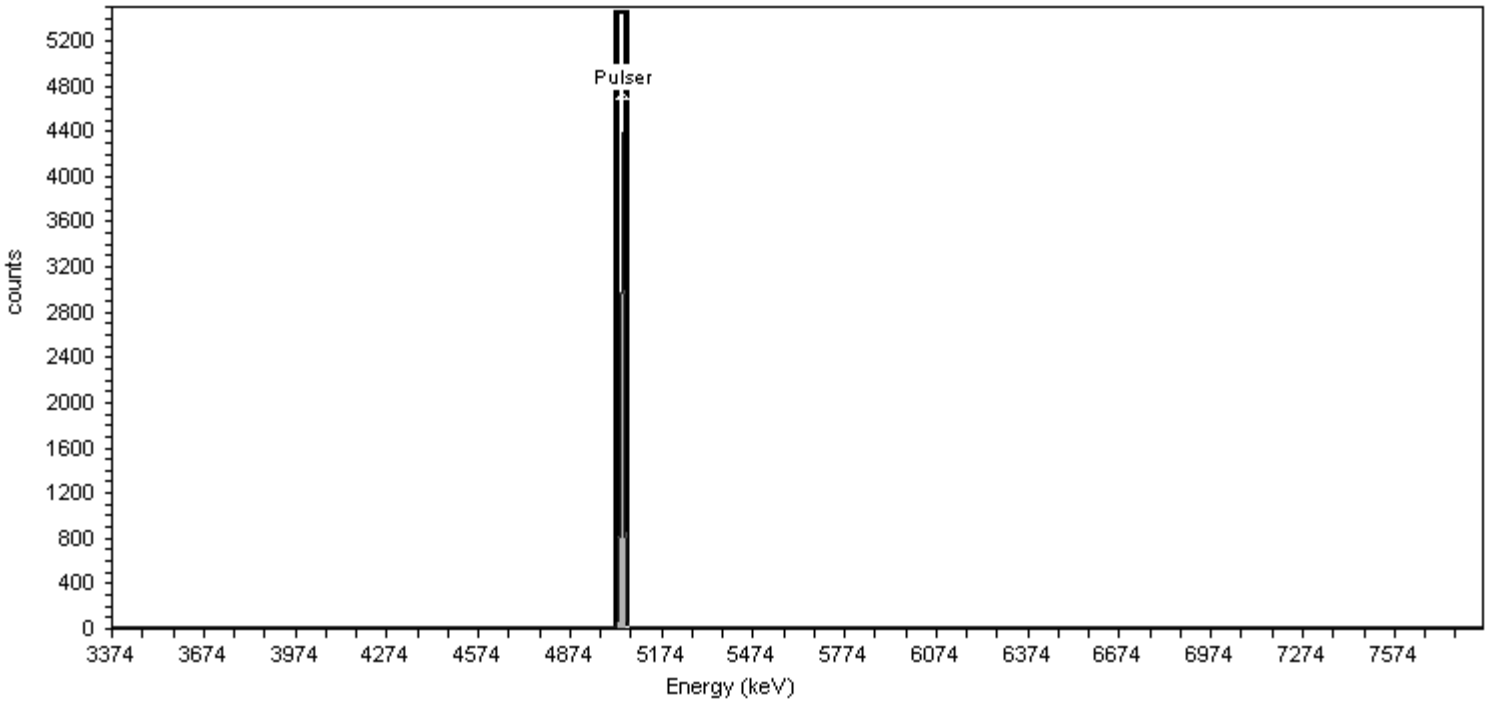
Batch Name: May2014aa Analyst: 60040
Description:

Acquisition

Detector: AV18 , SN: 51-082C5
Acquisition Start Date: 5/23/2014 8:55:01AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8875;AV18-20140505
Calibration Date: 5/5/2014 10:09:08PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.46% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5044.920	5024.425	5065.415	12.04	7,562.55	7,591.18

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:01:23AM 5/23/2014

Sample

Sample Name: Pulser;AV19
Comment:

Spectrum #4 Analysis #1

Batch

Batch Name: May2014aa
Description:

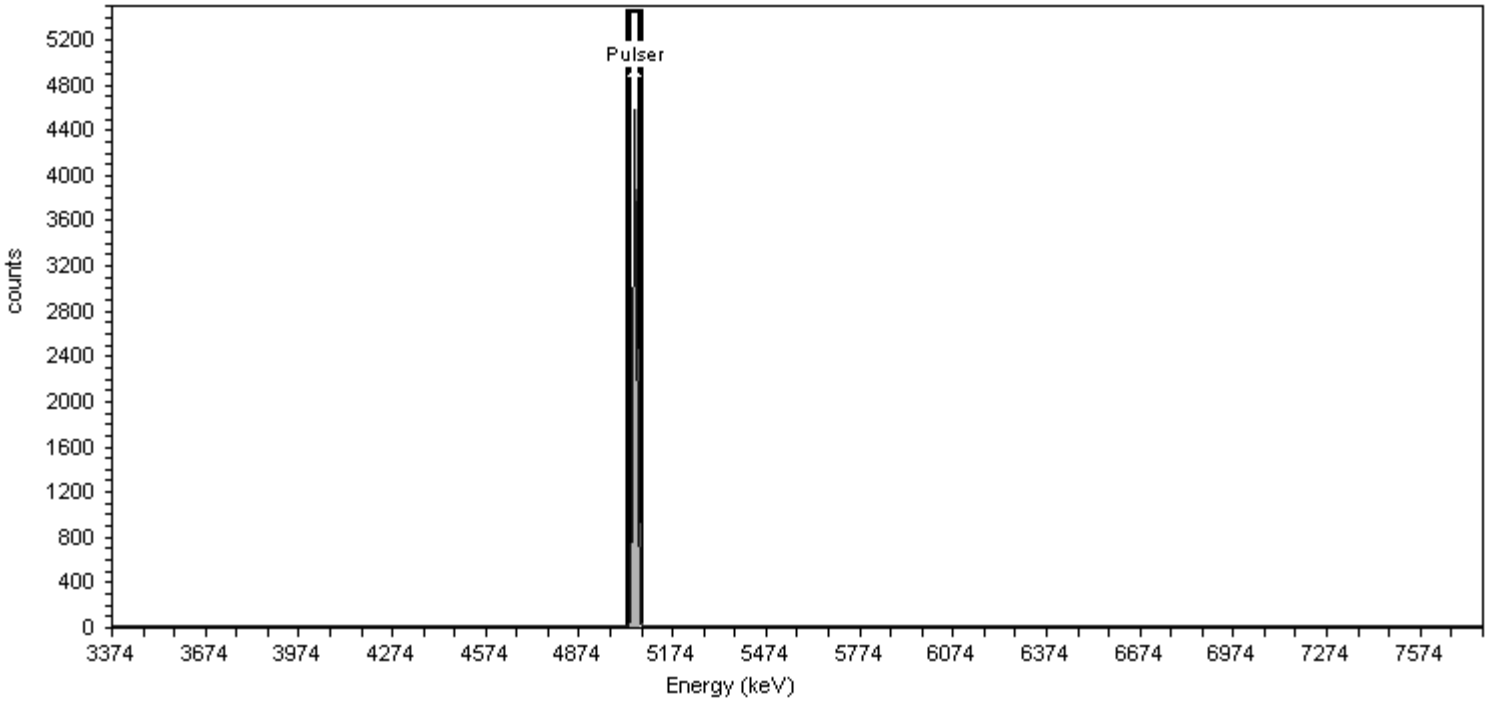
Analyst: 60040

Acquisition

Detector: AV19 , SN: 50-025FF5
Acquisition Start Date: 5/23/2014 8:55:02AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8876;AV19-20140505
Calibration Date: 5/5/2014 10:09:02PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.34% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5052.295	5032.837	5071.753	11.43	7,498.73	7,628.25

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:01:29AM 5/23/2014

Sample

Sample Name: Pulser;AV20
Comment:

Spectrum #4 Analysis #1

Batch

Batch Name: May2014aa
Description:

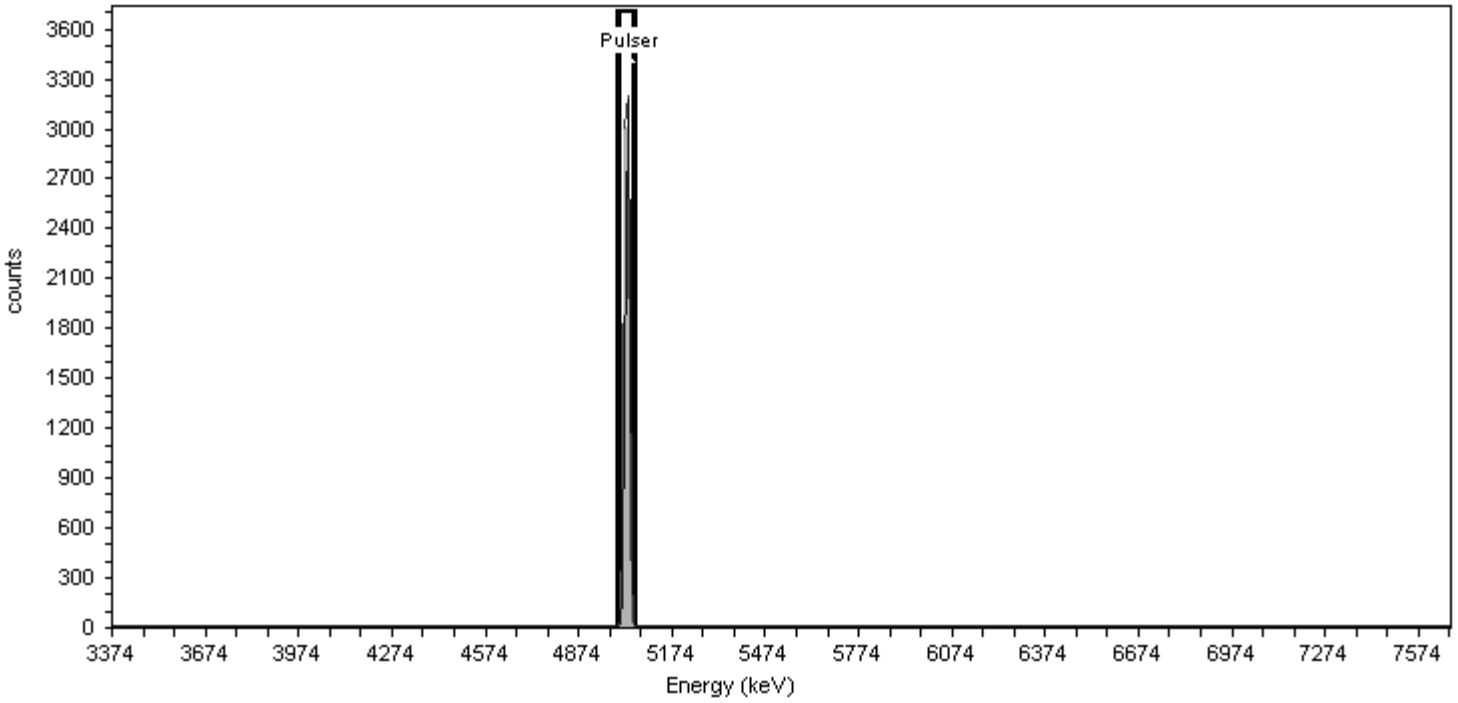
Analyst: 60040

Acquisition

Detector: AV20 , SN: 48-121A7
Acquisition Start Date: 5/23/2014 8:55:03AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8877;AV20-20140505
Calibration Date: 5/5/2014 10:09:21PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.56% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.916	5004.242	5057.588	15.67	7,191.35	7,669.25

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
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Earth City, MO 63045
4:23:23PM 5/21/2014

Sample

Sample Name: Pulser;AV43 Spectrum #2 Analysis #1
Comment:

Batch

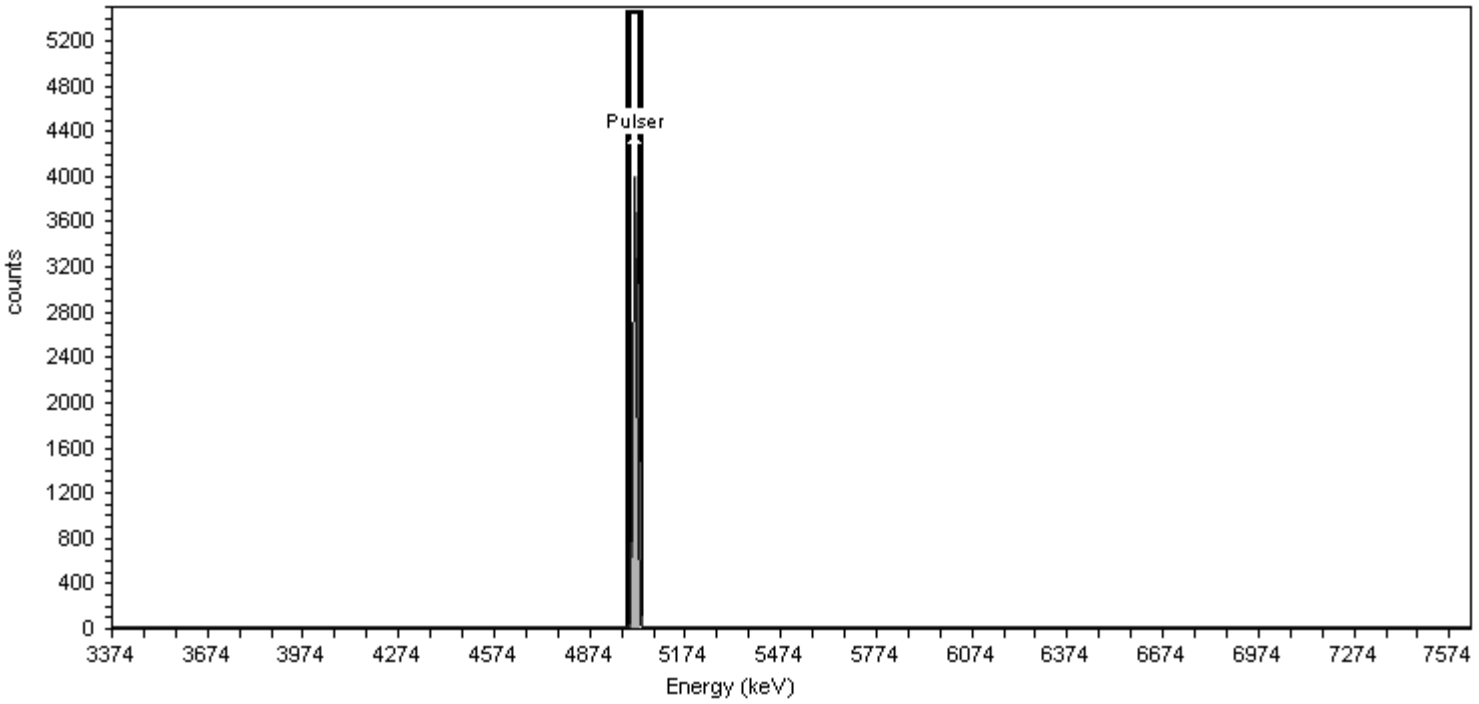
Batch Name: May2014bb Analyst: 60040
Description:

Acquisition

Detector: AV43 , SN: 49-190X4
Acquisition Start Date: 5/21/2014 4:01:53PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9794;AV43-20140505
Calibration Date: 5/5/2014 10:09:47PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.74% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.707	4994.831	5034.582	11.68	6,686.23	7,449.97

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
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Earth City, MO 63045
4:23:18PM 5/21/2014

Sample

Sample Name: Pulser;AV44 Spectrum #2 Analysis #1
Comment:

Batch

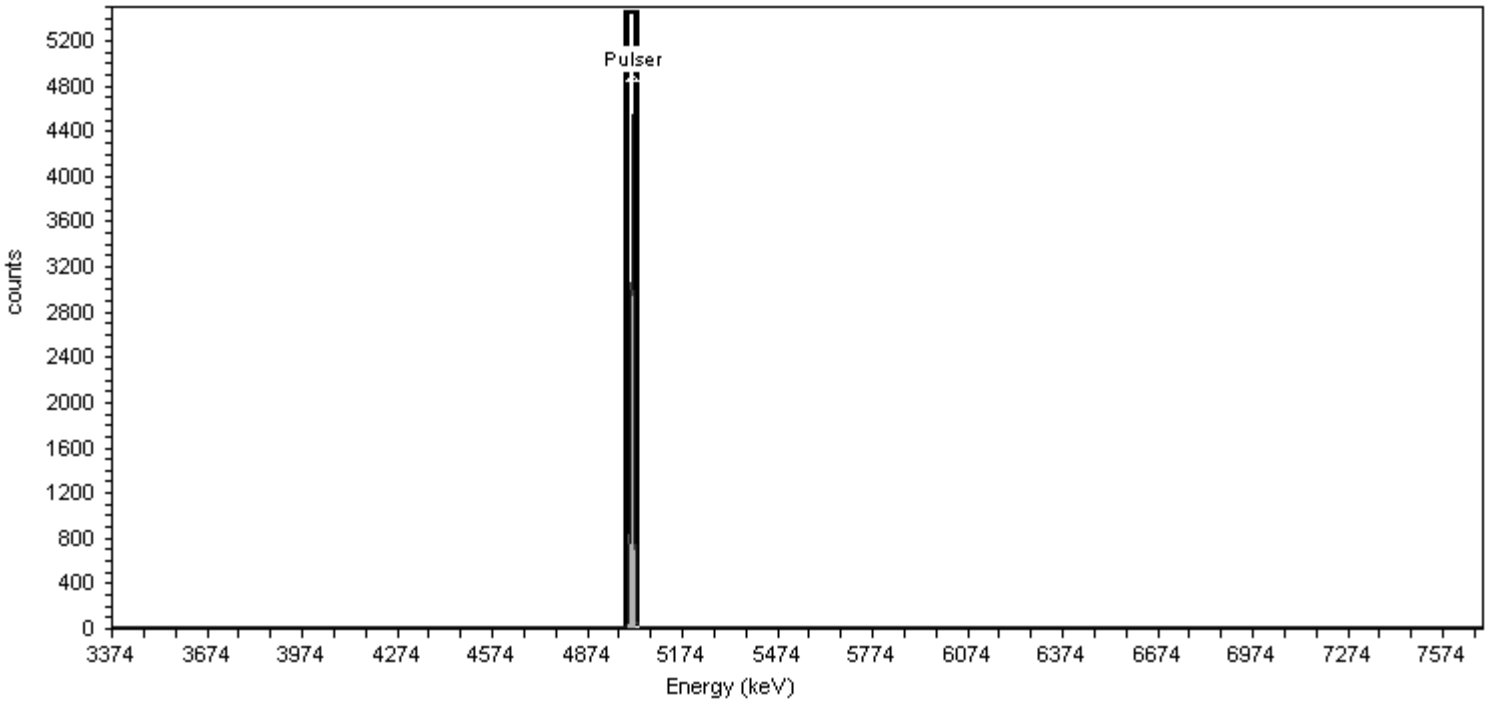
Batch Name: May2014bb Analyst: 60040
Description:

Acquisition

Detector: AV44 , SN: 50-051JJ1
Acquisition Start Date: 5/21/2014 4:01:57PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9795;AV44-20140505
Calibration Date: 5/5/2014 10:09:57PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.32% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5015.092	4995.432	5034.751	11.55	7,512.21	7,511.90

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TestAmerica St. Louis
13715 Rider Trail North
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9:04:11AM 5/23/2014

Sample

Sample Name: Pulser;AV45 Spectrum #4 Analysis #1
Comment:

Batch

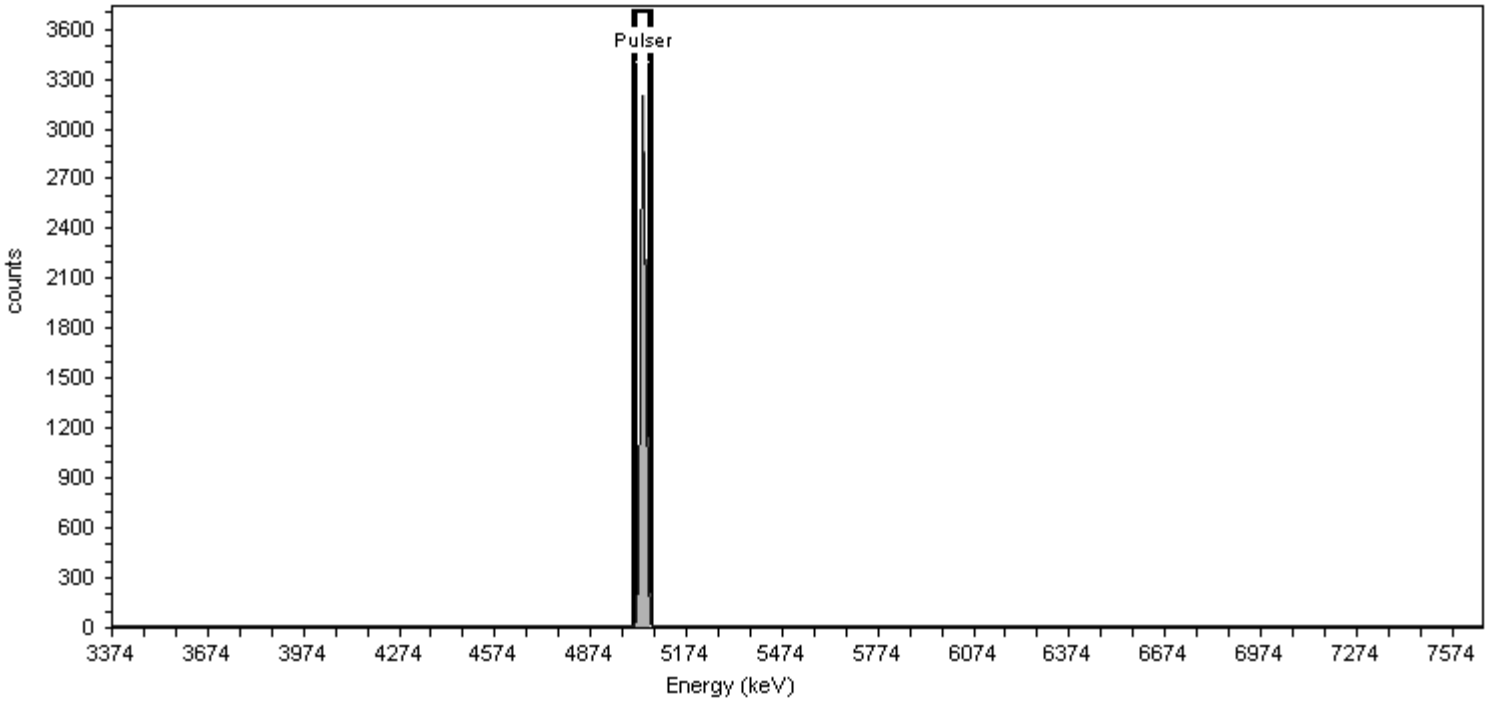
Batch Name: May2014bb Analyst: 60040
Description:

Acquisition

Detector: AV45 , SN: 48-158FF2
Acquisition Start Date: 5/23/2014 8:55:16AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9817;AV45-20140505
Calibration Date: 5/5/2014 10:10:03PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.06% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.444	5009.255	5065.633	16.56	7,607.17	7,583.34

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:04:17AM 5/23/2014

Sample

Sample Name: Pulser;AV46 Spectrum #4 Analysis #1
Comment:

Batch

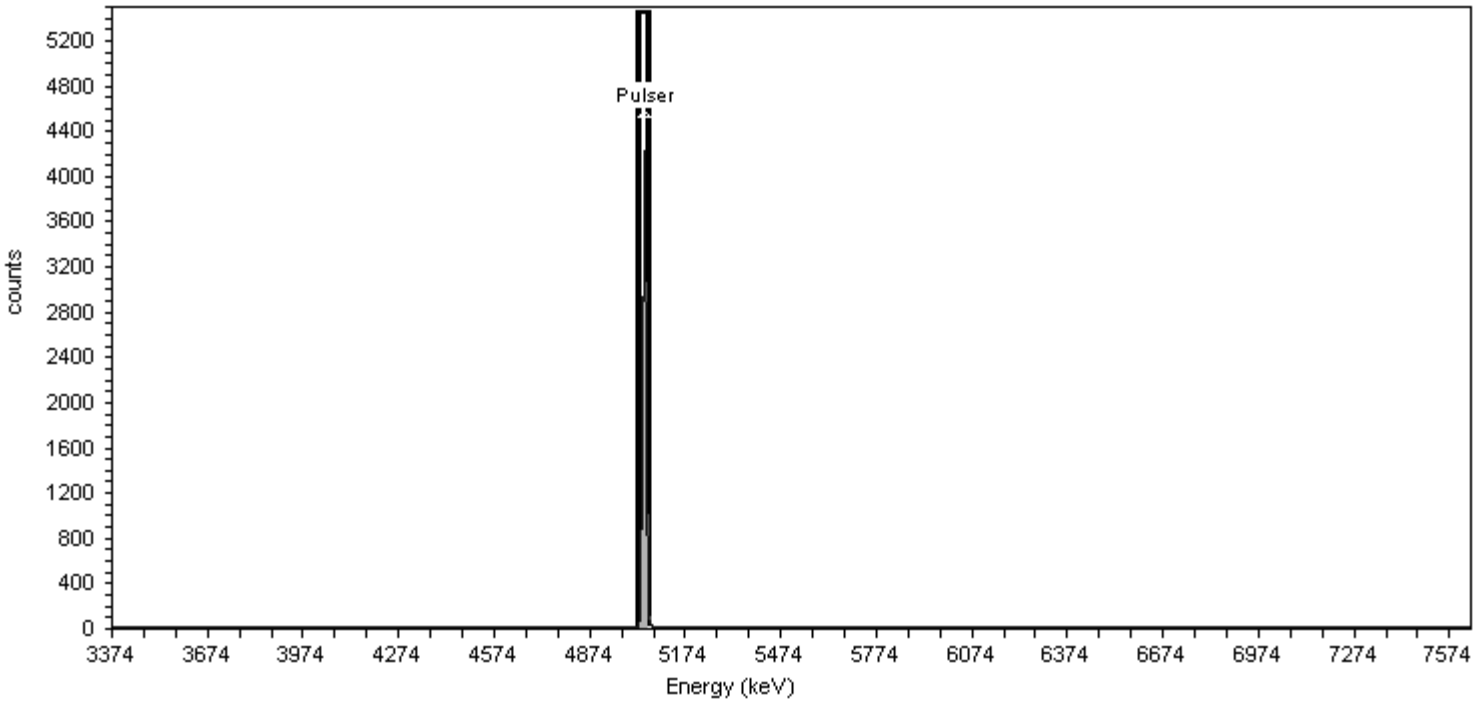
Batch Name: May2014bb Analyst: 60040
Description:

Acquisition

Detector: AV46 , SN: 49-202GG2
Acquisition Start Date: 5/23/2014 8:55:19AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9884;AV46-20140505
Calibration Date: 5/5/2014 10:10:09PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.80% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5044.789	5023.429	5066.149	12.55	7,605.52	7,463.19

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:23:35PM 5/21/2014

Sample

Sample Name: Pulser;AV48 Spectrum #2 Analysis #1
Comment:

Batch

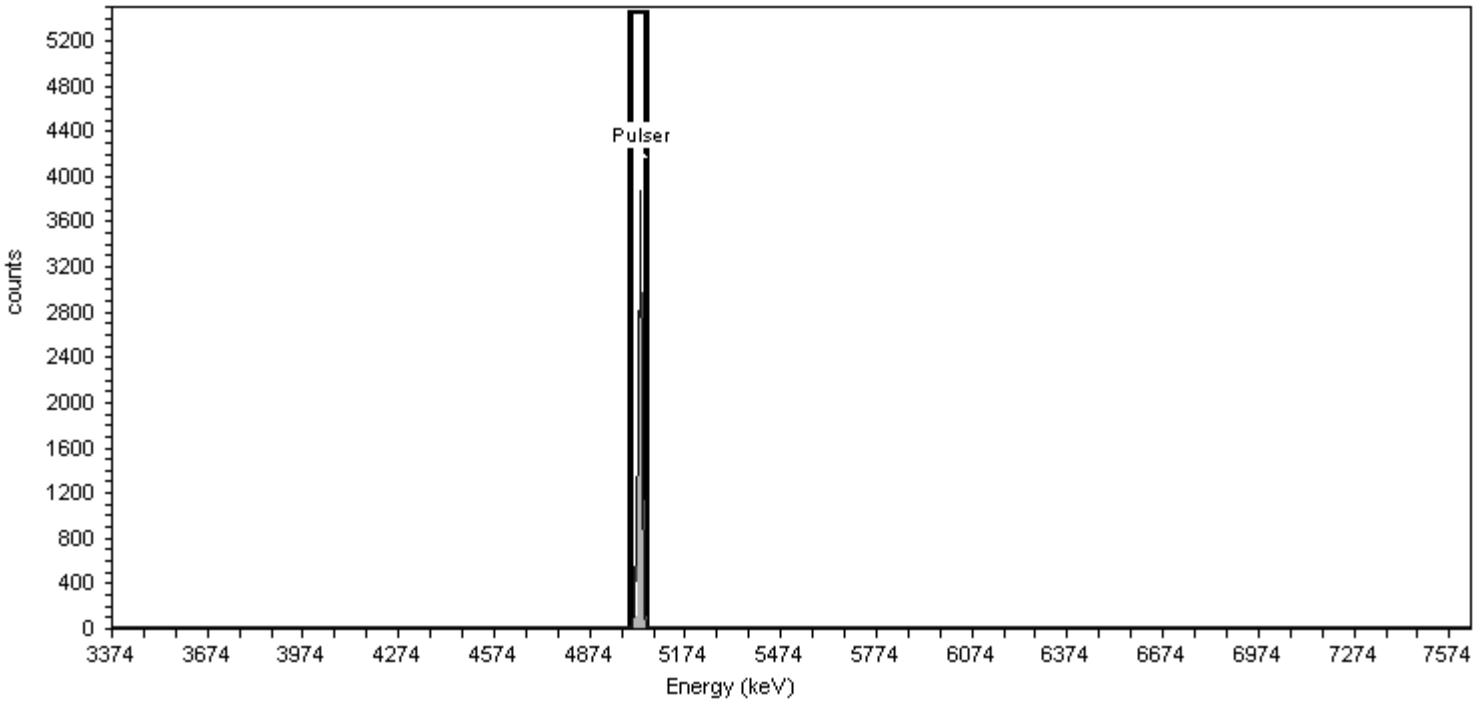
Batch Name: May2014bb Analyst: 60040
Description:

Acquisition

Detector: AV48 , SN: 50-051JJ4
Acquisition Start Date: 5/21/2014 4:02:04PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9886;AV48-20140505
Calibration Date: 5/5/2014 10:10:22PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.78% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.806	5006.752	5052.859	13.54	7,522.86	7,617.80

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:04:27AM 5/23/2014

Sample

Sample Name: Pulser;AV48 Spectrum #4 Analysis #1
Comment:

Batch

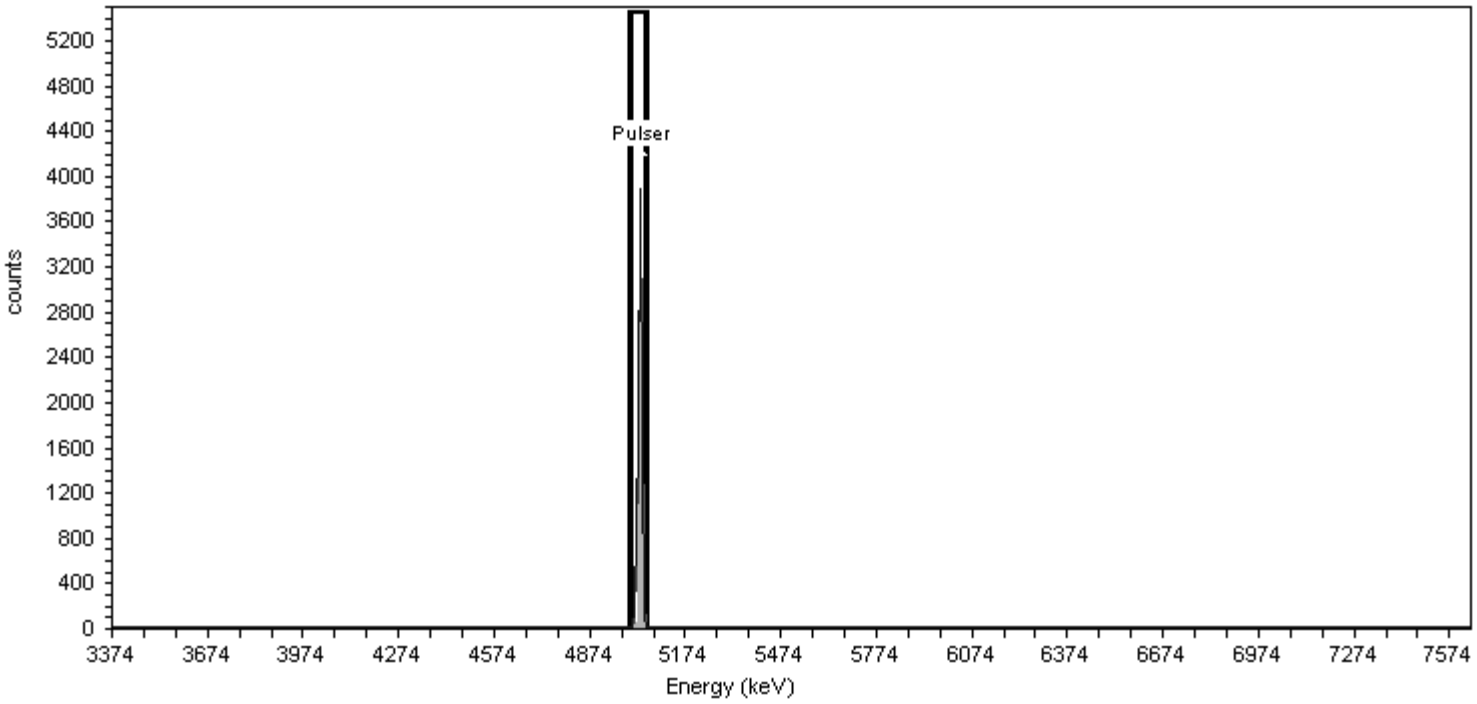
Batch Name: May2014bb Analyst: 60040
Description:

Acquisition

Detector: AV48 , SN: 50-051JJ4
Acquisition Start Date: 5/23/2014 8:55:29AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9886;AV48-20140505
Calibration Date: 5/5/2014 10:10:22PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.78% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.751	5007.117	5052.386	13.30	7,420.46	7,613.99

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:19:41PM 5/21/2014

Sample

Sample Name: Pulser;AV55 Spectrum #2 Analysis #1
Comment:

Batch

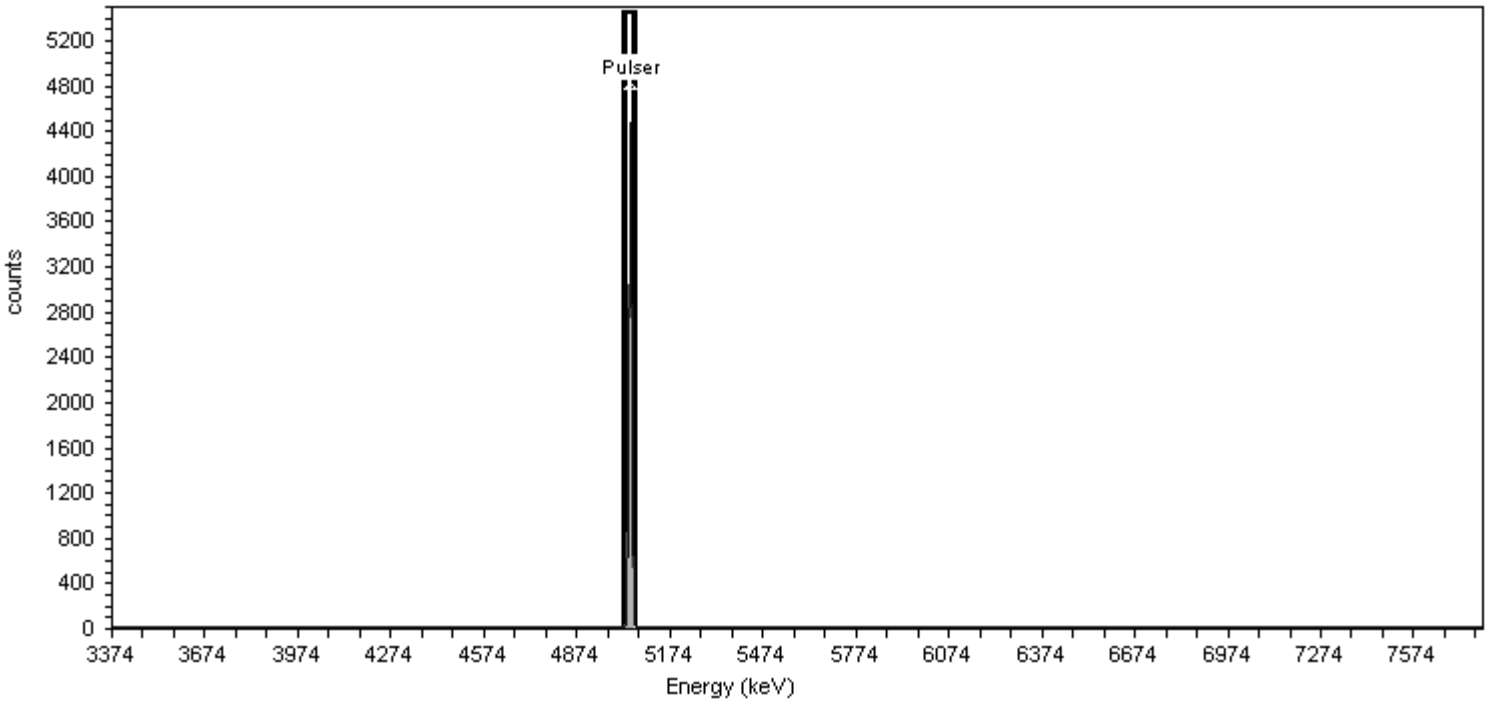
Batch Name: May2014bb Analyst: 60040
Description:

Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 5/21/2014 4:01:12PM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-7107;AV55-20140507
Calibration Date: 5/7/2014 10:48:56PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.79% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5044.977	5026.458	5063.495	10.88	6,974.82	7,164.28

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:03:08AM 5/23/2014

Sample

Sample Name: Pulser;AV57 Spectrum #4 Analysis #1
Comment:

Batch

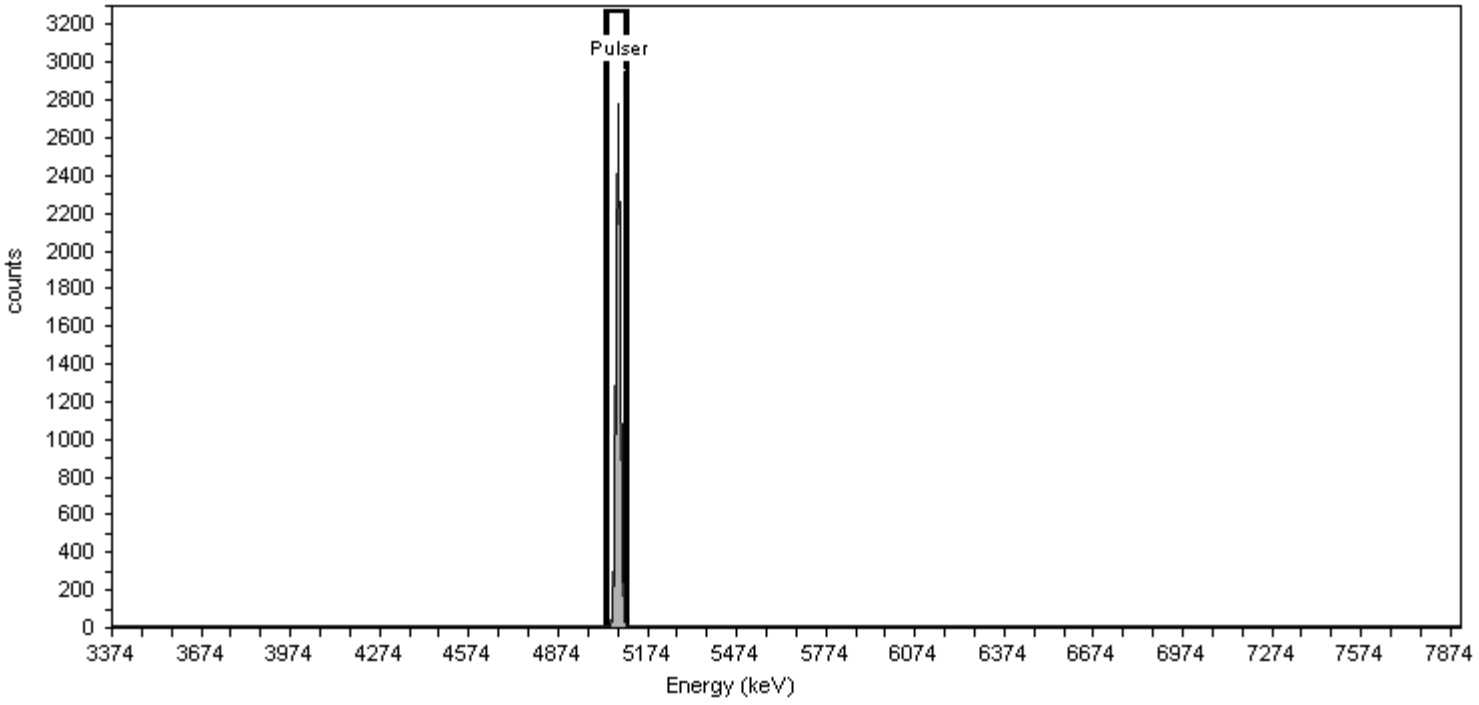
Batch Name: May2014bb Analyst: 60040
Description:

Acquisition

Detector: AV57 , SN: 48-158EE3
Acquisition Start Date: 5/23/2014 8:55:31AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9793;AV57-20140504
Calibration Date: 5/5/2014 6:53:40PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.74% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5074.972	5044.802	5105.142	17.72	7,067.02	7,226.90

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:03:14AM 5/23/2014

Sample

Sample Name: Pulser;AV58 Spectrum #4 Analysis #1
Comment:

Batch

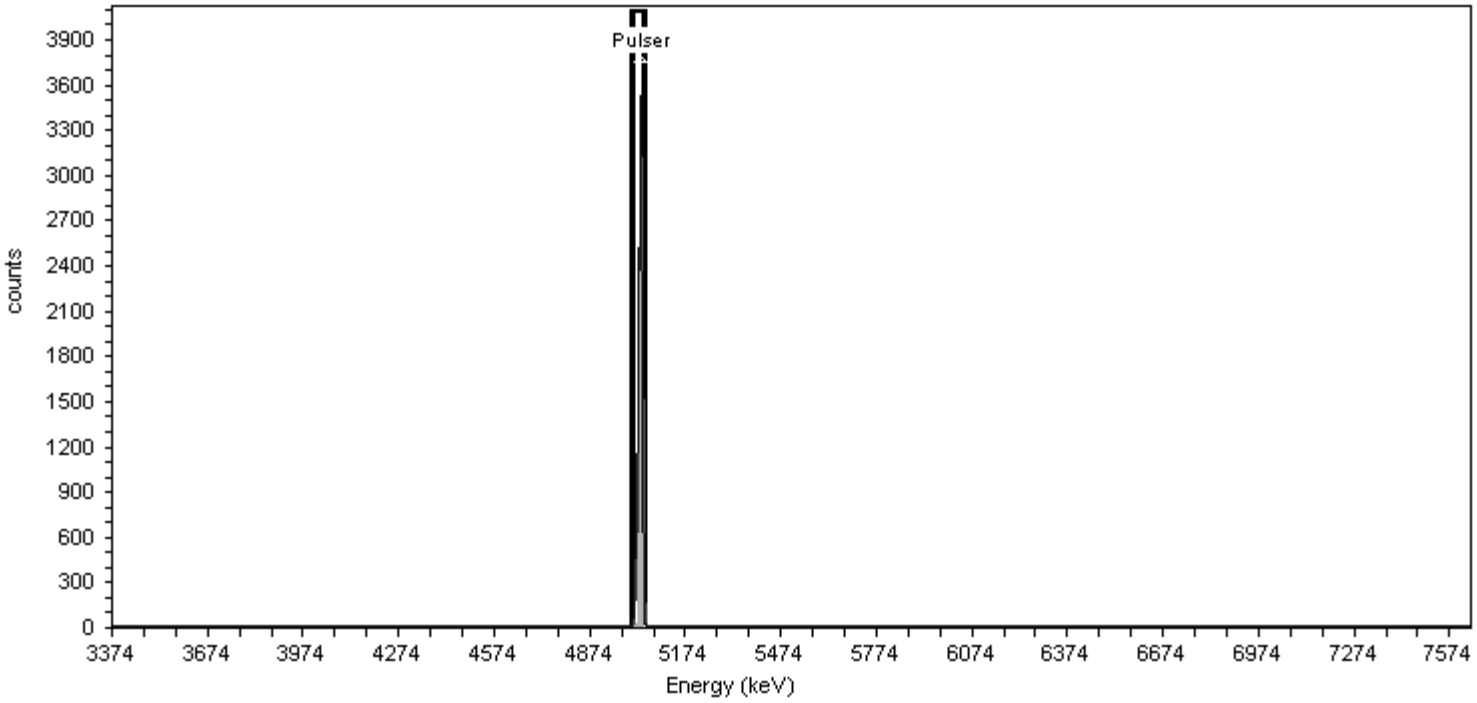
Batch Name: May2014bb Analyst: 60040
Description:

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 5/23/2014 8:55:31AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9794;AV58-20140504
Calibration Date: 5/5/2014 6:53:46PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.56% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.551	5008.093	5051.010	12.61	6,389.33	6,966.47

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:03:26AM 5/23/2014

Sample

Sample Name: Pulser;AV59
Comment:

Spectrum #5 Analysis #1

Batch

Batch Name: May2014bb
Description:

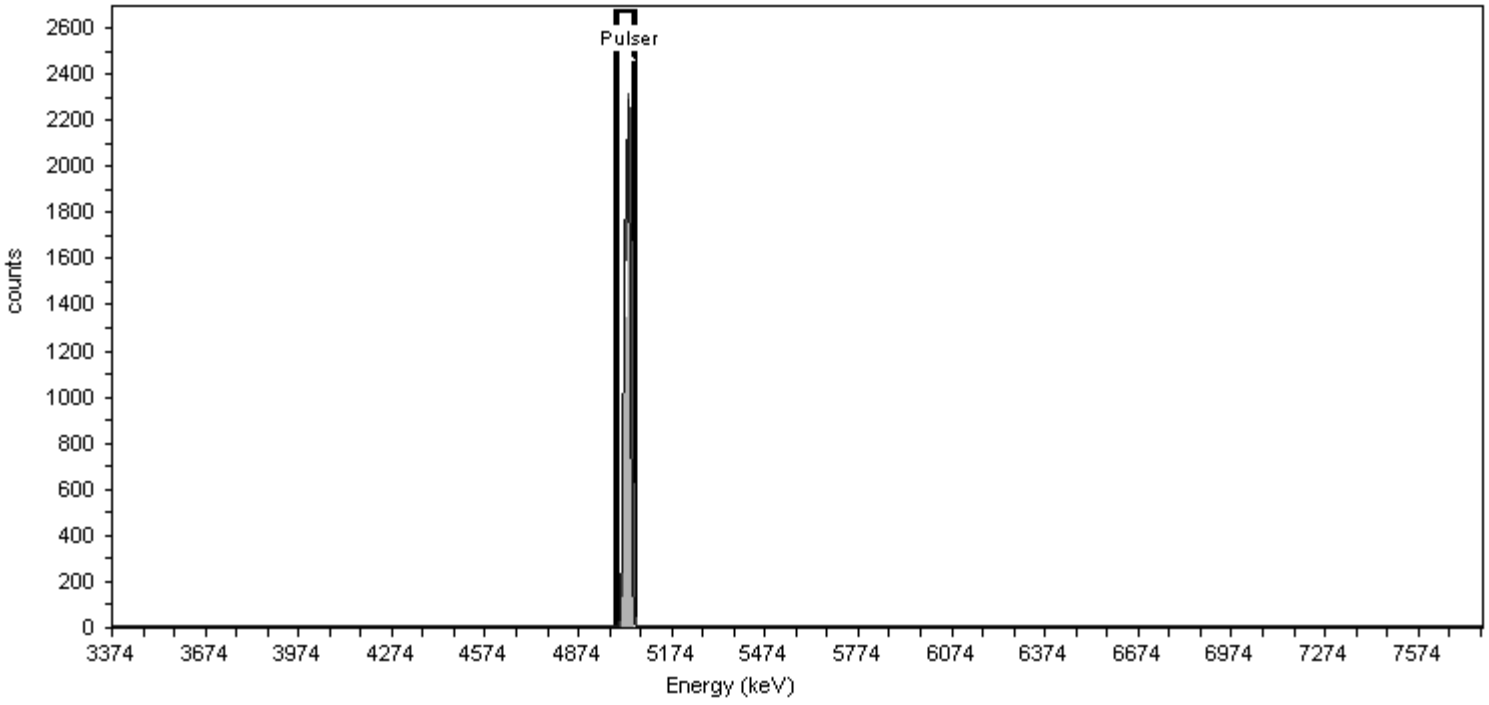
Analyst: 60040

Acquisition

Detector: AV59 , SN: 49-155M7
Acquisition Start Date: 5/23/2014 8:55:31AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9795;AV59-20140504
Calibration Date: 5/5/2014 6:53:53PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.44% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5028.965	4998.997	5058.933	17.61	5,838.80	7,180.42

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:03:37AM 5/23/2014

Sample

Sample Name: Pulser;AV60
Comment:

Spectrum #4 Analysis #1

Batch

Batch Name: May2014bb
Description:

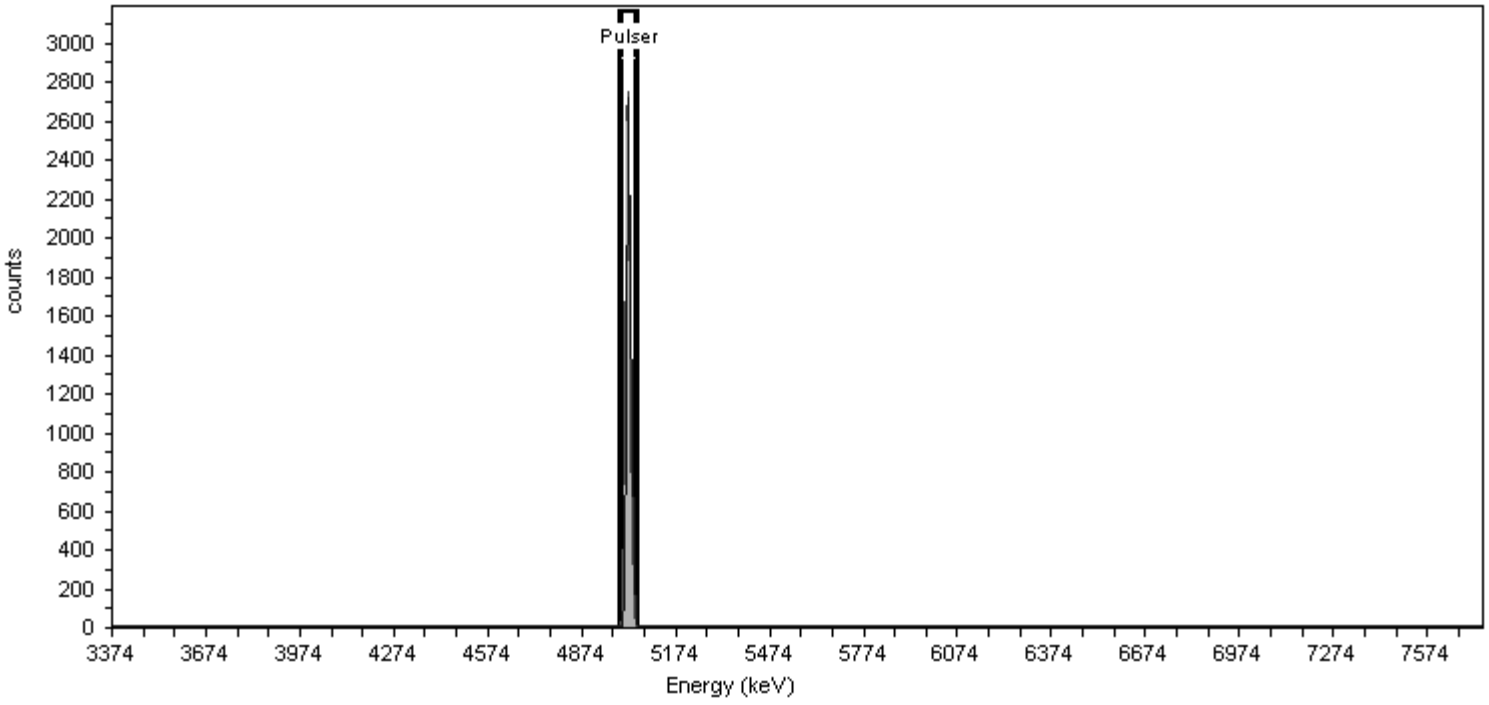
Analyst: 60040

Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 5/23/2014 8:55:32AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9817;AV60-20140504
Calibration Date: 5/5/2014 6:53:59PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.33% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5023.627	4997.167	5050.088	15.55	6,133.69	7,233.86

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:02:17AM 5/23/2014

Sample

Sample Name: Pulser;AV61 Spectrum #4 Analysis #1
Comment:

Batch

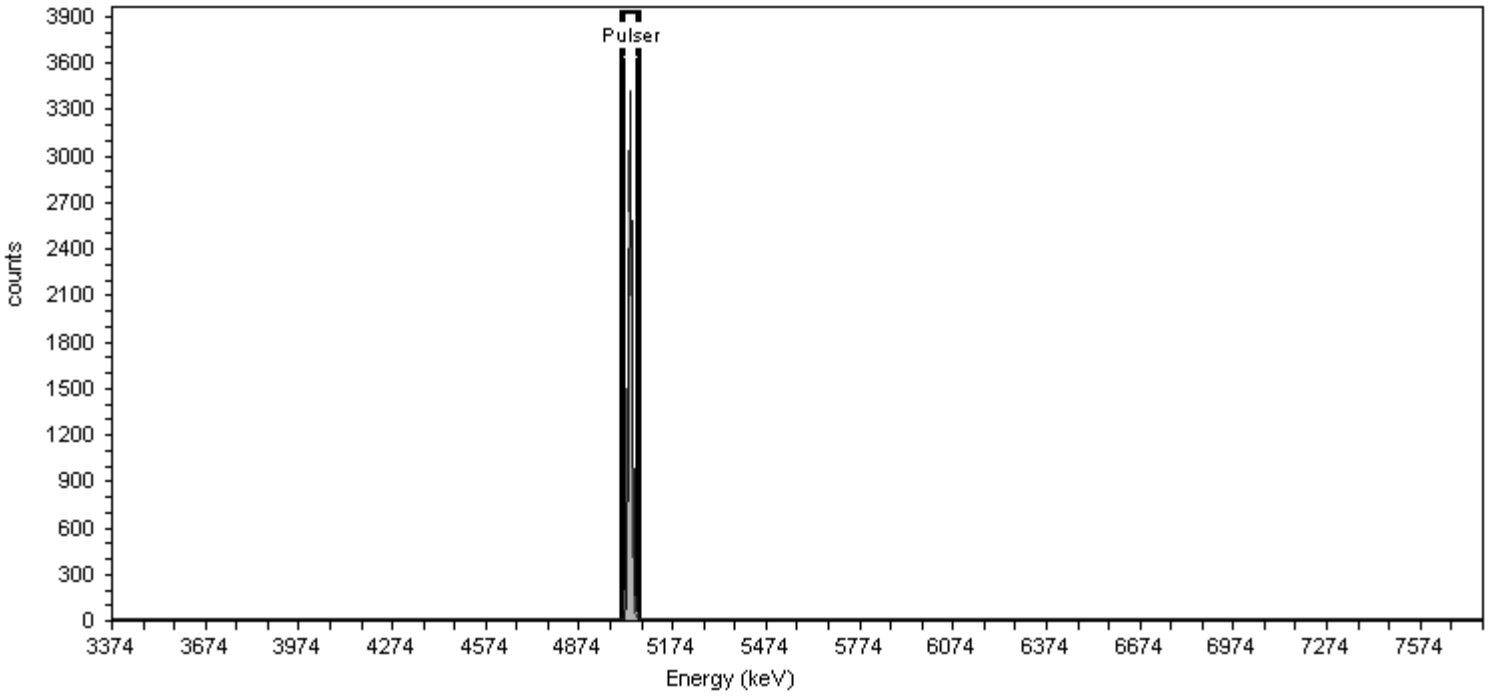
Batch Name: May2014bb Analyst: 60040
Description:

Acquisition

Detector: AV61 , SN: 5-051JJ3
Acquisition Start Date: 5/23/2014 8:55:34AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9884;AV61-20140504
Calibration Date: 5/5/2014 6:54:06PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.46% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5038.027	5014.130	5061.923	14.04	6,890.50	7,251.49

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:02:23AM 5/23/2014

Sample

Sample Name: Pulser;AV62 Spectrum #4 Analysis #1
Comment:

Batch

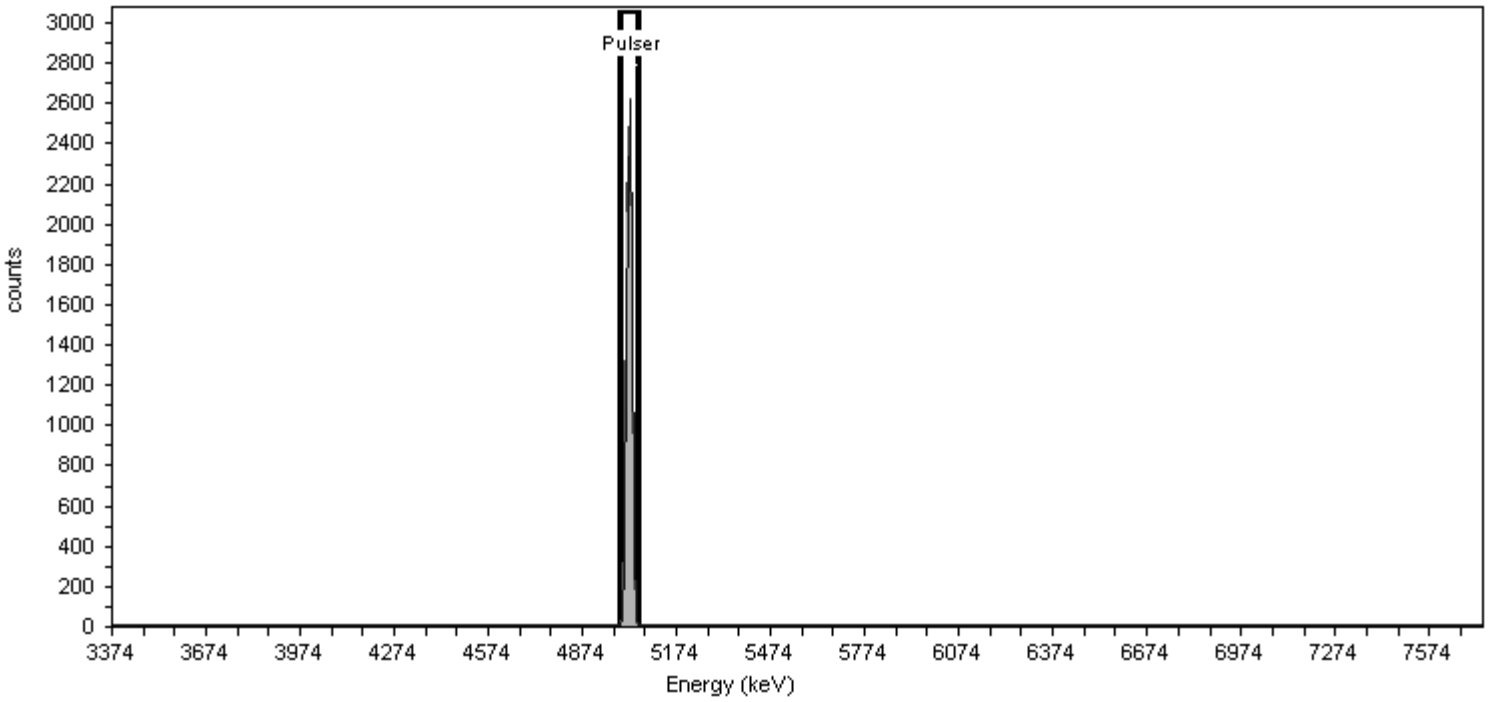
Batch Name: May2014bb Analyst: 60040
Description:

Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 5/23/2014 8:55:35AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9885;AV62-20140504
Calibration Date: 5/5/2014 6:54:13PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5023.042	4992.885	5053.200	17.72	6,653.58	7,212.95

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:21:54PM 5/21/2014

Sample

Sample Name: Pulser;AV78 Spectrum #2 Analysis #1
Comment:

Batch

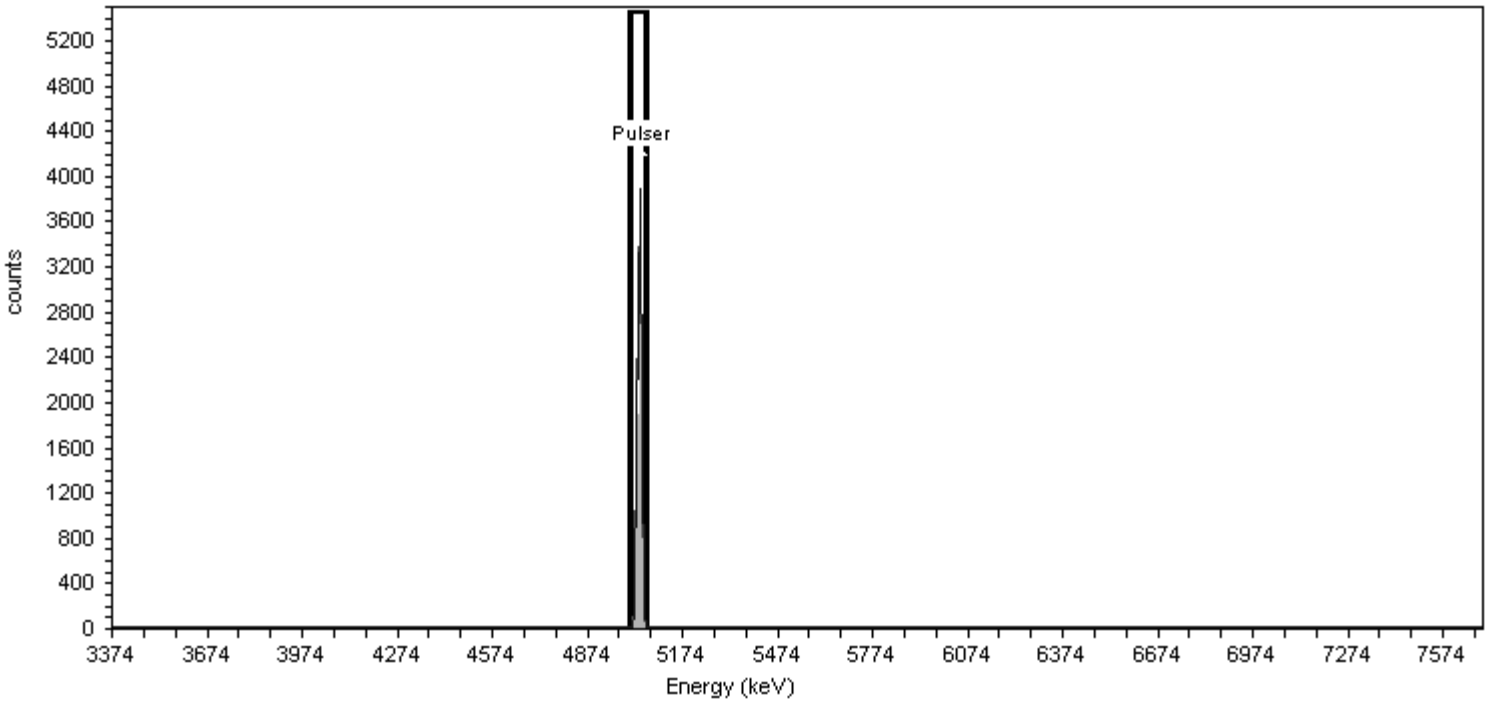
Batch Name: May2014cc Analyst: 60040
Description:

Acquisition

Detector: AV78 , SN: 46-033FF4
Acquisition Start Date: 5/21/2014 4:01:53PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9886;AV78-20140504
Calibration Date: 5/4/2014 8:45:34PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.71% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.510	5014.599	5060.422	13.46	7,501.49	7,550.73

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:22:00PM 5/21/2014

Sample

Sample Name: Pulser;AV79
Comment:

Spectrum #2 Analysis #1

Batch

Batch Name: May2014cc
Description:

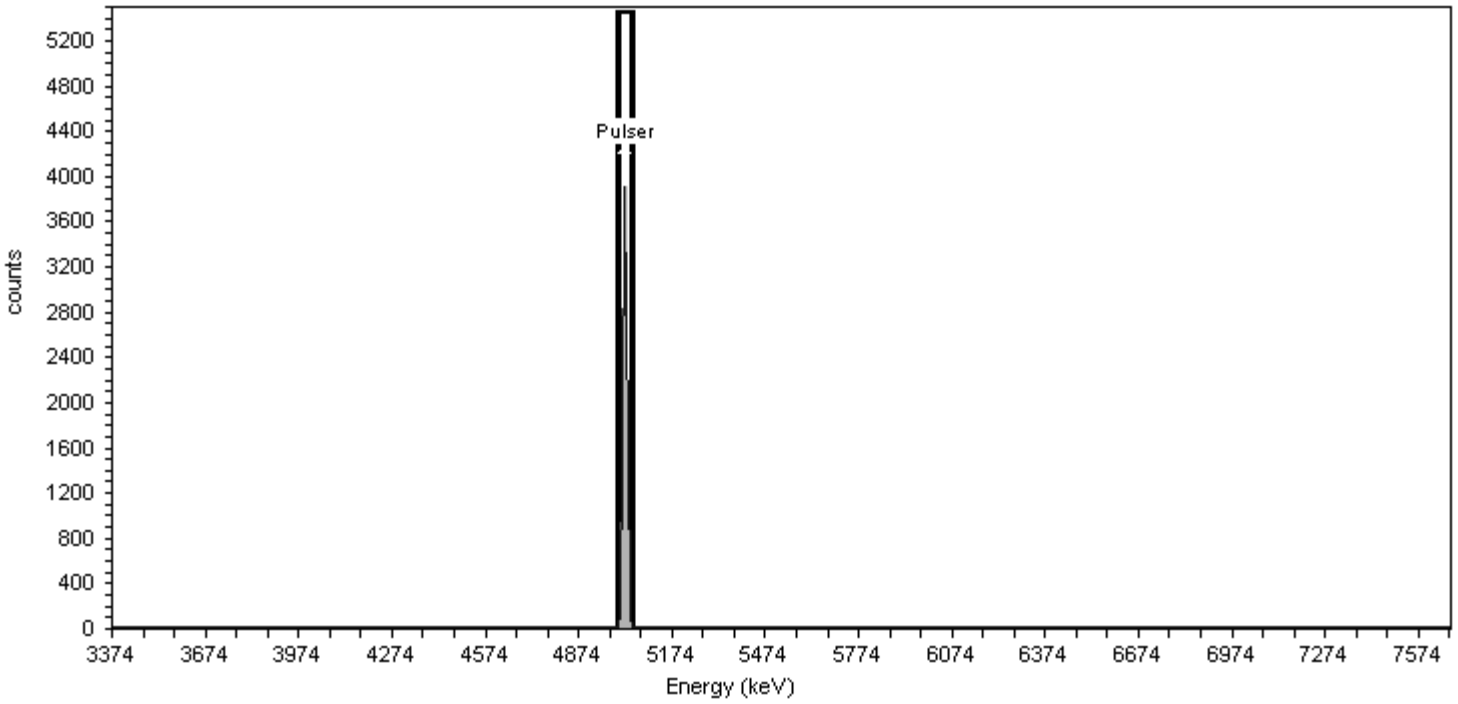
Analyst: 60040

Acquisition

Detector: AV79 , SN: 46-033Q5
Acquisition Start Date: 5/21/2014 4:01:55PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-7107;AV79-20140501
Calibration Date: 5/4/2014 5:31:27PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.05% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5022.567	5000.189	5044.945	13.15	7,366.22	7,432.50

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:22:16PM 5/21/2014

Sample

Sample Name: Pulser;AV82 Spectrum #2 Analysis #1
Comment:

Batch

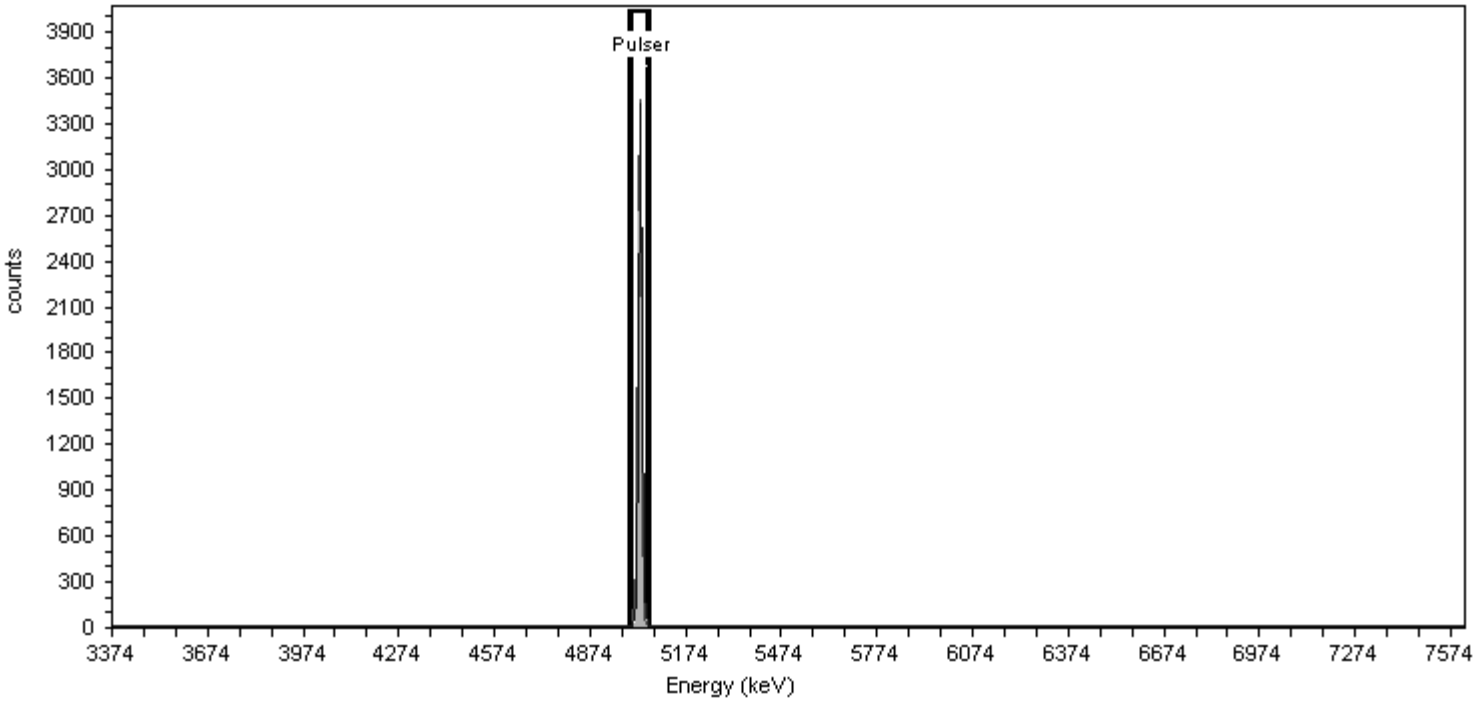
Batch Name: May2014cc Analyst: 60040
Description:

Acquisition

Detector: AV82 , SN: 46-032EE5
Acquisition Start Date: 5/21/2014 4:02:01PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8876;AV82-20140501
Calibration Date: 5/4/2014 5:31:49PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.76% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.539	5006.126	5054.952	14.34	7,092.75	7,539.01

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:22:27PM 5/21/2014

Sample

Sample Name: Pulser;AV84 Spectrum #2 Analysis #1
Comment:

Batch

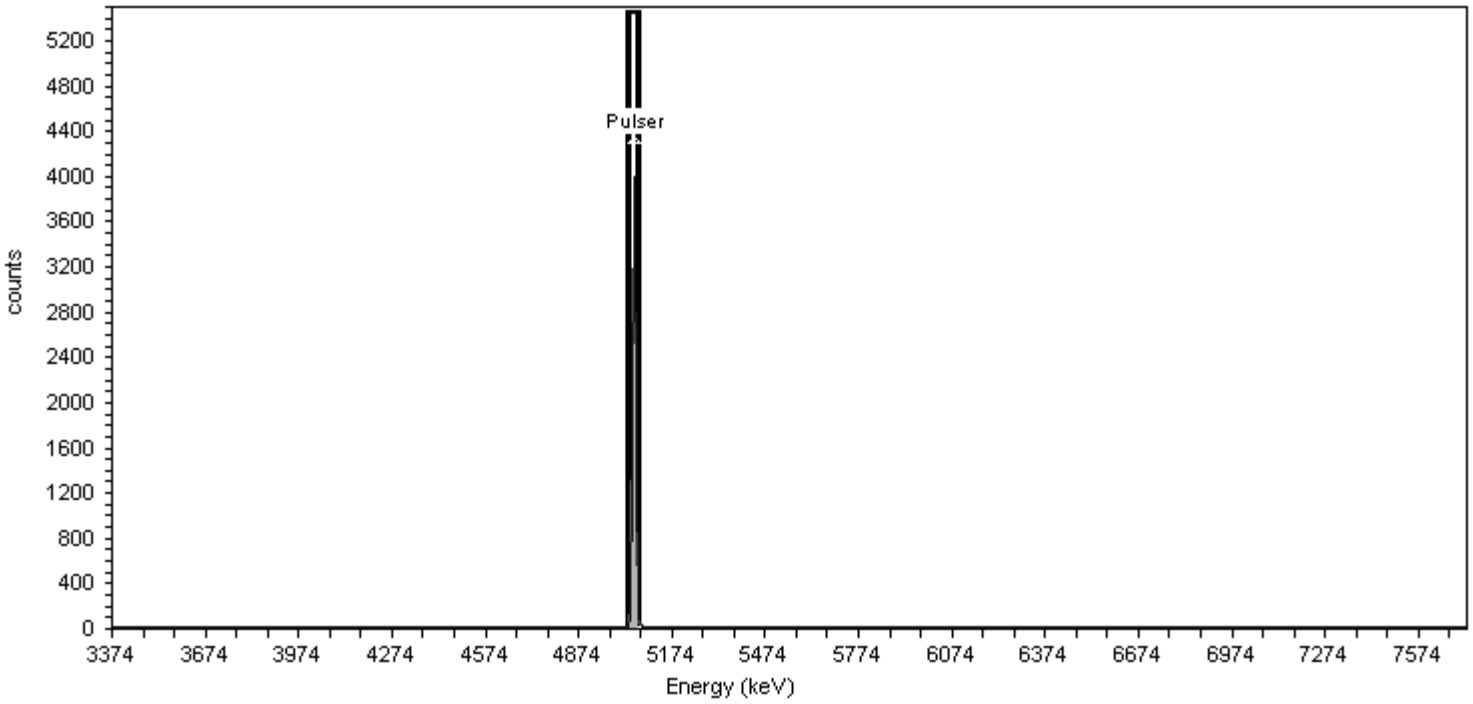
Batch Name: May2014cc Analyst: 60040
Description:

Acquisition

Detector: AV84 , SN: 46-033FF3
Acquisition Start Date: 5/21/2014 4:02:05PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9520;AV84-20140501
Calibration Date: 5/4/2014 5:32:01PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.40% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5052.565	5031.179	5073.952	12.56	7,190.86	7,487.59

Initial Calibrations

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:38:19PM 5/6/2014

Calibration

Sample Name: IC-7107;AV1-20140505
Description:
Detector: AV1

Calibration Date: 5/6/2014 5:38:14PM
Analyst: 60040

Source Info

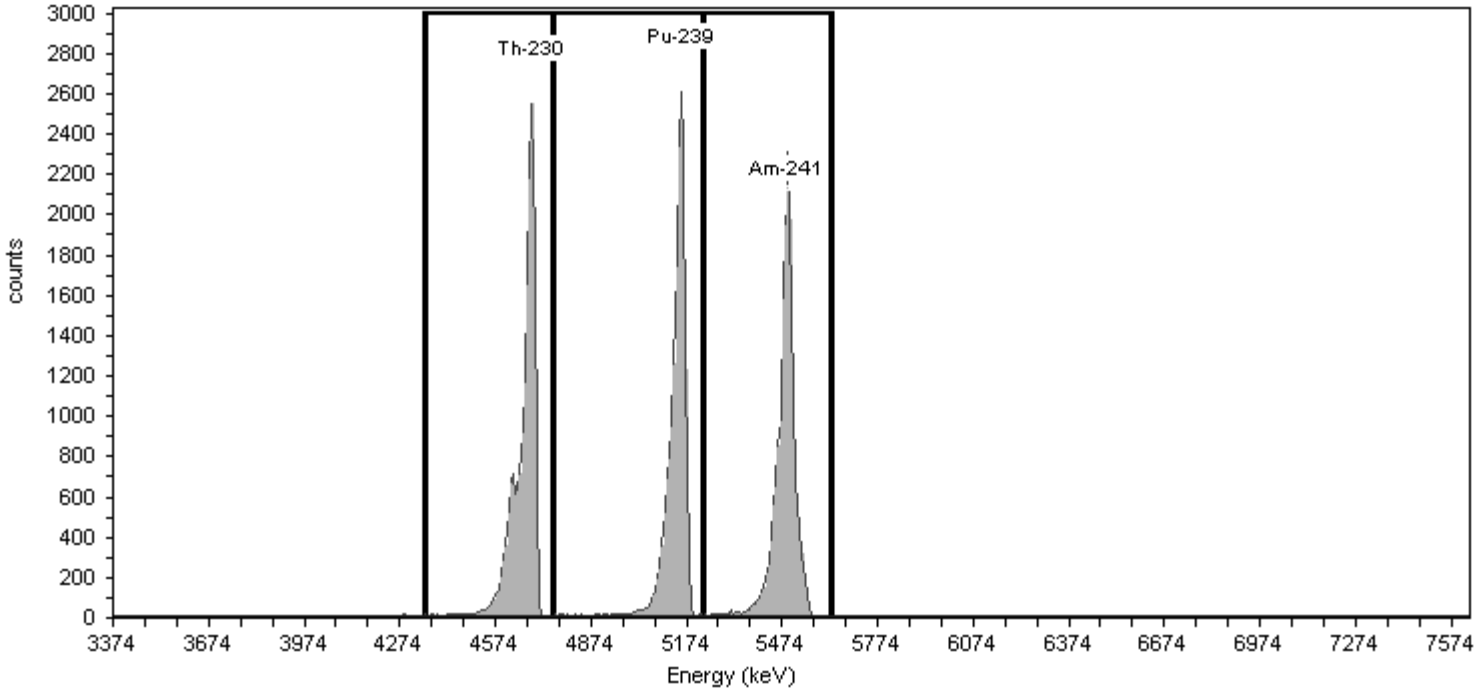
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV1 , SN: 49-188 AA4
Acquisition Start Date: 5/5/2014 10:25:57PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 26.30% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,453.00	117.52
Pu-239	240	5.16	186	249	16,264.00	116.17
Am-241	284	5.49	249	303	15,950.00	113.93

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:19PM 5/6/2014

Calibration

Sample Name: IC-9795;AV11-20140505
Description:
Detector: AV11

Calibration Date: 5/6/2014 5:39:16PM
Analyst: 60040

Source Info

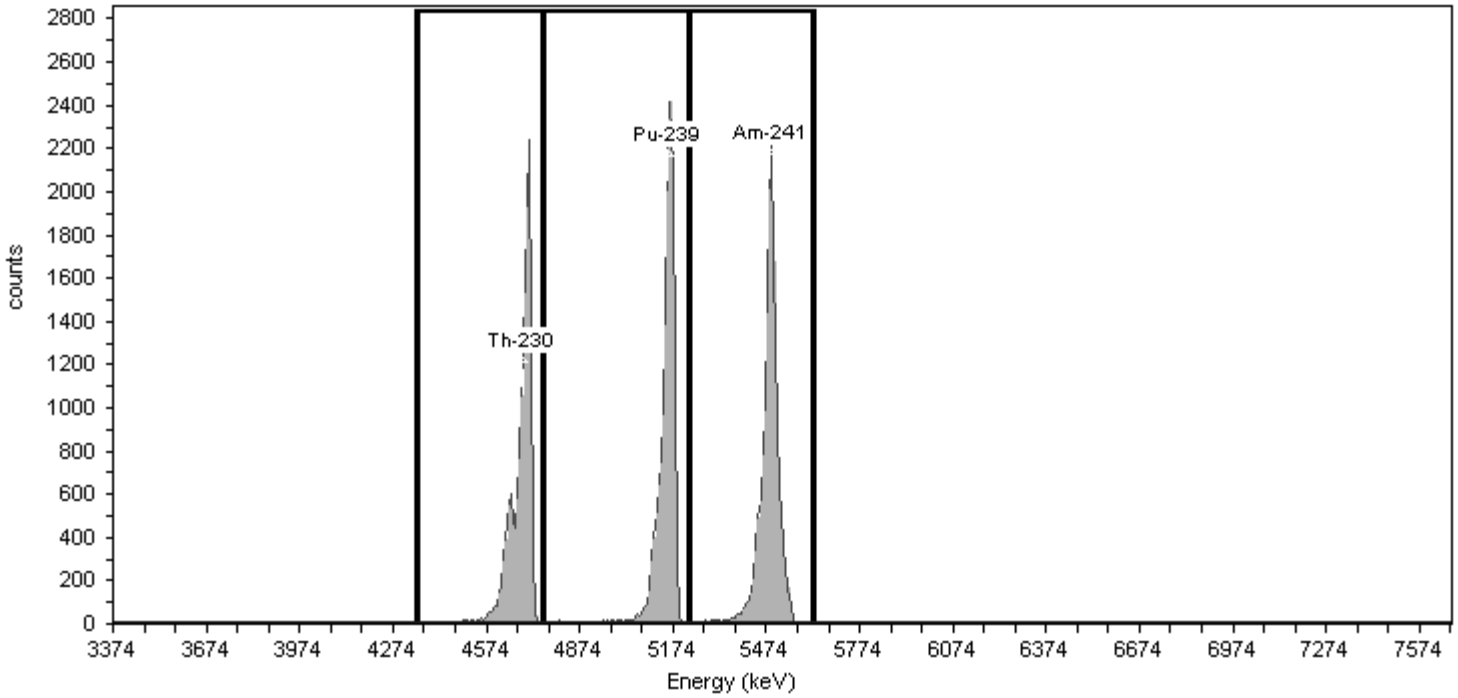
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 5/5/2014 10:27:49PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 26.88% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,230.00	94.50
Pu-239	240	5.16	186	249	13,518.00	96.56
Am-241	284	5.49	249	303	14,326.00	102.33

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:45PM 5/6/2014

Calibration

Sample Name: IC-9886;AV15-20140505
Description:
Detector: AV15

Calibration Date: 5/6/2014 5:39:42PM
Analyst: 60040

Source Info

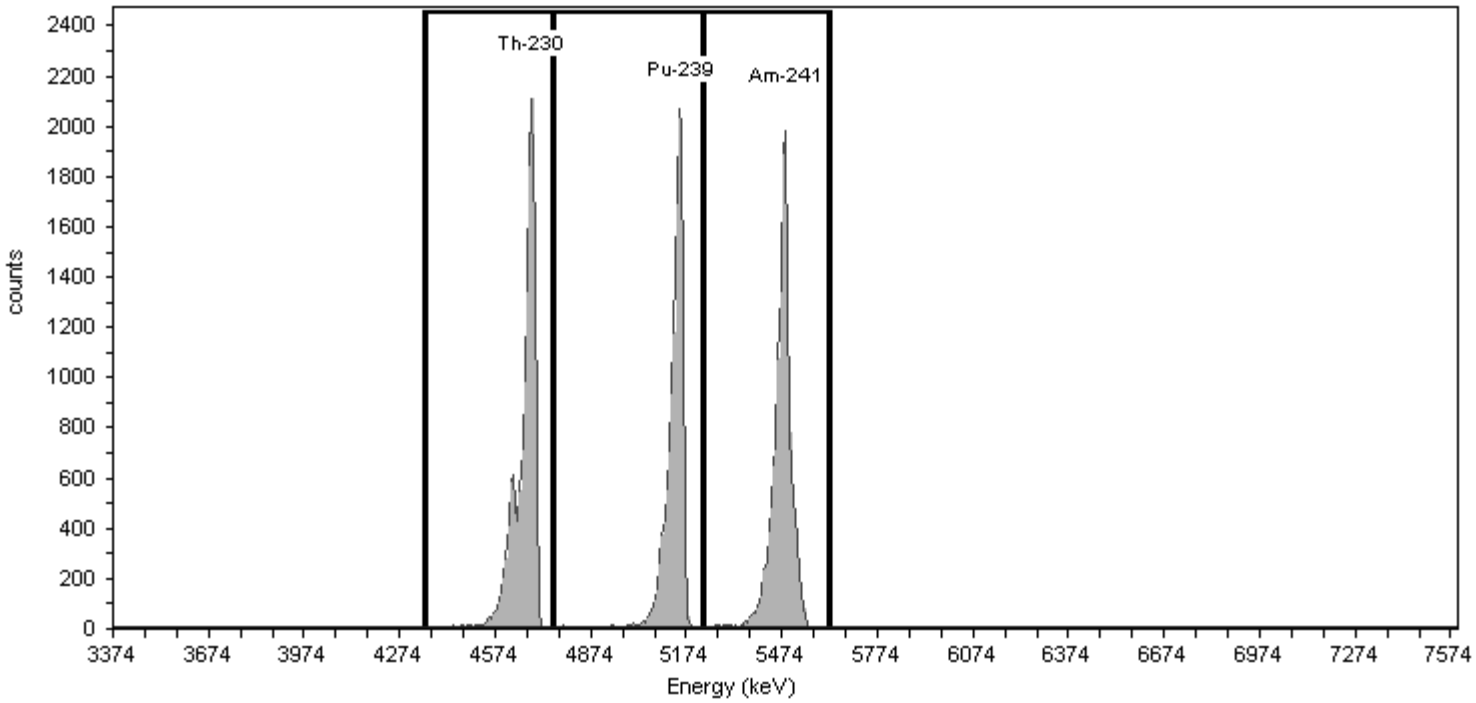
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV15 , SN: 41-172C5
Acquisition Start Date: 5/5/2014 10:28:49PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.62% +/- 0.34% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,308.00	95.06
Pu-239	240	5.16	186	249	12,470.00	89.07
Am-241	284	5.49	249	303	13,519.00	96.56

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:08:45PM 5/5/2014

Calibration

Sample Name: IC-7107;AV16-20140505
Description:
Detector: AV16

Calibration Date: 5/5/2014 10:08:41PM
Analyst: 60040

Source Info

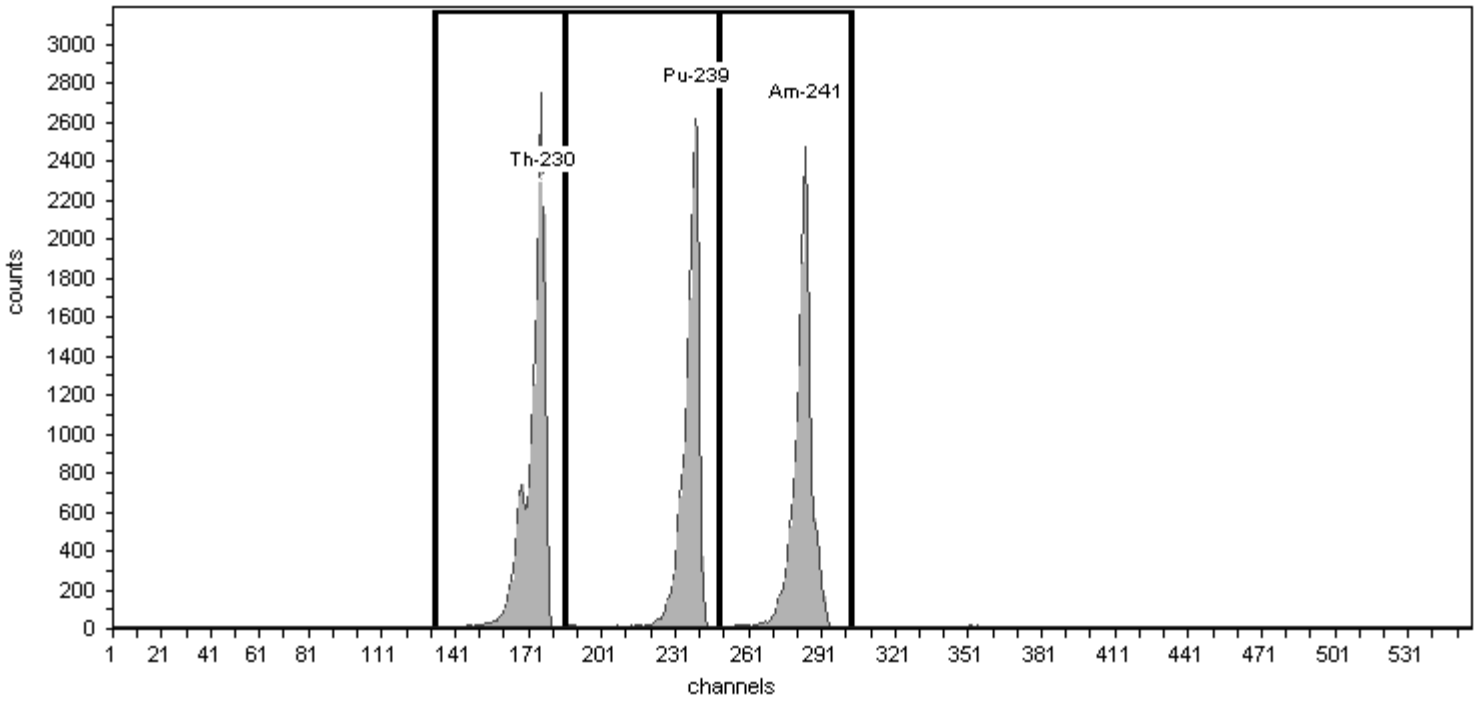
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV16 , SN: 51-082B6
Acquisition Start Date: 5/5/2014 7:27:49PM
Live Time: 140.00 min.
Real Time: 140.02 min.
Efficiency: 27.11% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	17,234.00	123.10
Pu-239	240	5.16	186	249	16,511.00	117.94
Am-241	284	5.49	249	303	16,391.00	117.08

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:08:53PM 5/5/2014

Calibration

Sample Name: IC-8874;AV17-20140505
Description:
Detector: AV17

Calibration Date: 5/5/2014 10:08:49PM
Analyst: 60040

Source Info

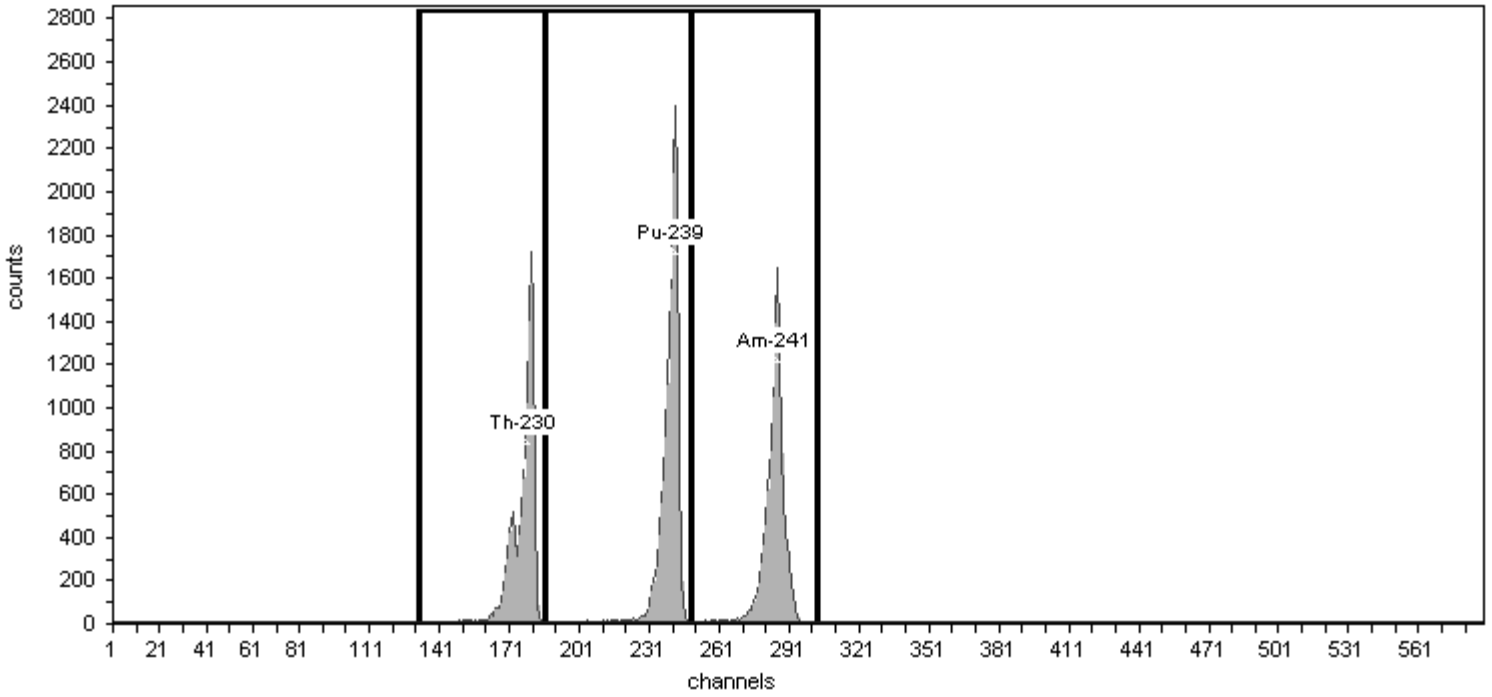
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV17 , SN: 50-051C4
Acquisition Start Date: 5/5/2014 7:28:08PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 26.07% +/- 0.37% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	10,563.00	75.45
Pu-239	240	5.16	186	249	13,740.00	98.14
Am-241	284	5.49	249	303	10,934.00	78.10

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:09:15PM 5/5/2014

Calibration

Sample Name: IC-8875;AV18-20140505
Description:
Detector: AV18

Calibration Date: 5/5/2014 10:09:08PM
Analyst: 60040

Source Info

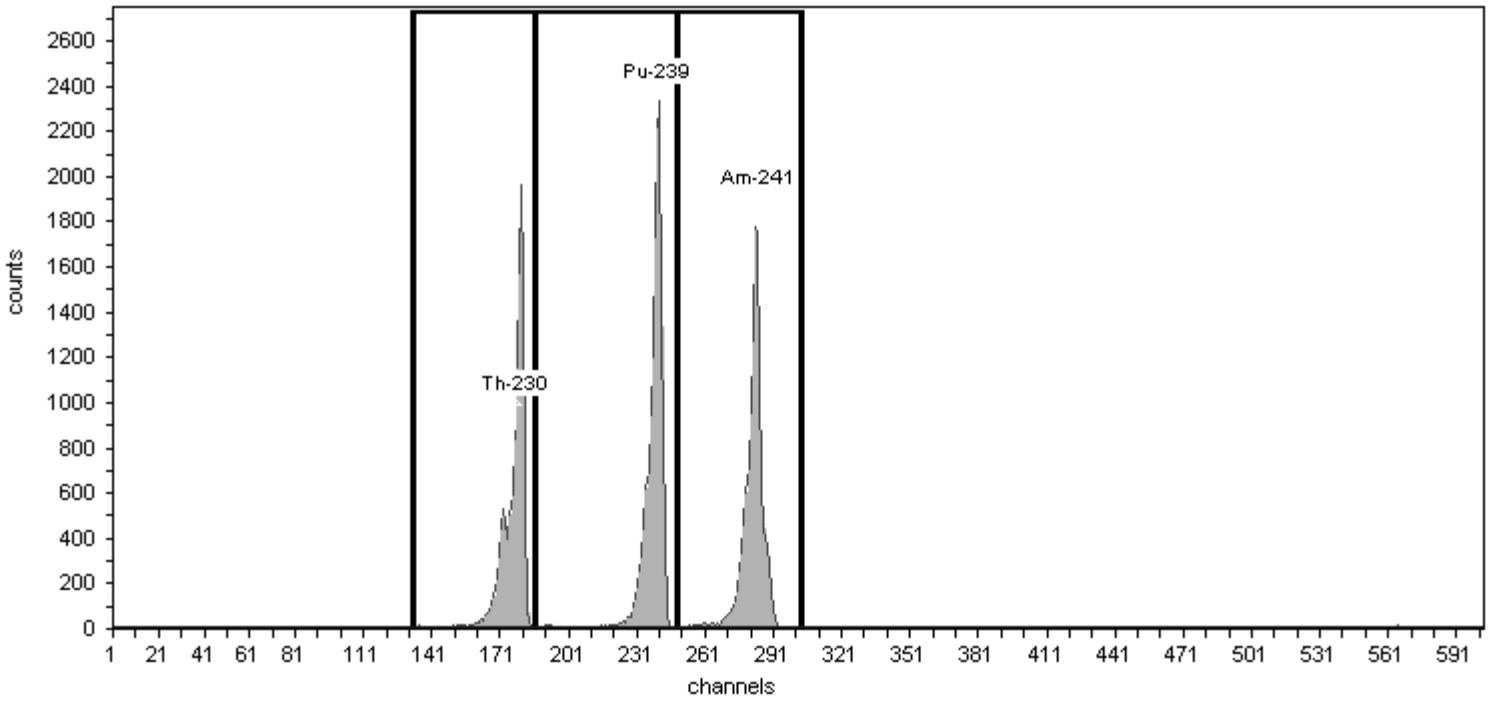
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV18 , SN: 51-082C5
Acquisition Start Date: 5/5/2014 7:28:19PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.46% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	11,763.00	84.02
Pu-239	240	5.16	186	249	13,227.00	94.48
Am-241	284	5.49	249	303	11,935.00	85.25

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:09:08PM 5/5/2014

Calibration

Sample Name: IC-8876;AV19-20140505
Description:
Detector: AV19

Calibration Date: 5/5/2014 10:09:02PM
Analyst: 60040

Source Info

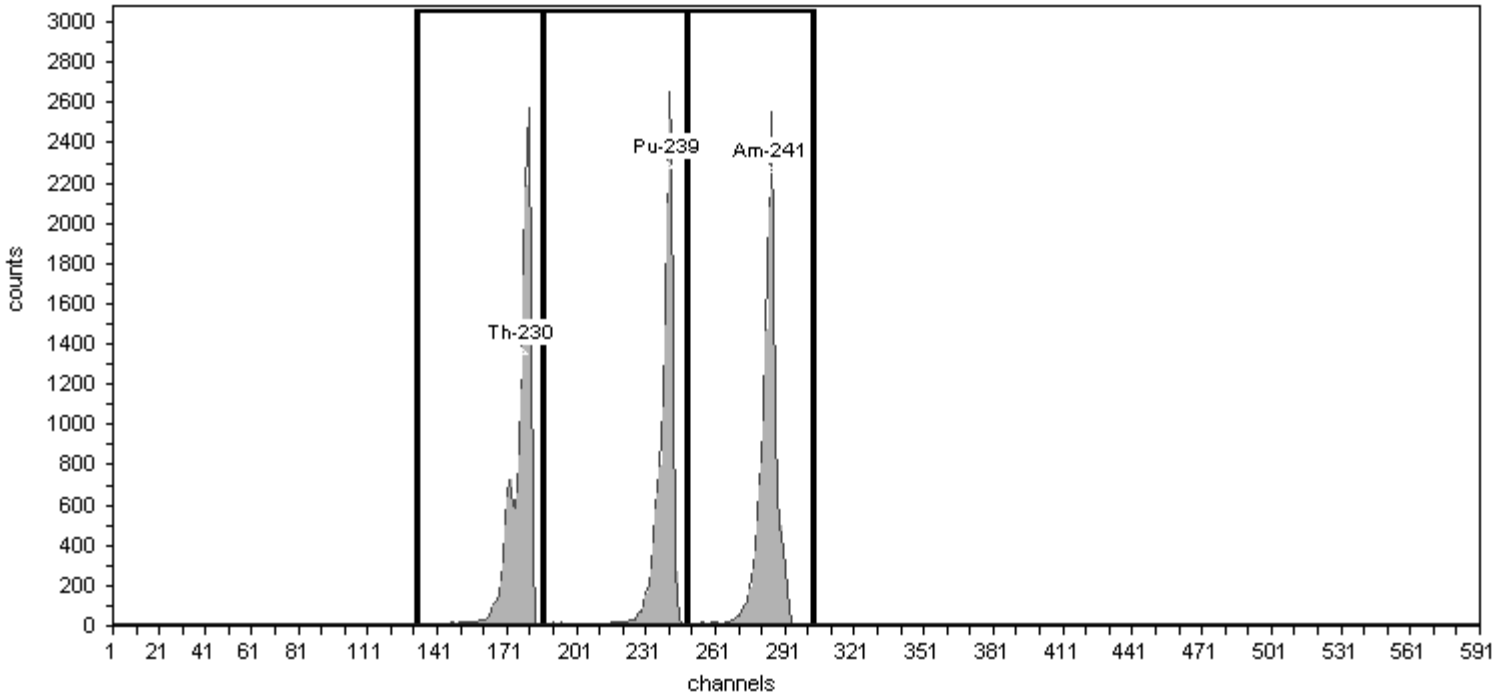
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV19 , SN: 50-025FF5
Acquisition Start Date: 5/5/2014 7:28:32PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.34% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	15,406.00	110.04
Pu-239	240	5.16	186	249	14,896.00	106.40
Am-241	284	5.49	249	303	15,462.00	110.44

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:09:25PM 5/5/2014

Calibration

Sample Name: IC-8877;AV20-20140505
Description:
Detector: AV20

Calibration Date: 5/5/2014 10:09:21PM
Analyst: 60040

Source Info

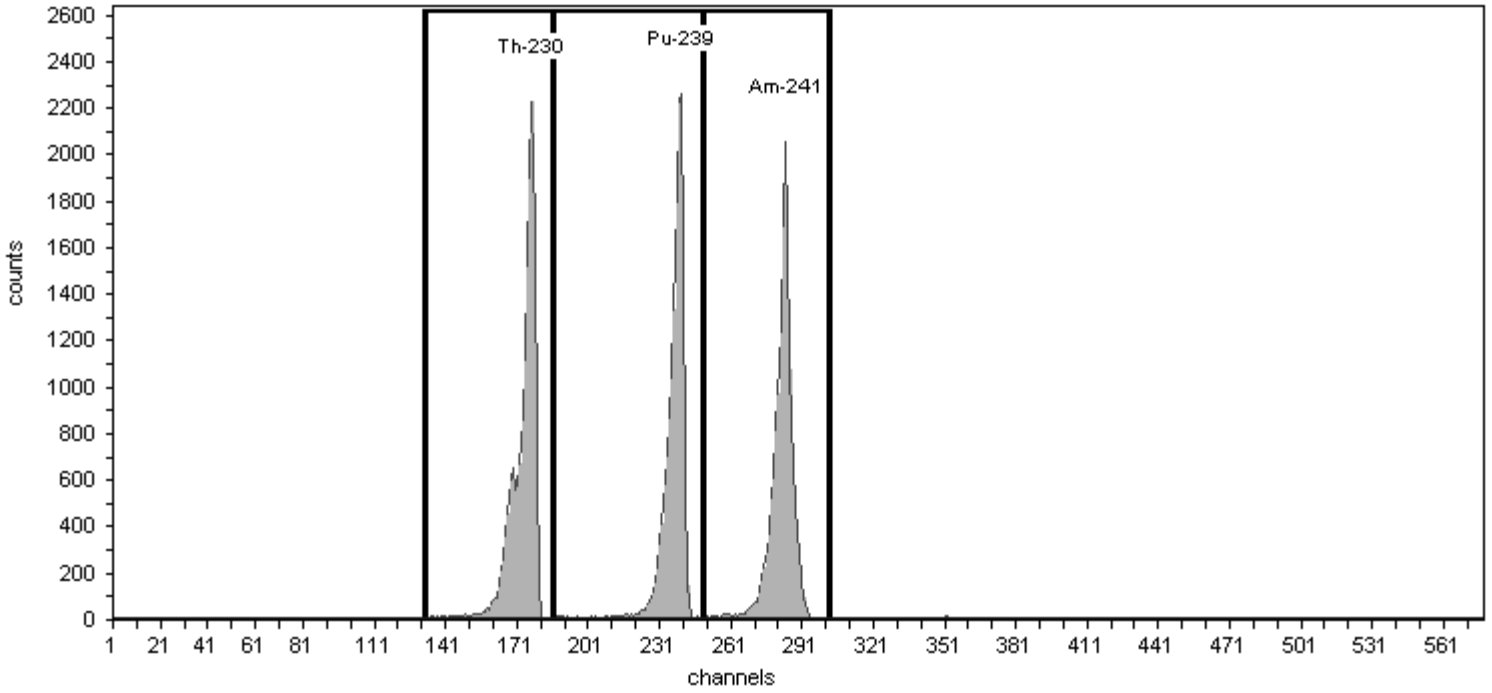
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV20 , SN: 48-121A7
Acquisition Start Date: 5/5/2014 7:28:49PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.56% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	15,158.00	108.27
Pu-239	240	5.16	186	249	14,844.00	106.03
Am-241	284	5.49	249	303	14,347.00	102.48

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:09:51PM 5/5/2014

Calibration

Sample Name: IC-9794;AV43-20140505
Description:
Detector: AV43

Calibration Date: 5/5/2014 10:09:47PM
Analyst: 60040

Source Info

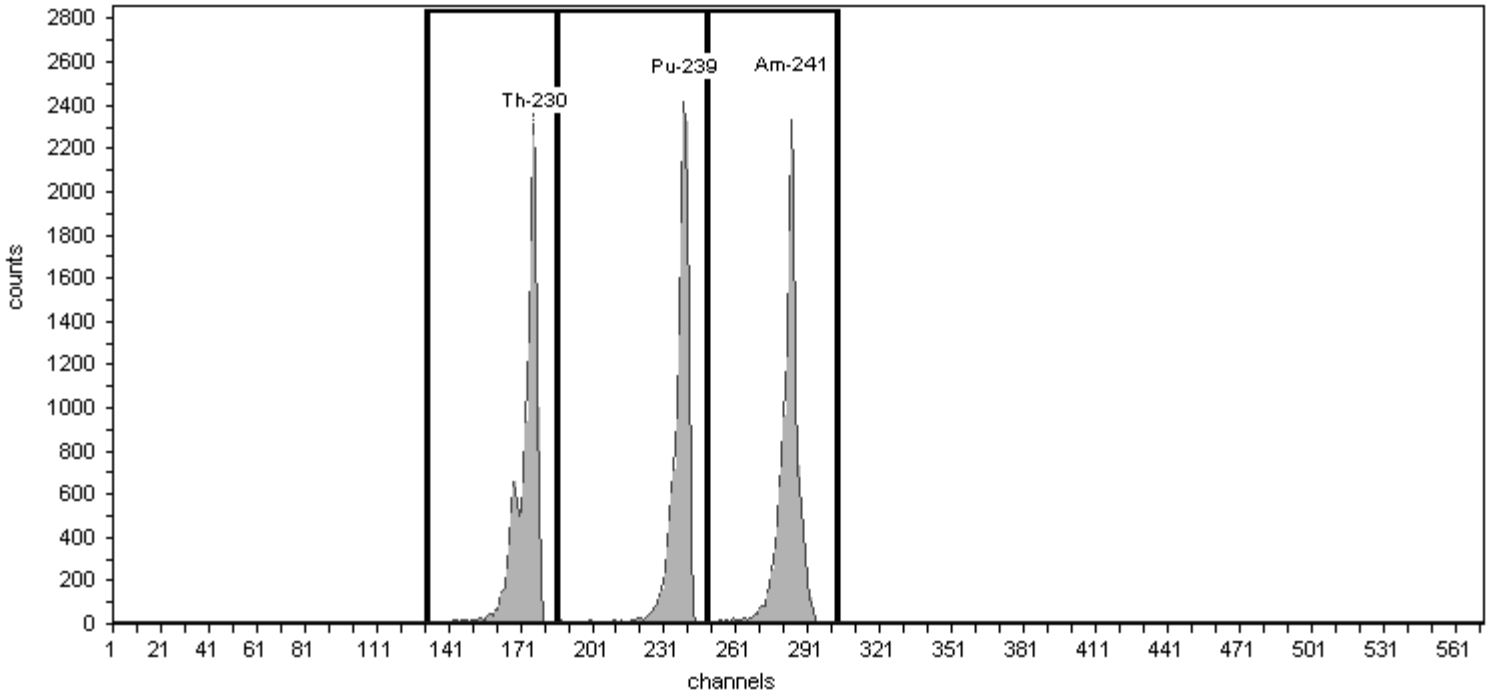
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV43 , SN: 49-190X4
Acquisition Start Date: 5/5/2014 7:30:02PM
Live Time: 140.00 min.
Real Time: 140.08 min.
Efficiency: 25.74% +/- 0.32% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,478.00	103.41
Pu-239	240	5.16	186	249	13,913.00	99.38
Am-241	284	5.49	249	303	15,090.00	107.79

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:10:00PM 5/5/2014

Calibration

Sample Name: IC-9795;AV44-20140505
Description:
Detector: AV44

Calibration Date: 5/5/2014 10:09:57PM
Analyst: 60040

Source Info

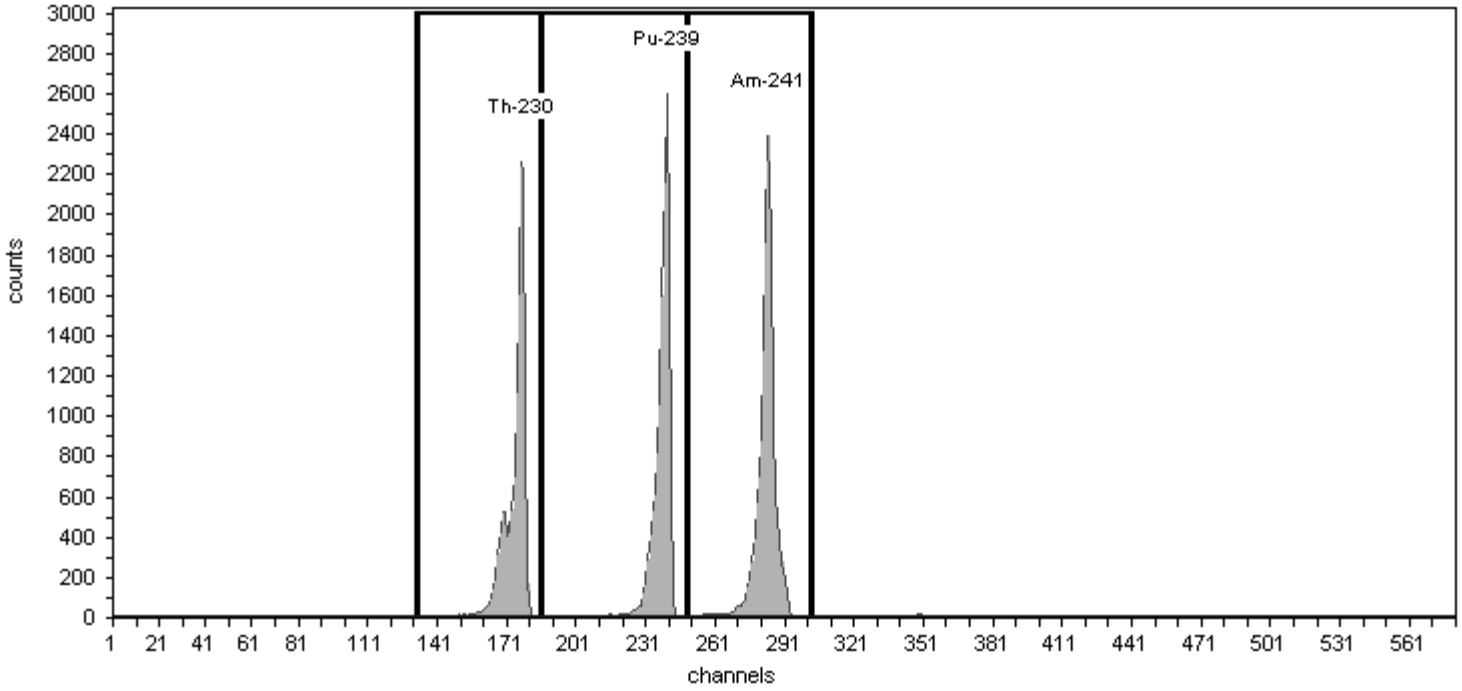
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV44 , SN: 50-051JJ1
Acquisition Start Date: 5/5/2014 7:30:18PM
Live Time: 140.00 min.
Real Time: 140.08 min.
Efficiency: 26.32% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,875.00	91.96
Pu-239	240	5.16	186	249	13,229.00	94.49
Am-241	284	5.49	249	303	14,113.00	100.81

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:10:06PM 5/5/2014

Calibration

Sample Name: IC-9817;AV45-20140505
Description:
Detector: AV45

Calibration Date: 5/5/2014 10:10:03PM
Analyst: 60040

Source Info

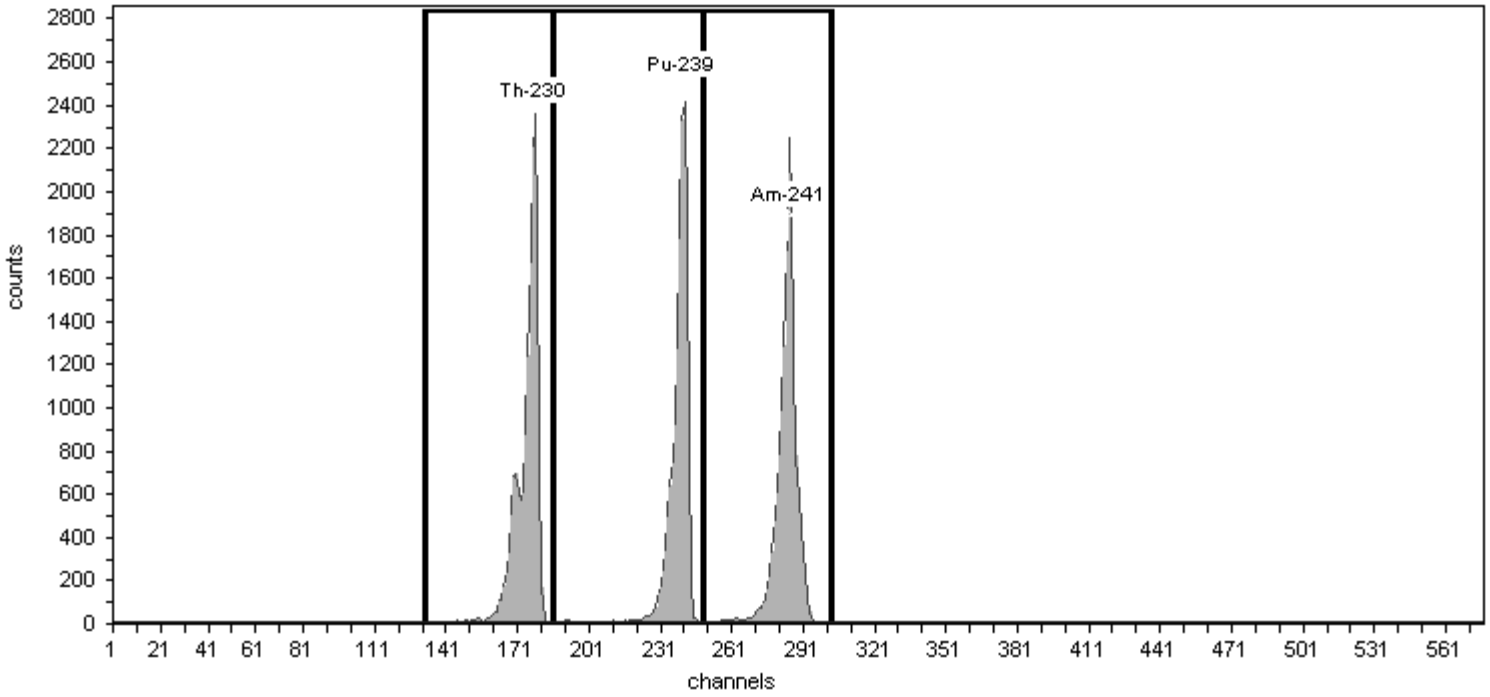
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV45 , SN: 48-158FF2
Acquisition Start Date: 5/5/2014 7:30:35PM
Live Time: 140.00 min.
Real Time: 140.08 min.
Efficiency: 26.06% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,022.00	114.44
Pu-239	240	5.16	186	249	14,730.00	105.21
Am-241	284	5.49	249	303	15,078.00	107.70

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:10:13PM 5/5/2014

Calibration

Sample Name: IC-9884;AV46-20140505
Description:
Detector: AV46

Calibration Date: 5/5/2014 10:10:09PM
Analyst: 60040

Source Info

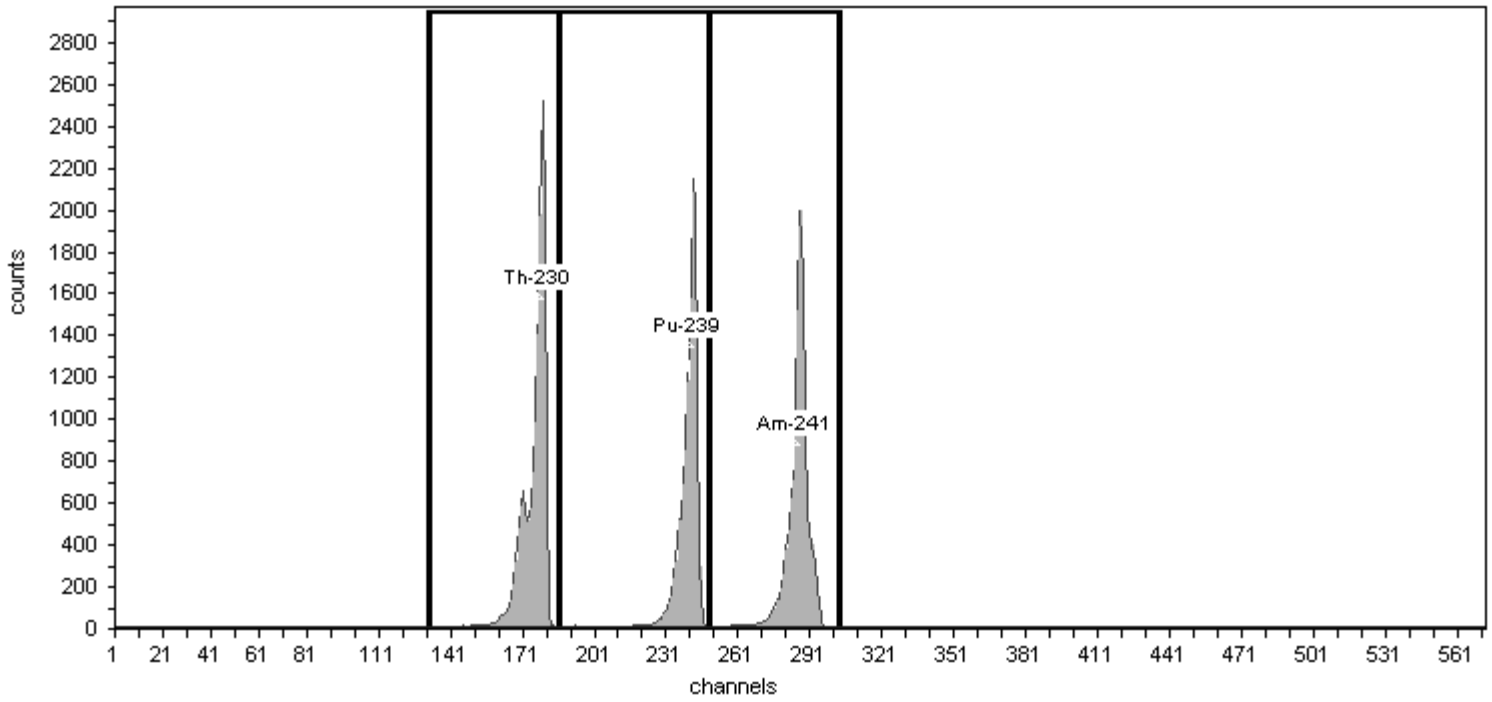
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV46 , SN: 49-202GG2
Acquisition Start Date: 5/5/2014 7:30:55PM
Live Time: 140.00 min.
Real Time: 140.08 min.
Efficiency: 26.80% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,928.00	106.63
Pu-239	240	5.16	186	249	12,228.00	87.34
Am-241	284	5.49	249	303	12,660.00	90.43

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:10:25PM 5/5/2014

Calibration

Sample Name: IC-9886;AV48-20140505
Description:
Detector: AV48

Calibration Date: 5/5/2014 10:10:22PM
Analyst: 60040

Source Info

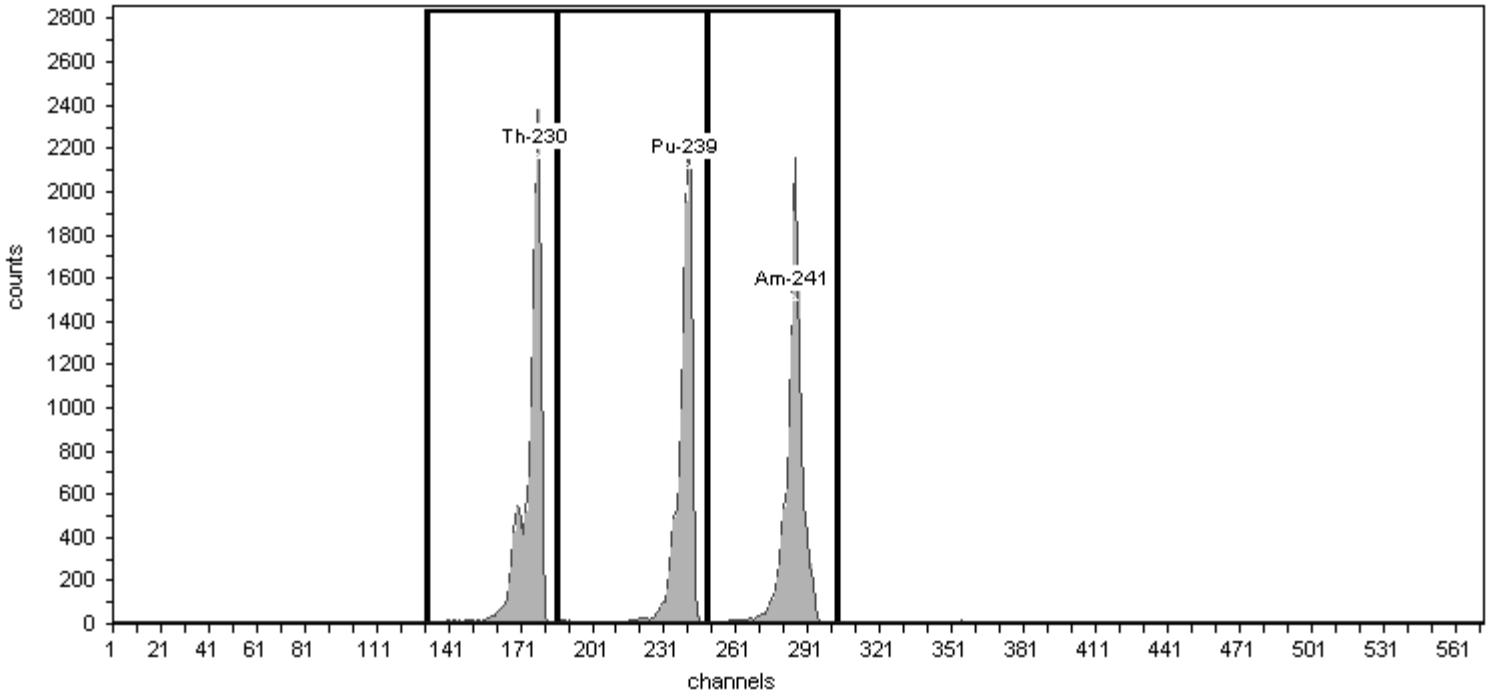
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV48 , SN: 50-051JJ4
Acquisition Start Date: 5/5/2014 7:32:02PM
Live Time: 140.00 min.
Real Time: 140.08 min.
Efficiency: 25.78% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,428.00	95.91
Pu-239	240	5.16	186	249	12,557.00	89.69
Am-241	284	5.49	249	303	13,561.00	96.86

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:44PM 5/5/2014

Calibration

Sample Name: IC-9793;AV57-20140504
Description:
Detector: AV57

Calibration Date: 5/5/2014 6:53:40PM
Analyst: 60040

Source Info

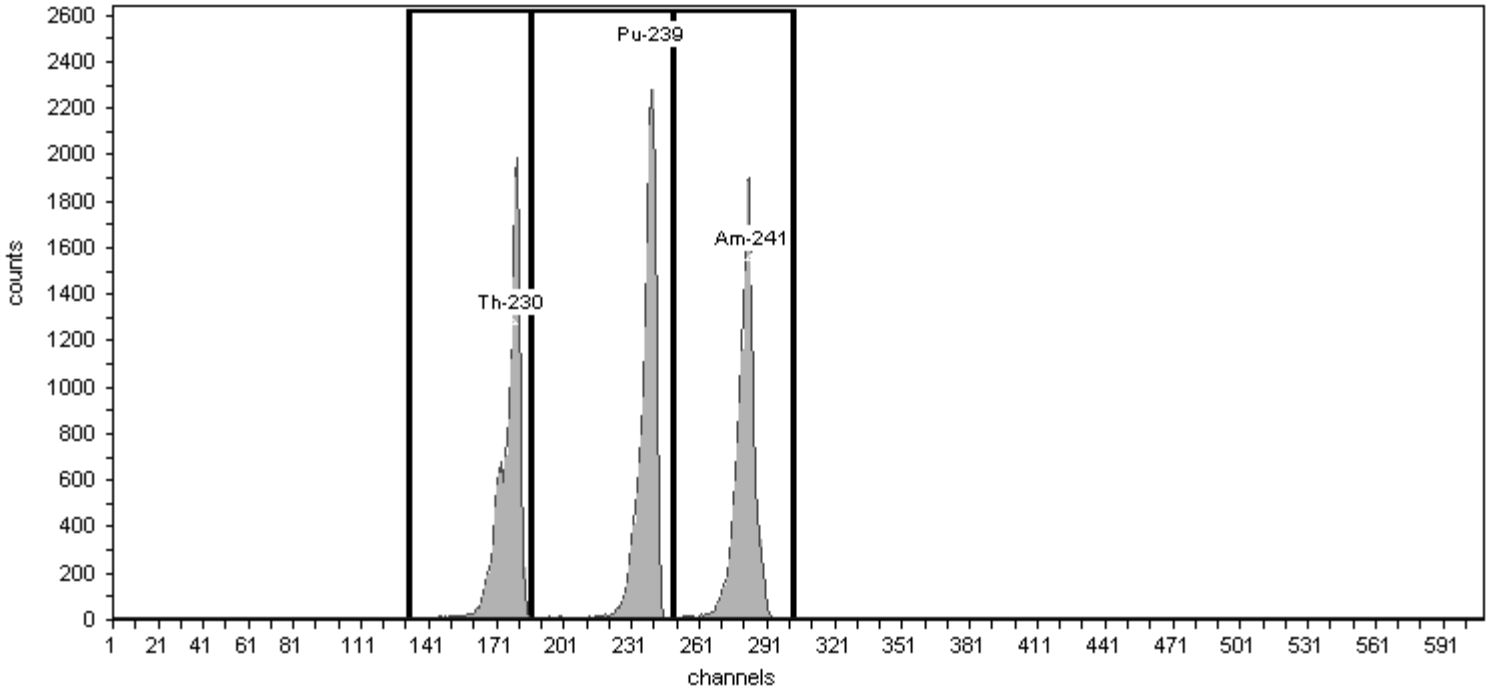
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV57 , SN: 48-158EE3
Acquisition Start Date: 5/4/2014 9:05:08PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 26.74% +/- 0.33% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,915.00	106.54
Pu-239	240	5.16	186	249	15,361.00	109.72
Am-241	284	5.49	249	303	14,709.00	105.06

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:50PM 5/5/2014

Calibration

Sample Name: IC-9794;AV58-20140504
Description:
Detector: AV58

Calibration Date: 5/5/2014 6:53:46PM
Analyst: 60040

Source Info

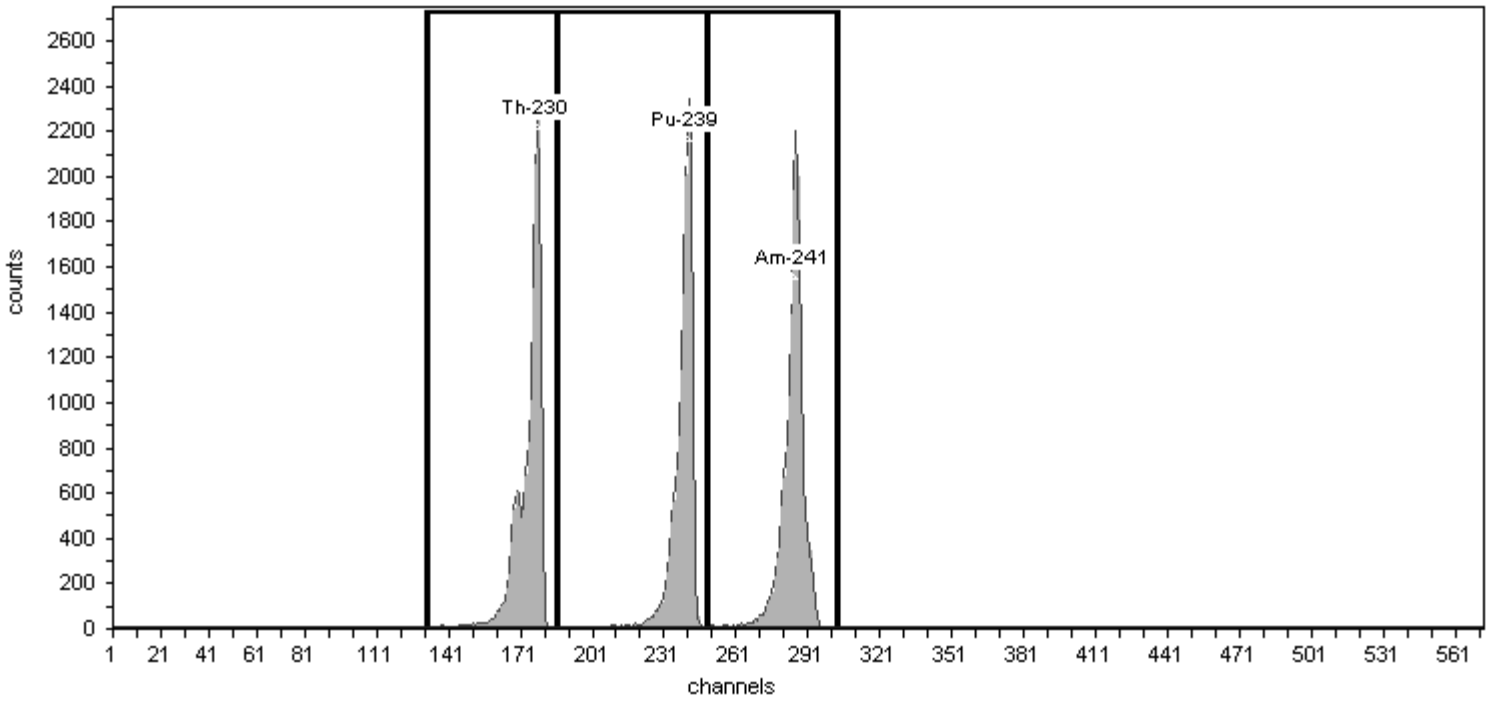
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 5/4/2014 9:05:25PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 26.56% +/- 0.33% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,633.00	104.52
Pu-239	240	5.16	186	249	14,396.00	102.83
Am-241	284	5.49	249	303	15,822.00	113.01

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:56PM 5/5/2014

Calibration

Sample Name: IC-9795;AV59-20140504
Description:
Detector: AV59

Calibration Date: 5/5/2014 6:53:53PM
Analyst: 60040

Source Info

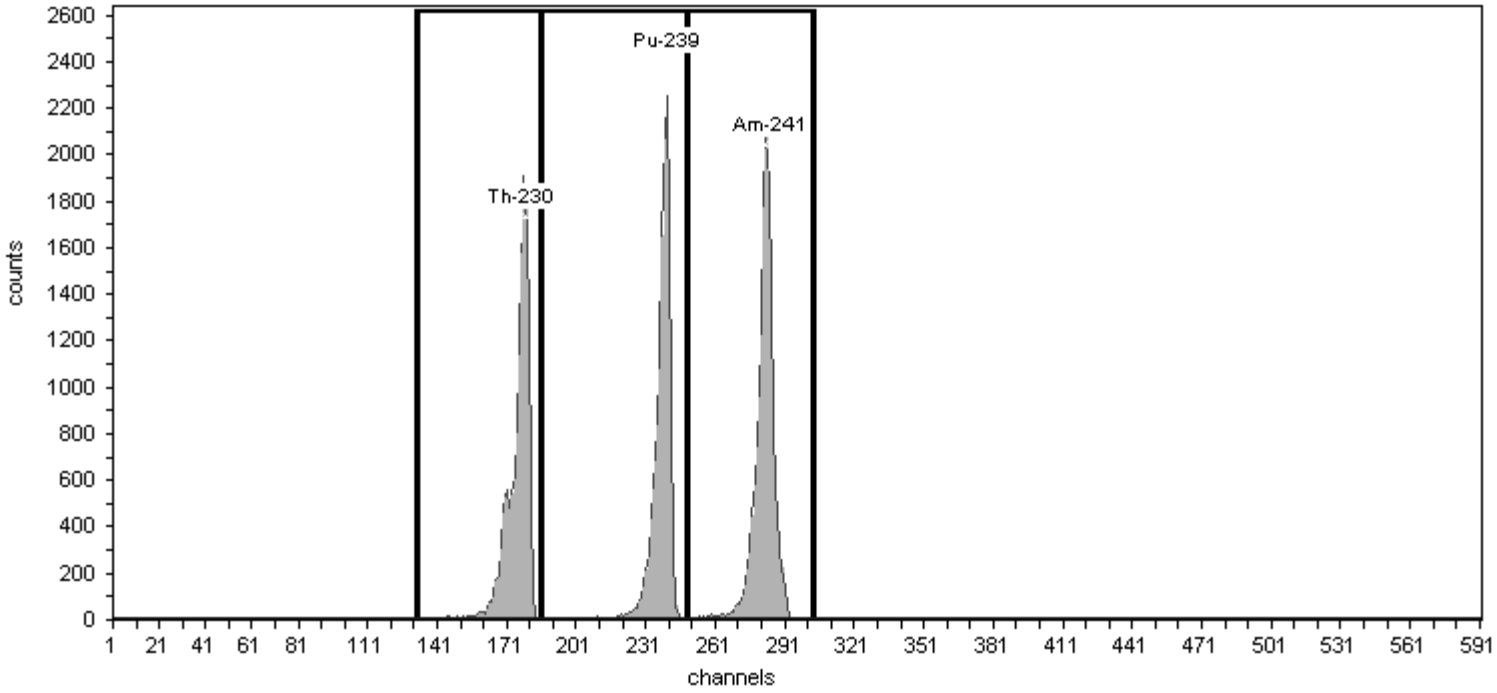
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV59 , SN: 49-155M7
Acquisition Start Date: 5/4/2014 9:05:42PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 27.44% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,530.00	96.64
Pu-239	240	5.16	186	249	13,591.00	97.08
Am-241	284	5.49	249	303	14,815.00	105.82

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:54:03PM 5/5/2014

Calibration

Sample Name: IC-9817;AV60-20140504
Description:
Detector: AV60

Calibration Date: 5/5/2014 6:53:59PM
Analyst: 60040

Source Info

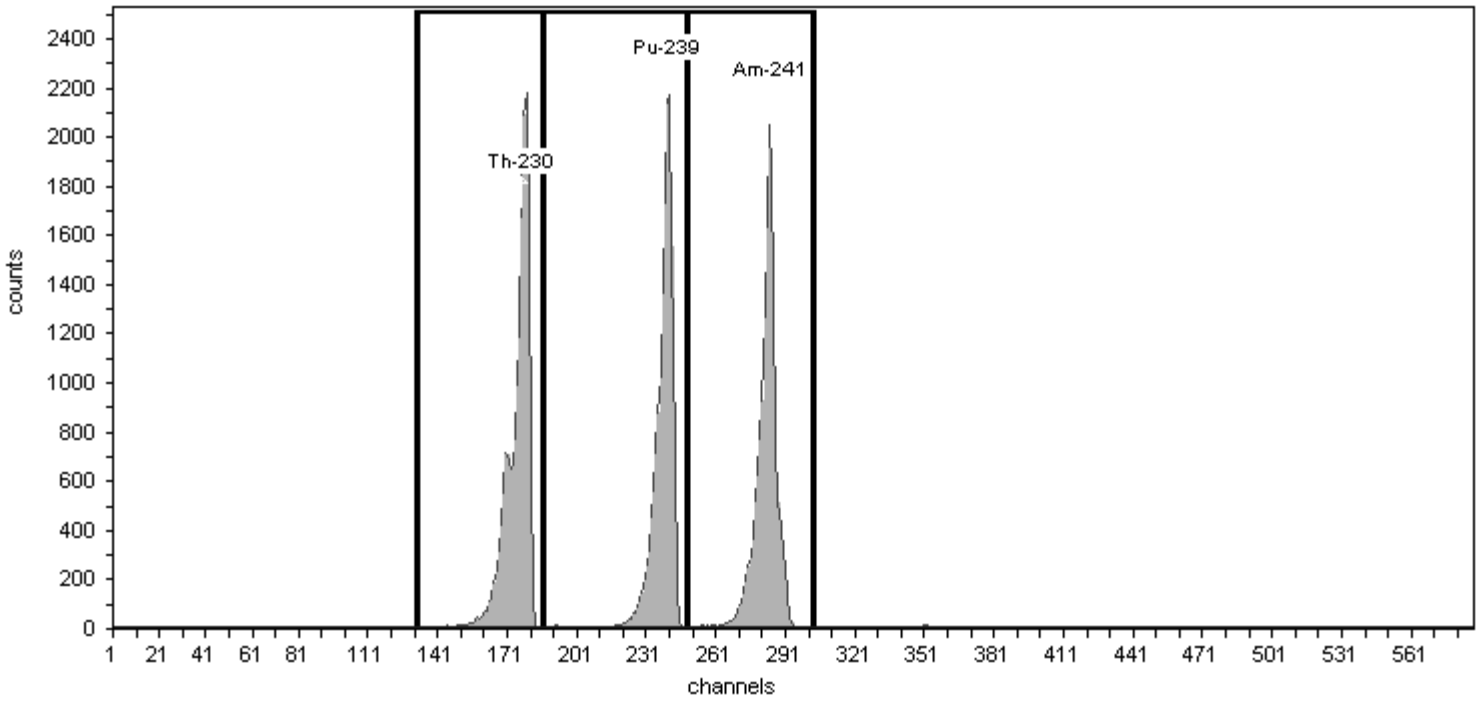
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 5/4/2014 9:06:02PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 26.33% +/- 0.32% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,279.00	116.28
Pu-239	240	5.16	186	249	14,858.00	106.13
Am-241	284	5.49	249	303	15,157.00	108.26

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:54:10PM 5/5/2014

Calibration

Sample Name: IC-9884;AV61-20140504
Description:
Detector: AV61

Calibration Date: 5/5/2014 6:54:06PM
Analyst: 60040

Source Info

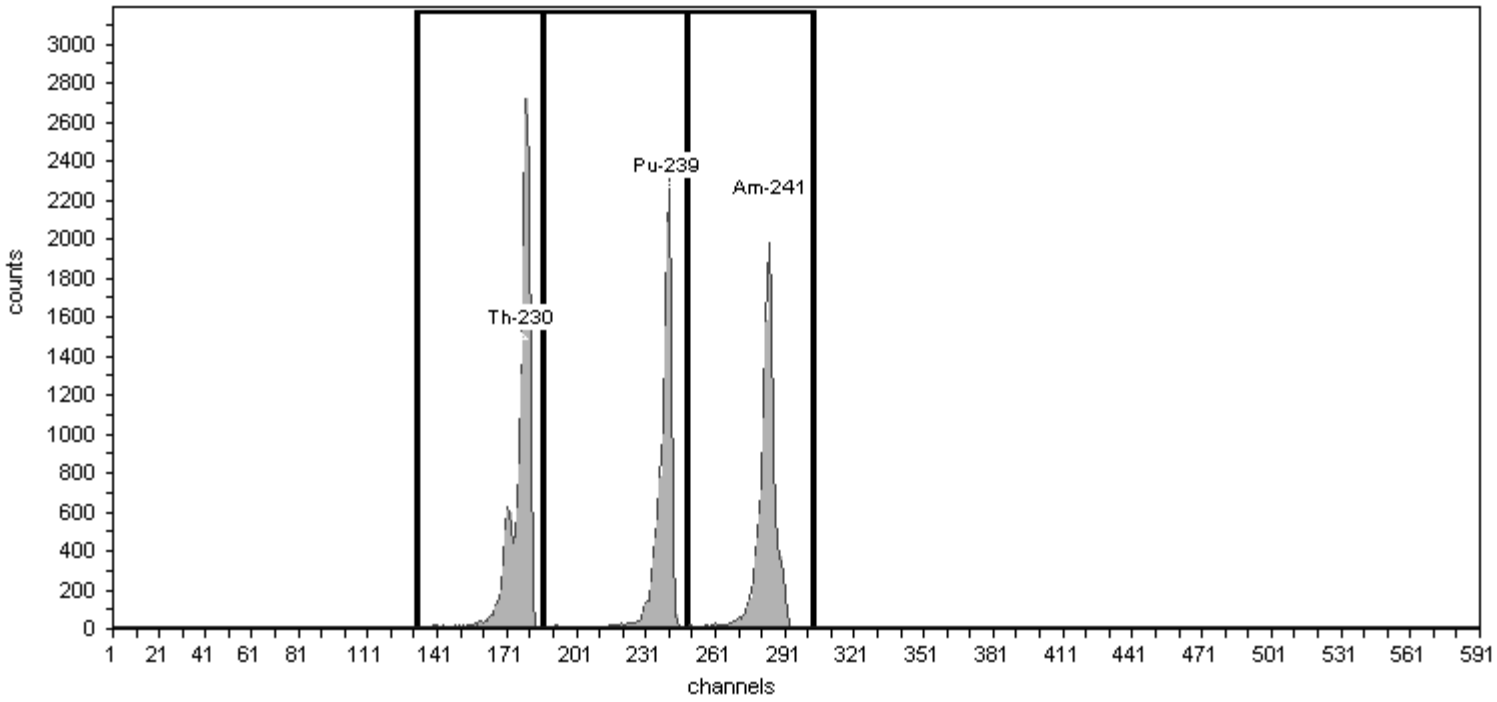
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV61 , SN: 5-051JJ3
Acquisition Start Date: 5/4/2014 9:06:04PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 26.46% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,902.00	106.44
Pu-239	240	5.16	186	249	12,091.00	86.36
Am-241	284	5.49	249	303	12,283.00	87.74

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:54:16PM 5/5/2014

Calibration

Sample Name: IC-9885;AV62-20140504
Description:
Detector: AV62

Calibration Date: 5/5/2014 6:54:13PM
Analyst: 60040

Source Info

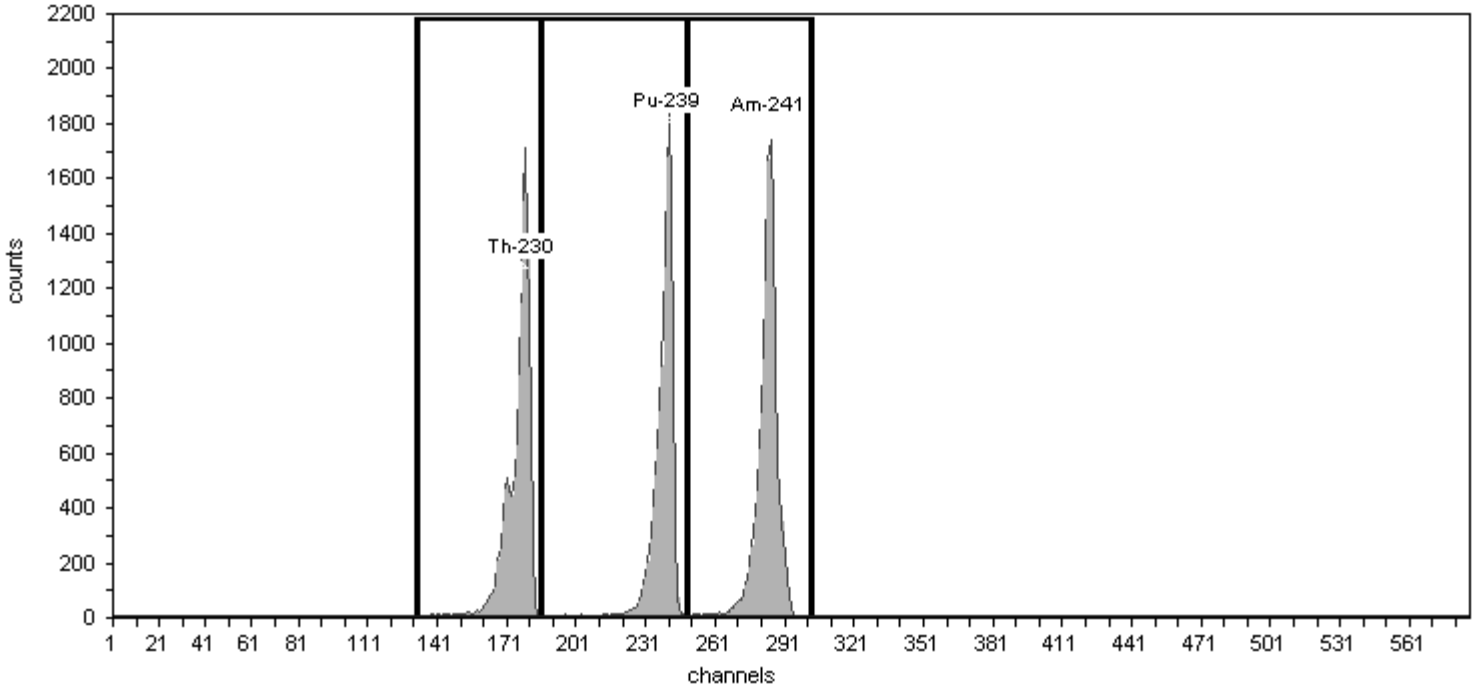
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 5/4/2014 9:06:28PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 26.34% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,181.00	87.01
Pu-239	240	5.16	186	249	12,037.00	85.98
Am-241	284	5.49	249	303	13,168.00	94.06

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:45:37PM 5/4/2014

Calibration

Sample Name: IC-9886;AV78-20140504
Description:
Detector: AV78

Calibration Date: 5/4/2014 8:45:34PM
Analyst: 60040

Source Info

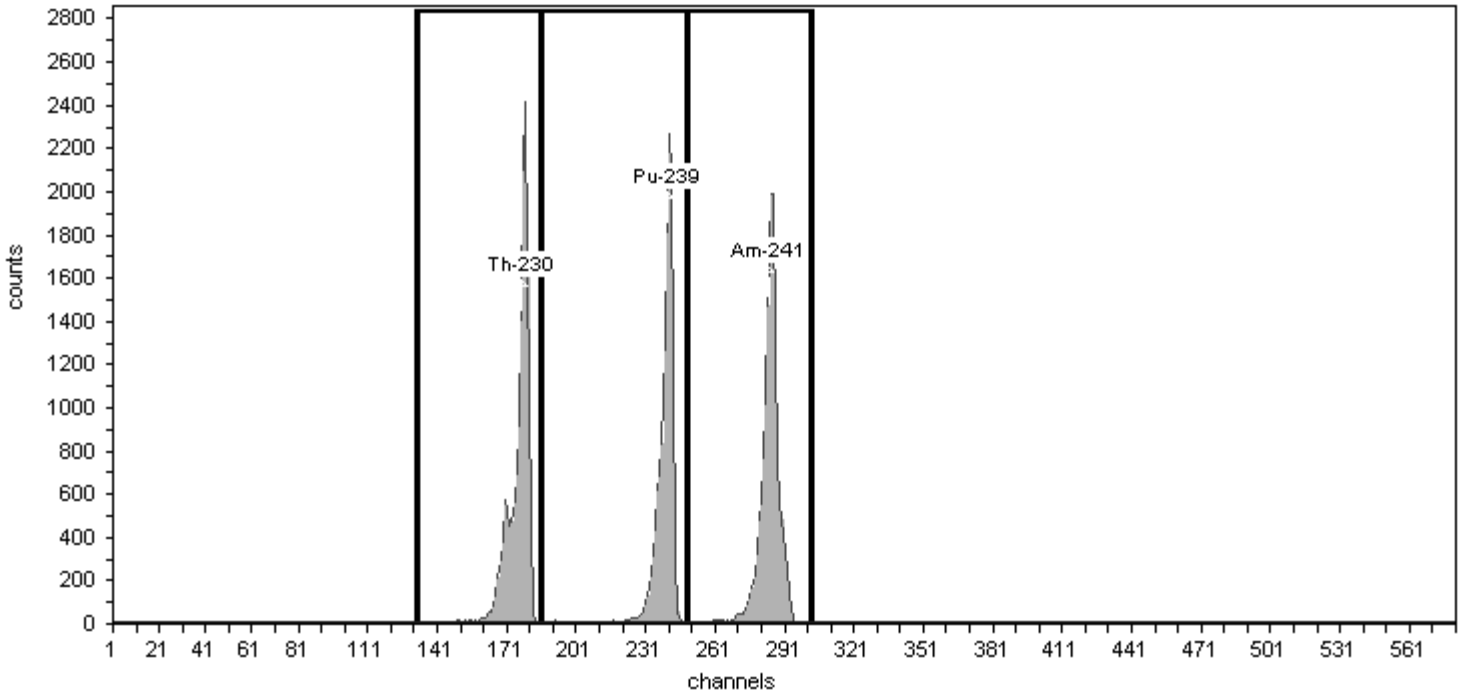
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV78 , SN: 46-033FF4
Acquisition Start Date: 5/4/2014 5:51:18PM
Live Time: 140.00 min.
Real Time: 140.06 min.
Efficiency: 25.71% +/- 0.34% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,586.00	97.04
Pu-239	240	5.16	186	249	12,514.00	89.39
Am-241	284	5.49	249	303	13,337.00	95.26

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:31:33PM 5/4/2014

Calibration

Sample Name: IC-7107;AV79-20140501
Description:
Detector: AV79

Calibration Date: 5/4/2014 5:31:27PM
Analyst: 60040

Source Info

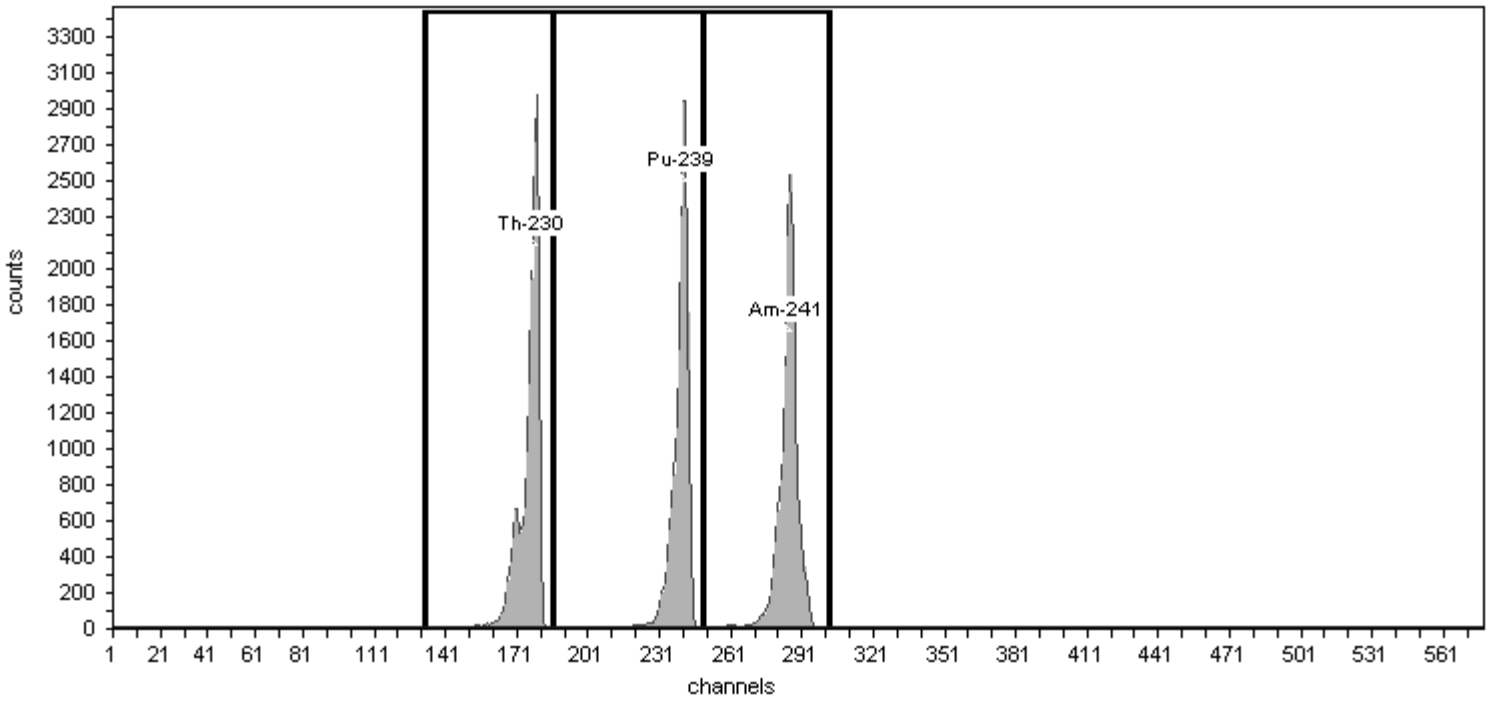
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV79 , SN: 46-033Q5
Acquisition Start Date: 5/1/2014 7:15:10PM
Live Time: 140.00 min.
Real Time: 140.06 min.
Efficiency: 27.05% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	17,161.00	122.58
Pu-239	240	5.16	186	249	16,466.00	117.61
Am-241	284	5.49	249	303	16,390.00	117.07

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:31:52PM 5/4/2014

Calibration

Sample Name: IC-8876;AV82-20140501
Description:
Detector: AV82

Calibration Date: 5/4/2014 5:31:49PM
Analyst: 60040

Source Info

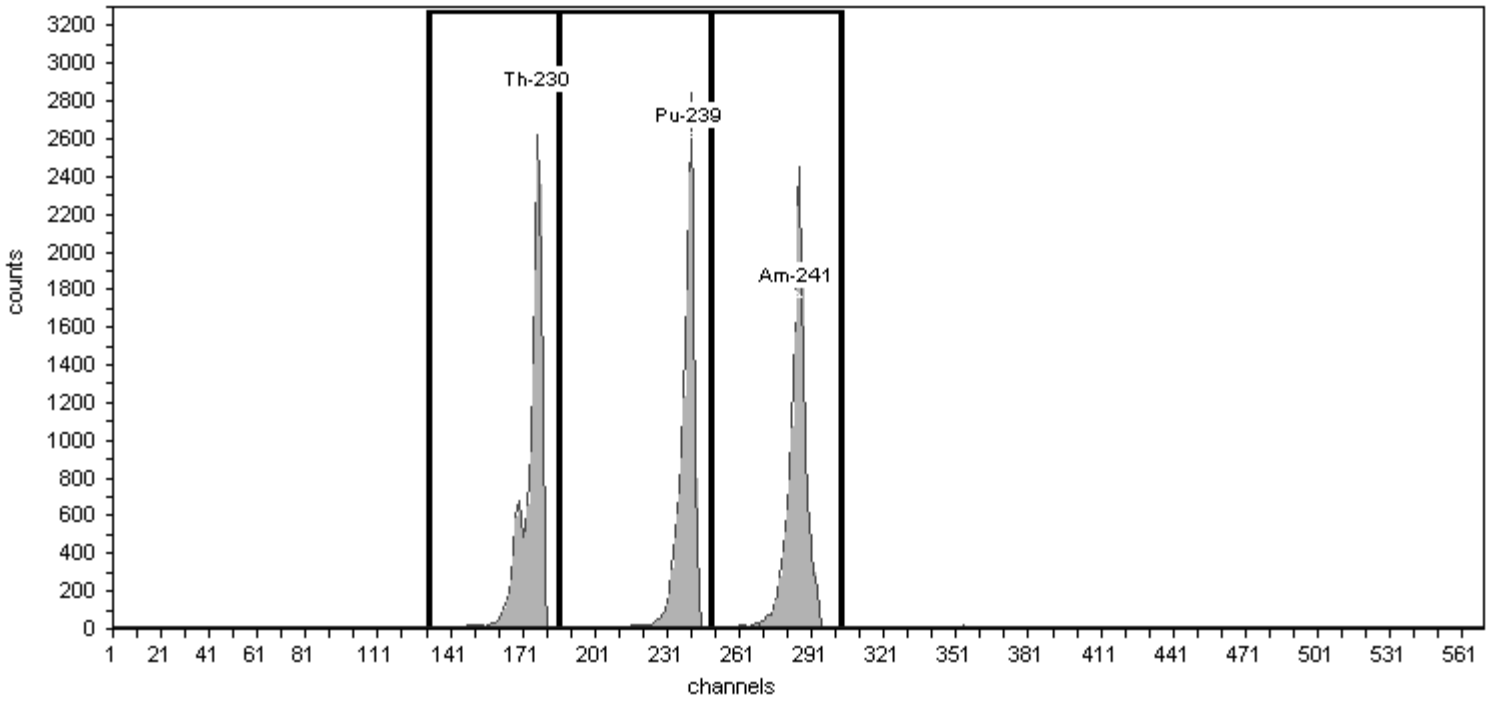
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV82 , SN: 46-032EE5
Acquisition Start Date: 5/1/2014 7:15:43PM
Live Time: 140.00 min.
Real Time: 140.06 min.
Efficiency: 25.76% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	15,627.00	111.62
Pu-239	240	5.16	186	249	15,112.00	107.94
Am-241	284	5.49	249	303	15,786.00	112.76

Initial Calibration Verifications

Alpha Spectroscopy Calibration Summary

Detector: AV1

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120511/1	05/05/14 22:25	82232-334_00001	0.2630	0.20-0.32		
ICV 160-120846/1	05/07/14 23:01	82247-334_00001	0.2524	0.20-0.32	96.0	95-105
CCV 160-122944/1	05/18/14 19:19	82232-334_00001	0.2651	0.20-0.32	100.8	95-105

Detector: AV11

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120513/1	05/05/14 22:27	82243-334_00001	0.2688	0.20-0.32		
ICV 160-120848/1	05/07/14 23:04	82242-334_00001	0.2598	0.20-0.32	96.6	95-105
CCV 160-122963/1	05/19/14 17:57	82243-334_00001	0.2673	0.20-0.32	99.5	95-105

Detector: AV15

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120517/1	05/05/14 22:28	82247-334_00001	0.2562	0.20-0.32		
ICV 160-120852/1	05/07/14 23:04	82246-334_00001	0.2590	0.20-0.32	101.1	95-105
CCV 160-122950/1	05/18/14 19:22	82247-334_00001	0.2580	0.20-0.32	100.7	95-105

Detector: AV16

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120398/1	05/05/14 19:27	82232-334_00001	0.2711	0.20-0.32		
ICV 160-121072/1	05/08/14 00:14	82247-334_00001	0.2609	0.20-0.32	96.2	95-105
CCV 160-122951/1	05/18/14 20:51	82232-334_00001	0.2727	0.20-0.32	100.6	95-105

Detector: AV17

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120399/1	05/05/14 19:28	82233-334_00001	0.2607	0.20-0.32		
ICV 160-121073/1	05/08/14 00:14	82232-334_00001	0.2633	0.20-0.32	101.0	95-105
CCV 160-122952/1	05/18/14 19:22	82233-334_00001	0.2571	0.20-0.32	98.6	95-105

Detector: AV18

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120400/1	05/05/14 19:28	82234-334_00001	0.2546	0.20-0.32		
ICV 160-121074/1	05/08/14 00:14	82233-334_00001	0.2618	0.20-0.32	102.8	95-105
CCV 160-122953/1	05/18/14 20:51	82234-334_00001	0.2515	0.20-0.32	98.8	95-105

Detector: AV19

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120401/1	05/05/14 19:28	82235-334_00001	0.2534	0.20-0.32		
ICV 160-121361/1	05/08/14 14:33	82235-334_00001	0.2496	0.20-0.32	98.5	95-105
CCV 160-122965/1	05/19/14 17:58	82235-334_00001	0.2512	0.20-0.32	99.2	95-105

Detector: AV20

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120402/1	05/05/14 19:28	82236-334_00001	0.2556	0.20-0.32		
ICV 160-120854/1	05/07/14 23:05	82235-334_00001	0.2551	0.20-0.32	99.8	95-105
CCV 160-122954/1	05/18/14 20:52	82236-334_00001	0.2535	0.20-0.32	99.2	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV43

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120406/1	05/05/14 19:30	82242-334_00001	0.2574	0.20-0.32		
ICV 160-121077/1	05/08/14 00:16	82241-334_00001	0.2568	0.20-0.32	99.8	95-105
CCV 160-122515/1	05/15/14 19:01	82242-334_00001	0.2587	0.20-0.32	100.5	95-105

Detector: AV44

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120407/1	05/05/14 19:30	82243-334_00001	0.2632	0.20-0.32		
ICV 160-121078/1	05/08/14 00:17	82242-334_00001	0.2594	0.20-0.32	98.6	95-105
CCV 160-122516/1	05/15/14 19:01	82243-334_00001	0.2639	0.20-0.32	100.3	95-105

Detector: AV45

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120408/1	05/05/14 19:30	82244-334_00001	0.2606	0.20-0.32		
ICV 160-121363/1	05/08/14 14:32	82243-334_00001	0.2658	0.20-0.32	102.0	95-105
CCV 160-122517/1	05/15/14 19:02	82244-334_00001	0.2585	0.20-0.32	99.2	95-105

Detector: AV46

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120409/1	05/05/14 19:30	82245-334_00001	0.2680	0.20-0.32		
ICV 160-121079/1	05/08/14 00:18	82244-334_00001	0.2610	0.20-0.32	97.4	95-105
CCV 160-122518/1	05/15/14 19:02	82245-334_00001	0.2624	0.20-0.32	97.9	95-105

Detector: AV48

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120411/1	05/05/14 19:32	82247-334_00001	0.2578	0.20-0.32		
ICV 160-121081/1	05/08/14 00:18	82246-334_00001	0.2600	0.20-0.32	100.9	95-105
CCV 160-122520/1	05/15/14 19:03	82247-334_00001	0.2591	0.20-0.32	100.5	95-105

Detector: AV57

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120279/1	05/04/14 21:05	82241-334_00001	0.2674	0.20-0.32		
ICV 160-121370/1	05/08/14 14:35	82240-334_00001	0.2676	0.20-0.32	100.1	95-105
CCV 160-122526/1	05/15/14 19:05	82241-334_00001	0.2706	0.20-0.32	101.2	95-105

Detector: AV58

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120280/1	05/04/14 21:05	82242-334_00001	0.2656	0.20-0.32		
ICV 160-121371/1	05/08/14 14:35	82241-334_00001	0.2710	0.20-0.32	102.0	95-105
CCV 160-122530/1	05/15/14 20:43	82242-334_00001	0.2645	0.20-0.32	99.6	95-105

Detector: AV59

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120281/1	05/04/14 21:05	82243-334_00001	0.2744	0.20-0.32		
ICV 160-121372/1	05/08/14 14:36	82242-334_00001	0.2677	0.20-0.32	97.5	95-105
CCV 160-122531/1	05/15/14 20:44	82243-334_00001	0.2748	0.20-0.32	100.1	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV60

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120282/1	05/04/14 21:06	82244-334_00001	0.2633	0.20-0.32		
ICV 160-121373/1	05/08/14 17:21	82243-334_00001	0.2725	0.20-0.32	103.5	95-105
CCV 160-122532/1	05/15/14 20:44	82244-334_00001	0.2625	0.20-0.32	99.7	95-105

Detector: AV61

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120283/1	05/04/14 21:06	82245-334_00001	0.2646	0.20-0.32		
ICV 160-121374/1	05/08/14 14:36	82244-334_00001	0.2581	0.20-0.32	97.5	95-105
CCV 160-122533/1	05/15/14 20:44	82244-334_00001	0.2632	0.20-0.32	99.5	95-105

Detector: AV62

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120284/1	05/04/14 21:06	82246-334_00001	0.2634	0.20-0.32		
ICV 160-121375/1	05/08/14 14:36	82245-334_00001	0.2622	0.20-0.32	99.6	95-105
CCV 160-122534/1	05/15/14 20:44	82246-334_00001	0.2641	0.20-0.32	100.3	95-105

Detector: AV78

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120055/1	05/04/14 17:51	82247-334_00001	0.2571	0.20-0.32		
ICV 160-121385/1	05/08/14 17:20	82246-334_00001	0.2600	0.20-0.32	101.1	95-105
CCV 160-122550/1	05/15/14 21:58	82247-334_00001	0.2604	0.20-0.32	101.3	95-105

Detector: AV79

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119923/1	05/01/14 19:15	82232-334_00001	0.2705	0.20-0.32		
ICV 160-121432/1	05/11/14 20:47	82247-334_00001	0.2634	0.20-0.32	97.4	95-105
CCV 160-122647/1	05/15/14 23:08	82232-334_00001	0.2761	0.20-0.32	102.1	95-105

Detector: AV82

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119926/1	05/01/14 19:15	82235-334_00001	0.2576	0.20-0.32		
ICV 160-121434/1	05/11/14 20:48	82234-334_00001	0.2576	0.20-0.32	100.0	95-105
CCV 160-122665/1	05/16/14 15:28	82235-334_00001	0.2594	0.20-0.32	100.7	95-105

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:05:34AM 5/8/2014

Calibration

Sample Name: ICV-9886;AV1-20140507
Description:
Detector: AV1

Calibration Date: 5/8/2014 12:05:29AM
Analyst: 60040

Source Info

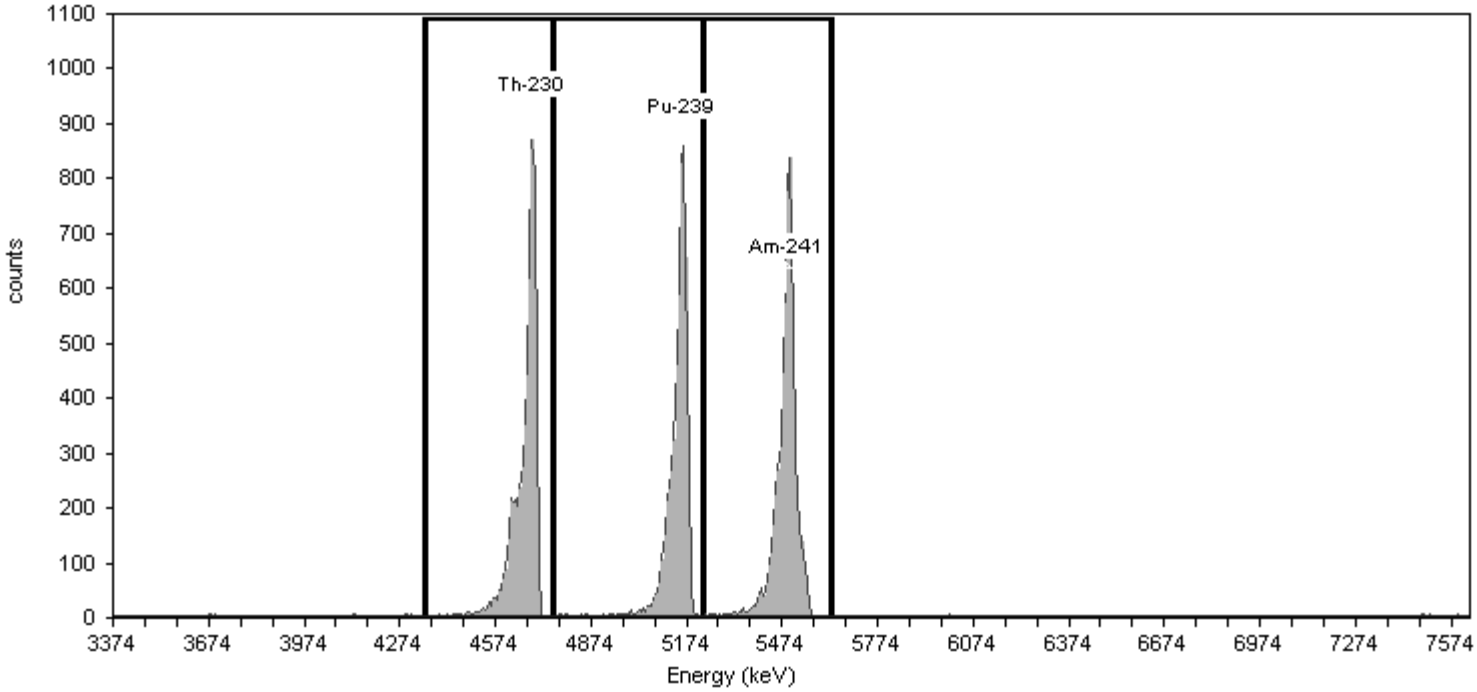
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV1 , SN: 49-188 AA4
Acquisition Start Date: 5/7/2014 11:01:59PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.24% +/- 0.45% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,533.00	92.22
Pu-239	240	5.16	186	249	5,365.00	89.42
Am-241	284	5.49	249	303	5,699.00	94.98

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:26AM 5/8/2014

Calibration

Sample Name: ICV-9794;AV11-20140507
Description:
Detector: AV11

Calibration Date: 5/8/2014 12:06:22AM
Analyst: 60040

Source Info

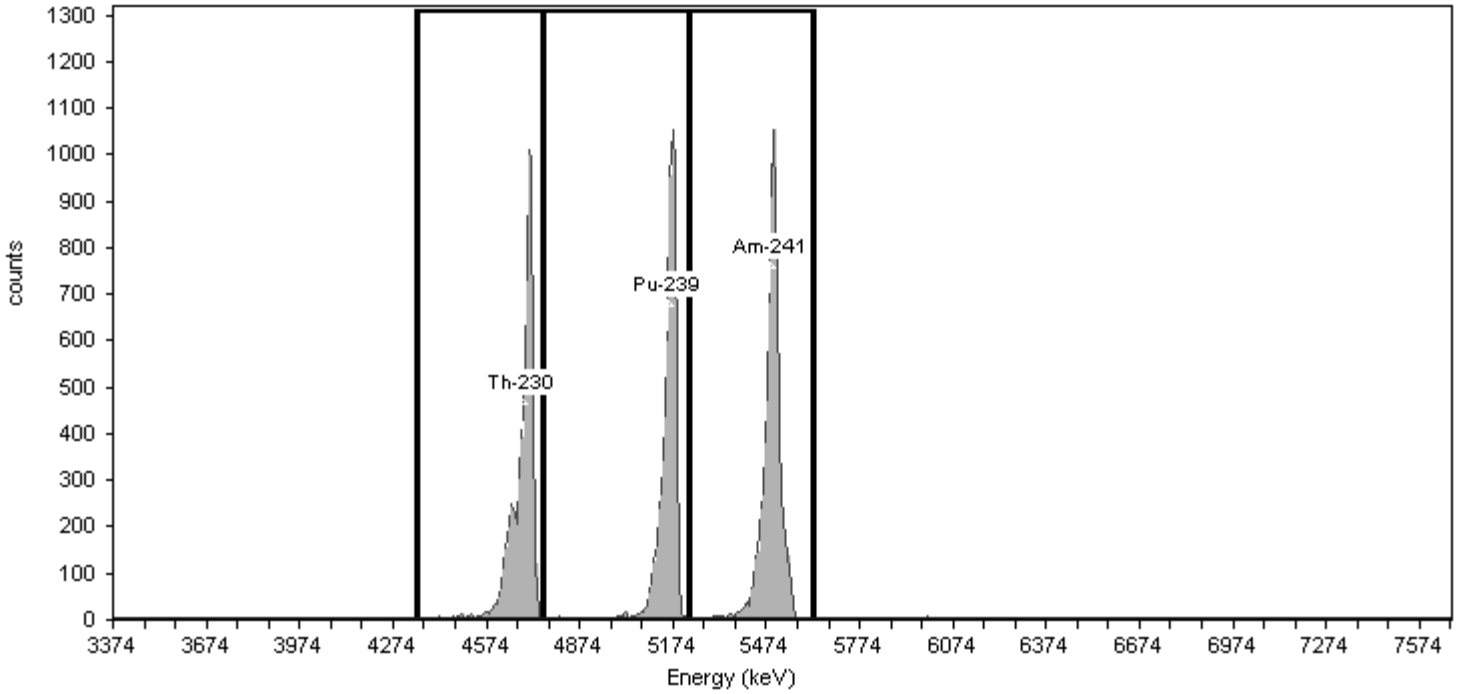
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 5/7/2014 11:04:13PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.98% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,238.00	103.97
Pu-239	240	5.16	186	249	5,922.00	98.70
Am-241	284	5.49	249	303	6,644.00	110.73

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:50AM 5/8/2014

Calibration

Sample Name: ICV-9885;AV15-20140507
Description:
Detector: AV15

Calibration Date: 5/8/2014 12:06:47AM
Analyst: 60040

Source Info

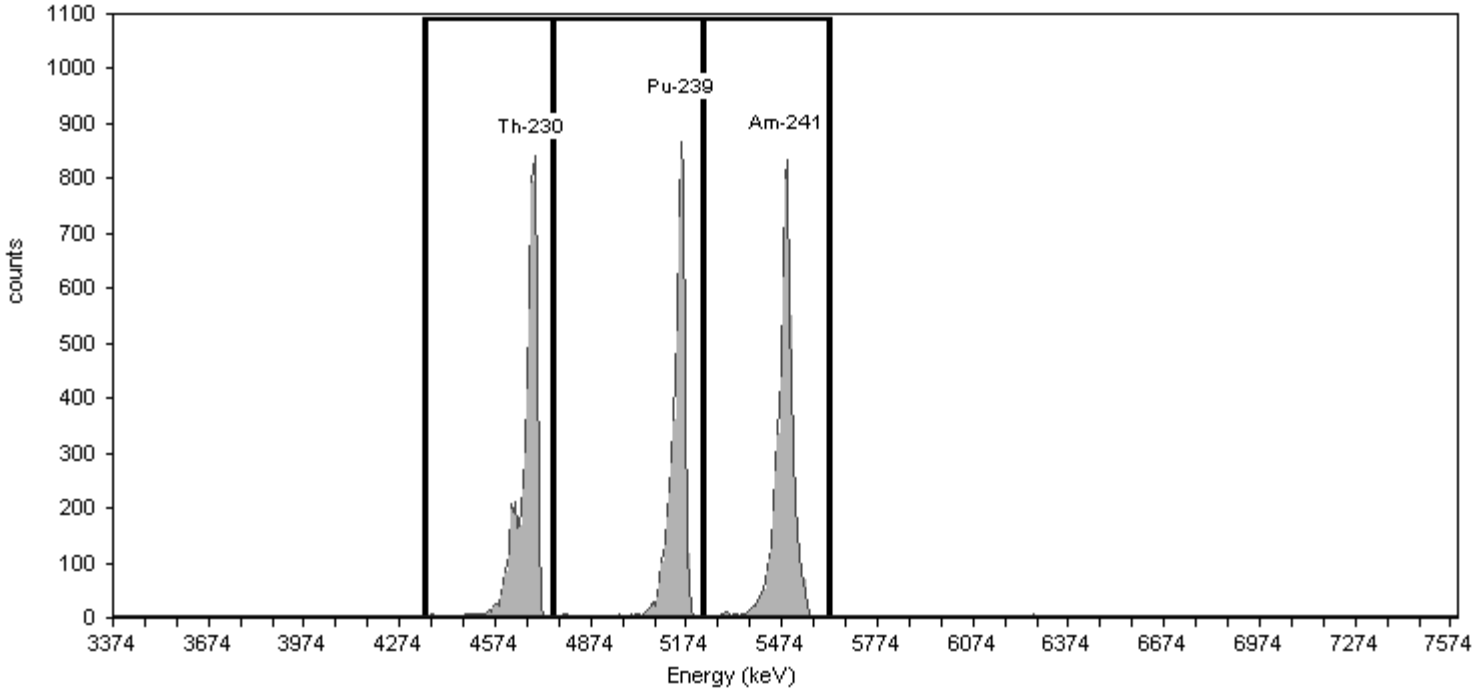
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV15 , SN: 41-172C5
Acquisition Start Date: 5/7/2014 11:04:58PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.90% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,224.00	87.07
Pu-239	240	5.16	186	249	4,981.00	83.02
Am-241	284	5.49	249	303	5,544.00	92.40

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:19:38PM 5/8/2014

Calibration

Sample Name: ICV-9886;AV16-20140507
Description:
Detector: AV16

Calibration Date: 5/8/2014 2:19:34PM
Analyst: 60040

Source Info

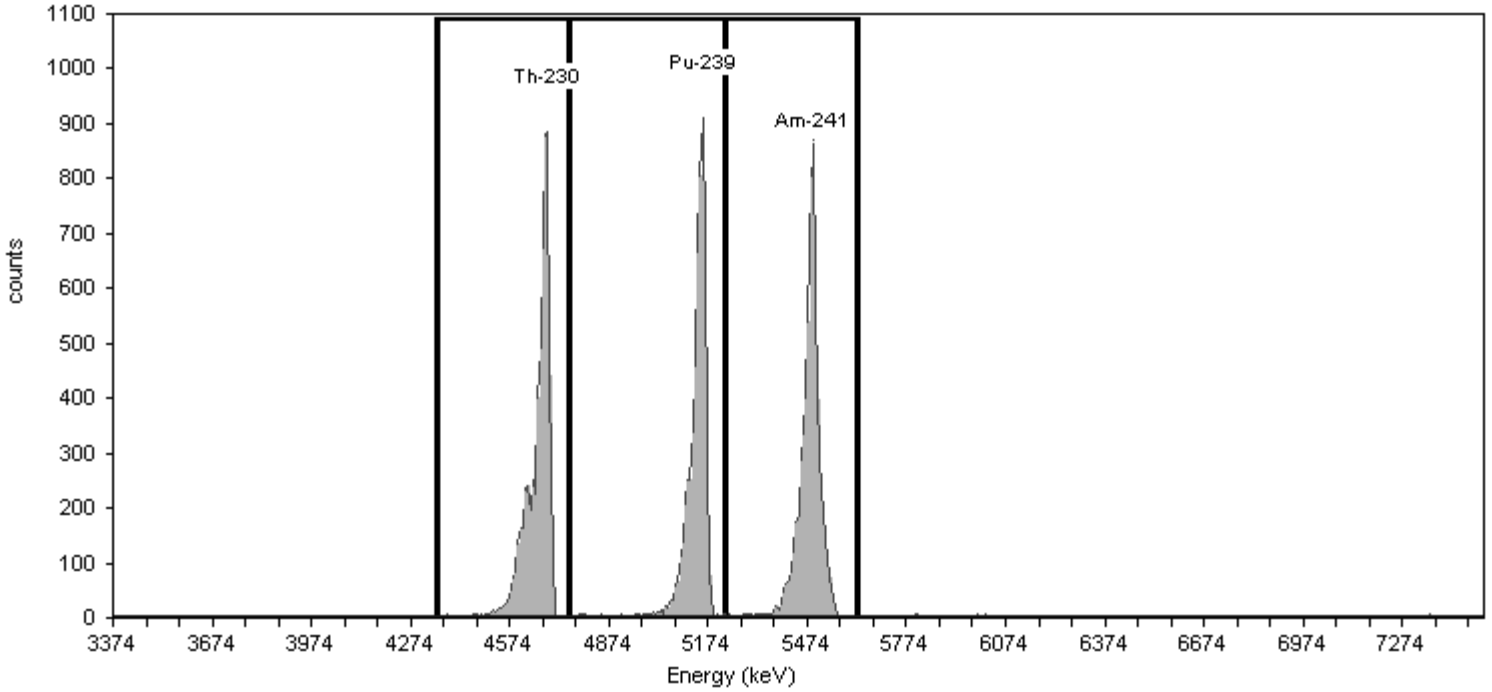
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV16 , SN: 51-082B6
Acquisition Start Date: 5/8/2014 12:14:17AM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.09% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,829.00	97.15
Pu-239	240	5.16	186	249	5,478.00	91.30
Am-241	284	5.49	249	303	5,844.00	97.40

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:19:44PM 5/8/2014

Calibration

Sample Name: ICV-7107;AV17-20140507
Description:
Detector: AV17

Calibration Date: 5/8/2014 2:19:41PM
Analyst: 60040

Source Info

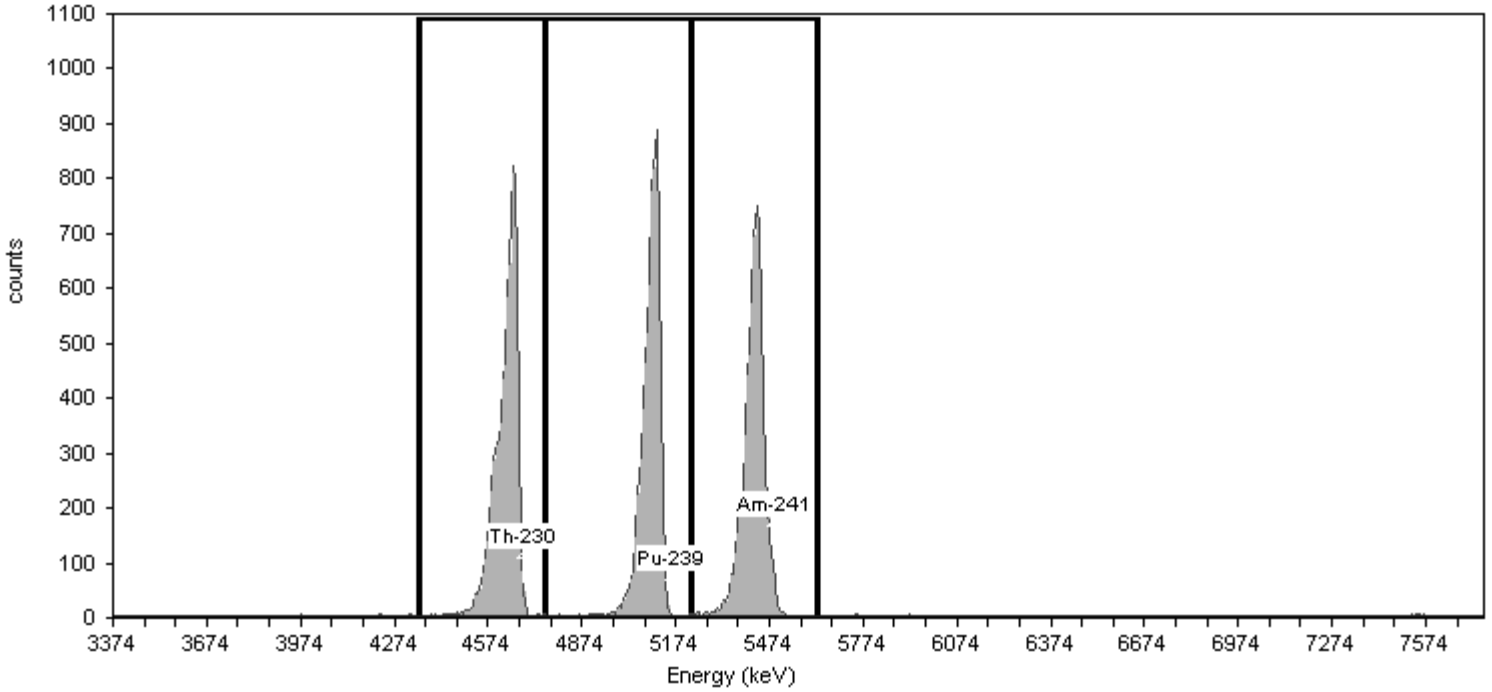
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV17 , SN: 50-051C4
Acquisition Start Date: 5/8/2014 12:14:34AM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.33% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,156.00	119.27
Pu-239	240	5.16	186	249	6,932.00	115.53
Am-241	284	5.49	249	303	6,785.00	113.08

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:19:50PM 5/8/2014

Calibration

Sample Name: ICV-8874;AV18-20140507
Description:
Detector: AV18

Calibration Date: 5/8/2014 2:19:46PM
Analyst: 60040

Source Info

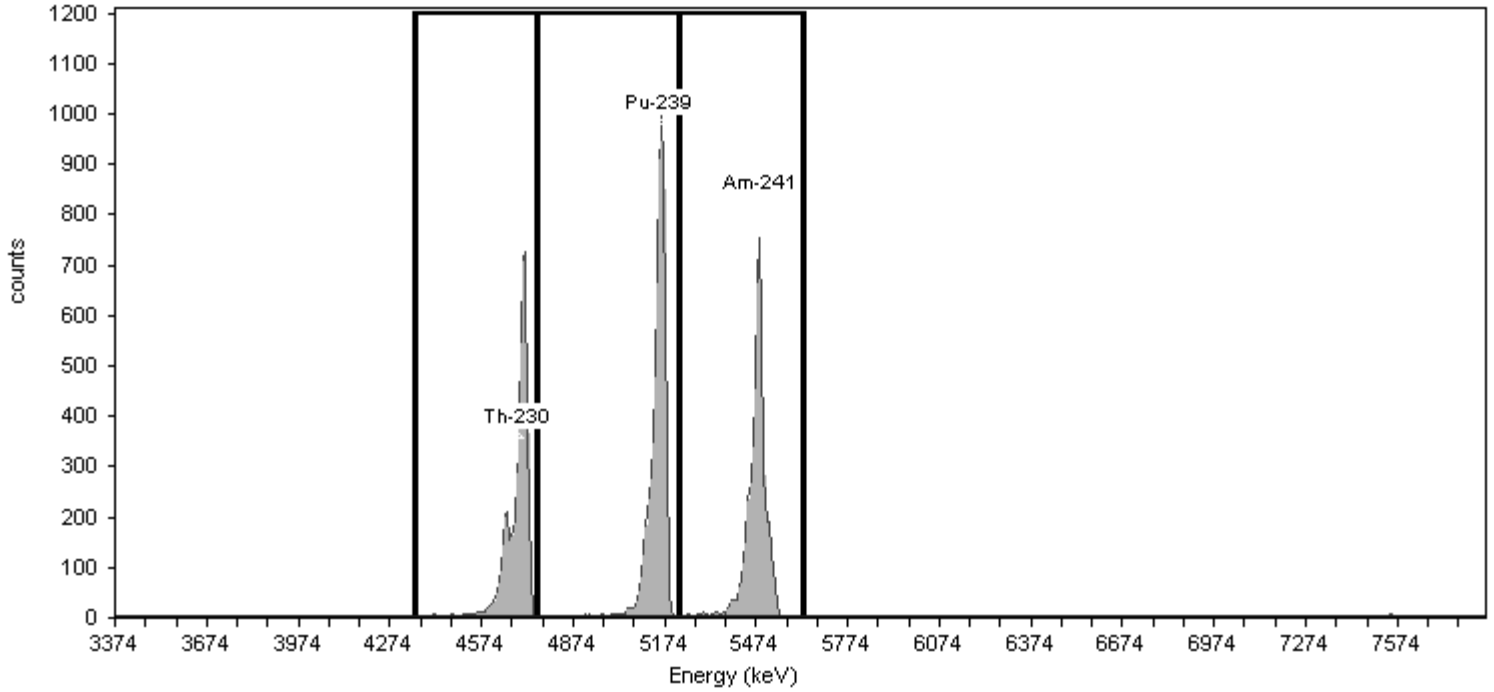
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV18 , SN: 51-082C5
Acquisition Start Date: 5/8/2014 12:14:45AM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.18% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,525.00	75.42
Pu-239	240	5.16	186	249	5,794.00	96.57
Am-241	284	5.49	249	303	4,855.00	80.92

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:20PM 5/8/2014

Calibration

Sample Name: ICV-8876;AV19-050814
Description:
Detector: AV19

Calibration Date: 5/8/2014 4:56:13PM
Analyst: 60040

Source Info

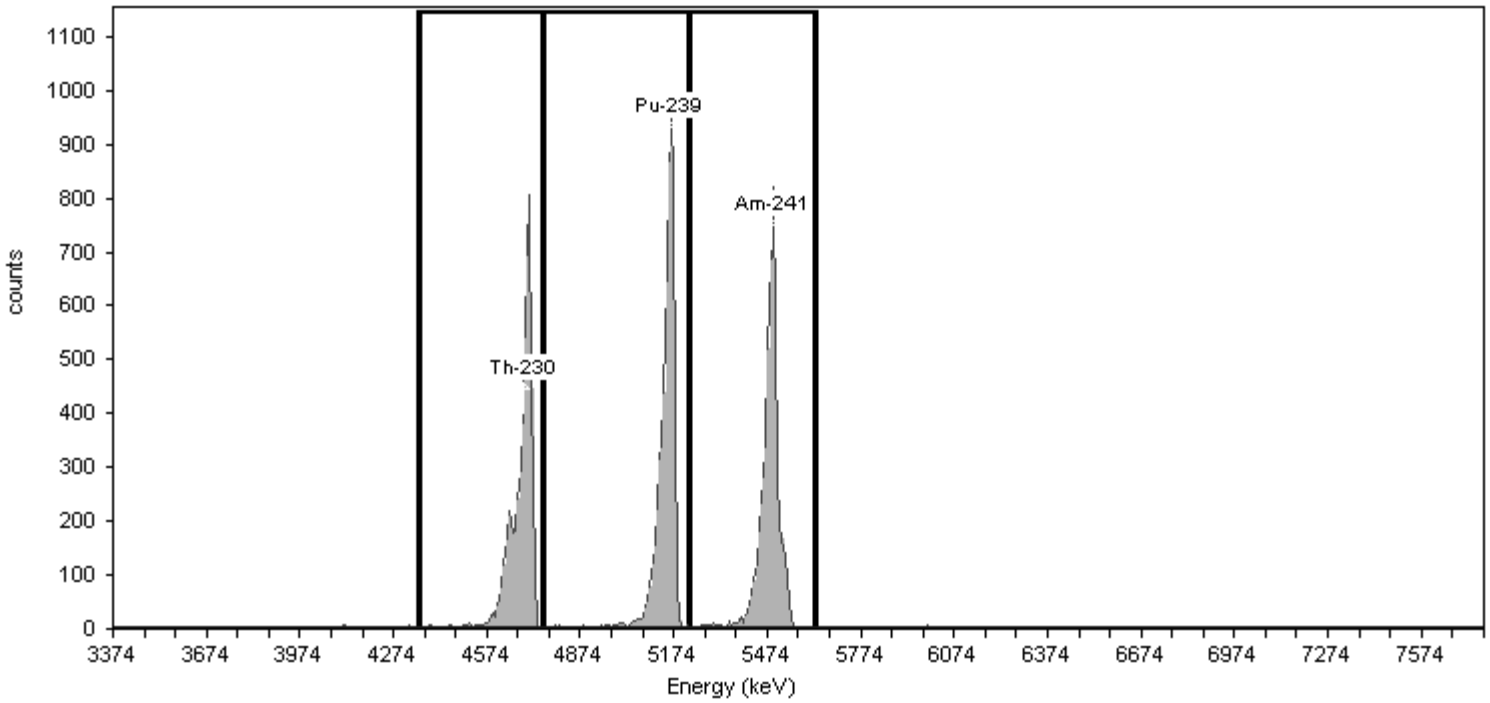
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV19 , SN: 50-025FF5
Acquisition Start Date: 5/8/2014 2:33:29PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 24.96% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,852.00	80.87
Pu-239	240	5.16	186	249	5,673.00	94.55
Am-241	284	5.49	249	303	5,012.00	83.53

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:56AM 5/8/2014

Calibration

Sample Name: ICV-8876;AV20-20140507
Description:
Detector: AV20

Calibration Date: 5/8/2014 12:06:53AM
Analyst: 60040

Source Info

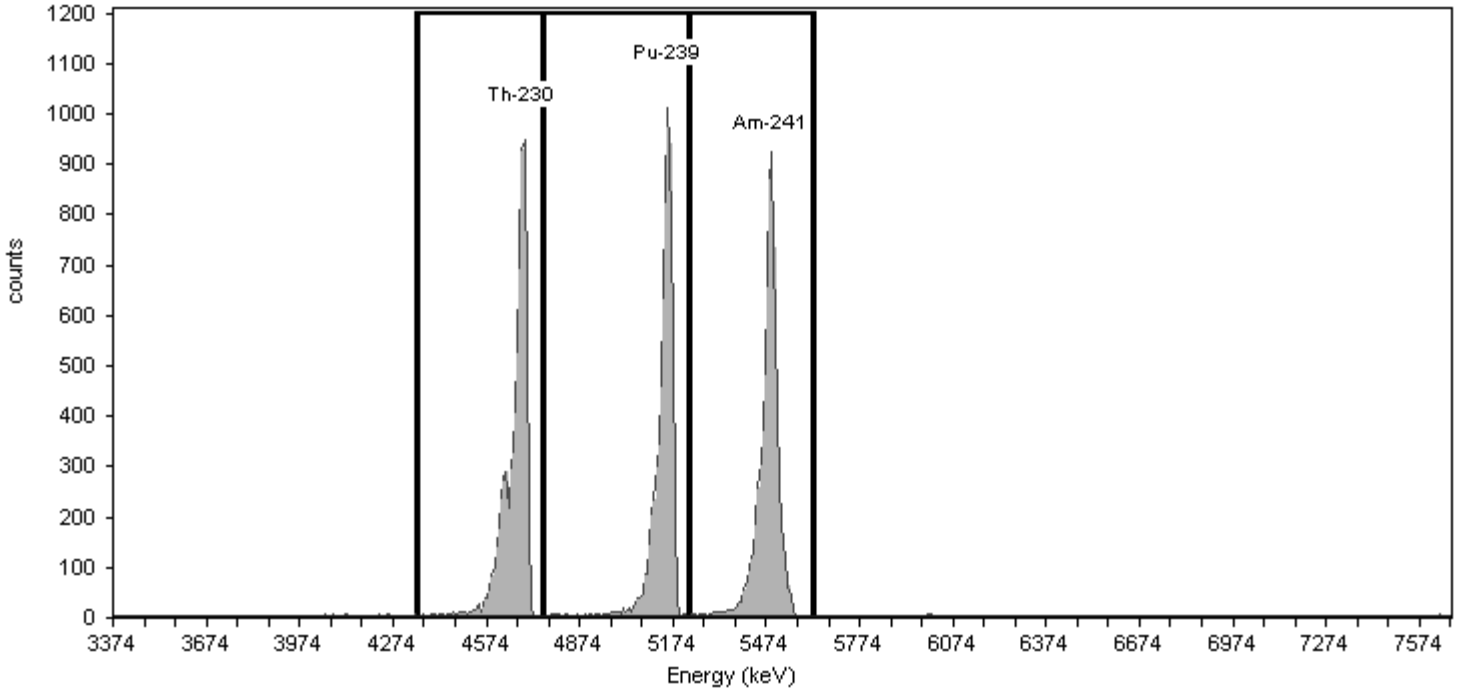
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV20 , SN: 48-121A7
Acquisition Start Date: 5/7/2014 11:05:20PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.51% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,706.00	111.77
Pu-239	240	5.16	186	249	6,368.00	106.13
Am-241	284	5.49	249	303	6,673.00	111.22

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:20:08PM 5/8/2014

Calibration

Sample Name: ICV-9793;AV43-20140507
Description:
Detector: AV43

Calibration Date: 5/8/2014 2:20:05PM
Analyst: 60040

Source Info

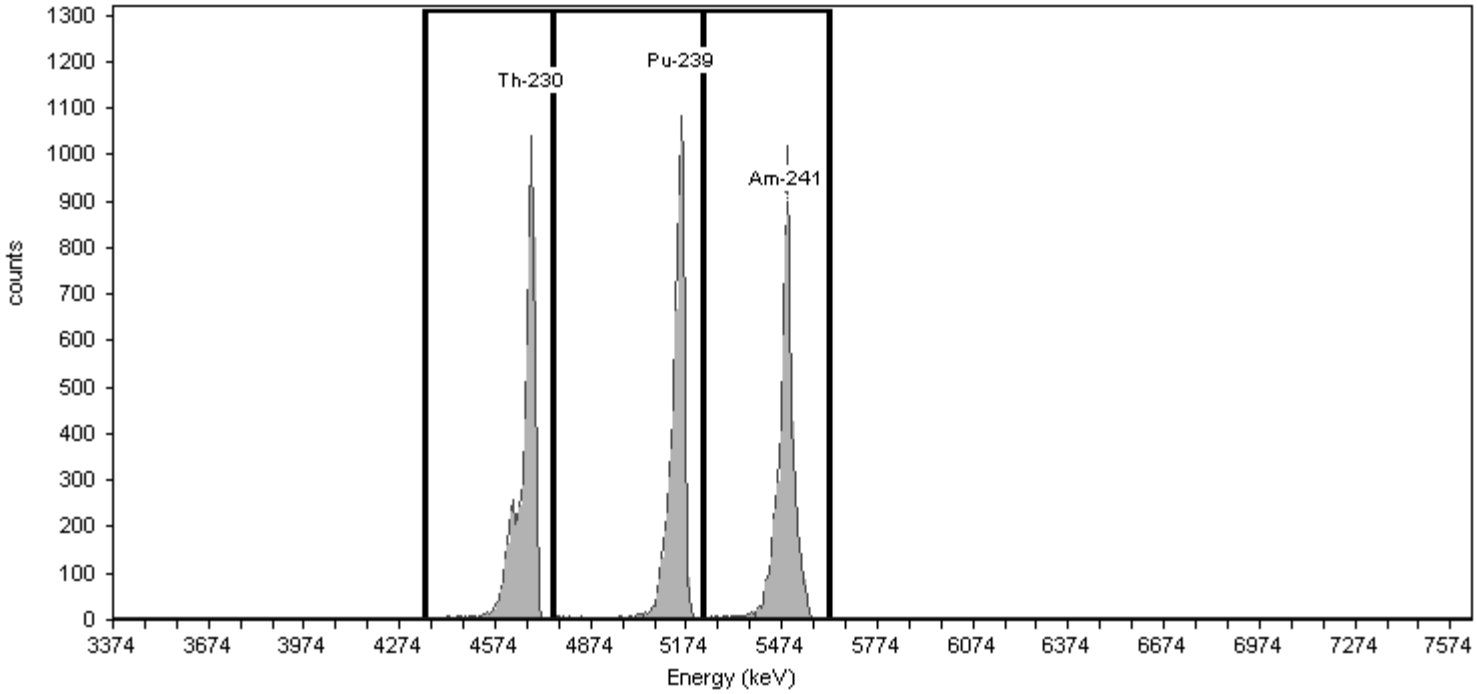
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV43 , SN: 49-190X4
Acquisition Start Date: 5/8/2014 12:16:52AM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.68% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,093.00	101.55
Pu-239	240	5.16	186	249	6,250.00	104.17
Am-241	284	5.49	249	303	6,174.00	102.90

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:20:18PM 5/8/2014

Calibration

Sample Name: ICV-9794;AV44-20140507
Description:
Detector: AV44

Calibration Date: 5/8/2014 2:20:13PM
Analyst: 60040

Source Info

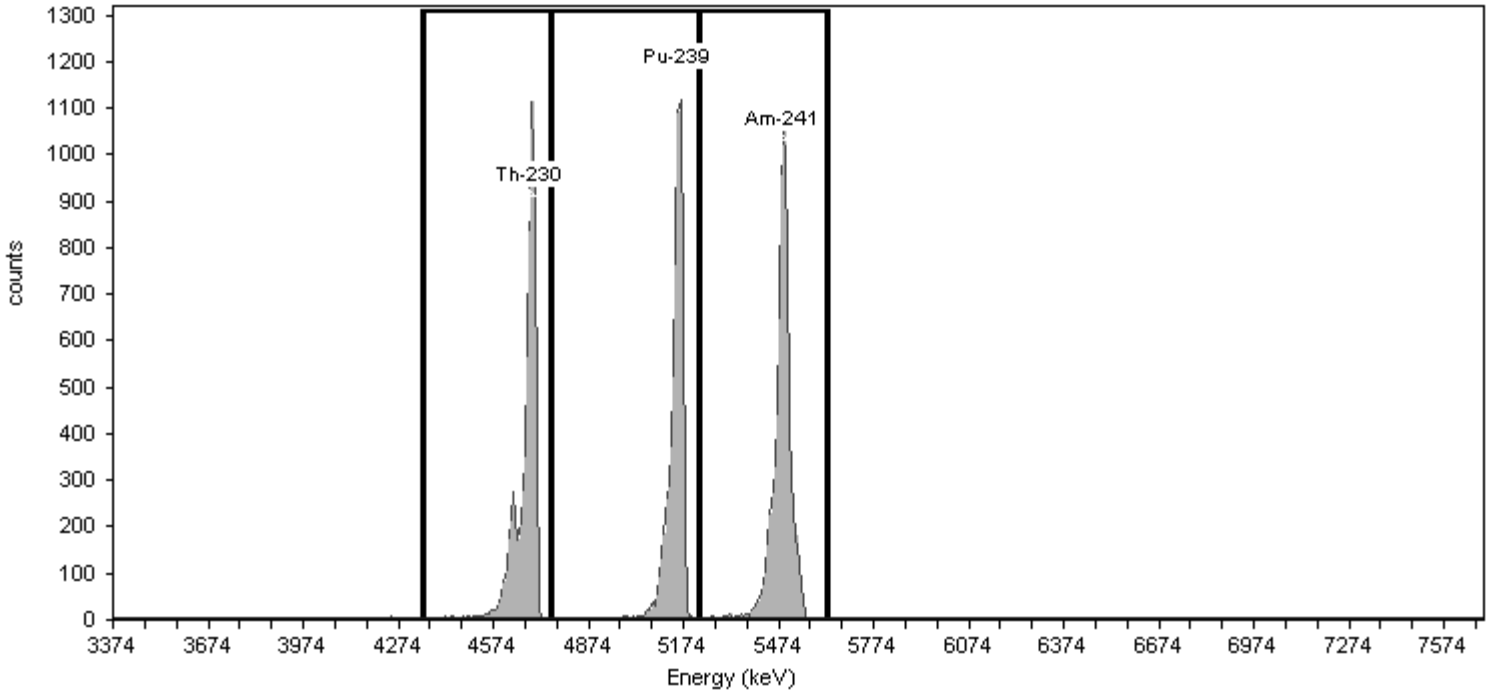
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV44 , SN: 50-051JJ1
Acquisition Start Date: 5/8/2014 12:17:17AM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.94% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,074.00	101.23
Pu-239	240	5.16	186	249	5,990.00	99.83
Am-241	284	5.49	249	303	6,711.00	111.85

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:13PM 5/8/2014

Calibration

Sample Name: ICV-9795;AV45-050814
Description:
Detector: AV45

Calibration Date: 5/8/2014 4:56:08PM
Analyst: 60040

Source Info

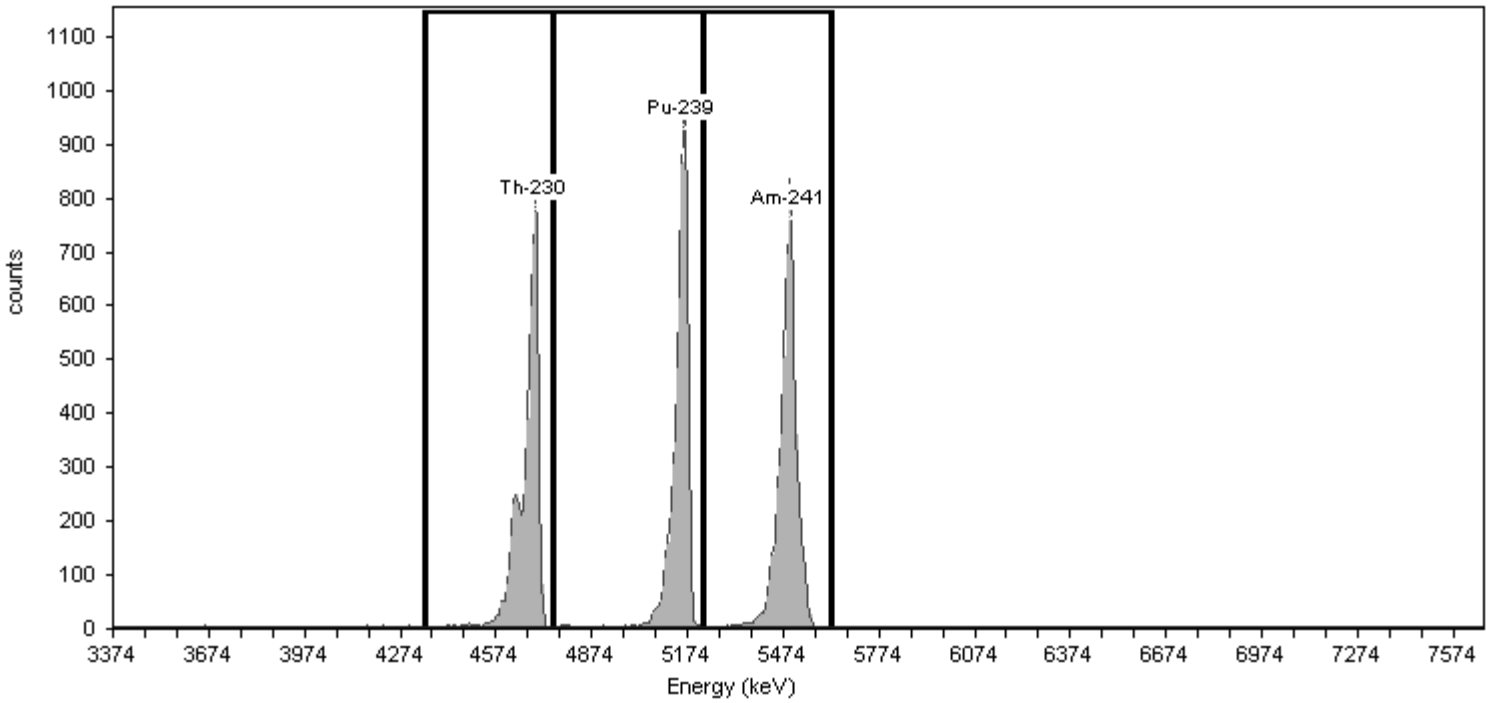
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV45 , SN: 48-158FF2
Acquisition Start Date: 5/8/2014 2:32:48PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.58% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,659.00	94.32
Pu-239	240	5.16	186	249	5,682.00	94.70
Am-241	284	5.49	249	303	6,066.00	101.10

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:20:40PM 5/8/2014

Calibration

Sample Name: ICV-9817;AV46-20140507
Description:
Detector: AV46

Calibration Date: 5/8/2014 2:20:37PM
Analyst: 60040

Source Info

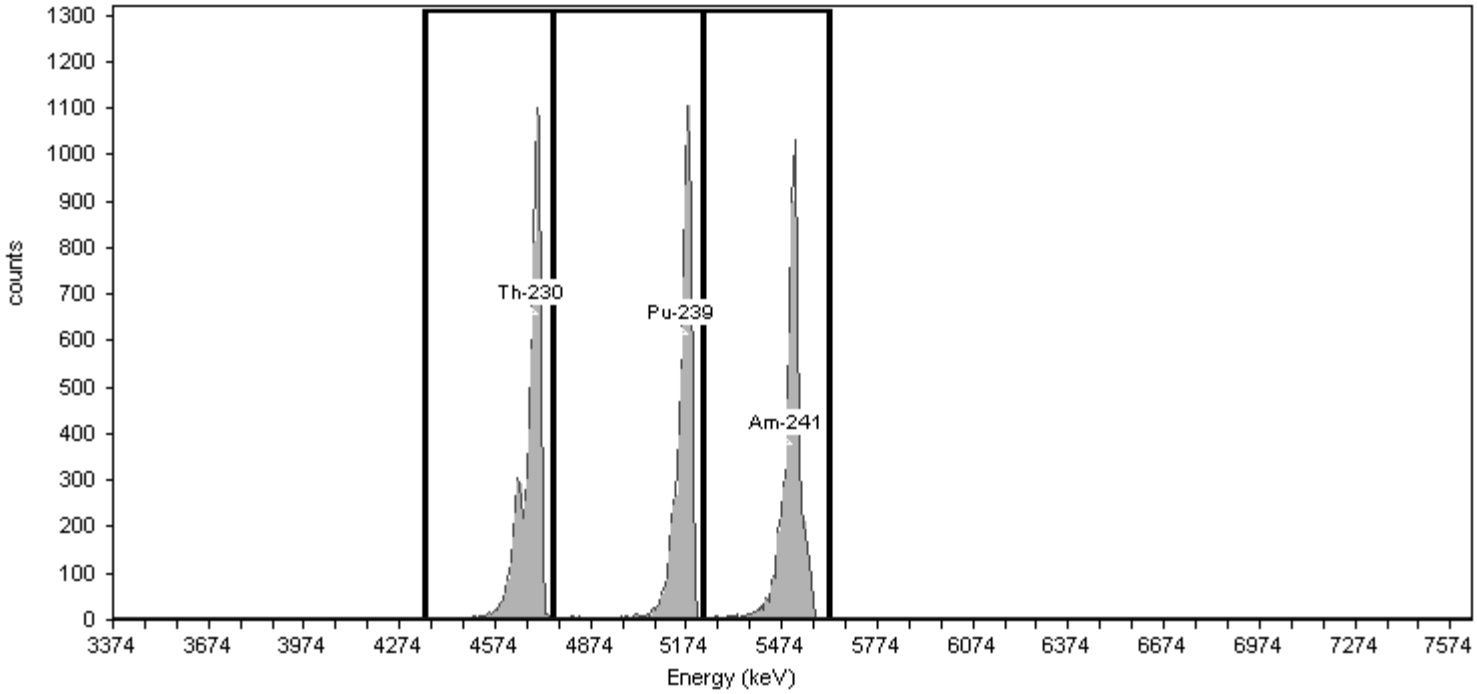
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV46 , SN: 49-202GG2
Acquisition Start Date: 5/8/2014 12:18:27AM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.10% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,959.00	115.98
Pu-239	240	5.16	186	249	6,287.00	104.78
Am-241	284	5.49	249	303	6,423.00	107.05

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:20:52PM 5/8/2014

Calibration

Sample Name: ICV-9885;AV48-20140507
Description:
Detector: AV48

Calibration Date: 5/8/2014 2:20:49PM
Analyst: 60040

Source Info

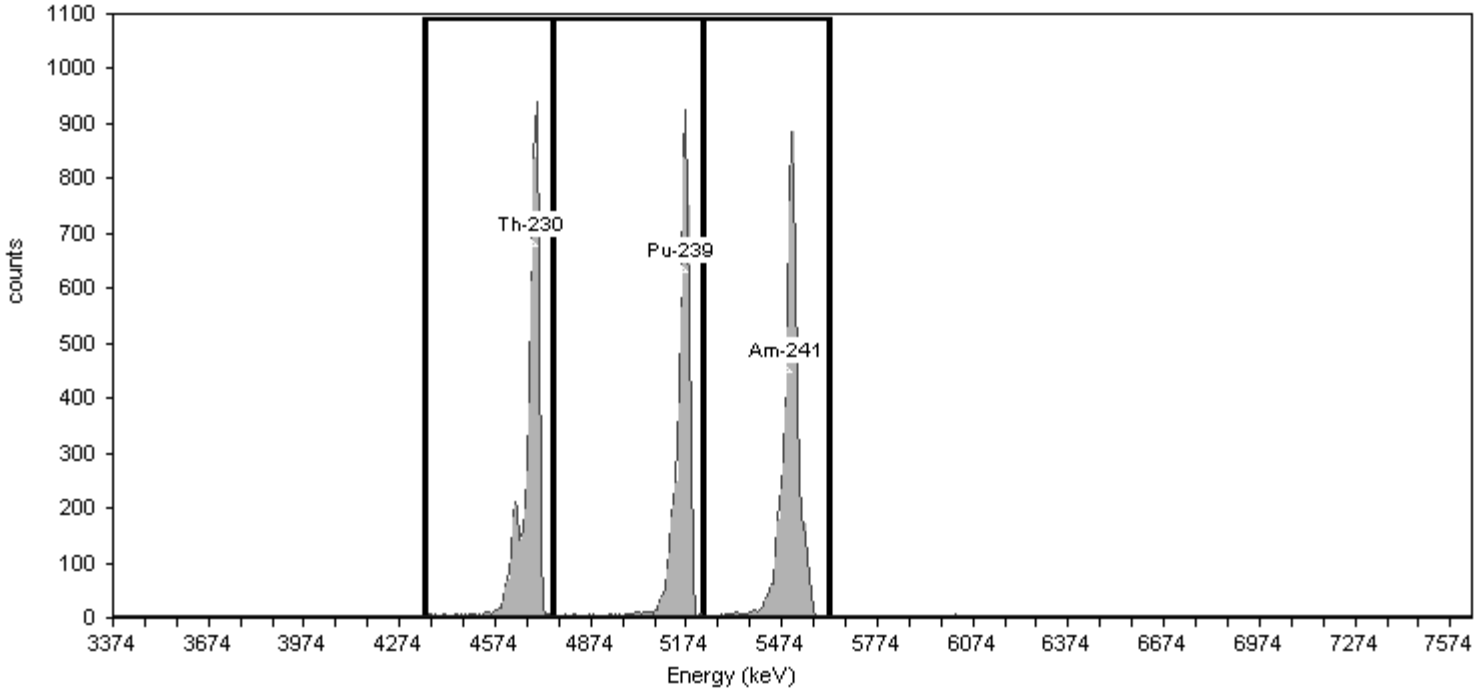
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV48 , SN: 50-051JJ4
Acquisition Start Date: 5/8/2014 12:18:29AM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.00% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,274.00	87.90
Pu-239	240	5.16	186	249	4,946.00	82.43
Am-241	284	5.49	249	303	5,595.00	93.25

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:53PM 5/8/2014

Calibration

Sample Name: ICV-9792;AV57-050814
Description:
Detector: AV57

Calibration Date: 5/8/2014 4:56:50PM
Analyst: 60040

Source Info

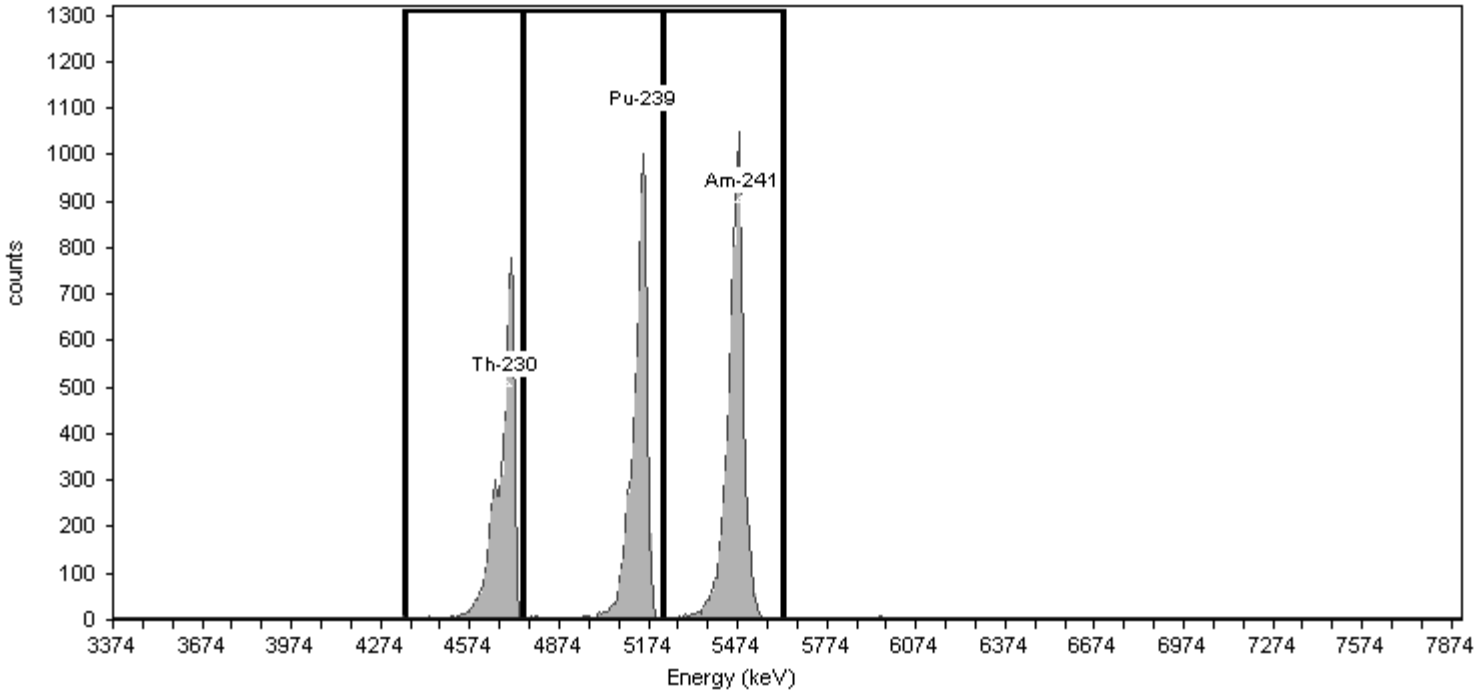
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV57 , SN: 48-158EE3
Acquisition Start Date: 5/8/2014 2:35:05PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.76% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,940.00	99.00
Pu-239	240	5.16	186	249	7,041.00	117.35
Am-241	284	5.49	249	303	7,940.00	132.33

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:59PM 5/8/2014

Calibration

Sample Name: ICV-9793;AV58-050814
Description:
Detector: AV58

Calibration Date: 5/8/2014 4:56:56PM
Analyst: 60040

Source Info

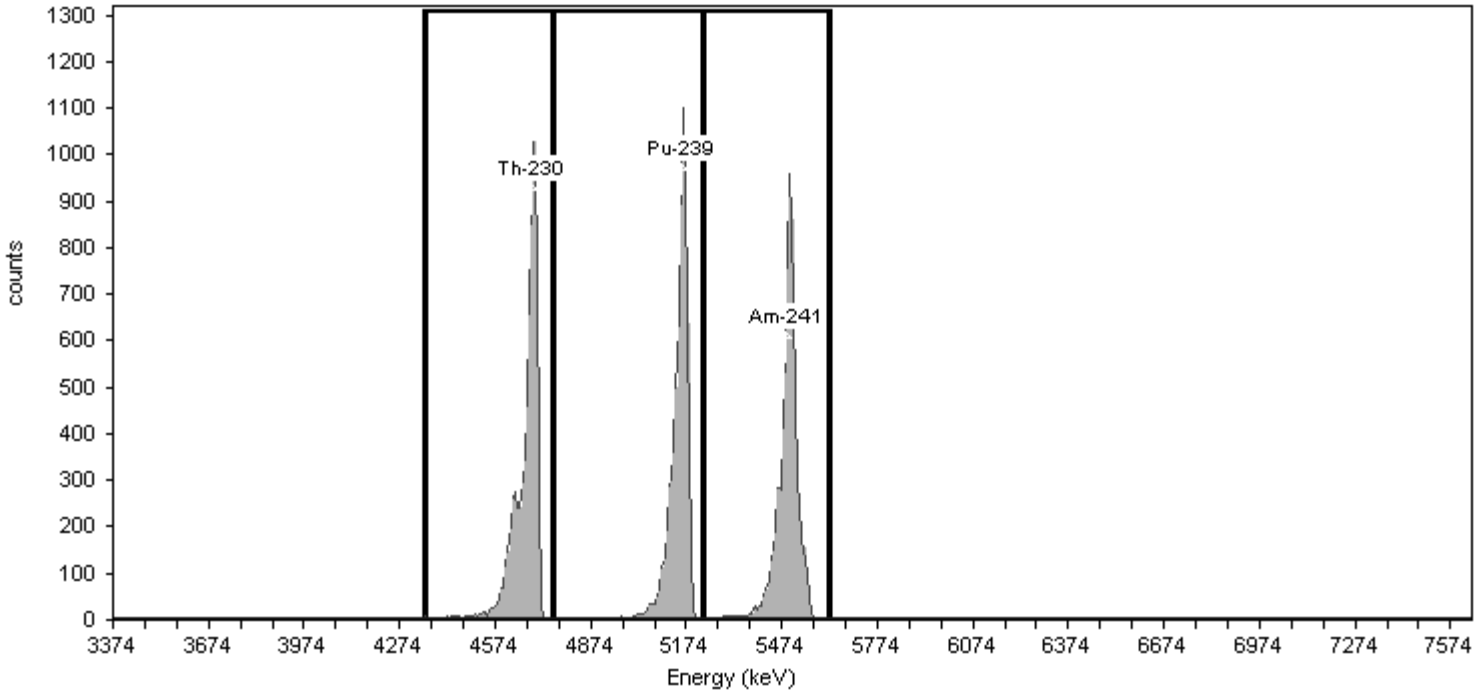
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 5/8/2014 2:35:18PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 27.10% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,559.00	109.32
Pu-239	240	5.16	186	249	6,569.00	109.48
Am-241	284	5.49	249	303	6,413.00	106.88

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:57:08PM 5/8/2014

Calibration

Sample Name: ICV-9794;AV59-050814
Description:
Detector: AV59

Calibration Date: 5/8/2014 4:57:05PM
Analyst: 60040

Source Info

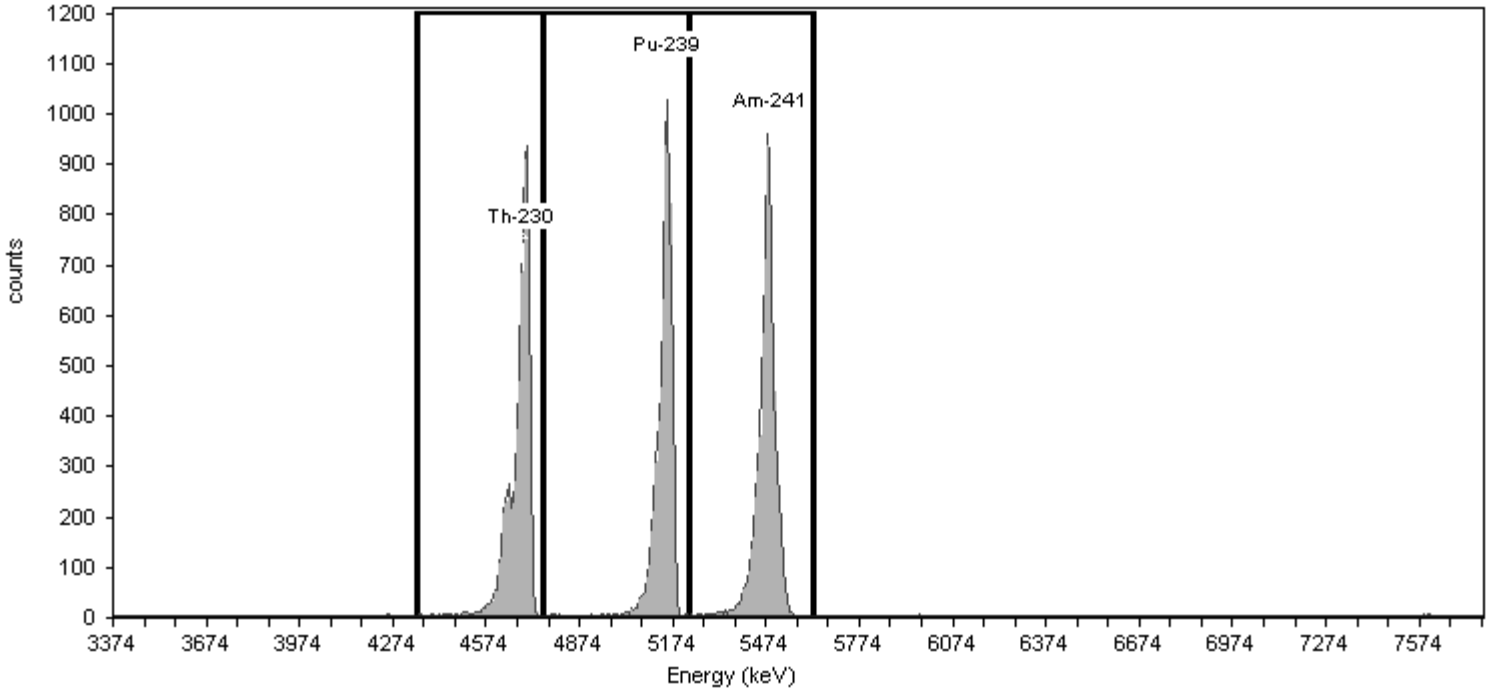
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV59 , SN: 49-155M7
Acquisition Start Date: 5/8/2014 2:36:11PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.77% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,424.00	107.07
Pu-239	240	5.16	186	249	6,120.00	102.00
Am-241	284	5.49	249	303	6,829.00	113.82

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:24:44PM 5/11/2014

Calibration

Sample Name: ICV-9795;AV60-20140508
Description:
Detector: AV60

Calibration Date: 5/11/2014 7:13:44PM
Analyst: 60040

Source Info

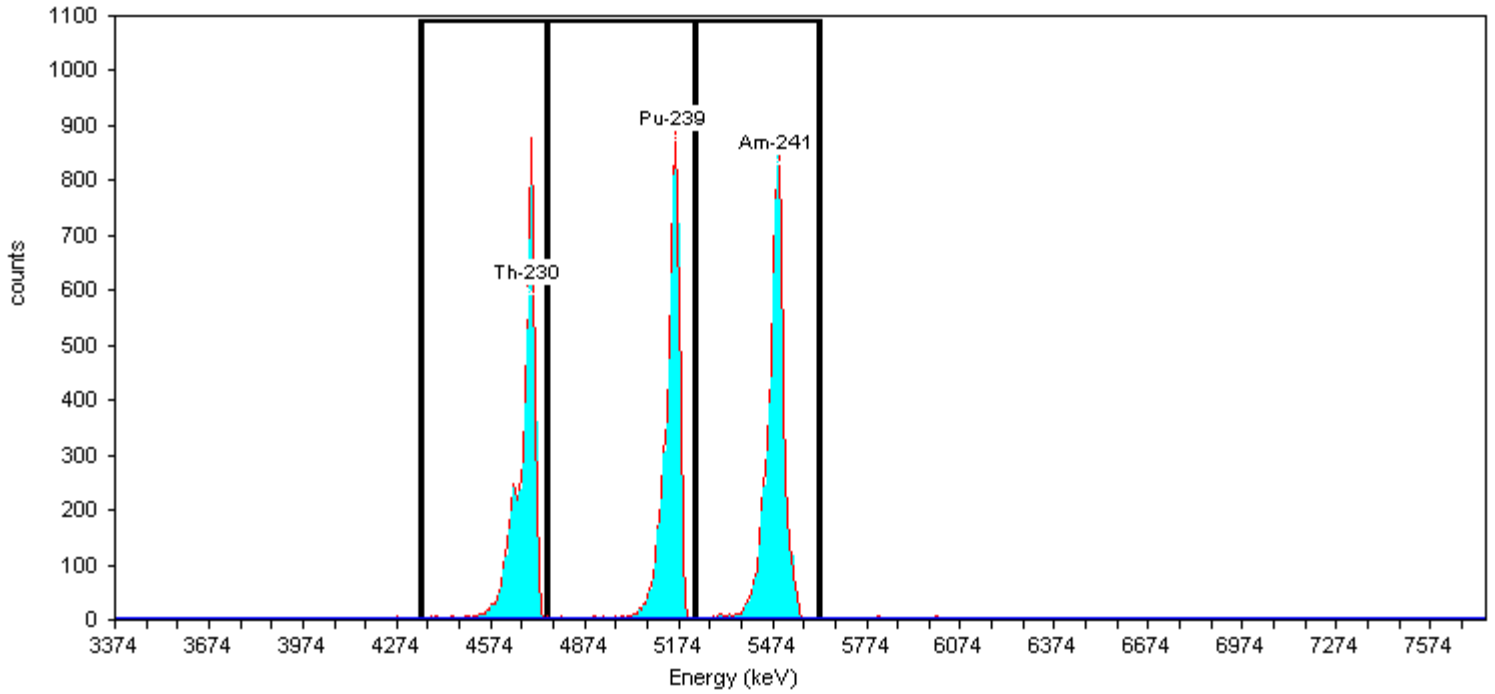
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 5/8/2014 5:21:42PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 27.25% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,727.00	95.45
Pu-239	240	5.16	186	249	5,760.00	96.00
Am-241	284	5.49	249	303	6,362.00	106.03

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:57:49PM 5/8/2014

Calibration

Sample Name: ICV-9817;AV61-050814
Description:
Detector: AV61

Calibration Date: 5/8/2014 4:57:46PM
Analyst: 60040

Source Info

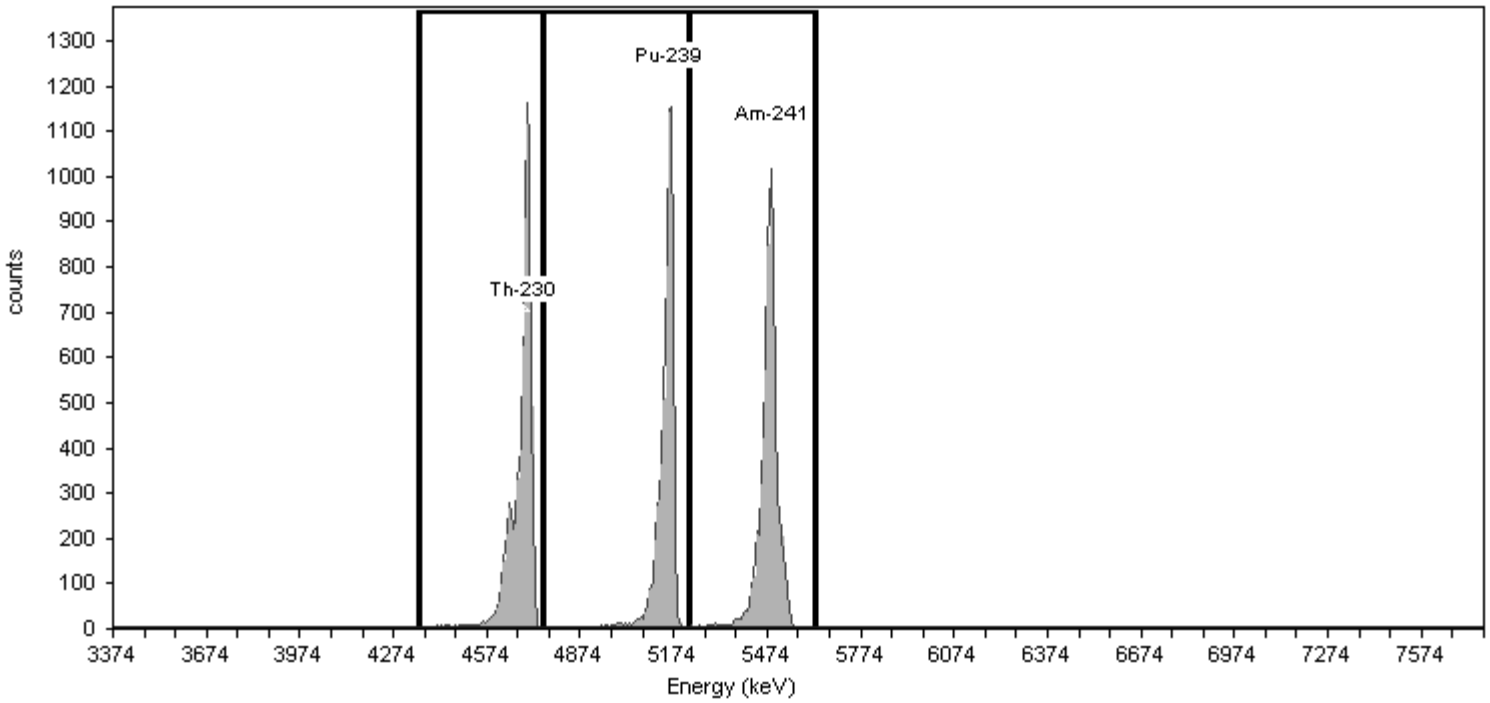
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV61 , SN: 5-051JJ3
Acquisition Start Date: 5/8/2014 2:36:18PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.81% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,807.00	113.45
Pu-239	240	5.16	186	249	6,203.00	103.38
Am-241	284	5.49	249	303	6,437.00	107.28

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:57:55PM 5/8/2014

Calibration

Sample Name: ICV-9884;AV62-050814
Description:
Detector: AV62

Calibration Date: 5/8/2014 4:57:52PM
Analyst: 60040

Source Info

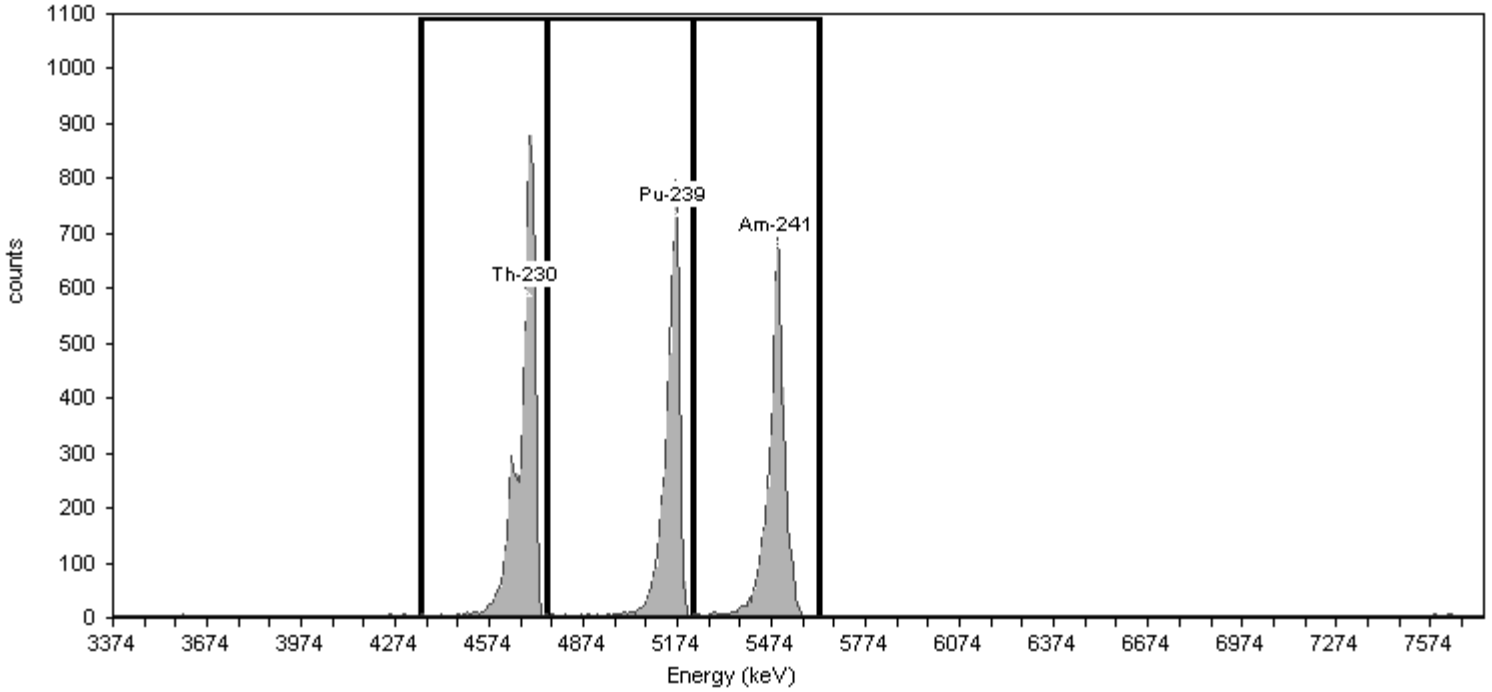
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 5/8/2014 2:36:19PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.22% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,368.00	106.13
Pu-239	240	5.16	186	249	5,206.00	86.77
Am-241	284	5.49	249	303	5,104.00	85.07

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:25:47PM 5/11/2014

Calibration

Sample Name: ICV-9885;AV78-20140508
Description:
Detector: AV78

Calibration Date: 5/11/2014 7:13:19PM
Analyst: 60040

Source Info

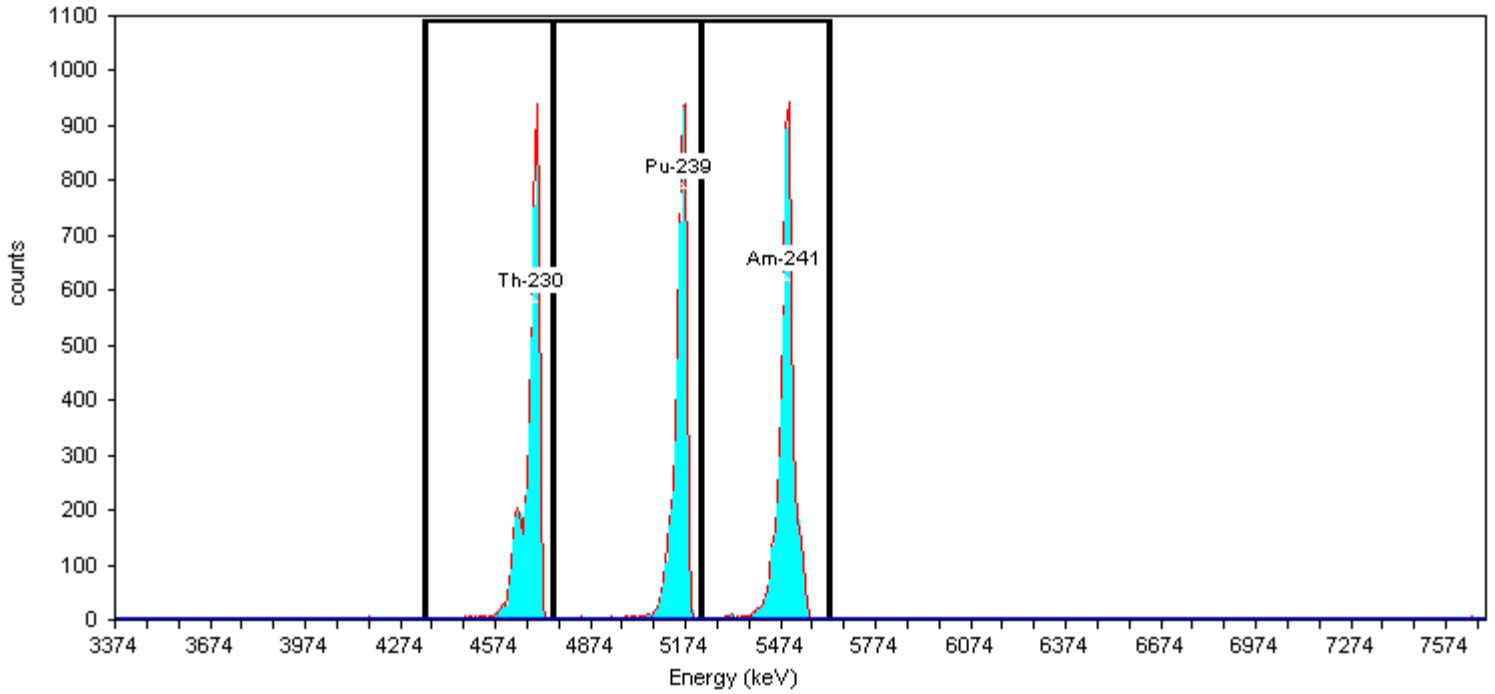
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV78 , SN: 46-033FF4
Acquisition Start Date: 5/8/2014 5:20:32PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.00% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,193.00	86.55
Pu-239	240	5.16	186	249	5,036.00	83.93
Am-241	284	5.49	249	303	5,583.00	93.05

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:53:16PM 5/11/2014

Calibration

Sample Name: ICV-9886;AV79-20140511
Description:
Detector: AV79

Calibration Date: 5/11/2014 9:53:12PM
Analyst: 60040

Source Info

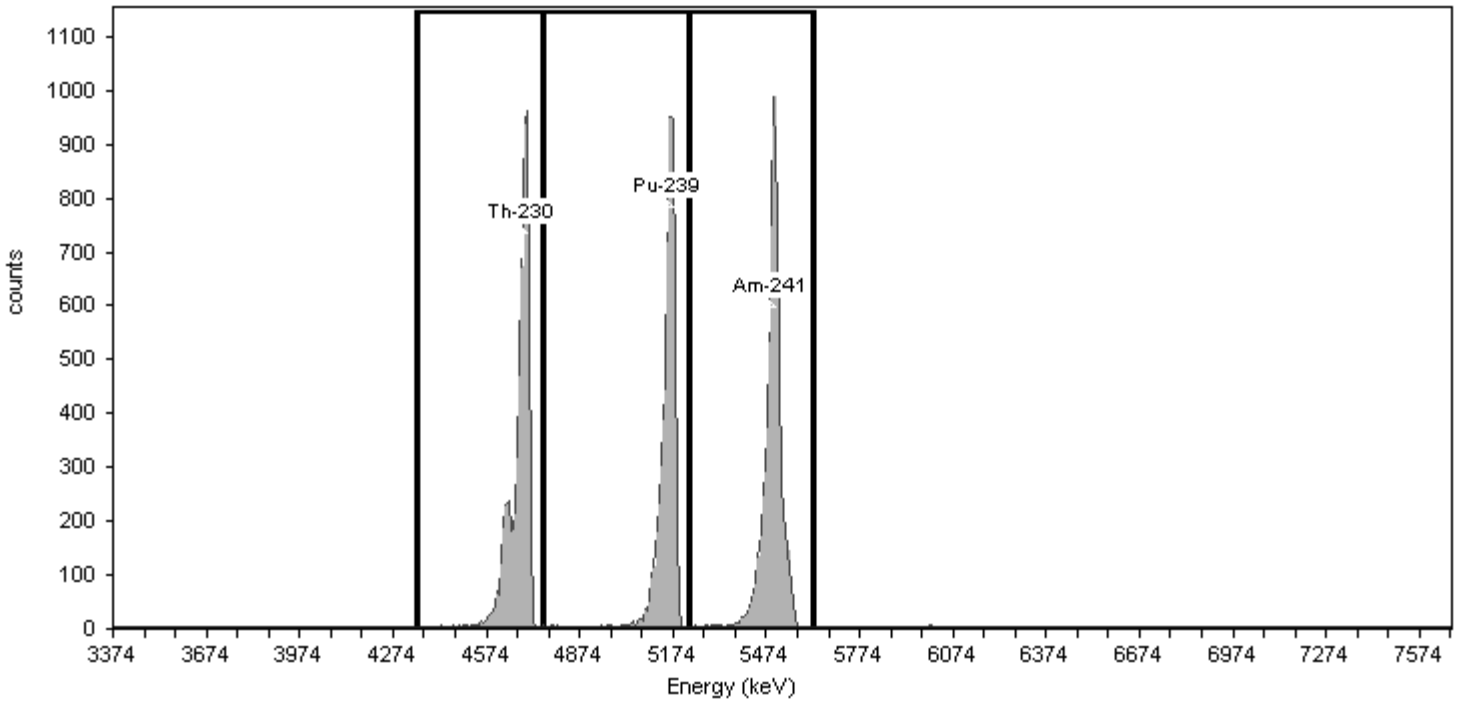
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV79 , SN: 46-033Q5
Acquisition Start Date: 5/11/2014 8:47:29PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.34% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,837.00	97.28
Pu-239	240	5.16	186	249	5,415.00	90.25
Am-241	284	5.49	249	303	6,065.00	101.08

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:53:31PM 5/11/2014

Calibration

Sample Name: ICV-8875;AV82-20140511
Description:
Detector: AV82

Calibration Date: 5/11/2014 9:53:28PM
Analyst: 60040

Source Info

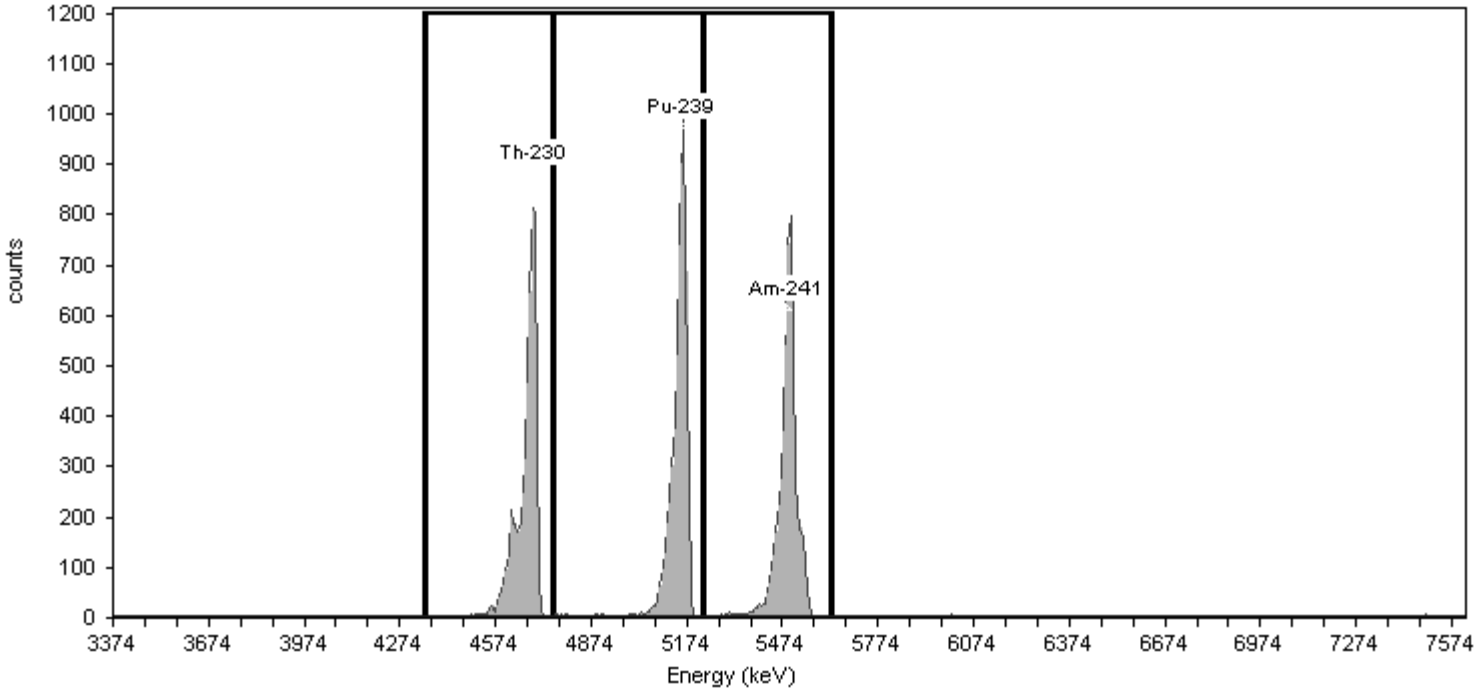
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV82 , SN: 46-032EE5
Acquisition Start Date: 5/11/2014 8:48:04PM
Live Time: 60.01 min.
Real Time: 60.03 min.
Efficiency: 25.76% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,130.00	85.49
Pu-239	240	5.16	186	249	5,712.00	95.19
Am-241	284	5.49	249	303	5,161.00	86.00

Monthly Calibration Verifications

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:37:10PM 5/18/2014

Calibration

Sample Name: CCV-7107;AV1-20140518
Description:
Detector: AV1

Calibration Date: 5/18/2014 8:37:07PM
Analyst: 60040

Source Info

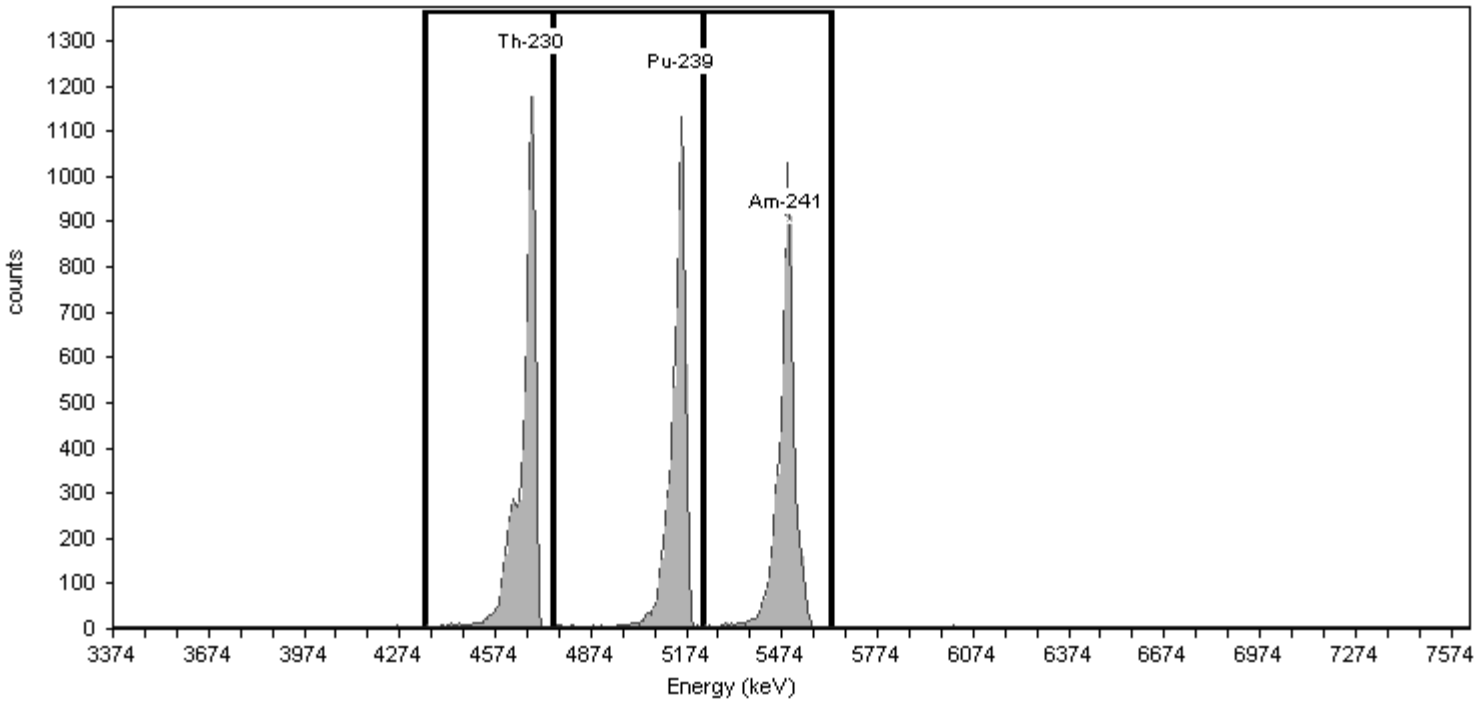
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV1 , SN: 49-188 AA4
Acquisition Start Date: 5/18/2014 7:19:05PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.51% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,273.00	121.22
Pu-239	240	5.16	186	249	6,910.00	115.17
Am-241	284	5.49	249	303	6,824.00	113.73

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:20:50PM 5/19/2014

Calibration

Sample Name: CCV-9795;AV11-20140519
Description:
Detector: AV11

Calibration Date: 5/19/2014 7:20:47PM
Analyst: 60040

Source Info

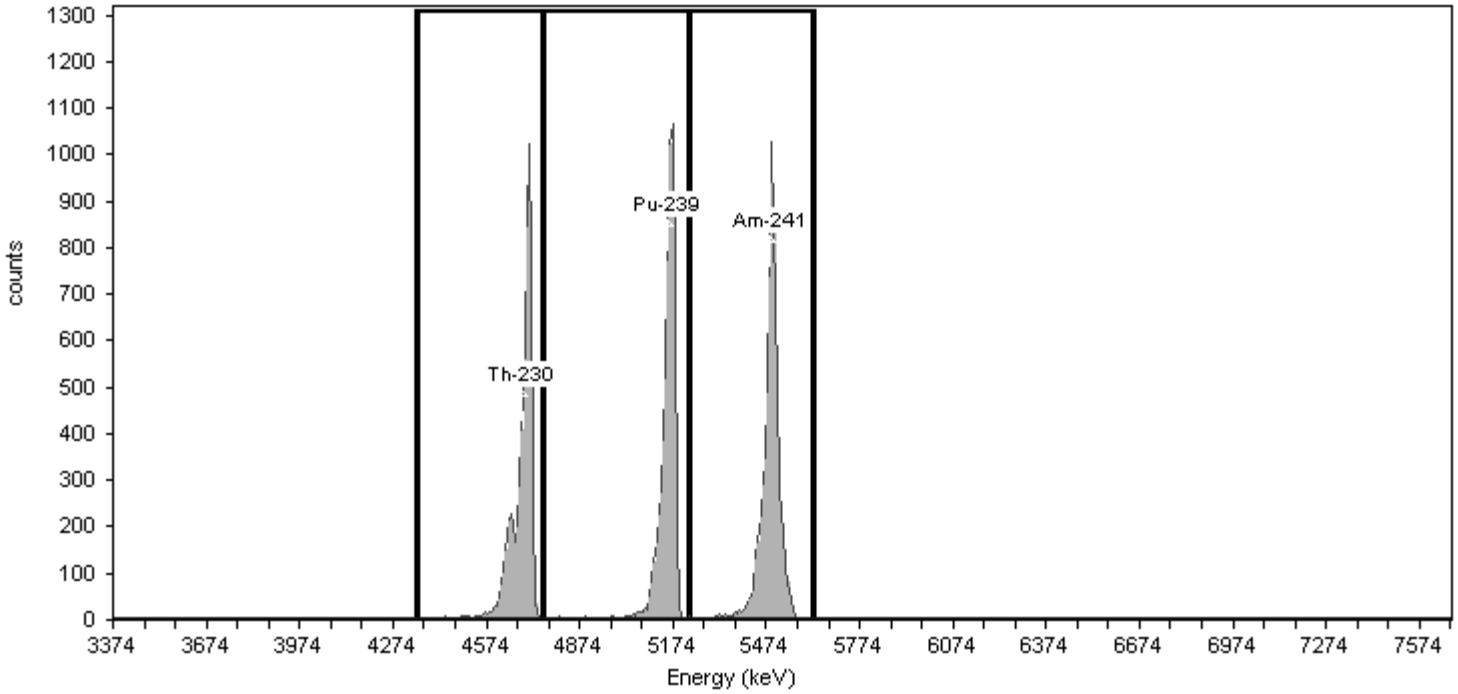
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 5/19/2014 5:57:32PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.73% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,707.00	95.12
Pu-239	240	5.16	186	249	5,760.00	96.00
Am-241	284	5.49	249	303	6,043.00	100.72

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:38:22PM 5/18/2014

Calibration

Sample Name: CCV-9886;AV15-20140518
Description:
Detector: AV15

Calibration Date: 5/18/2014 8:38:19PM
Analyst: 60040

Source Info

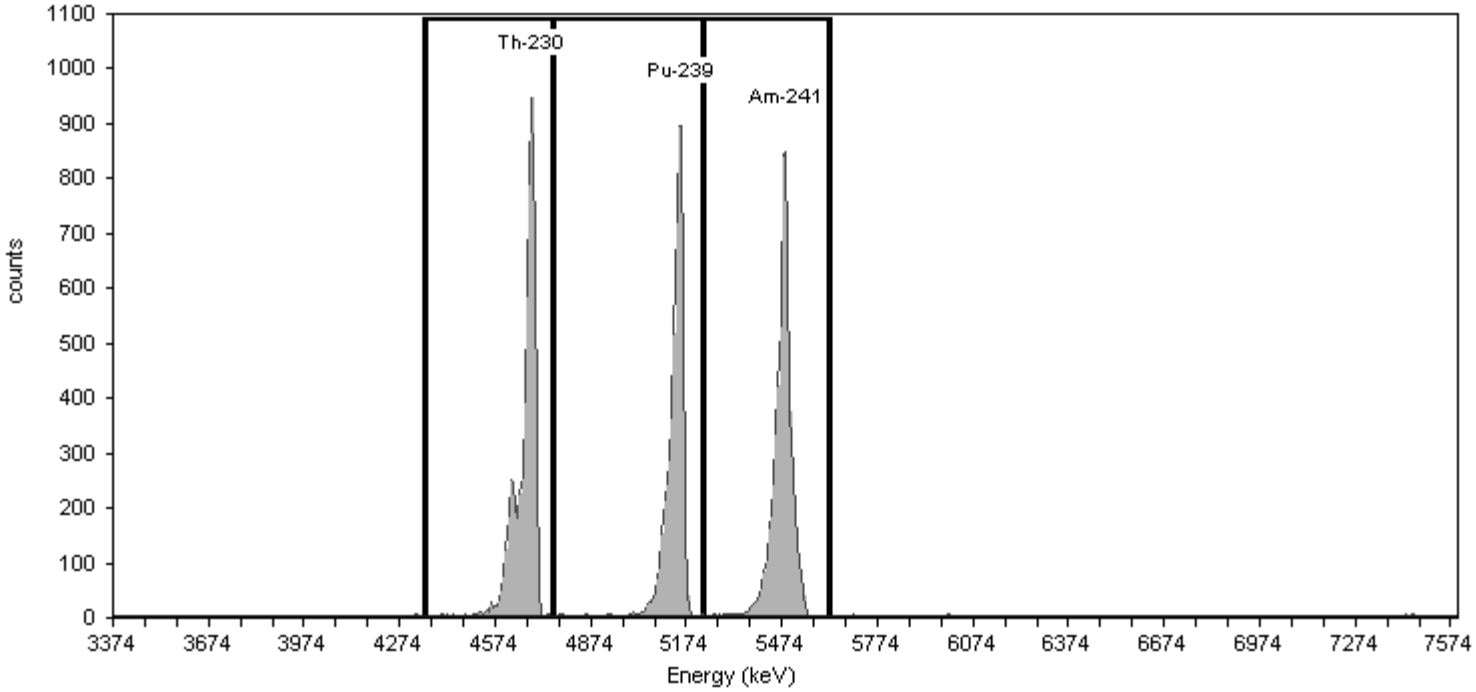
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV15 , SN: 41-172C5
Acquisition Start Date: 5/18/2014 7:22:13PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 25.80% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,693.00	94.88
Pu-239	240	5.16	186	249	5,436.00	90.60
Am-241	284	5.49	249	303	5,834.00	97.23

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:43:46PM 5/19/2014

Calibration

Sample Name: CCV-7107;AV16-20140518
Description:
Detector: AV16

Calibration Date: 5/19/2014 5:43:43PM
Analyst: 60040

Source Info

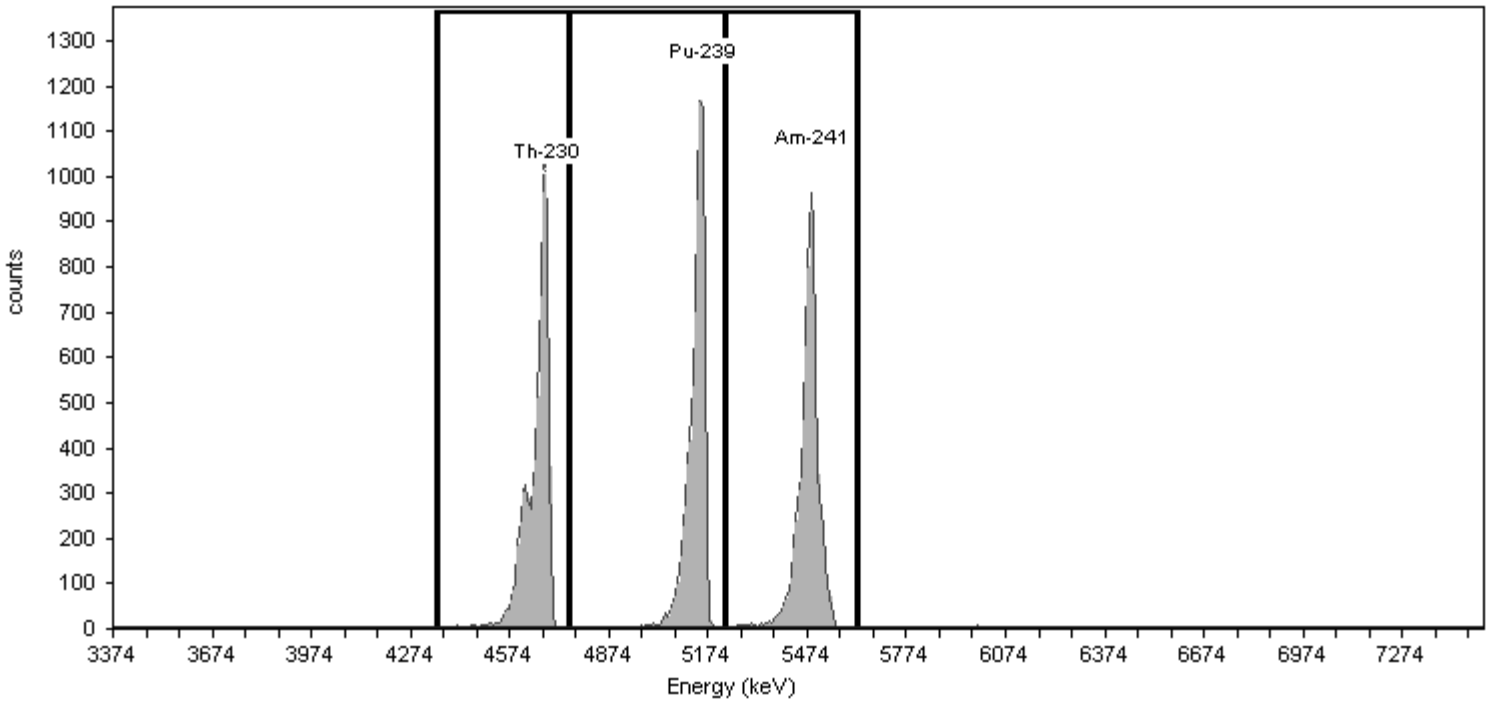
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV16 , SN: 51-082B6
Acquisition Start Date: 5/18/2014 8:51:47PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 27.27% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,339.00	122.32
Pu-239	240	5.16	186	249	7,255.00	120.92
Am-241	284	5.49	249	303	7,031.00	117.18

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:38:28PM 5/18/2014

Calibration

Sample Name: CCV-8874;AV17-20140518
Description:
Detector: AV17

Calibration Date: 5/18/2014 8:38:25PM
Analyst: 60040

Source Info

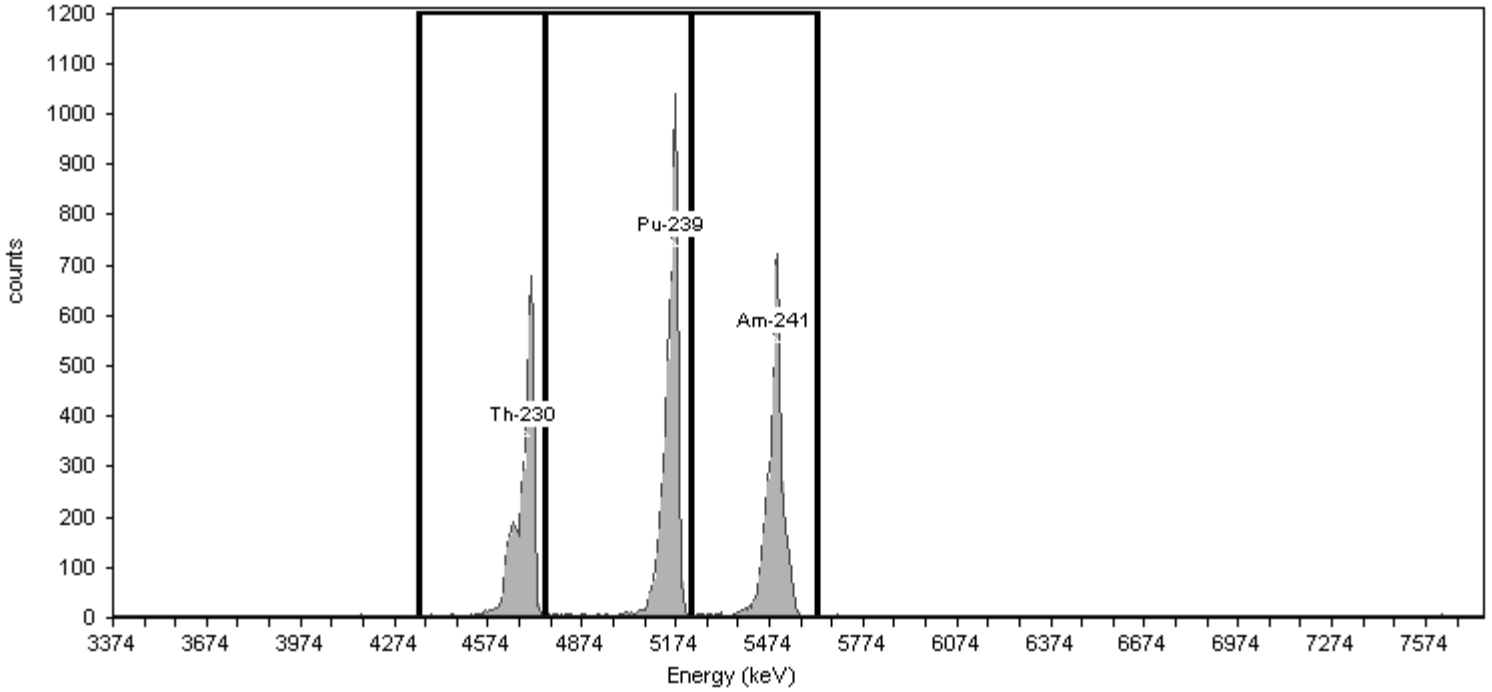
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV17 , SN: 50-051C4
Acquisition Start Date: 5/18/2014 7:22:34PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.71% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,373.00	72.88
Pu-239	240	5.16	186	249	5,836.00	97.27
Am-241	284	5.49	249	303	4,699.00	78.32

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:43:52PM 5/19/2014

Calibration

Sample Name: CCV-8875;AV18-20140518
Description:
Detector: AV18

Calibration Date: 5/19/2014 5:43:49PM
Analyst: 60040

Source Info

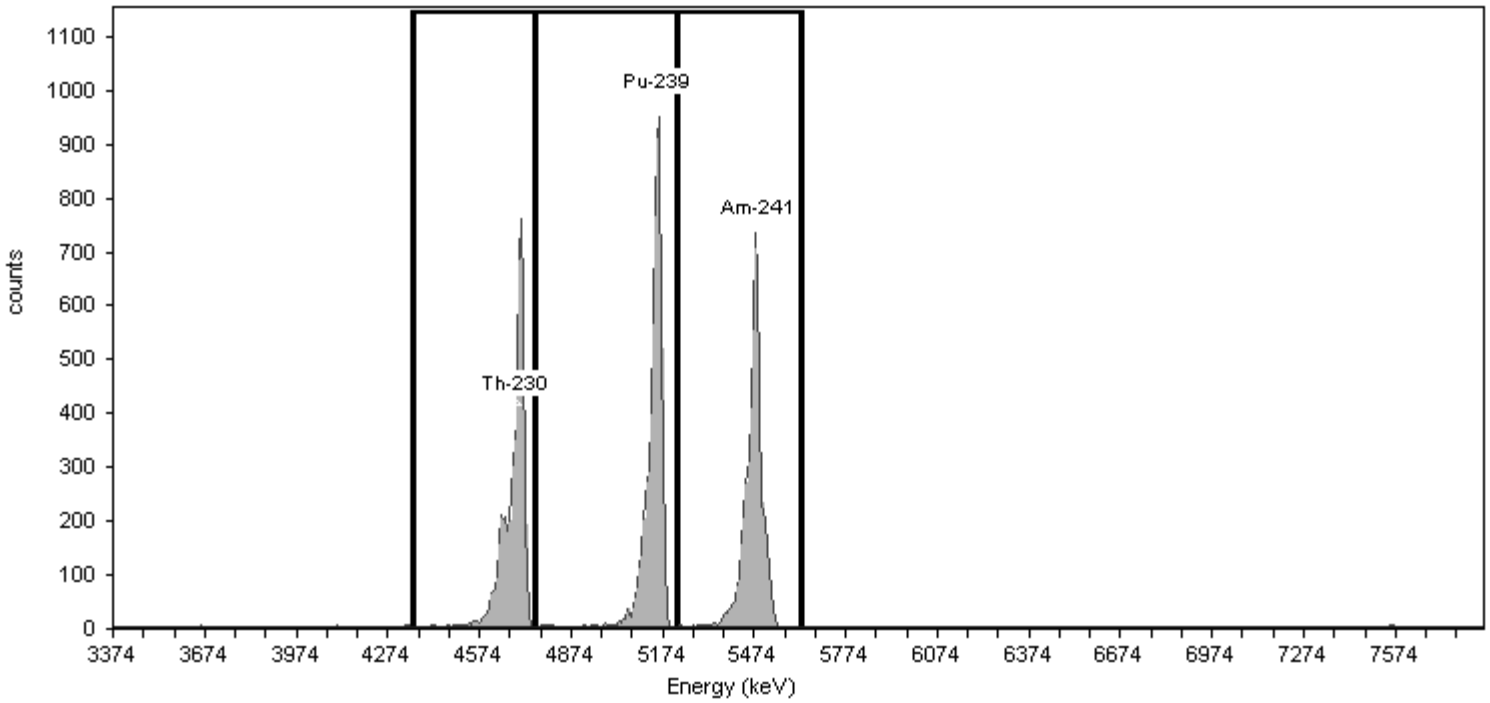
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV18 , SN: 51-082C5
Acquisition Start Date: 5/18/2014 8:51:48PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.15% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,999.00	83.32
Pu-239	240	5.16	186	249	5,630.00	93.83
Am-241	284	5.49	249	303	5,000.00	83.33

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:21:07PM 5/19/2014

Calibration

Sample Name: CCV-8876;AV19-20140519
Description:
Detector: AV19

Calibration Date: 5/19/2014 7:20:59PM
Analyst: 60040

Source Info

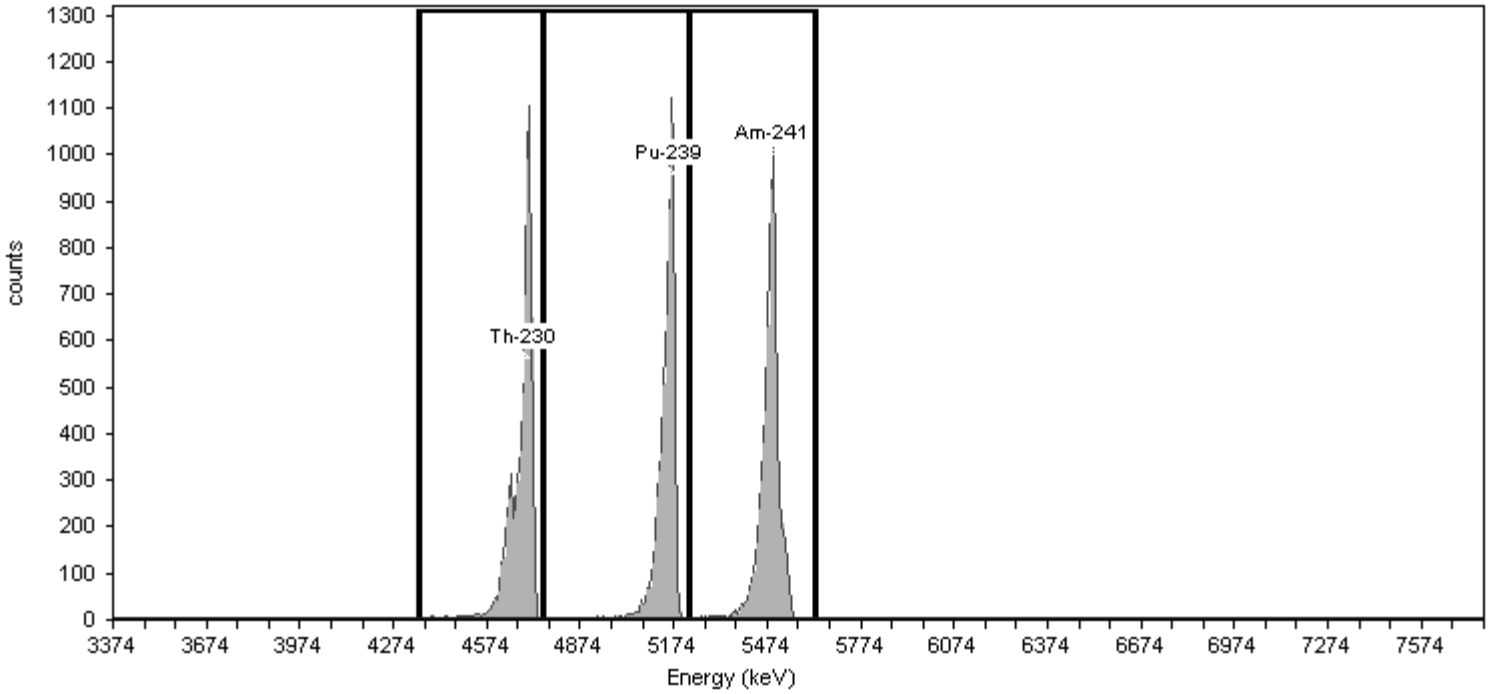
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV19 , SN: 50-025FF5
Acquisition Start Date: 5/19/2014 5:58:04PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.12% +/- 0.40% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,507.00	108.45
Pu-239	240	5.16	186	249	6,354.00	105.90
Am-241	284	5.49	249	303	6,584.00	109.73

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:43:58PM 5/19/2014

Calibration

Sample Name: CCV-8877;AV20-20140518
Description:
Detector: AV20

Calibration Date: 5/19/2014 5:43:55PM
Analyst: 60040

Source Info

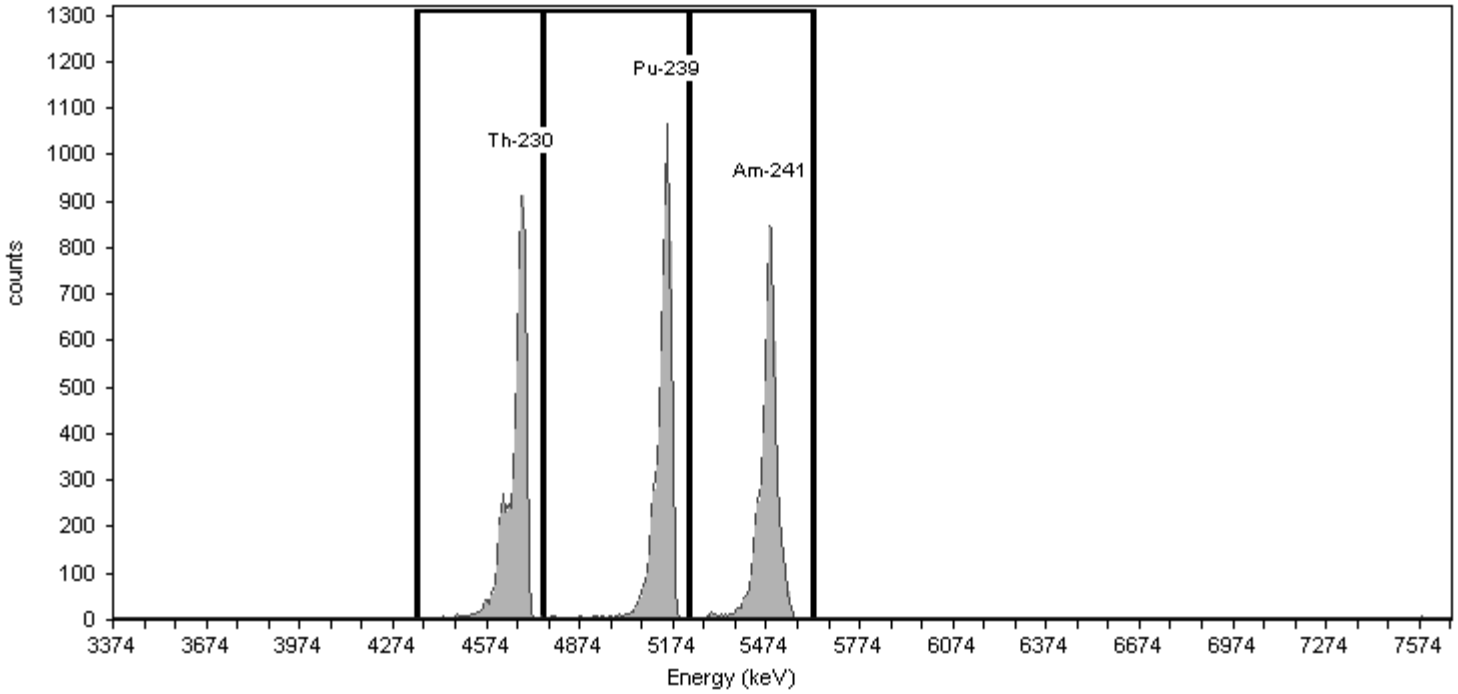
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV20 , SN: 48-121A7
Acquisition Start Date: 5/18/2014 8:52:01PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.35% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,185.00	103.08
Pu-239	240	5.16	186	249	6,464.00	107.73
Am-241	284	5.49	249	303	6,229.00	103.82

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:30:35PM 5/15/2014

Calibration

Sample Name: CCV-9794;AV43-05152014
Description:
Detector: AV43

Calibration Date: 5/15/2014 8:26:42PM
Analyst: 60040

Source Info

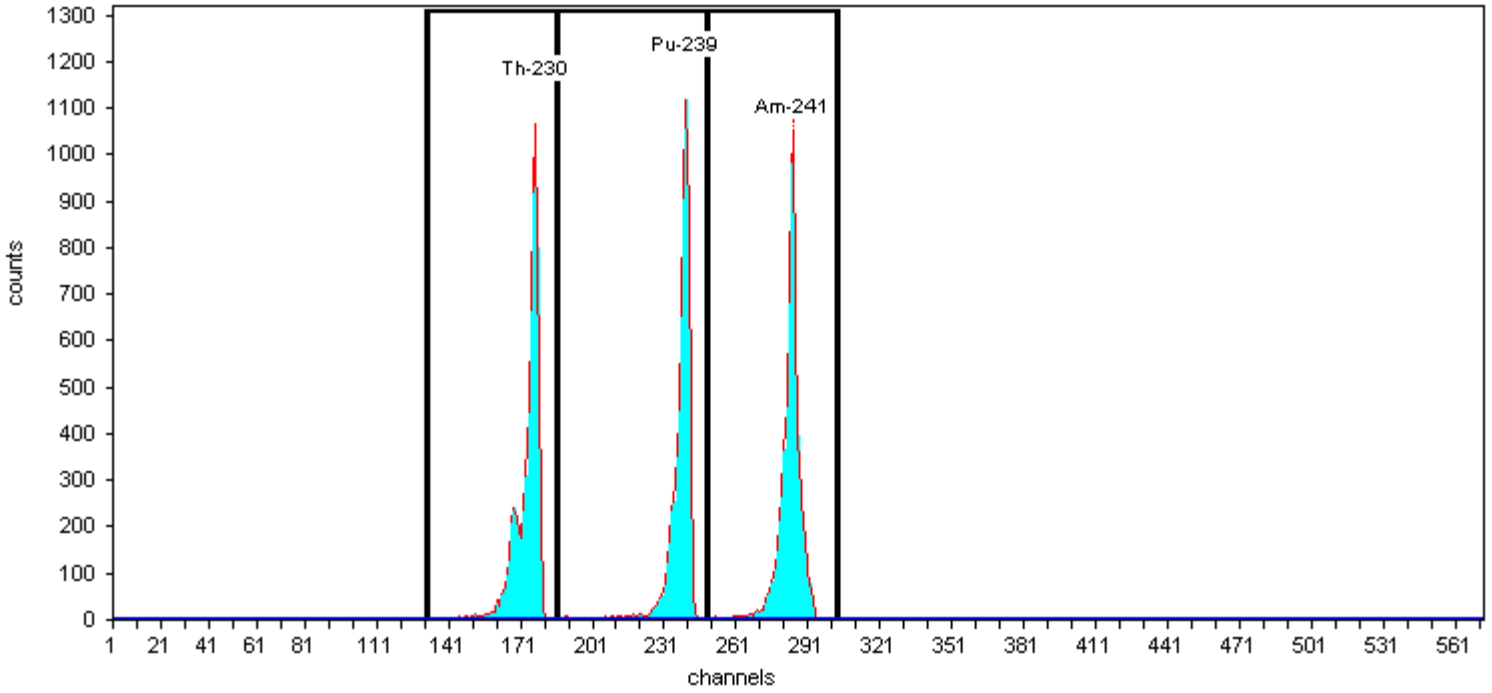
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV43 , SN: 49-190X4
Acquisition Start Date: 5/15/2014 7:01:21PM
Live Time: 60.00 min.
Real Time: 60.05 min.
Efficiency: 25.87% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,227.00	103.78
Pu-239	240	5.16	186	249	5,920.00	98.67
Am-241	284	5.49	249	303	6,581.00	109.68

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:30:59PM 5/15/2014

Calibration

Sample Name: CCV-9795;AV44-05152014
Description:
Detector: AV44

Calibration Date: 5/15/2014 8:30:53PM
Analyst: 60040

Source Info

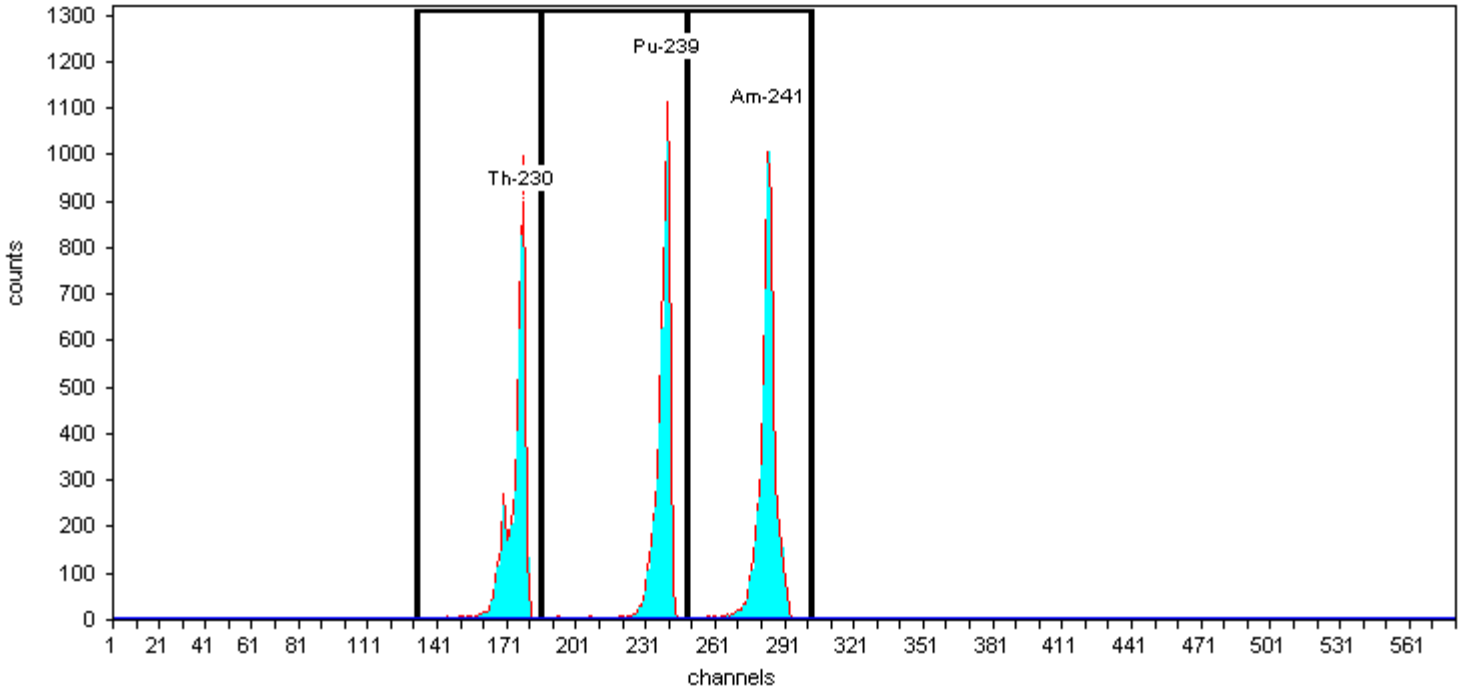
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV44 , SN: 50-051JJ1
Acquisition Start Date: 5/15/2014 7:01:23PM
Live Time: 60.00 min.
Real Time: 60.05 min.
Efficiency: 26.39% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,468.00	91.13
Pu-239	240	5.16	186	249	5,733.00	95.55
Am-241	284	5.49	249	303	6,085.00	101.42

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:31:20PM 5/15/2014

Calibration

Sample Name: CCV-9817;AV45-05152014a
Description:
Detector: AV45

Calibration Date: 5/15/2014 8:31:14PM
Analyst: 60040

Source Info

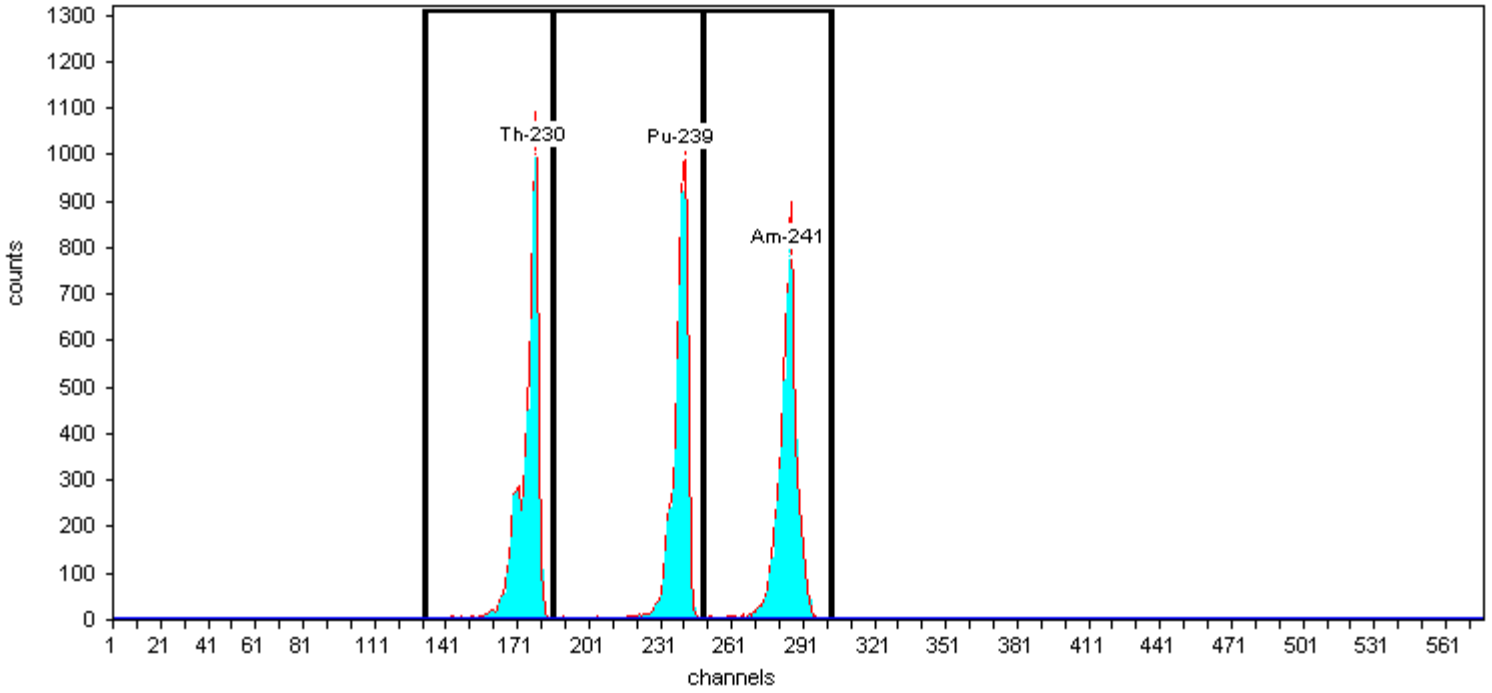
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV45 , SN: 48-158FF2
Acquisition Start Date: 5/15/2014 7:02:36PM
Live Time: 60.00 min.
Real Time: 60.05 min.
Efficiency: 25.85% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,888.00	114.80
Pu-239	240	5.16	186	249	6,161.00	102.68
Am-241	284	5.49	249	303	6,432.00	107.20

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:31:40PM 5/15/2014

Calibration

Sample Name: CCV-9884;AV46-05152014
Description:
Detector: AV46

Calibration Date: 5/15/2014 8:31:33PM
Analyst: 60040

Source Info

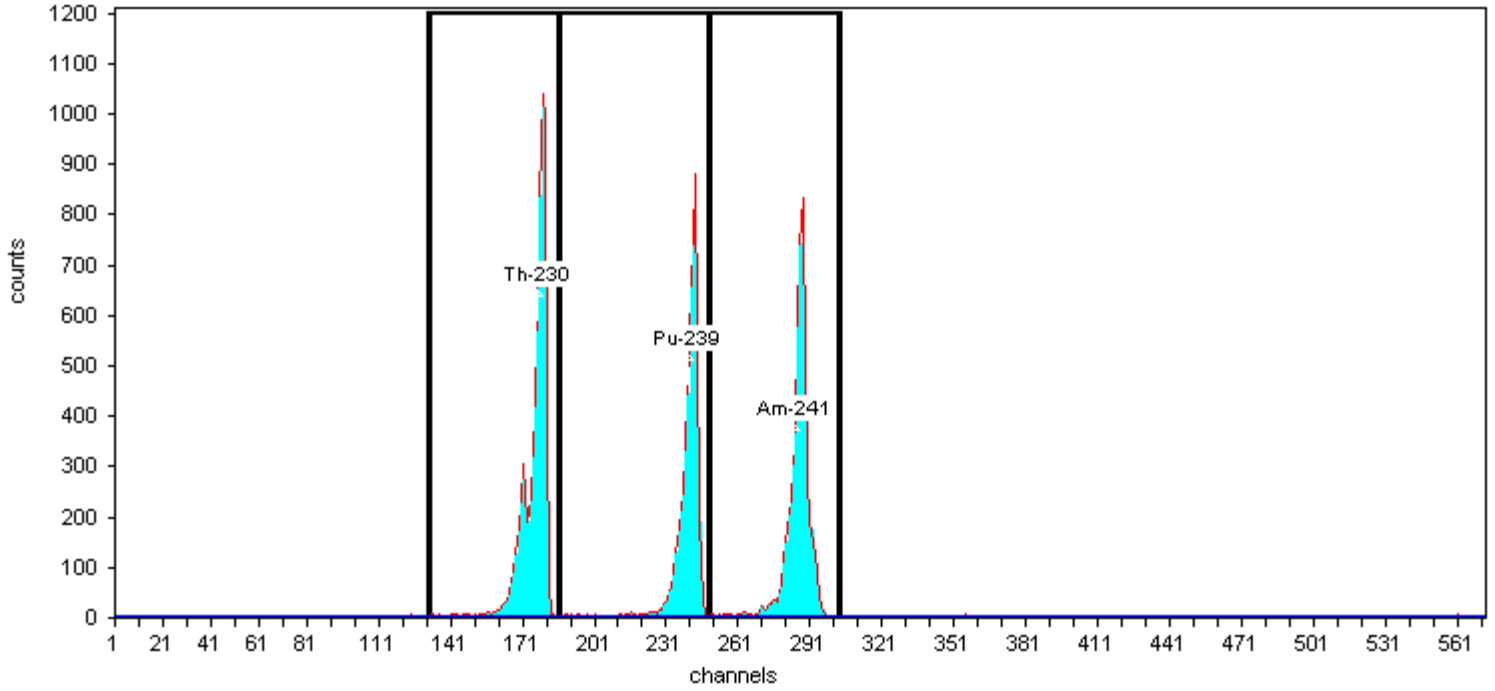
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV46 , SN: 49-202GG2
Acquisition Start Date: 5/15/2014 7:02:38PM
Live Time: 60.00 min.
Real Time: 60.05 min.
Efficiency: 26.24% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,490.00	108.17
Pu-239	240	5.16	186	249	4,950.00	82.50
Am-241	284	5.49	249	303	5,252.00	87.53

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:32:21PM 5/15/2014

Calibration

Sample Name: CCV-9886;AV48-05152014
Description:
Detector: AV48

Calibration Date: 5/15/2014 8:32:16PM
Analyst: 60040

Source Info

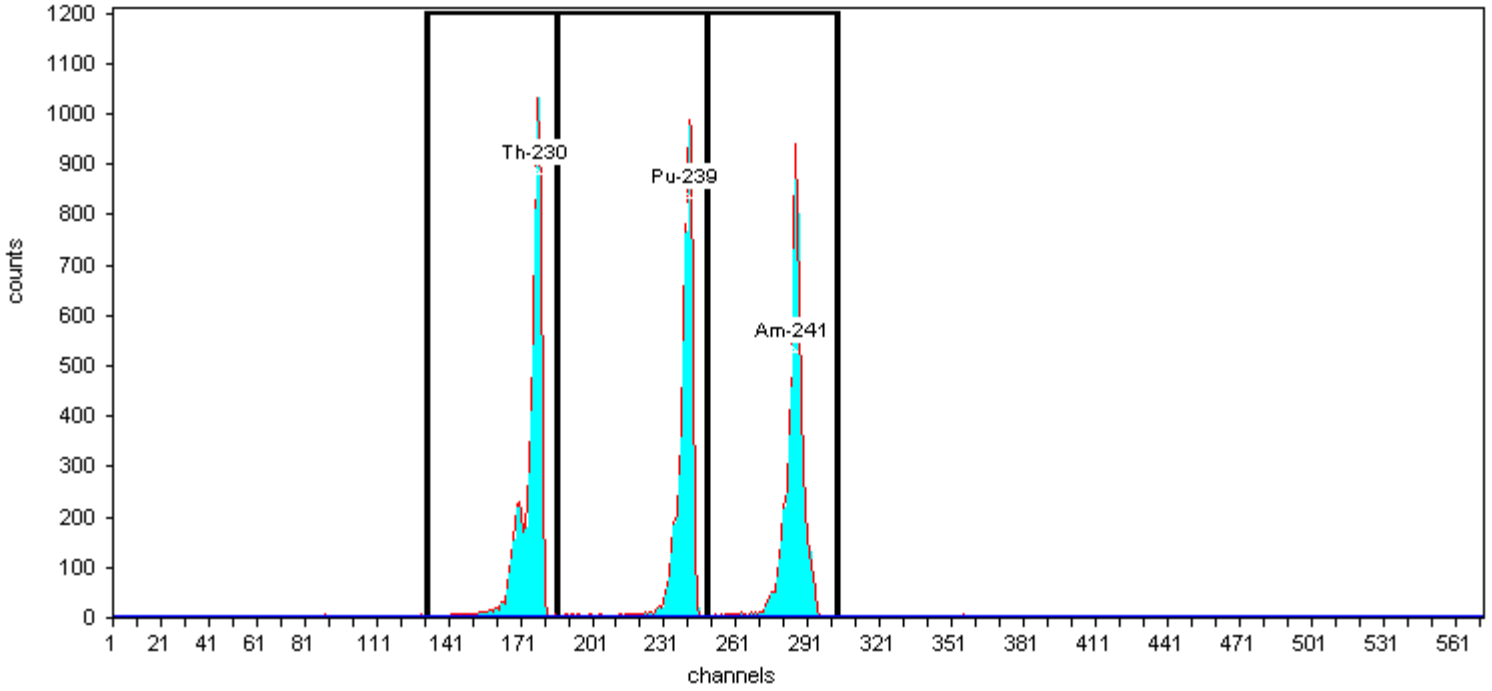
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV48 , SN: 50-051JJ4
Acquisition Start Date: 5/15/2014 7:03:45PM
Live Time: 60.00 min.
Real Time: 60.05 min.
Efficiency: 25.91% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,841.00	97.35
Pu-239	240	5.16	186	249	5,457.00	90.95
Am-241	284	5.49	249	303	5,733.00	95.55

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:35:30PM 5/15/2014

Calibration

Sample Name: CCV-9793;AV57-05152014
Description:
Detector: AV57

Calibration Date: 5/15/2014 8:35:25PM
Analyst: 60040

Source Info

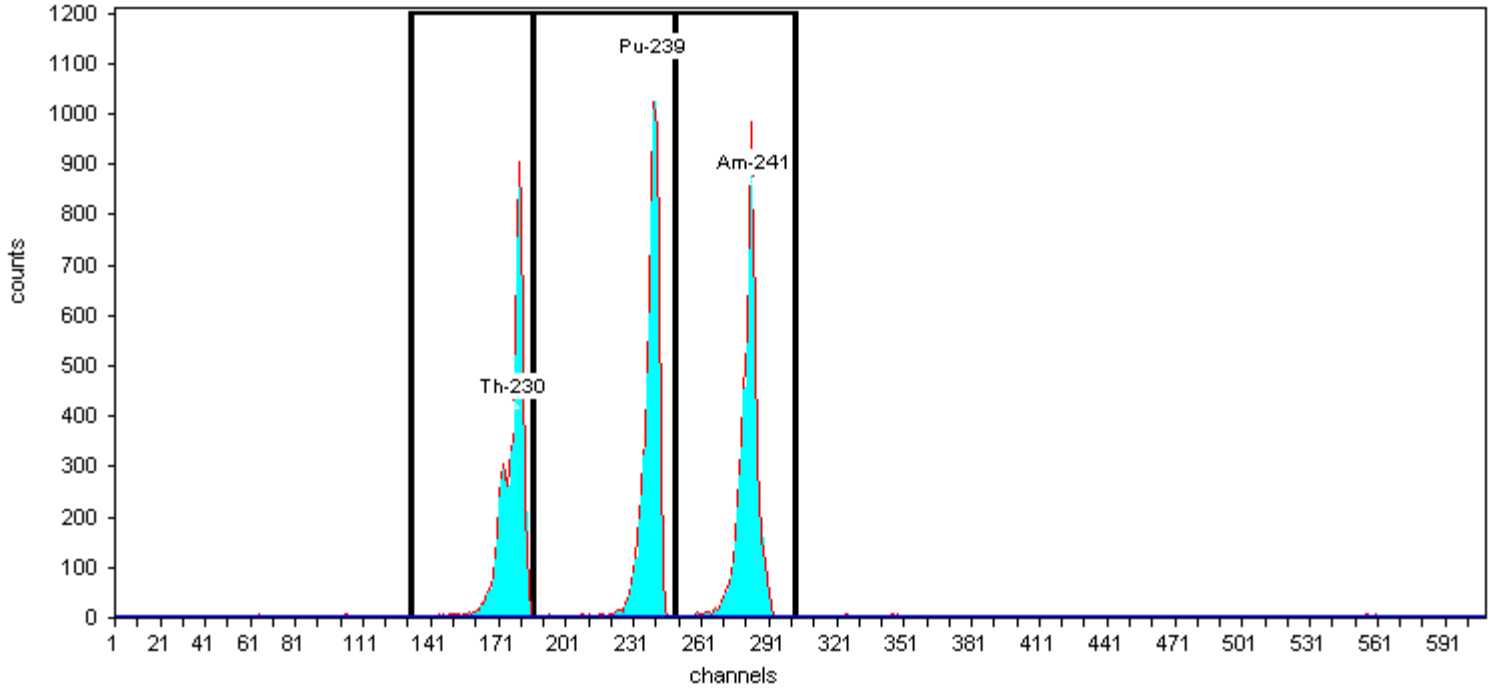
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV57 , SN: 48-158EE3
Acquisition Start Date: 5/15/2014 7:05:02PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 27.06% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,450.00	107.50
Pu-239	240	5.16	186	249	6,583.00	109.72
Am-241	284	5.49	249	303	6,480.00	108.00

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:45:57PM 5/15/2014

Calibration

Sample Name: CCV-9794;AV58-05152014
Description:
Detector: AV58

Calibration Date: 5/15/2014 9:45:54PM
Analyst: 60040

Source Info

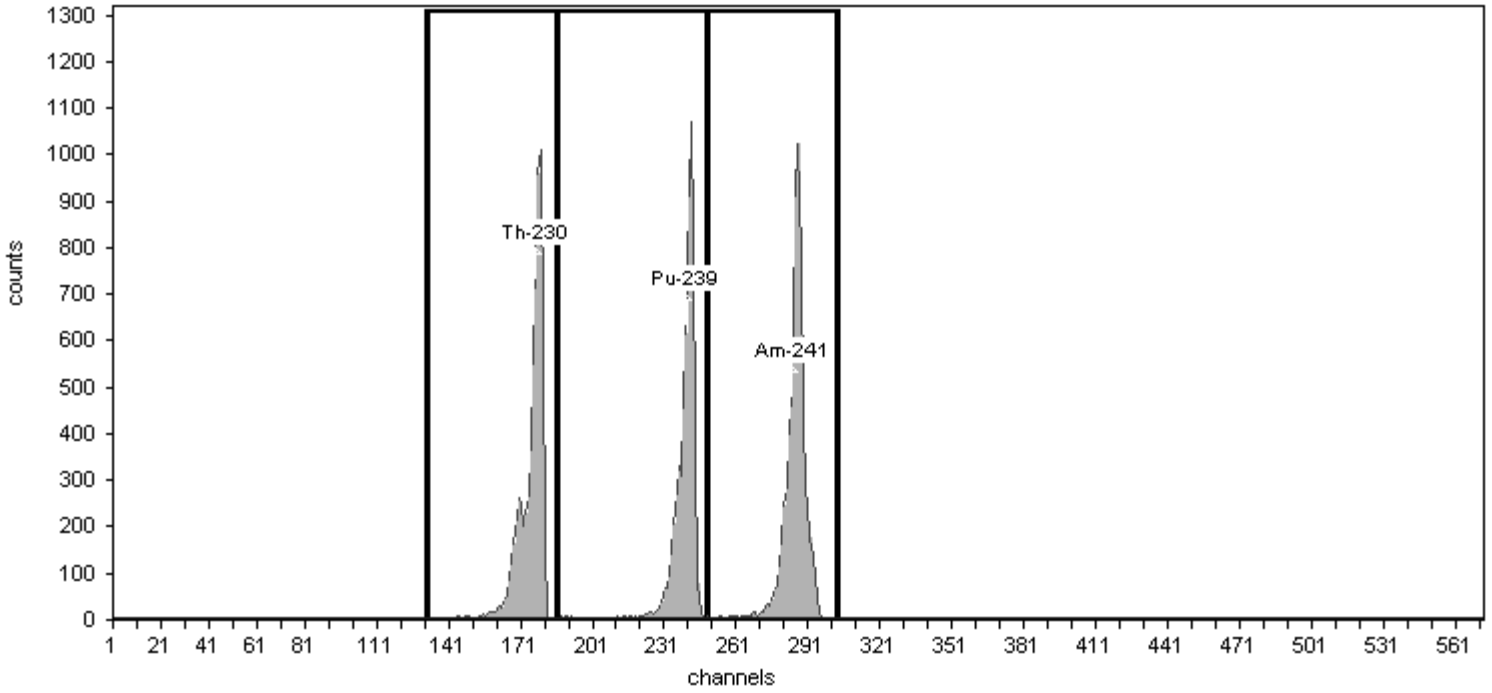
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 5/15/2014 8:43:36PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.45% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,375.00	106.25
Pu-239	240	5.16	186	249	5,999.00	99.98
Am-241	284	5.49	249	303	6,769.00	112.82

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:46:03PM 5/15/2014

Calibration

Sample Name: CCV-9795;AV59-05152014
Description:
Detector: AV59

Calibration Date: 5/15/2014 9:46:00PM
Analyst: 60040

Source Info

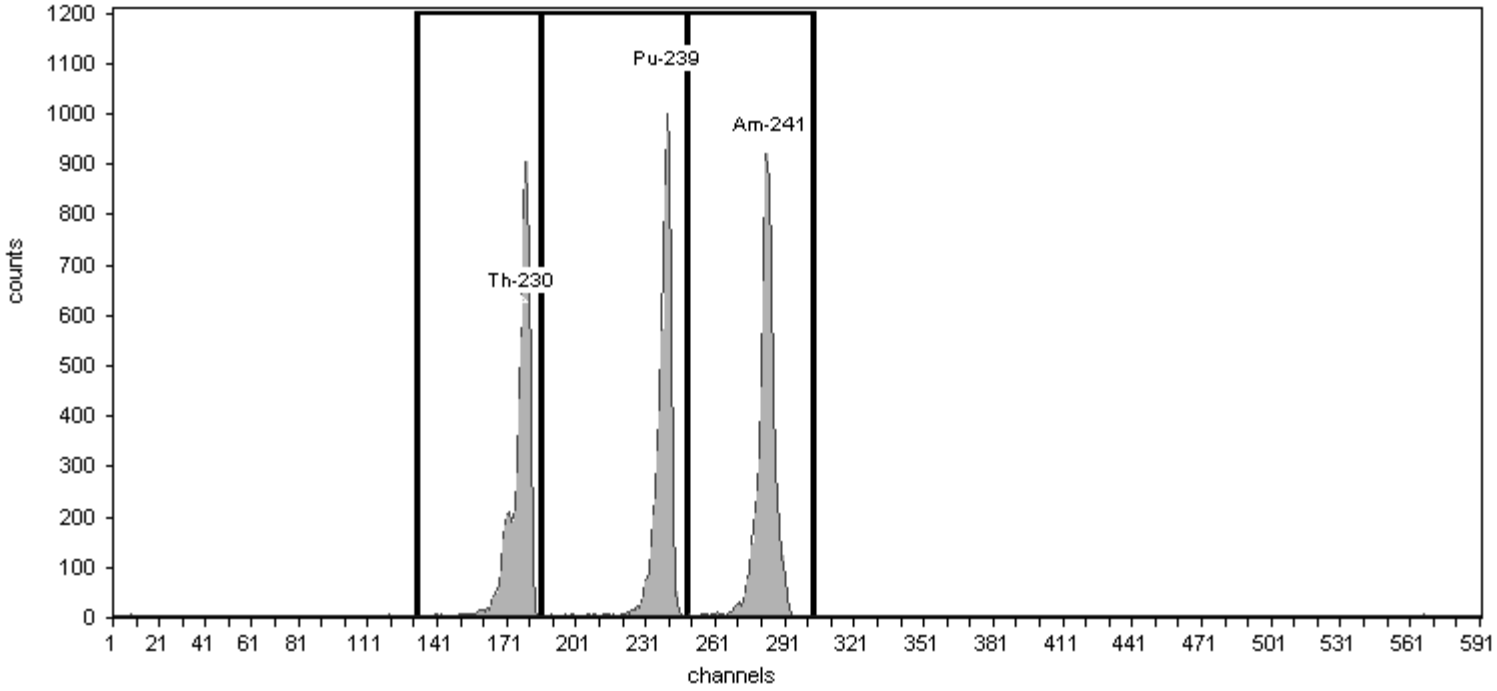
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV59 , SN: 49-155M7
Acquisition Start Date: 5/15/2014 8:44:02PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 27.48% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,753.00	95.88
Pu-239	240	5.16	186	249	5,932.00	98.87
Am-241	284	5.49	249	303	6,311.00	105.18

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:46:09PM 5/15/2014

Calibration

Sample Name: CCV-9817;AV60-05152014
Description:
Detector: AV60

Calibration Date: 5/15/2014 9:46:06PM
Analyst: 60040

Source Info

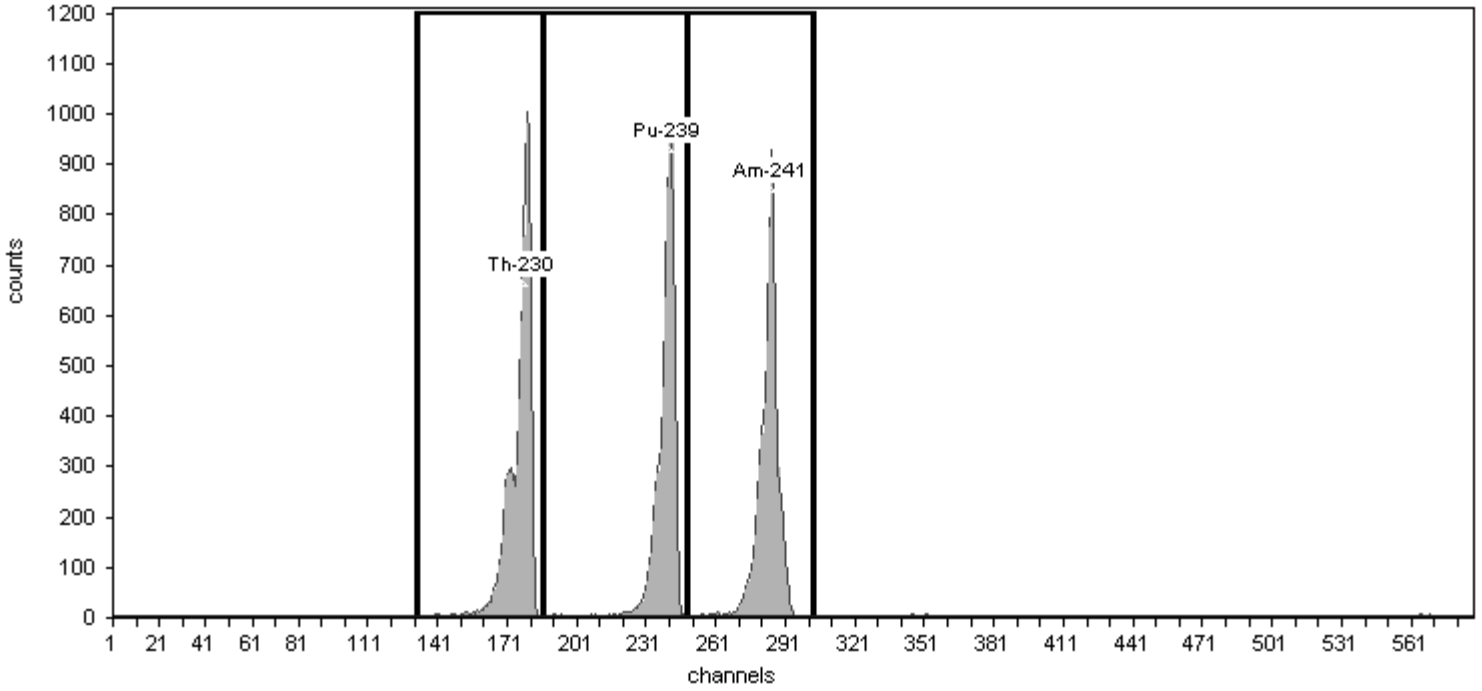
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 5/15/2014 8:44:03PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.25% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,963.00	116.05
Pu-239	240	5.16	186	249	6,288.00	104.80
Am-241	284	5.49	249	303	6,530.00	108.83

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:46:16PM 5/15/2014

Calibration

Sample Name: CCV-9817;AV61-05152014
Description:
Detector: AV61

Calibration Date: 5/15/2014 9:46:12PM
Analyst: 60040

Source Info

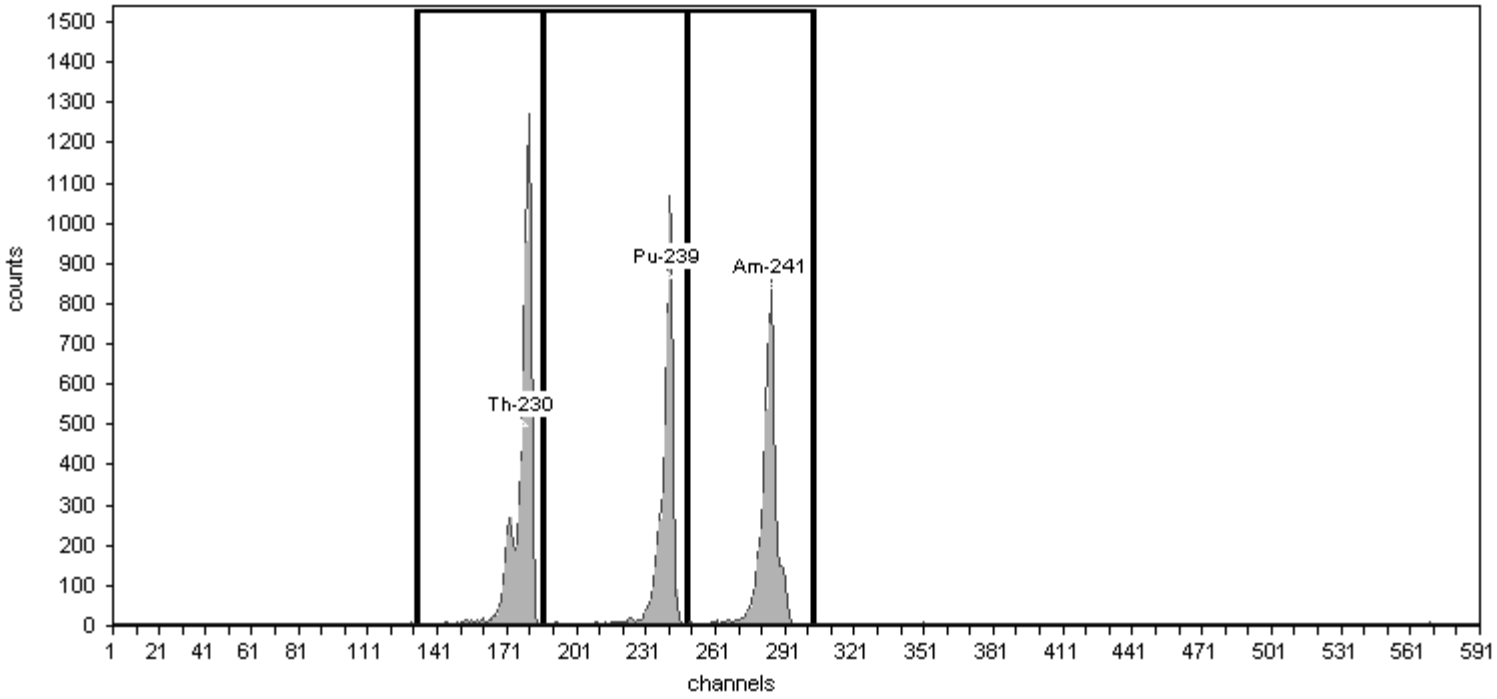
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV61 , SN: 5-051JJ3
Acquisition Start Date: 5/15/2014 8:44:25PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.32% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,448.00	107.47
Pu-239	240	5.16	186	249	5,211.00	86.85
Am-241	284	5.49	249	303	5,078.00	84.63

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:46:23PM 5/15/2014

Calibration

Sample Name: CCV-9885;AV62-05152014
Description:
Detector: AV62

Calibration Date: 5/15/2014 9:46:19PM
Analyst: 60040

Source Info

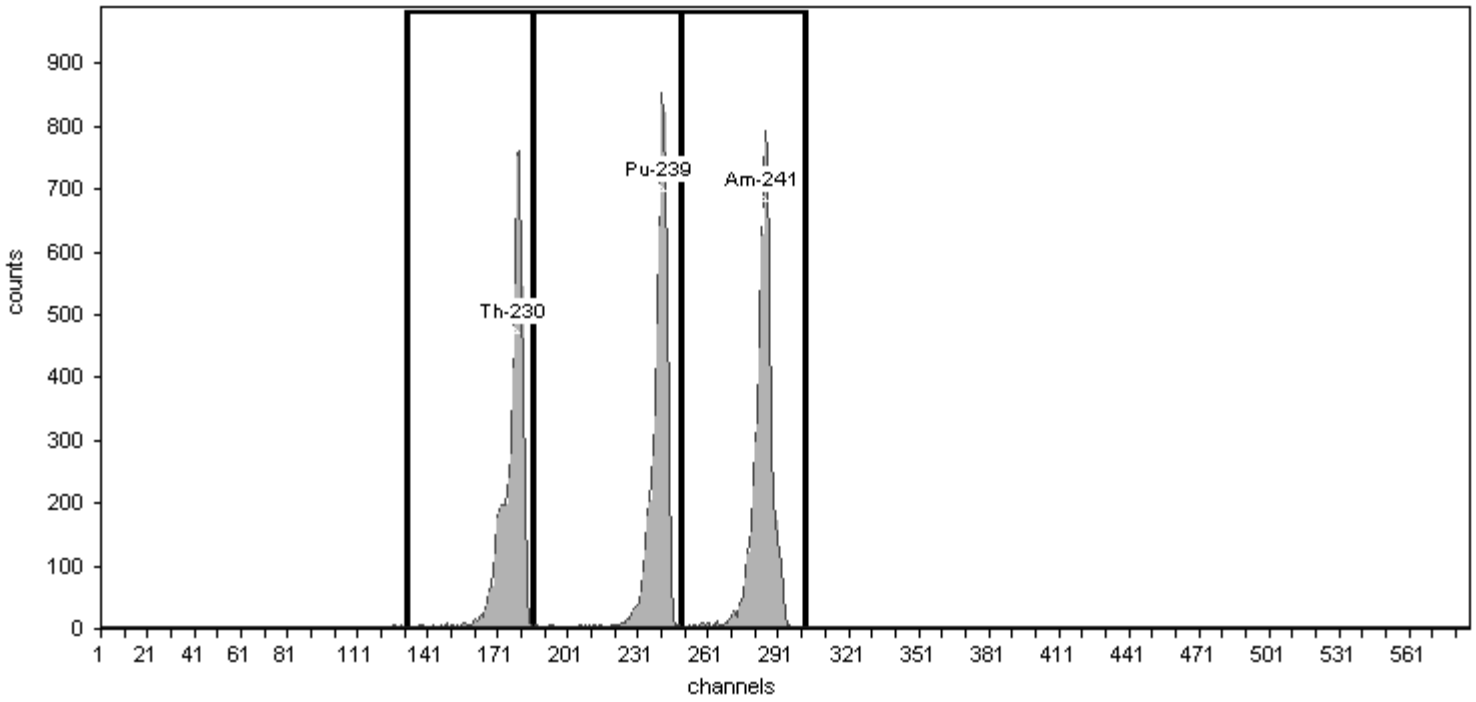
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 5/15/2014 8:44:26PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.41% +/- 0.50% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,213.00	86.88
Pu-239	240	5.16	186	249	5,235.00	87.25
Am-241	284	5.49	249	303	5,623.00	93.72

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:59:57PM 5/15/2014

Calibration

Sample Name: CCV-9886;AV78-05152014
Description:
Detector: AV78

Calibration Date: 5/15/2014 10:59:54PM
Analyst: 60040

Source Info

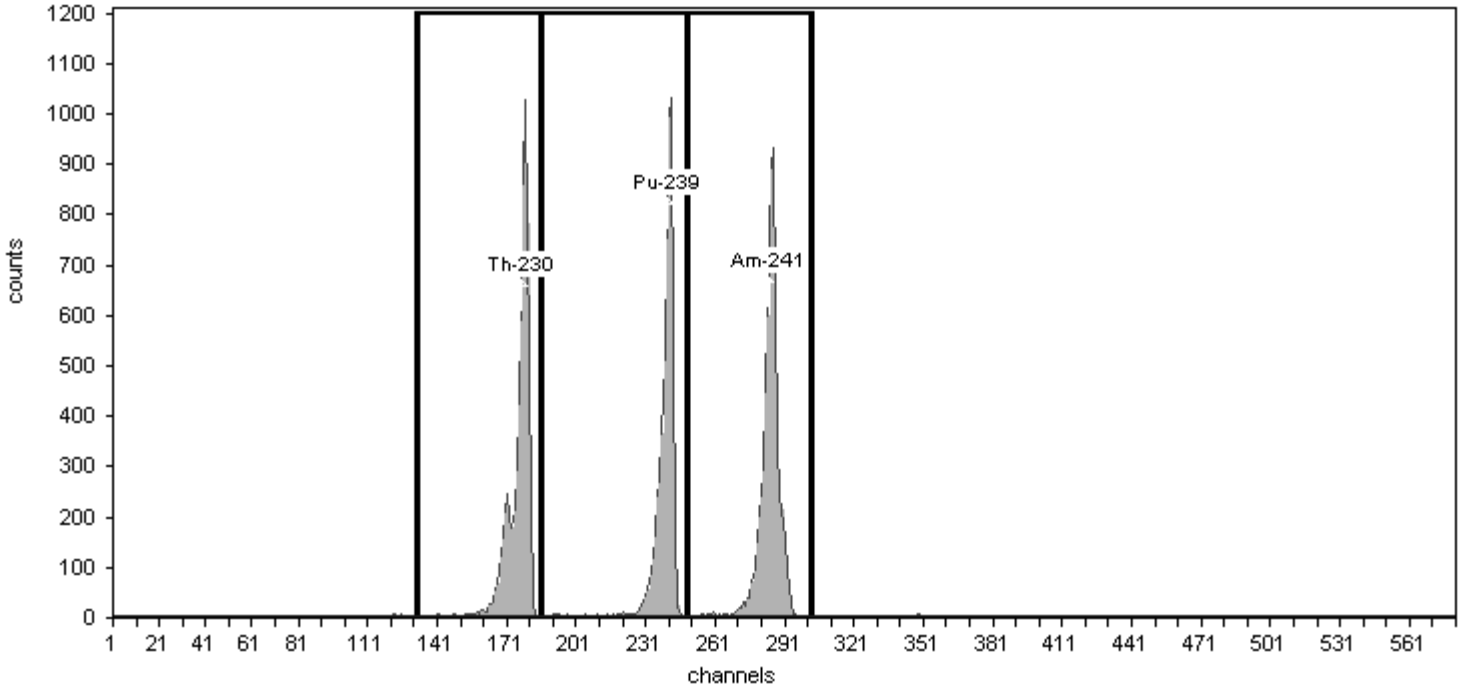
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV78 , SN: 46-033FF4
Acquisition Start Date: 5/15/2014 9:58:10PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.04% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,789.00	96.48
Pu-239	240	5.16	186	249	5,444.00	90.73
Am-241	284	5.49	249	303	5,885.00	98.08

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:03:08PM 5/16/2014

Calibration

Sample Name: CCV-7107;AV79-05152014
Description:
Detector: AV79

Calibration Date: 5/16/2014 3:03:04PM
Analyst: 60040

Source Info

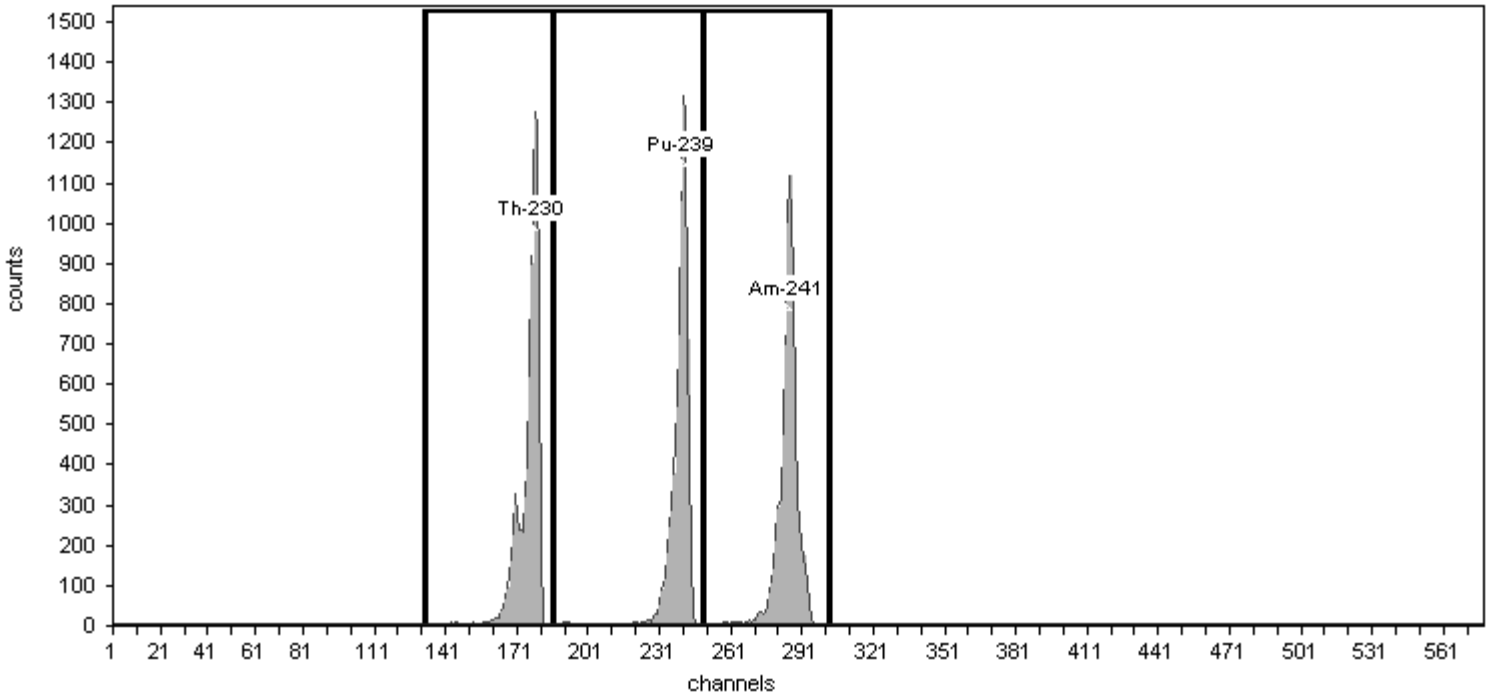
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV79 , SN: 46-033Q5
Acquisition Start Date: 5/15/2014 11:08:30PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 27.61% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,452.00	124.20
Pu-239	240	5.16	186	249	7,297.00	121.62
Am-241	284	5.49	249	303	7,144.00	119.07

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:33:22PM 5/16/2014

Calibration

Sample Name: CCV-8876;AV82-20140516
Description:
Detector: AV82

Calibration Date: 5/16/2014 4:33:16PM
Analyst: 60040

Source Info

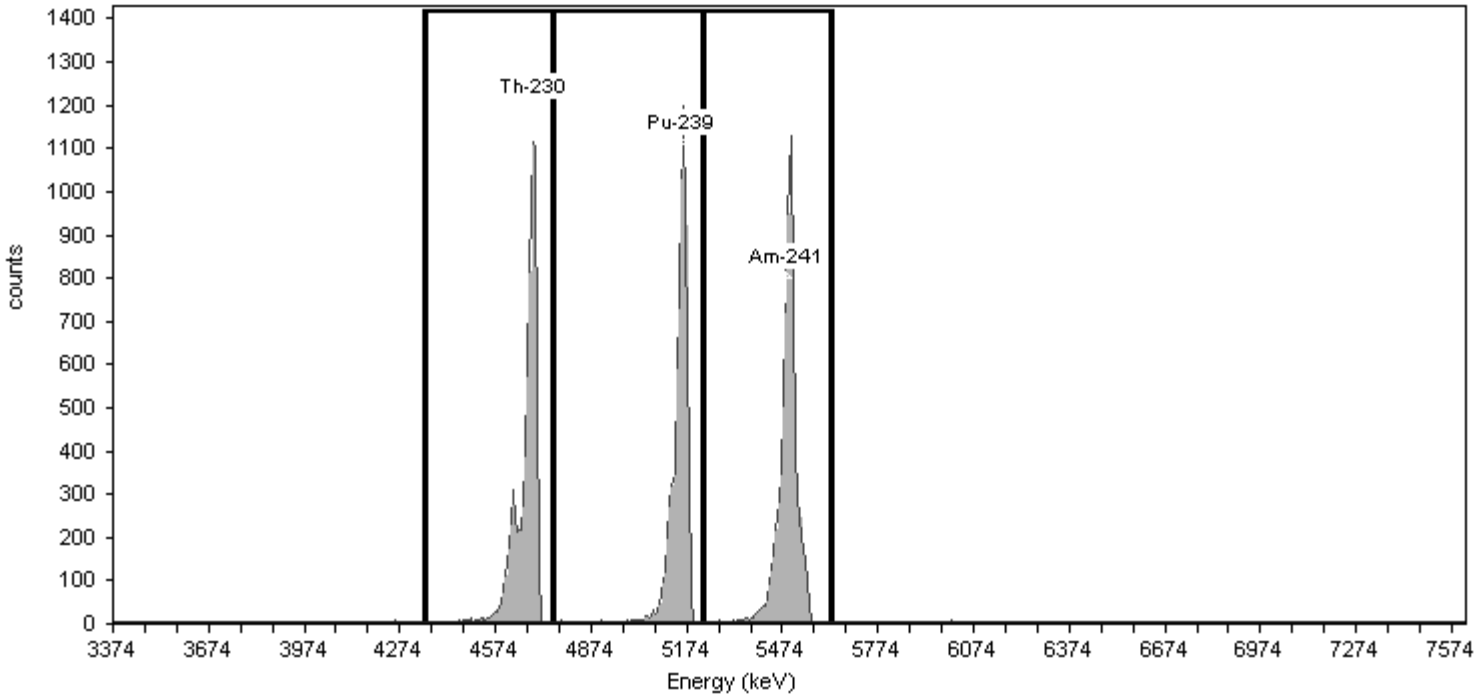
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV82 , SN: 46-032EE5
Acquisition Start Date: 5/16/2014 3:28:55PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.94% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,704.00	111.73
Pu-239	240	5.16	186	249	6,446.00	107.43
Am-241	284	5.49	249	303	6,919.00	115.32

Monthly Backgrounds

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:38:56PM 5/15/2014

Sample

Sample Name: ICB;AV1
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

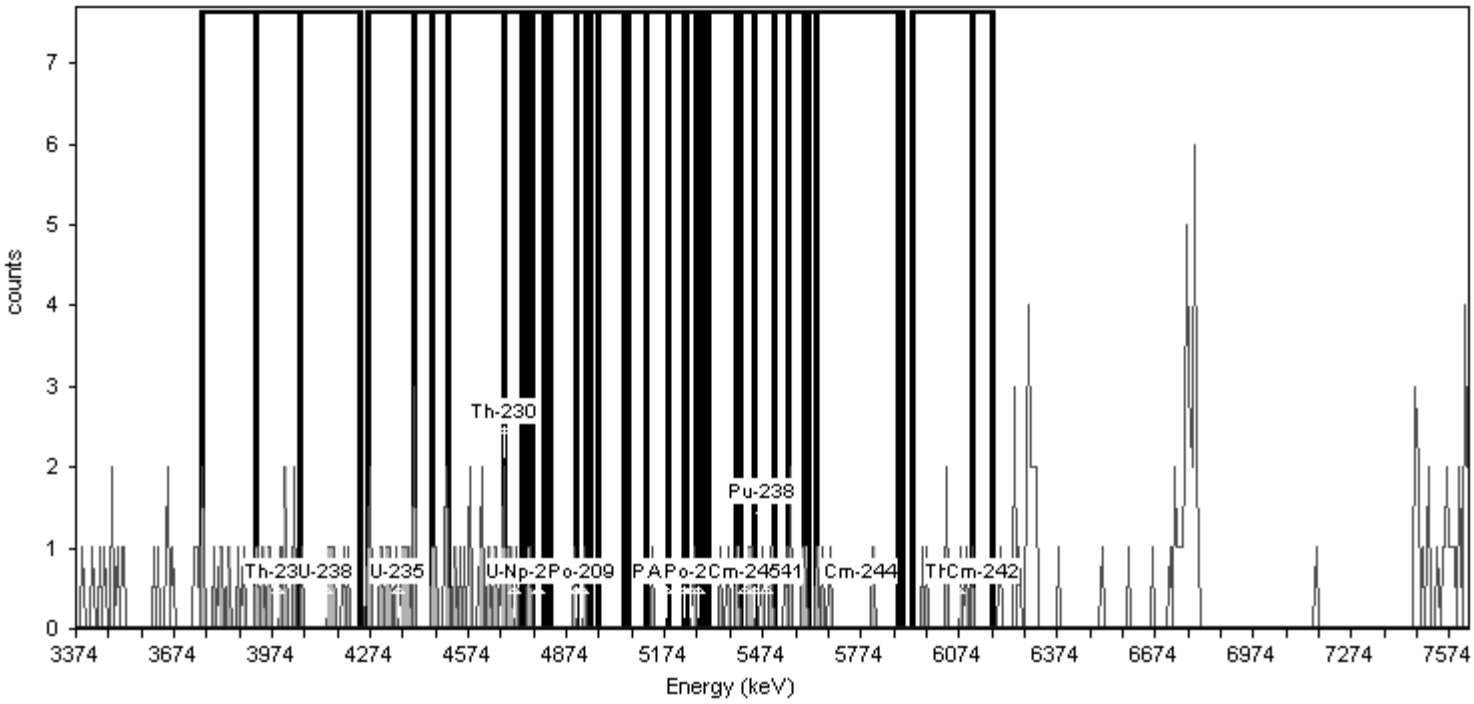
Analyst: 60040

Acquisition

Detector: AV1 , SN: 49-188 AA4
Acquisition Start Date: 5/15/2014 1:20:59AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV1-20140505
Calibration Date: 5/6/2014 5:38:14PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.30% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 181.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	19.00	1.979E-002	4.658E-003
U-238	4.14	3.92	4.24	16.00	1.667E-002	4.295E-003
U-235	4.36	4.26	4.46	16.00	1.667E-002	4.295E-003
Th-230	4.68	4.40	4.75	25.00	2.604E-002	5.311E-003
U-234	4.71	4.51	4.82	20.00	2.083E-002	4.774E-003
Pu-242	4.90	4.68	4.95	9.00	9.375E-003	3.294E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	8.00	8.333E-003	3.125E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	8.00	8.333E-003	3.125E-003
Am-241	5.48	5.30	5.60	12.00	1.250E-002	3.756E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	4.00	4.167E-003	2.329E-003
Cm-244	5.78	5.64	5.90	4.00	4.167E-003	2.329E-003
Th-227	6.07	5.93	6.18	7.00	7.292E-003	2.946E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:53PM 5/15/2014

Sample

Sample Name: ICB;AV11
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

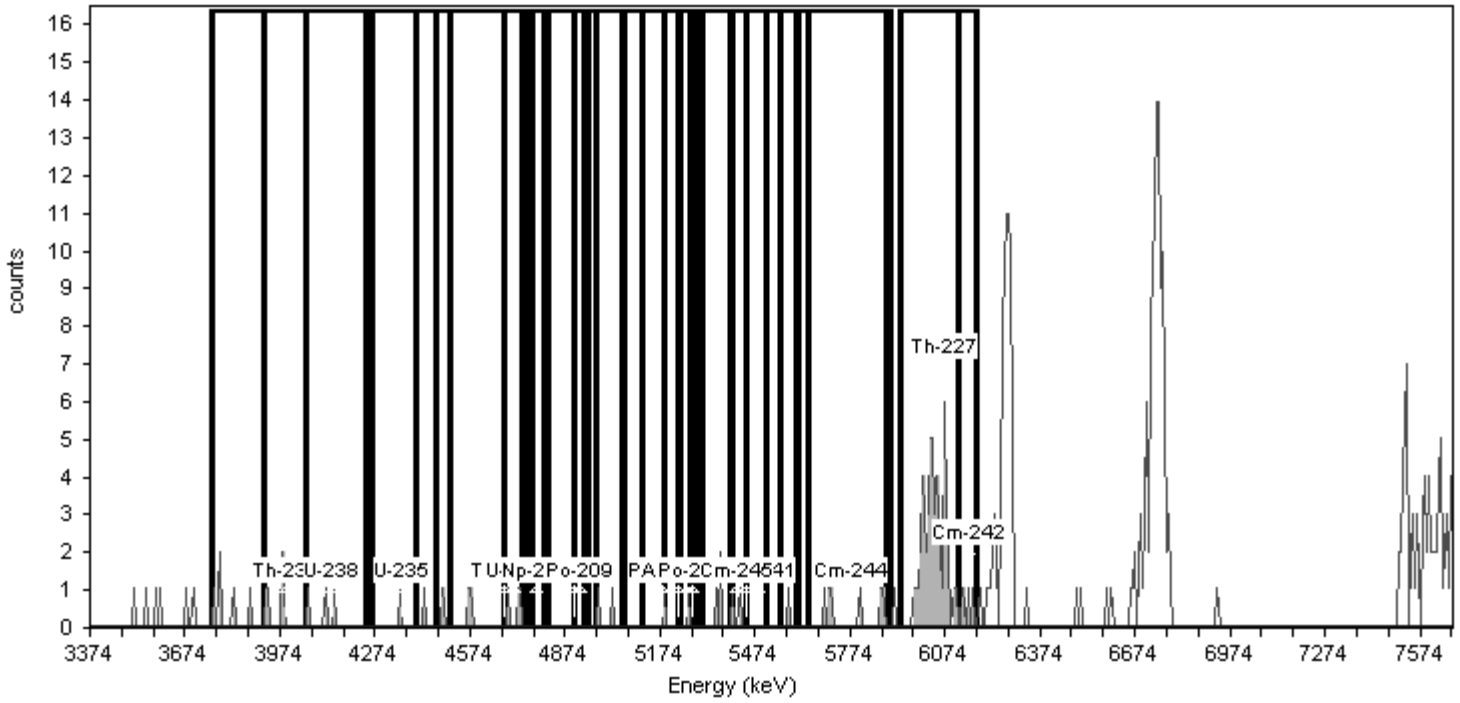
Analyst: 60040

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 5/15/2014 1:18:01AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9795;AV11-20140505
Calibration Date: 5/6/2014 5:39:16PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.88% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 308.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	9.00	9.375E-003	3.294E-003
U-238	4.14	3.92	4.24	7.00	7.292E-003	2.946E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	7.00	7.292E-003	2.946E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	5.00	5.208E-003	2.552E-003
Am-241	5.48	5.30	5.60	6.00	6.250E-003	2.756E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	6.00	6.250E-003	2.756E-003
Cm-244	5.78	5.64	5.90	6.00	6.250E-003	2.756E-003
Th-227	6.07	5.93	6.18	50.00	5.208E-002	7.439E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:40:16PM 5/15/2014

Sample

Sample Name: ICB;AV15
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

Analyst: 60040

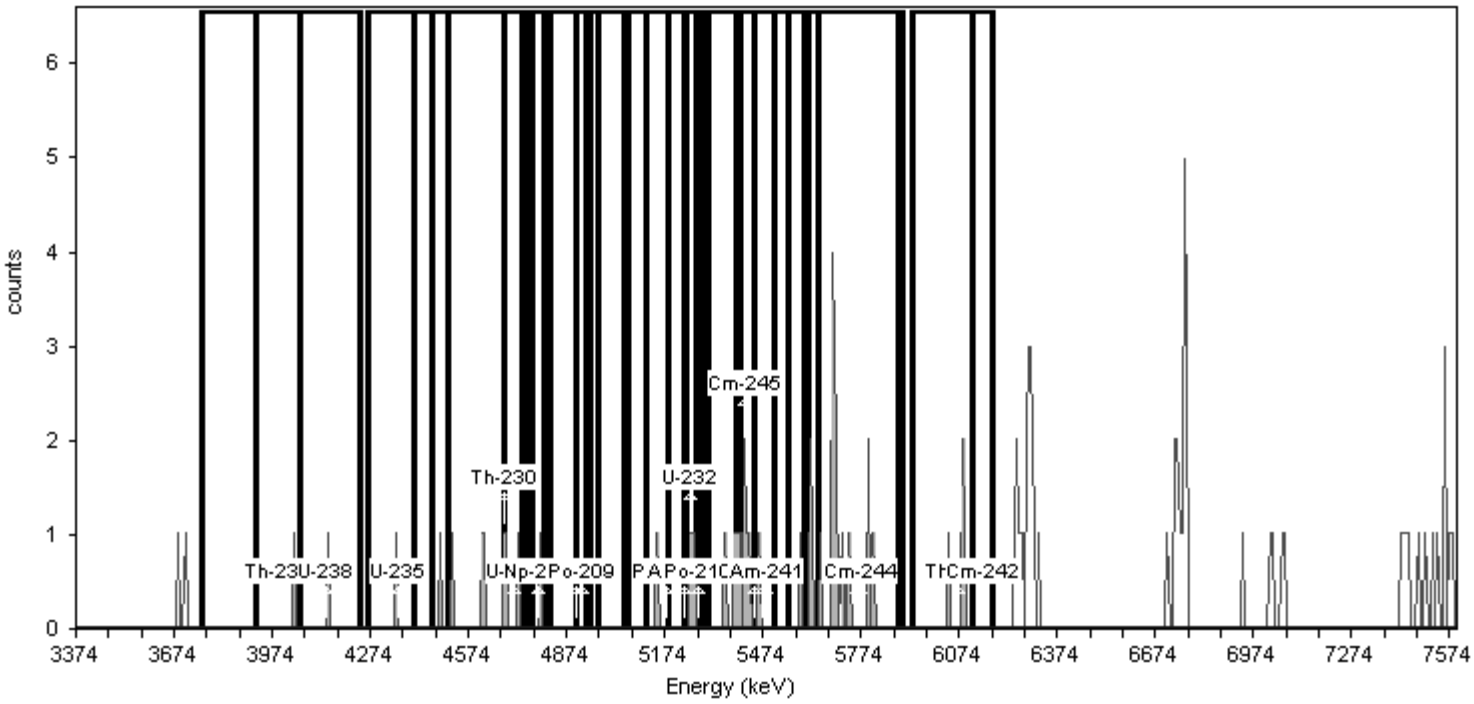
Acquisition

Detector: AV15 , SN: 41-172C5
Acquisition Start Date: 5/15/2014 1:17:55AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9886;AV15-20140505
Calibration Date: 5/6/2014 5:39:42PM

Energy Calibration Equation:

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

Efficiency: 25.62% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 95.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	11.00	1.146E-002	3.608E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	9.00	9.375E-003	3.294E-003
Am-241	5.48	5.30	5.60	10.00	1.042E-002	3.455E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	18.00	1.875E-002	4.541E-003
Cm-244	5.78	5.64	5.90	15.00	1.563E-002	4.167E-003
Th-227	6.07	5.93	6.18	3.00	3.125E-003	2.083E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:40:22PM 5/15/2014

Sample

Sample Name: ICB;AV16
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

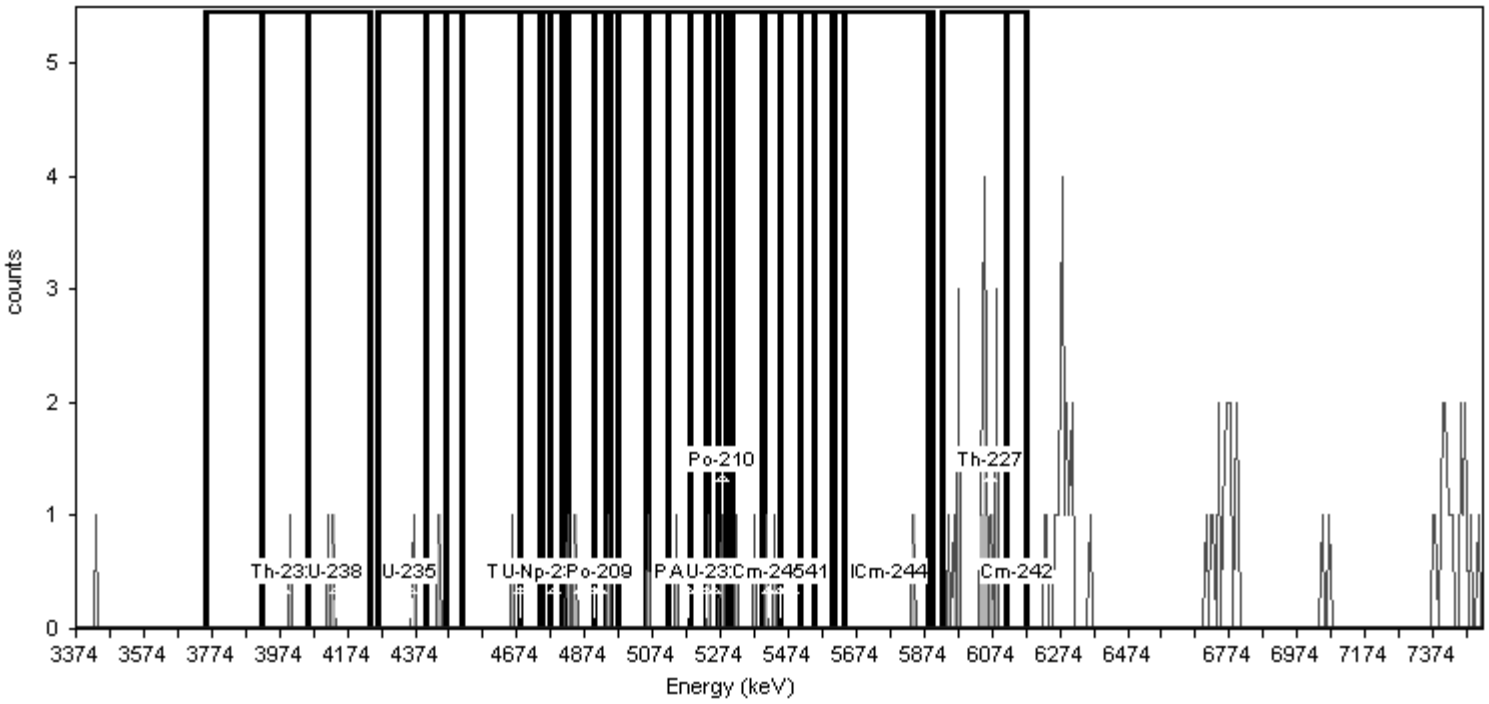
Analyst: 60040

Acquisition

Detector: AV16 , SN: 51-082B6
Acquisition Start Date: 5/15/2014 1:17:57AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV16-20140505
Calibration Date: 5/5/2014 10:08:41PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.11% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 85.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	6.00	6.250E-003	2.756E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	5.00	5.208E-003	2.552E-003
Am-241	5.48	5.30	5.60	4.00	4.167E-003	2.329E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	1.00	1.042E-003	1.473E-003
Cm-244	5.78	5.64	5.90	1.00	1.042E-003	1.473E-003
Th-227	6.07	5.93	6.18	16.00	1.667E-002	4.295E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:40:27PM 5/15/2014

Sample

Sample Name: ICB;AV17
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

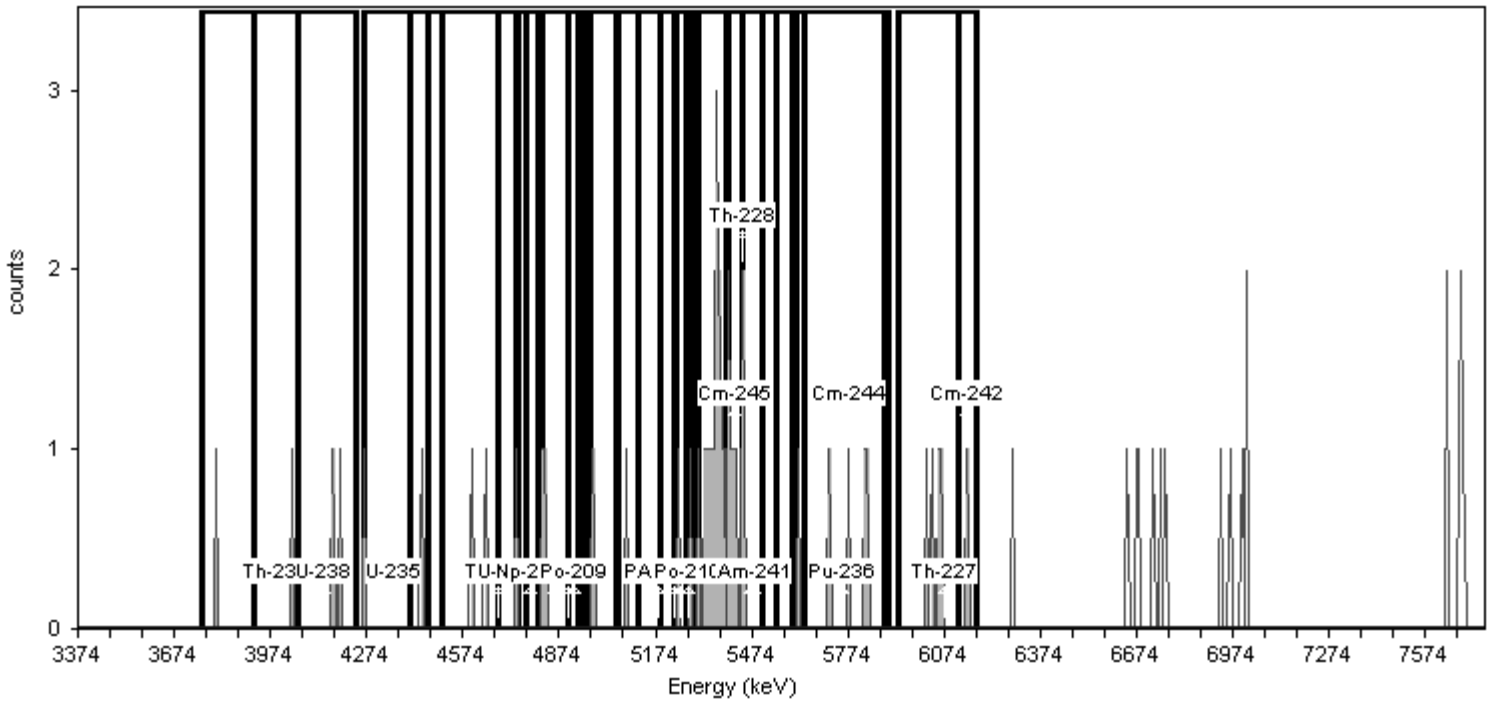
Analyst: 60040

Acquisition

Detector: AV17 , SN: 50-051C4
Acquisition Start Date: 5/15/2014 1:17:59AM
Live Time: 960.00 min.
Real Time: 960.06 min.
Calibration Name: IC-8874;AV17-20140505
Calibration Date: 5/5/2014 10:08:49PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.07% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 63.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	18.00	1.875E-002	4.541E-003
Th-228	5.45	5.19	5.51	22.00	2.292E-002	4.996E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	21.00	2.187E-002	4.886E-003
Am-241	5.48	5.30	5.60	20.00	2.083E-002	4.774E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	5.00	5.208E-003	2.552E-003
Cm-244	5.78	5.64	5.90	4.00	4.167E-003	2.329E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:40:33PM 5/15/2014

Sample

Sample Name: ICB;AV18
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

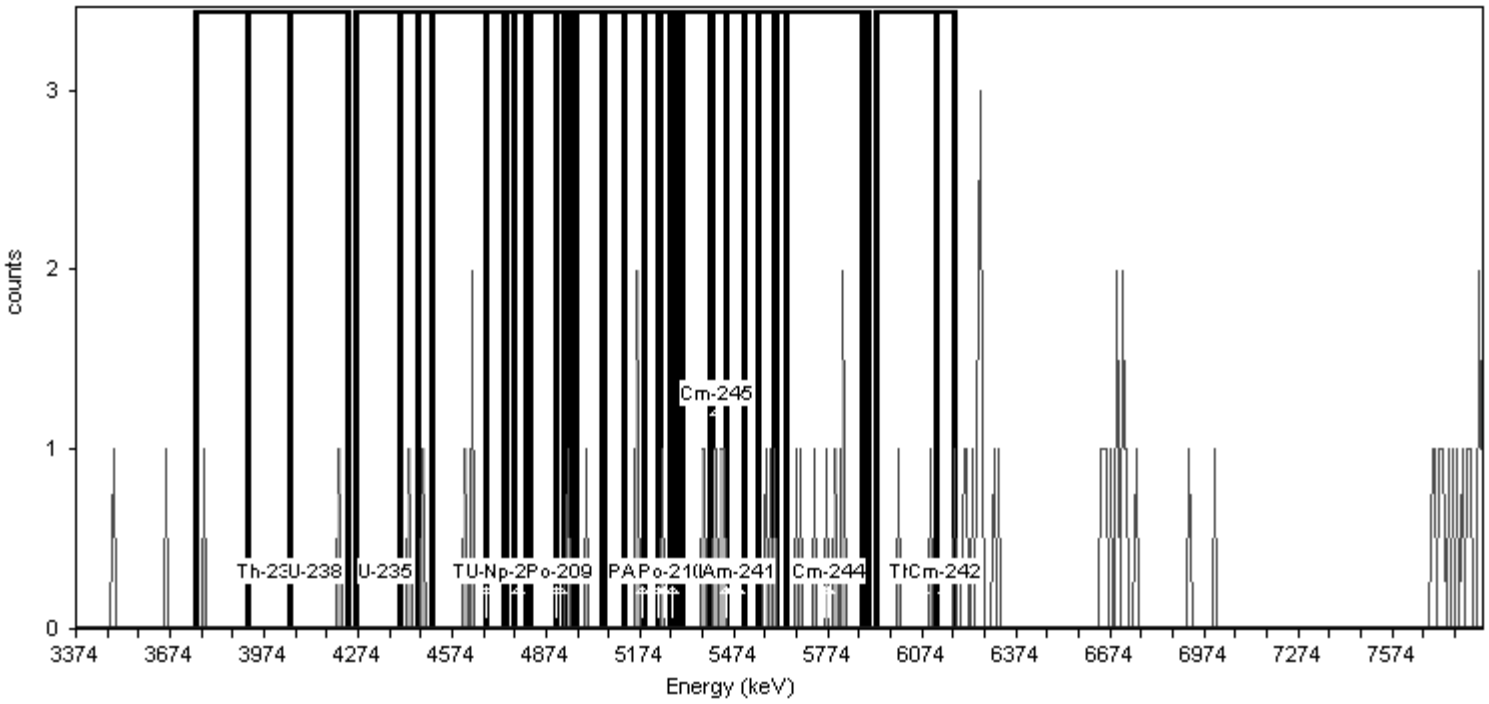
Analyst: 60040

Acquisition

Detector: AV18 , SN: 51-082C5
Acquisition Start Date: 5/15/2014 1:18:01AM
Live Time: 960.00 min.
Real Time: 960.06 min.
Calibration Name: IC-8875;AV18-20140505
Calibration Date: 5/5/2014 10:09:08PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.46% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 72.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	7.00	7.292E-003	2.946E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	6.00	6.250E-003	2.756E-003
Am-241	5.48	5.30	5.60	9.00	9.375E-003	3.294E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	8.00	8.333E-003	3.125E-003
Cm-244	5.78	5.64	5.90	8.00	8.333E-003	3.125E-003
Th-227	6.07	5.93	6.18	3.00	3.125E-003	2.083E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:40:56PM 5/15/2014

Sample

Sample Name: ICB;AV19
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

Analyst: 60040

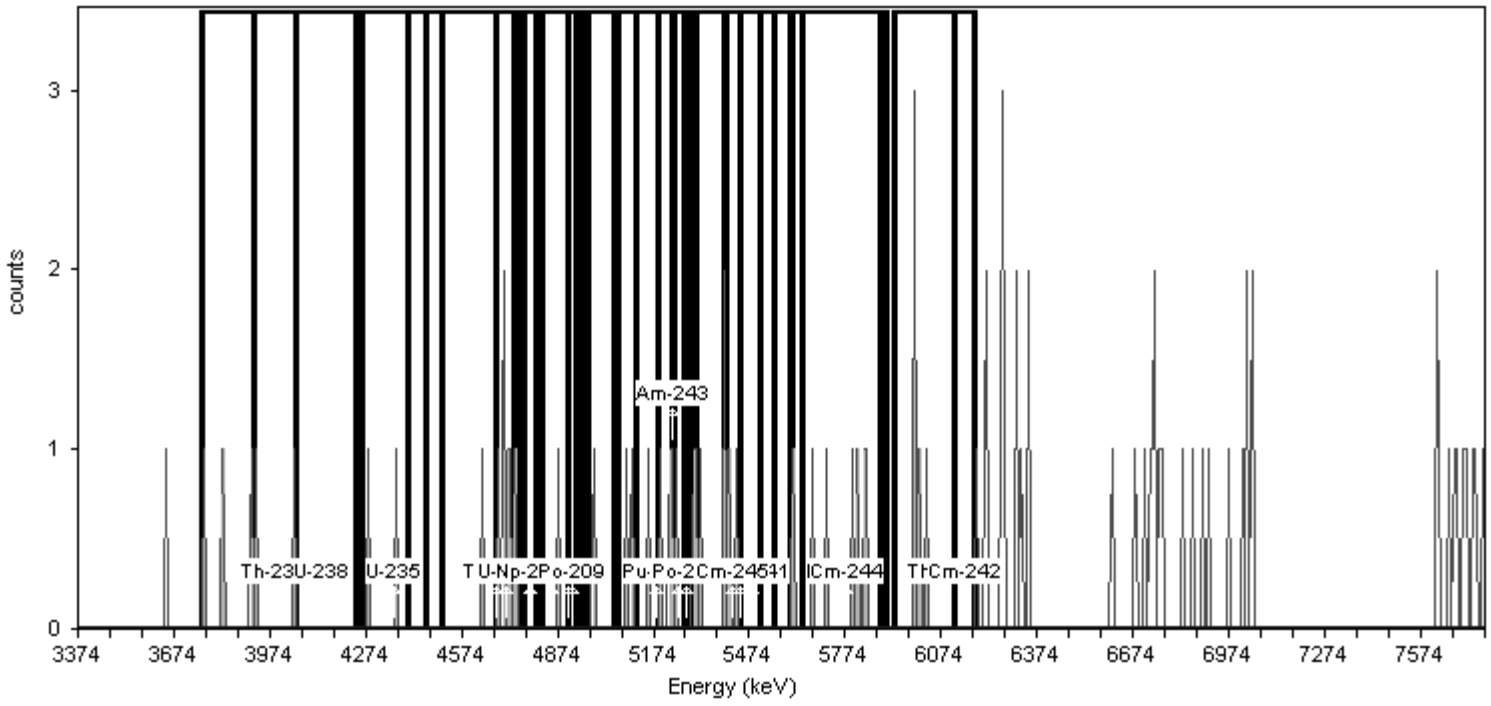
Acquisition

Detector: AV19 , SN: 50-025FF5
Acquisition Start Date: 5/15/2014 1:18:02AM
Live Time: 960.00 min.
Real Time: 960.06 min.
Calibration Name: IC-8876;AV19-20140505
Calibration Date: 5/5/2014 10:09:02PM

Energy Calibration Equation:

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

Efficiency: 25.34% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 85.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	5.00	5.208E-003	2.552E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	7.00	7.292E-003	2.946E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	7.00	7.292E-003	2.946E-003
Am-243	5.23	5.05	5.31	9.00	9.375E-003	3.294E-003
U-232	5.25	5.06	5.40	12.00	1.250E-002	3.756E-003
Th-228	5.45	5.19	5.51	11.00	1.146E-002	3.608E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	7.00	7.292E-003	2.946E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	7.00	7.292E-003	2.946E-003
Cm-244	5.78	5.64	5.90	6.00	6.250E-003	2.756E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:40:39PM 5/15/2014

Sample

Sample Name: ICB;AV20
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

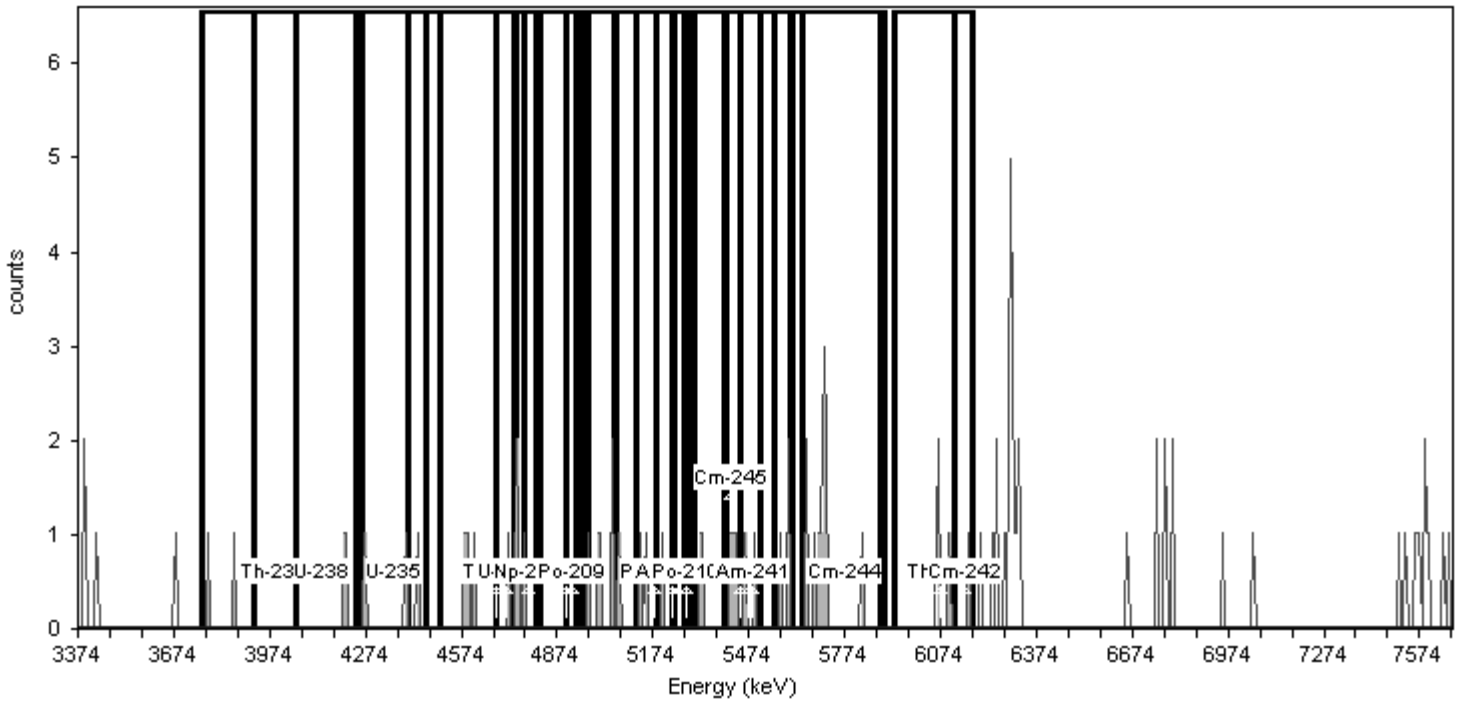
Analyst: 60040

Acquisition

Detector: AV20 , SN: 48-121A7
Acquisition Start Date: 5/15/2014 1:18:04AM
Live Time: 960.00 min.
Real Time: 960.06 min.
Calibration Name: IC-8877;AV20-20140505
Calibration Date: 5/5/2014 10:09:21PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.56% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 89.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	9.00	9.375E-003	3.294E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	9.00	9.375E-003	3.294E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	8.00	8.333E-003	3.125E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	10.00	1.042E-002	3.455E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	11.00	1.146E-002	3.608E-003
Cm-244	5.78	5.64	5.90	11.00	1.146E-002	3.608E-003
Th-227	6.07	5.93	6.18	4.00	4.167E-003	2.329E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:41:07PM 5/15/2014

Sample

Sample Name: ICB;AV43
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

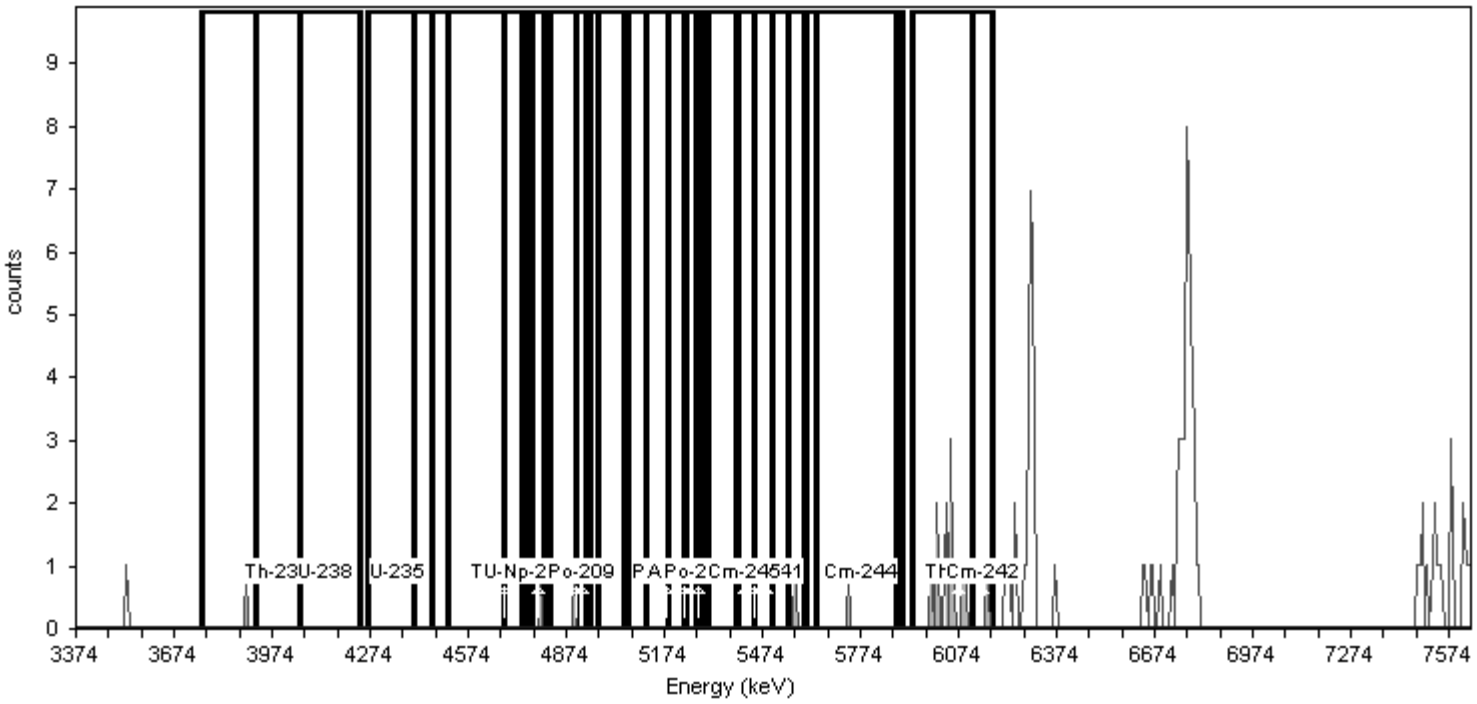
Analyst: 60040

Acquisition

Detector: AV43 , SN: 49-190X4
Acquisition Start Date: 5/15/2014 1:18:19AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9794;AV43-20140505
Calibration Date: 5/5/2014 10:09:47PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.74% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 105.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	0.00	0.000E+000	1.473E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	0.00	0.000E+000	1.473E-003
U-232	5.25	5.06	5.40	0.00	0.000E+000	1.473E-003
Th-228	5.45	5.19	5.51	0.00	0.000E+000	1.473E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	0.00	0.000E+000	1.473E-003
Am-241	5.48	5.30	5.60	1.00	1.042E-003	1.473E-003
Cm-245	5.42	5.40	5.45	0.00	0.000E+000	1.473E-003
Pu-236	5.76	5.61	5.89	1.00	1.042E-003	1.473E-003
Cm-244	5.78	5.64	5.90	1.00	1.042E-003	1.473E-003
Th-227	6.07	5.93	6.18	13.00	1.354E-002	3.898E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:41:13PM 5/15/2014

Sample

Sample Name: ICB;AV44
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

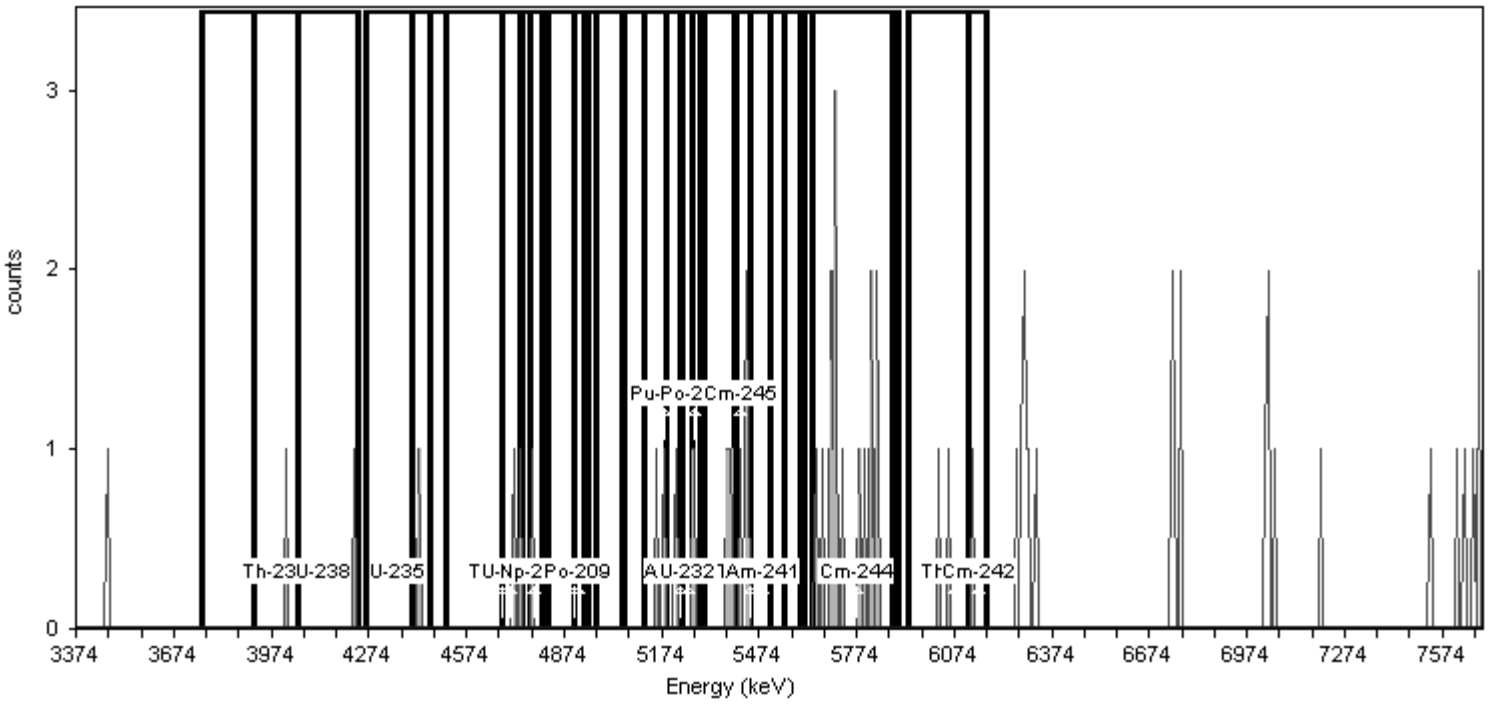
Analyst: 60040

Acquisition

Detector: AV44 , SN: 50-051JJ1
Acquisition Start Date: 5/15/2014 1:18:20AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9795;AV44-20140505
Calibration Date: 5/5/2014 10:09:57PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.32% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 61.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	8.00	8.333E-003	3.125E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	9.00	9.375E-003	3.294E-003
Am-241	5.48	5.30	5.60	7.00	7.292E-003	2.946E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	16.00	1.667E-002	4.295E-003
Cm-244	5.78	5.64	5.90	16.00	1.667E-002	4.295E-003
Th-227	6.07	5.93	6.18	3.00	3.125E-003	2.083E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:41:19PM 5/15/2014

Sample

Sample Name: ICB;AV45
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

Analyst: 60040

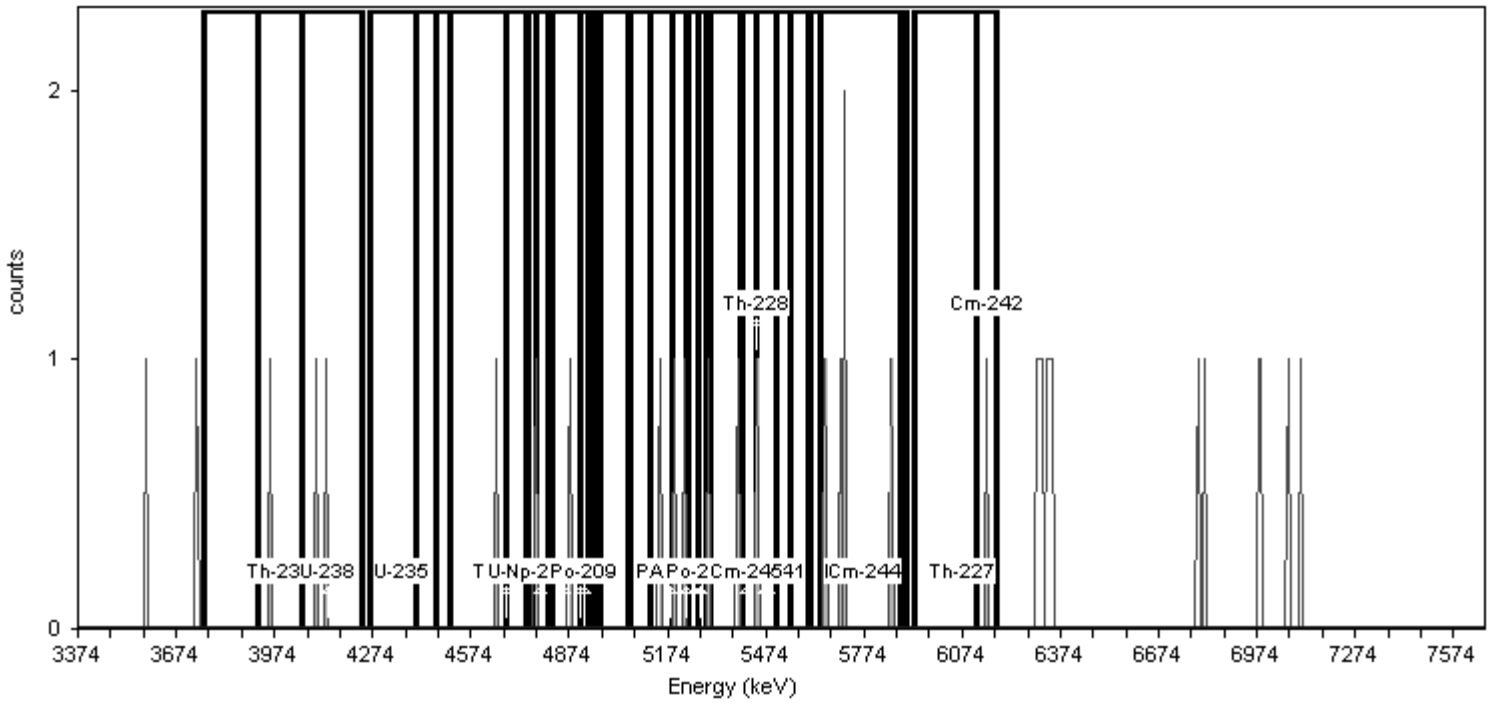
Acquisition

Detector: AV45 , SN: 48-158FF2
Acquisition Start Date: 5/15/2014 1:18:21AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9817;AV45-20140505
Calibration Date: 5/5/2014 10:10:03PM

Energy Calibration Equation:

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

Efficiency: 26.06% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 32.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	5.00	5.208E-003	2.552E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	3.00	3.125E-003	2.083E-003
Am-241	5.48	5.30	5.60	3.00	3.125E-003	2.083E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	5.00	5.208E-003	2.552E-003
Cm-244	5.78	5.64	5.90	5.00	5.208E-003	2.552E-003
Th-227	6.07	5.93	6.18	1.00	1.042E-003	1.473E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:41:25PM 5/15/2014

Sample

Sample Name: ICB;AV46
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

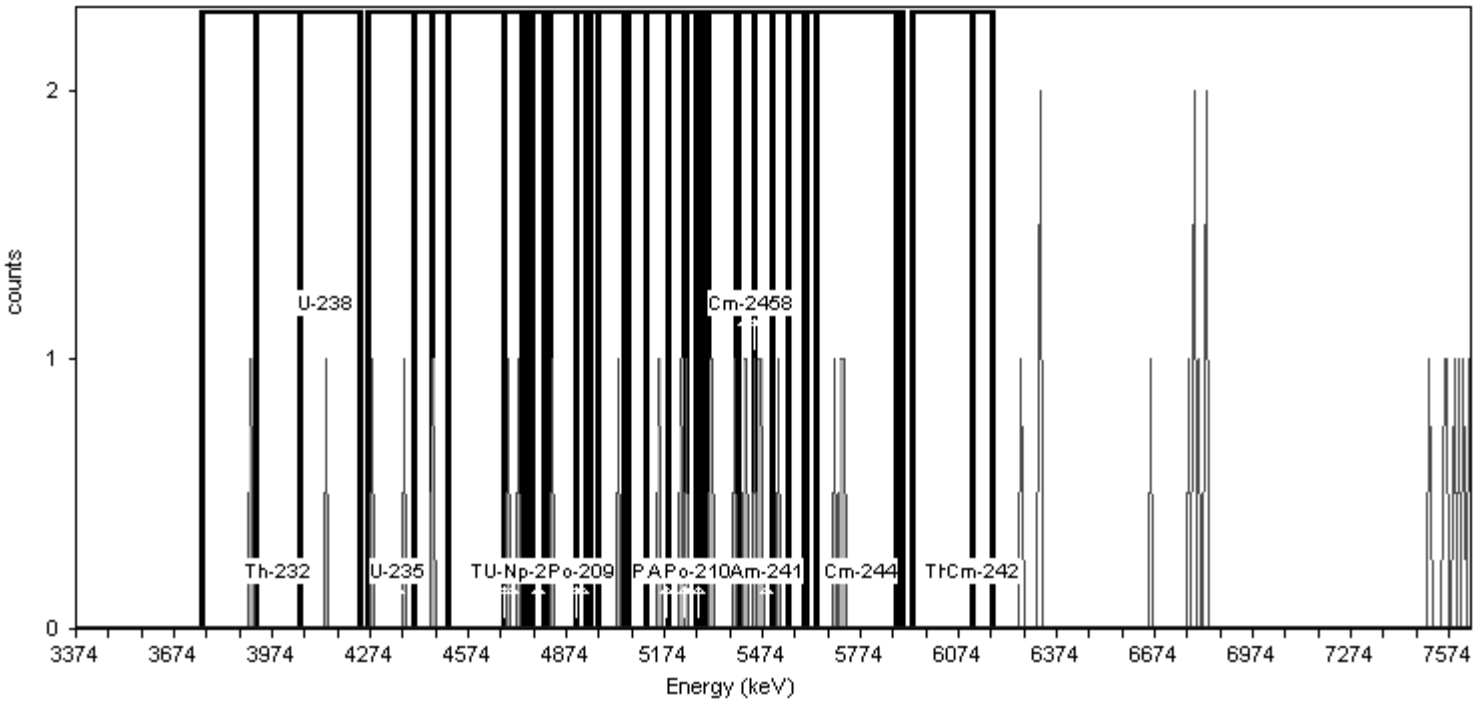
Analyst: 60040

Acquisition

Detector: AV46 , SN: 49-202GG2
Acquisition Start Date: 5/15/2014 1:18:22AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9884;AV46-20140505
Calibration Date: 5/5/2014 10:10:09PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.80% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 42.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	9.00	9.375E-003	3.294E-003
Am-241	5.48	5.30	5.60	9.00	9.375E-003	3.294E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	3.00	3.125E-003	2.083E-003
Cm-244	5.78	5.64	5.90	3.00	3.125E-003	2.083E-003
Th-227	6.07	5.93	6.18	0.00	0.000E+000	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:41:36PM 5/15/2014

Sample

Sample Name: ICB;AV48
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

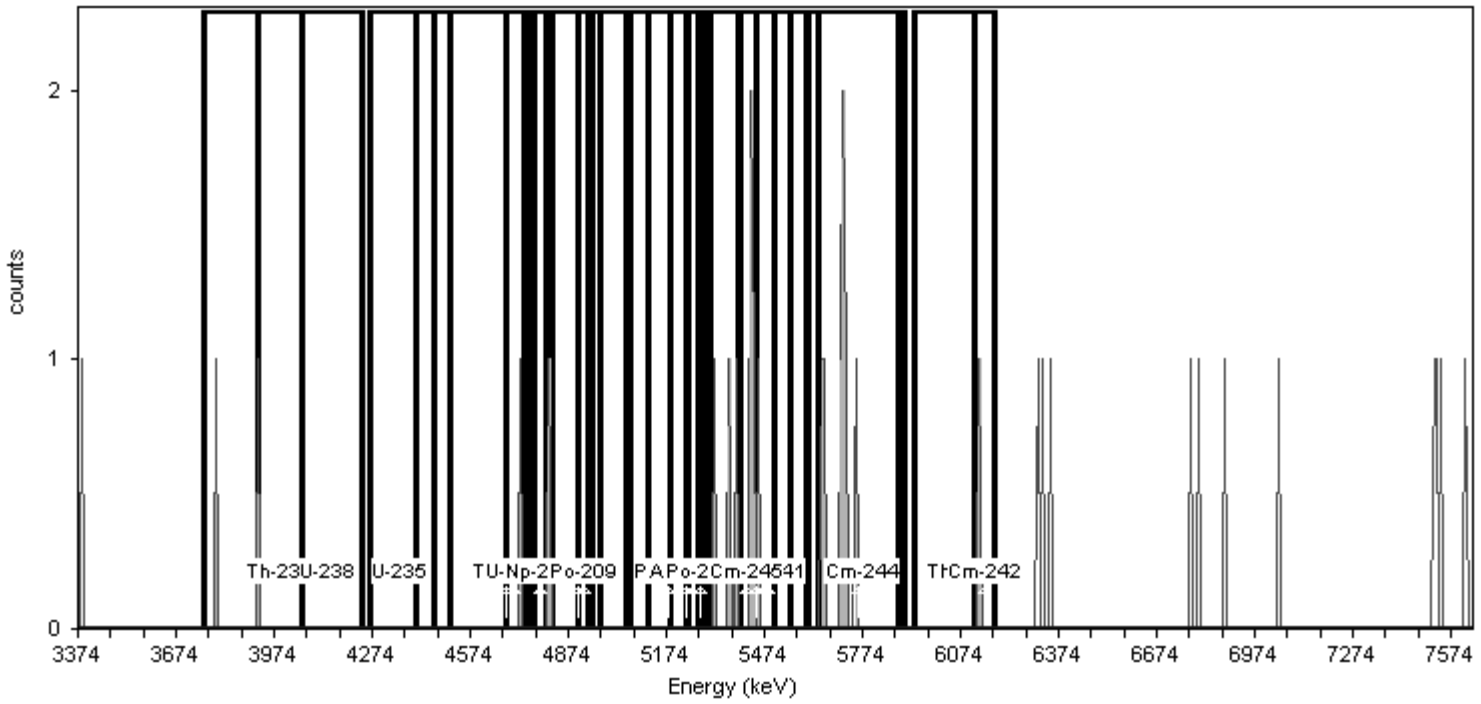
Analyst: 60040

Acquisition

Detector: AV48 , SN: 50-051JJ4
Acquisition Start Date: 5/15/2014 1:18:23AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9886;AV48-20140505
Calibration Date: 5/5/2014 10:10:22PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.78% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 31.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	0.00	0.000E+000	1.473E-003
U-232	5.25	5.06	5.40	3.00	3.125E-003	2.083E-003
Th-228	5.45	5.19	5.51	7.00	7.292E-003	2.946E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	7.00	7.292E-003	2.946E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	7.00	7.292E-003	2.946E-003
Cm-244	5.78	5.64	5.90	7.00	7.292E-003	2.946E-003
Th-227	6.07	5.93	6.18	1.00	1.042E-003	1.473E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:42:22PM 5/15/2014

Sample

Sample Name: ICB;AV57
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

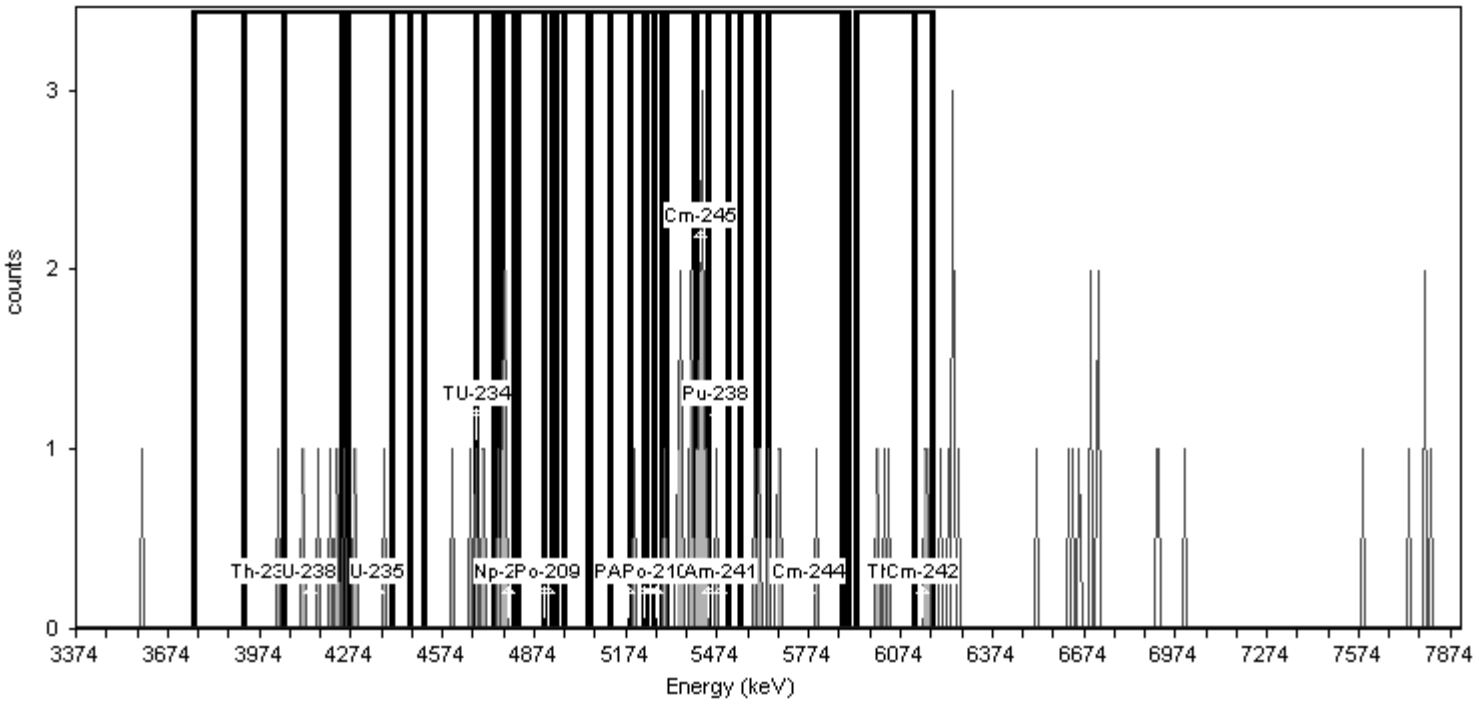
Analyst: 60040

Acquisition

Detector: AV57 , SN: 48-158EE3
Acquisition Start Date: 5/15/2014 1:18:35AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9793;AV57-20140504
Calibration Date: 5/5/2014 6:53:40PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.74% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 70.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	5.00	5.208E-003	2.552E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	9.00	9.375E-003	3.294E-003
Pu-242	4.90	4.68	4.95	7.00	7.292E-003	2.946E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	3.00	3.125E-003	2.083E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	9.00	9.375E-003	3.294E-003
Th-228	5.45	5.19	5.51	18.00	1.875E-002	4.541E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	17.00	1.771E-002	4.419E-003
Am-241	5.48	5.30	5.60	18.00	1.875E-002	4.541E-003
Cm-245	5.42	5.40	5.45	9.00	9.375E-003	3.294E-003
Pu-236	5.76	5.61	5.89	5.00	5.208E-003	2.552E-003
Cm-244	5.78	5.64	5.90	4.00	4.167E-003	2.329E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:42:33PM 5/15/2014

Sample

Sample Name: ICB;AV58
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

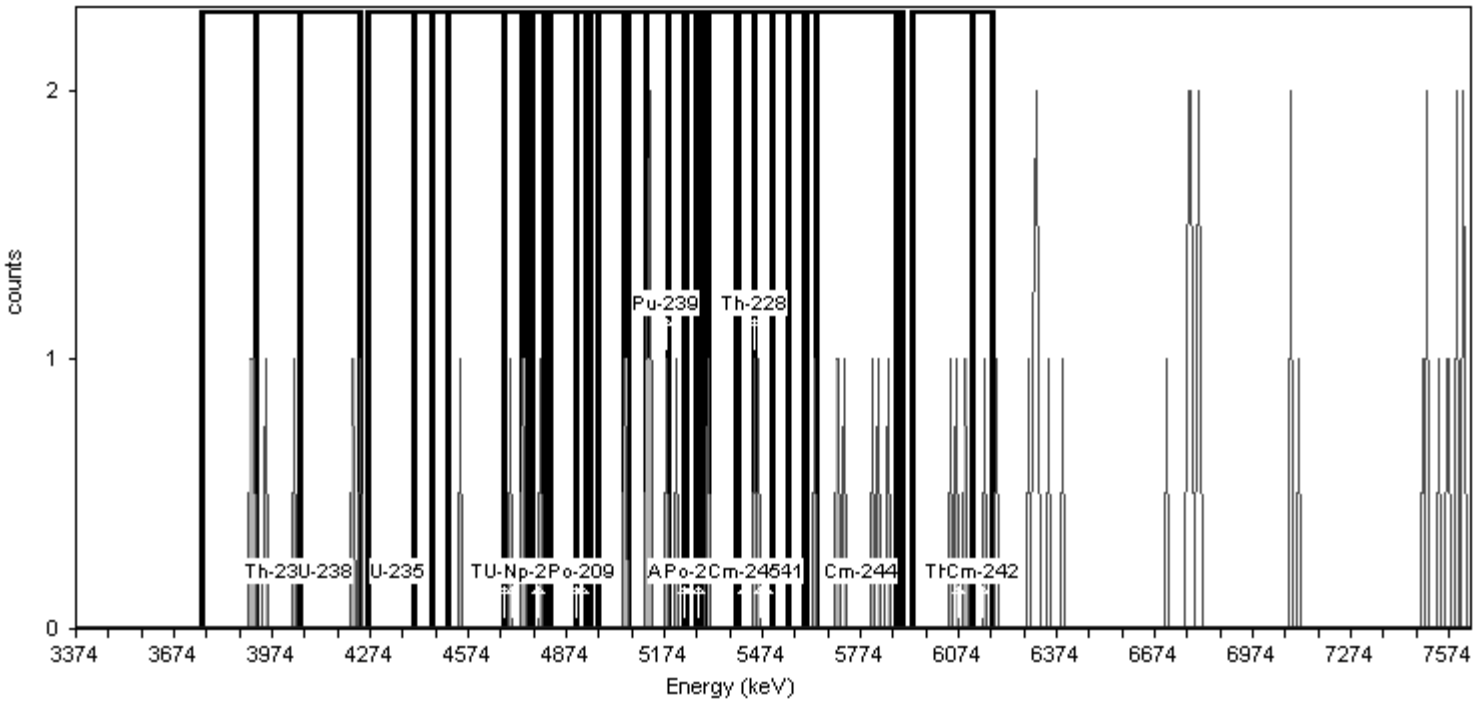
Analyst: 60040

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 5/15/2014 1:18:36AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9794;AV58-20140504
Calibration Date: 5/5/2014 6:53:46PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.56% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 61.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	4.00	4.167E-003	2.329E-003
U-238	4.14	3.92	4.24	4.00	4.167E-003	2.329E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	6.00	6.250E-003	2.756E-003
Am-243	5.23	5.05	5.31	7.00	7.292E-003	2.946E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	4.00	4.167E-003	2.329E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	3.00	3.125E-003	2.083E-003
Am-241	5.48	5.30	5.60	3.00	3.125E-003	2.083E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	7.00	7.292E-003	2.946E-003
Cm-244	5.78	5.64	5.90	6.00	6.250E-003	2.756E-003
Th-227	6.07	5.93	6.18	4.00	4.167E-003	2.329E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:42:40PM 5/15/2014

Sample

Sample Name: ICB;AV59
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

Analyst: 60040

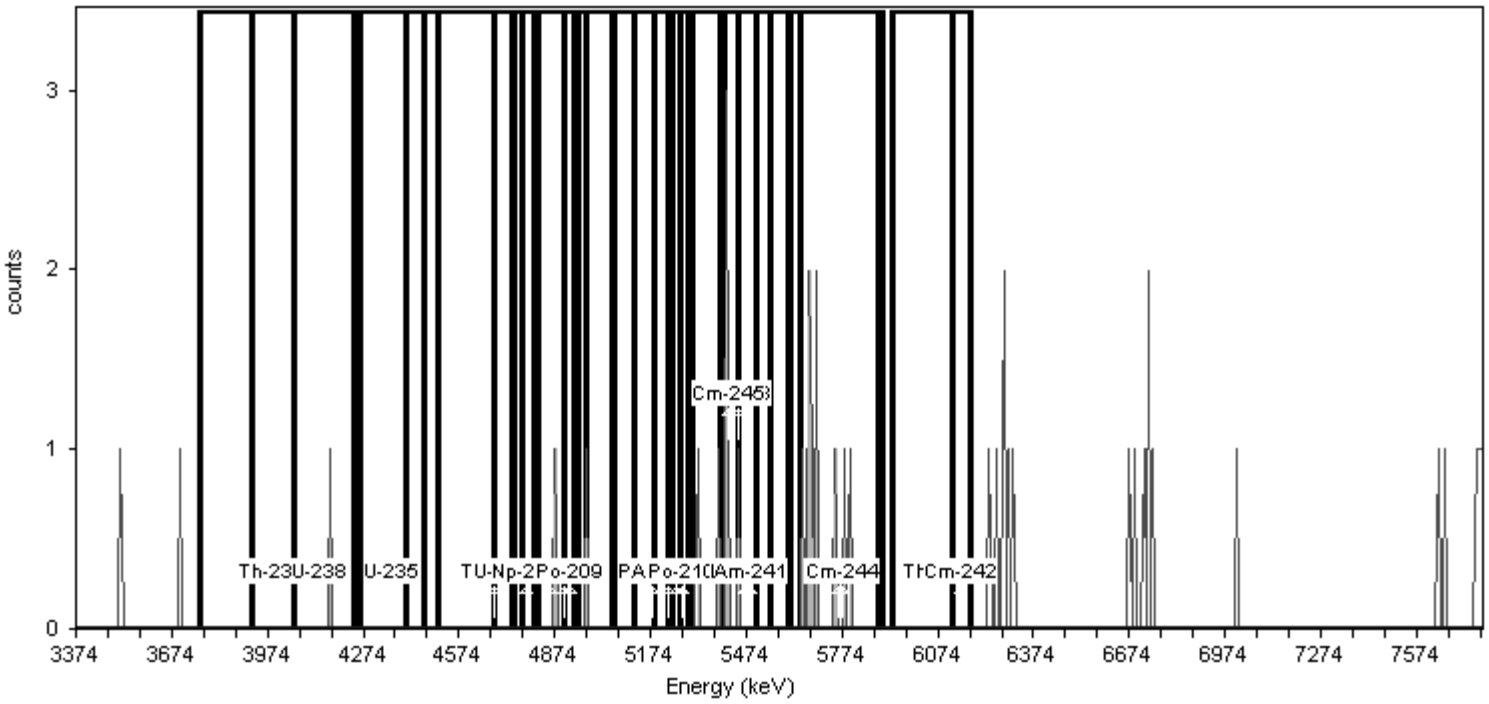
Acquisition

Detector: AV59 , SN: 49-155M7
Acquisition Start Date: 5/15/2014 1:18:38AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9795;AV59-20140504
Calibration Date: 5/5/2014 6:53:53PM

Energy Calibration Equation:

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

Efficiency: 27.44% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 39.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	0.00	0.000E+000	1.473E-003
U-234	4.71	4.51	4.82	0.00	0.000E+000	1.473E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	0.00	0.000E+000	1.473E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	7.00	7.292E-003	2.946E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	7.00	7.292E-003	2.946E-003
Cm-245	5.42	5.40	5.45	5.00	5.208E-003	2.552E-003
Pu-236	5.76	5.61	5.89	9.00	9.375E-003	3.294E-003
Cm-244	5.78	5.64	5.90	9.00	9.375E-003	3.294E-003
Th-227	6.07	5.93	6.18	0.00	0.000E+000	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:42:46PM 5/15/2014

Sample

Sample Name: ICB;AV60
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

Analyst: 60040

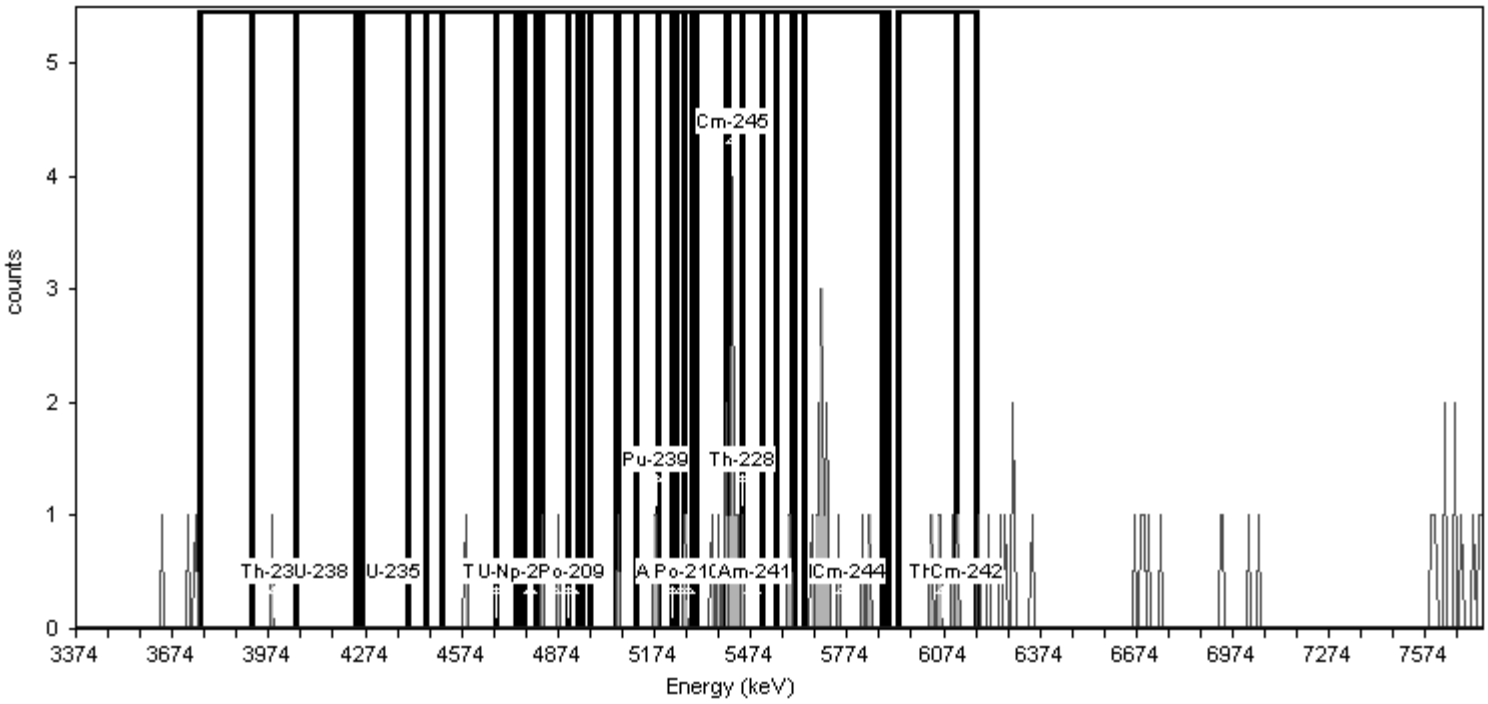
Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 5/15/2014 1:18:40AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9817;AV60-20140504
Calibration Date: 5/5/2014 6:53:59PM

Energy Calibration Equation:

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

Efficiency: 26.33% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 71.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	8.00	8.333E-003	3.125E-003
Th-228	5.45	5.19	5.51	13.00	1.354E-002	3.898E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	14.00	1.458E-002	4.034E-003
Cm-245	5.42	5.40	5.45	10.00	1.042E-002	3.455E-003
Pu-236	5.76	5.61	5.89	13.00	1.354E-002	3.898E-003
Cm-244	5.78	5.64	5.90	13.00	1.354E-002	3.898E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:42:51PM 5/15/2014

Sample

Sample Name: ICB;AV61
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

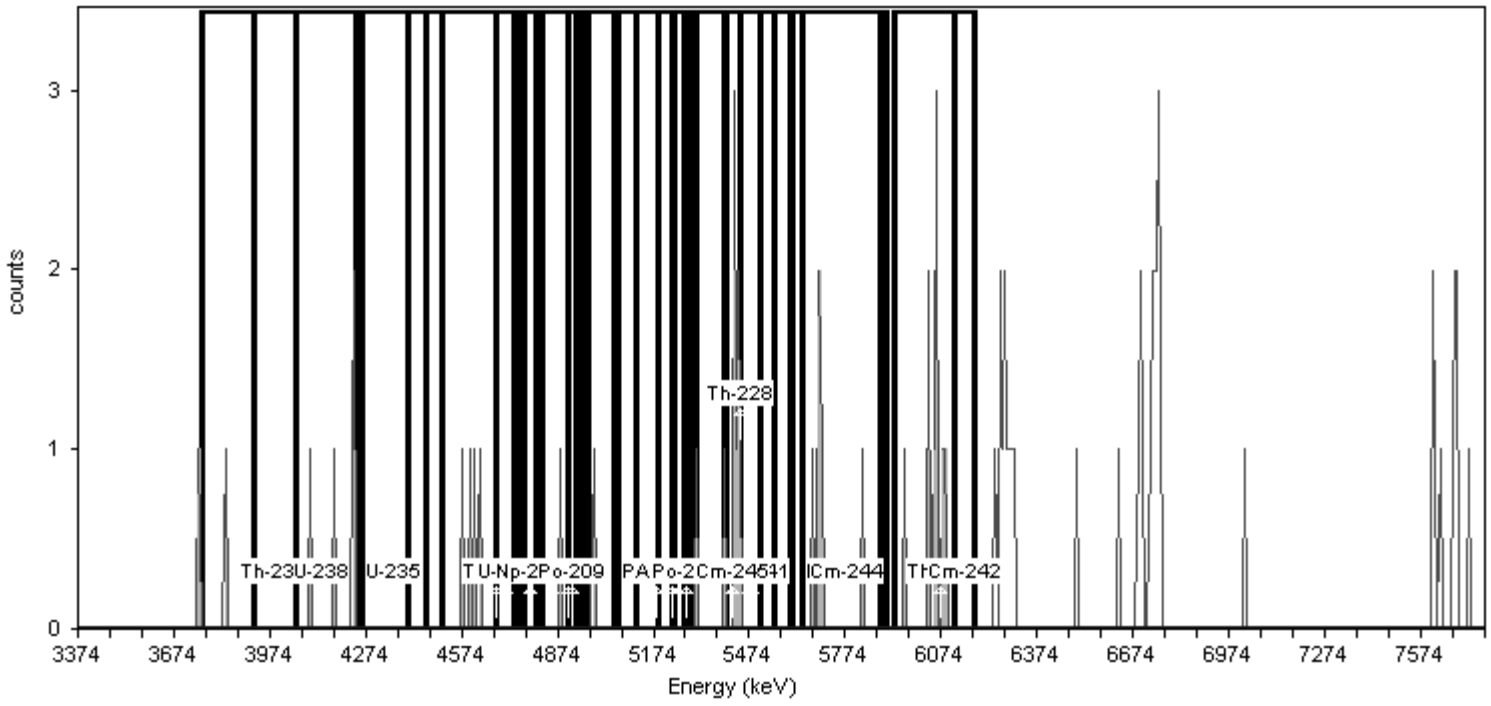
Analyst: 60040

Acquisition

Detector: AV61 , SN: 5-051JJ3
Acquisition Start Date: 5/15/2014 1:18:42AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9884;AV61-20140504
Calibration Date: 5/5/2014 6:54:06PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.46% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 71.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	4.00	4.167E-003	2.329E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	9.00	9.375E-003	3.294E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	9.00	9.375E-003	3.294E-003
Am-241	5.48	5.30	5.60	9.00	9.375E-003	3.294E-003
Cm-245	5.42	5.40	5.45	8.00	8.333E-003	3.125E-003
Pu-236	5.76	5.61	5.89	5.00	5.208E-003	2.552E-003
Cm-244	5.78	5.64	5.90	5.00	5.208E-003	2.552E-003
Th-227	6.07	5.93	6.18	9.00	9.375E-003	3.294E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:42:57PM 5/15/2014

Sample

Sample Name: ICB;AV62
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

Analyst: 60040

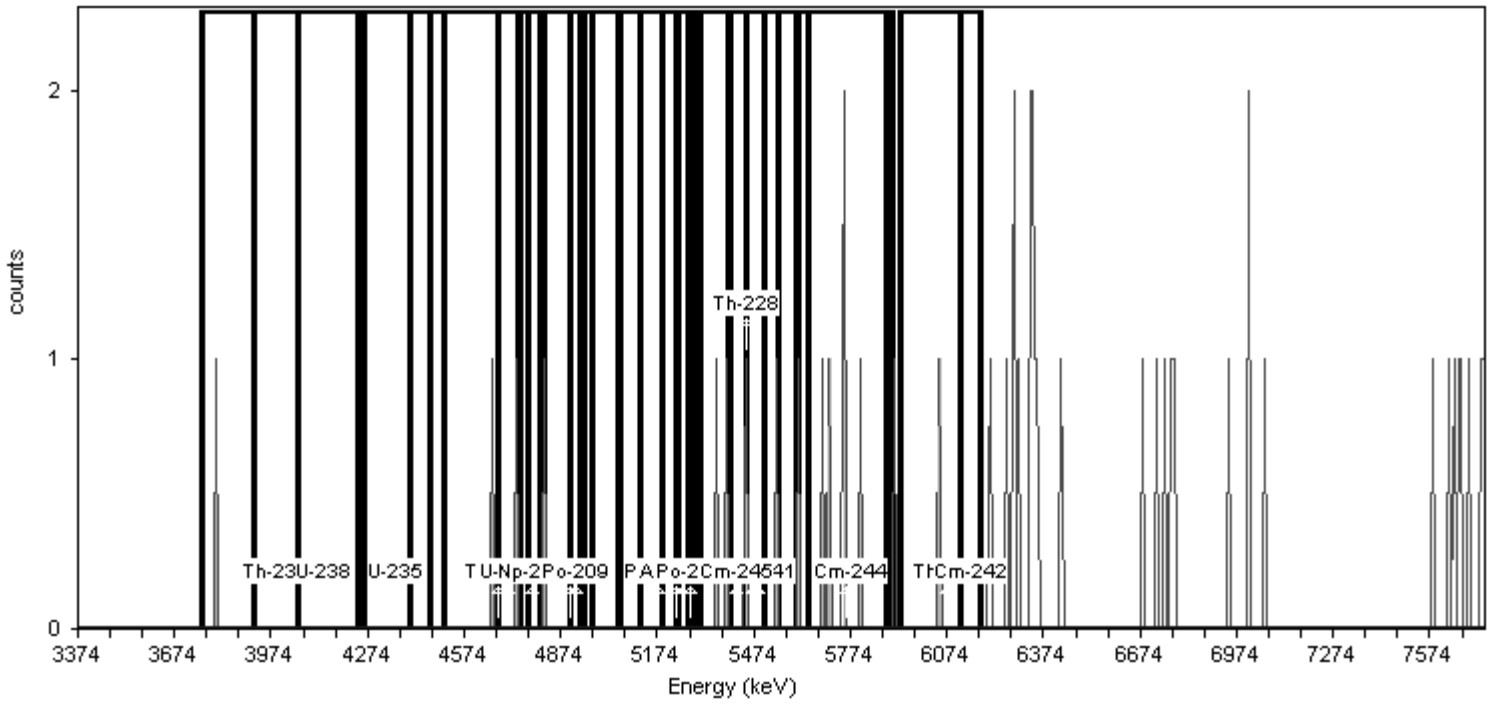
Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 5/15/2014 1:18:43AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9885;AV62-20140504
Calibration Date: 5/5/2014 6:54:13PM

Energy Calibration Equation:

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

Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 45.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	0.00	0.000E+000	1.473E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	3.00	3.125E-003	2.083E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	4.00	4.167E-003	2.329E-003
Am-241	5.48	5.30	5.60	4.00	4.167E-003	2.329E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	6.00	6.250E-003	2.756E-003
Cm-244	5.78	5.64	5.90	5.00	5.208E-003	2.552E-003
Th-227	6.07	5.93	6.18	1.00	1.042E-003	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:33:03PM 5/15/2014

Sample

Sample Name: ICB;AV78
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

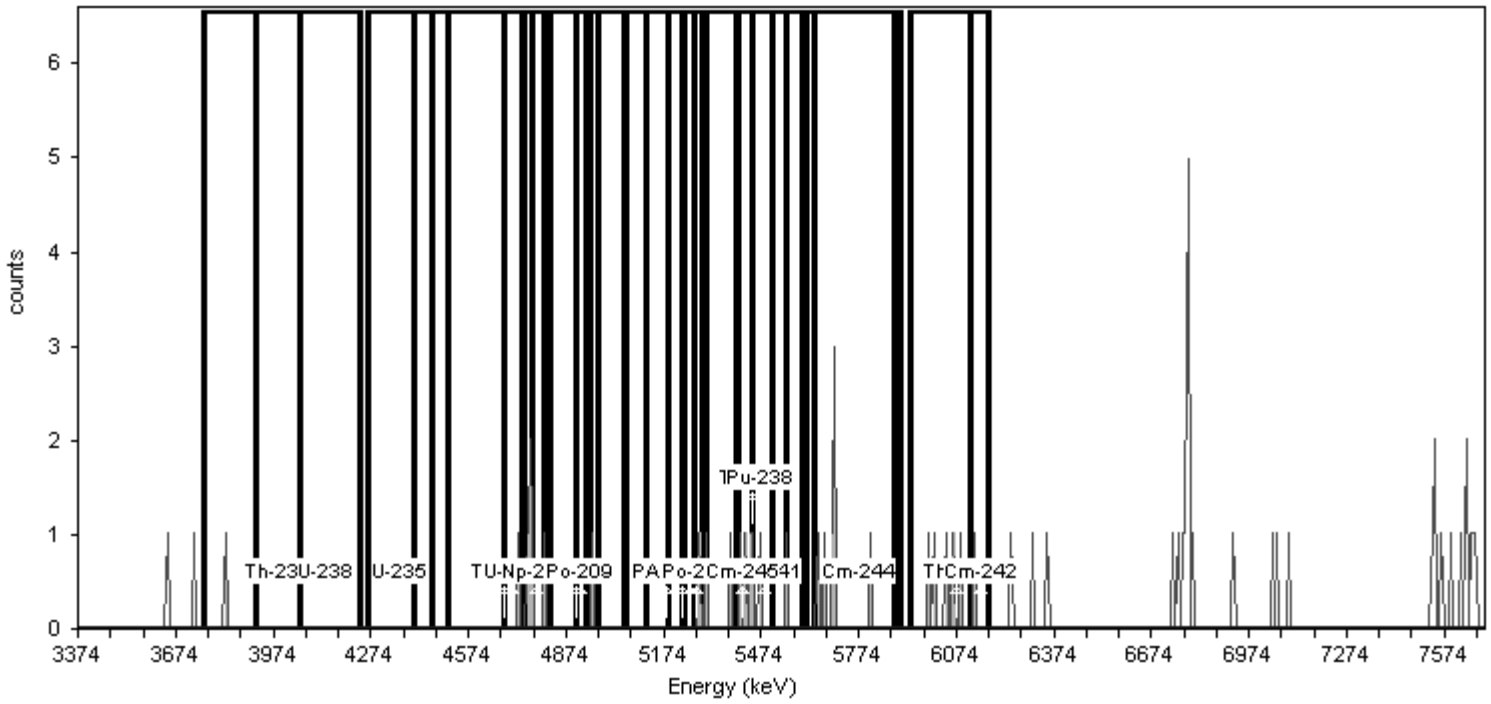
Analyst: 60040

Acquisition

Detector: AV78 , SN: 46-033FF4
Acquisition Start Date: 5/15/2014 1:19:14AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9886;AV78-20140504
Calibration Date: 5/4/2014 8:45:34PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.71% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 60.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	6.00	6.250E-003	2.756E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	6.00	6.250E-003	2.756E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	3.00	3.125E-003	2.083E-003
Th-228	5.45	5.19	5.51	8.00	8.333E-003	3.125E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	9.00	9.375E-003	3.294E-003
Am-241	5.48	5.30	5.60	8.00	8.333E-003	3.125E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	7.00	7.292E-003	2.946E-003
Cm-244	5.78	5.64	5.90	7.00	7.292E-003	2.946E-003
Th-227	6.07	5.93	6.18	6.00	6.250E-003	2.756E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:33:09PM 5/15/2014

Sample

Sample Name: ICB;AV79
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

Analyst: 60040

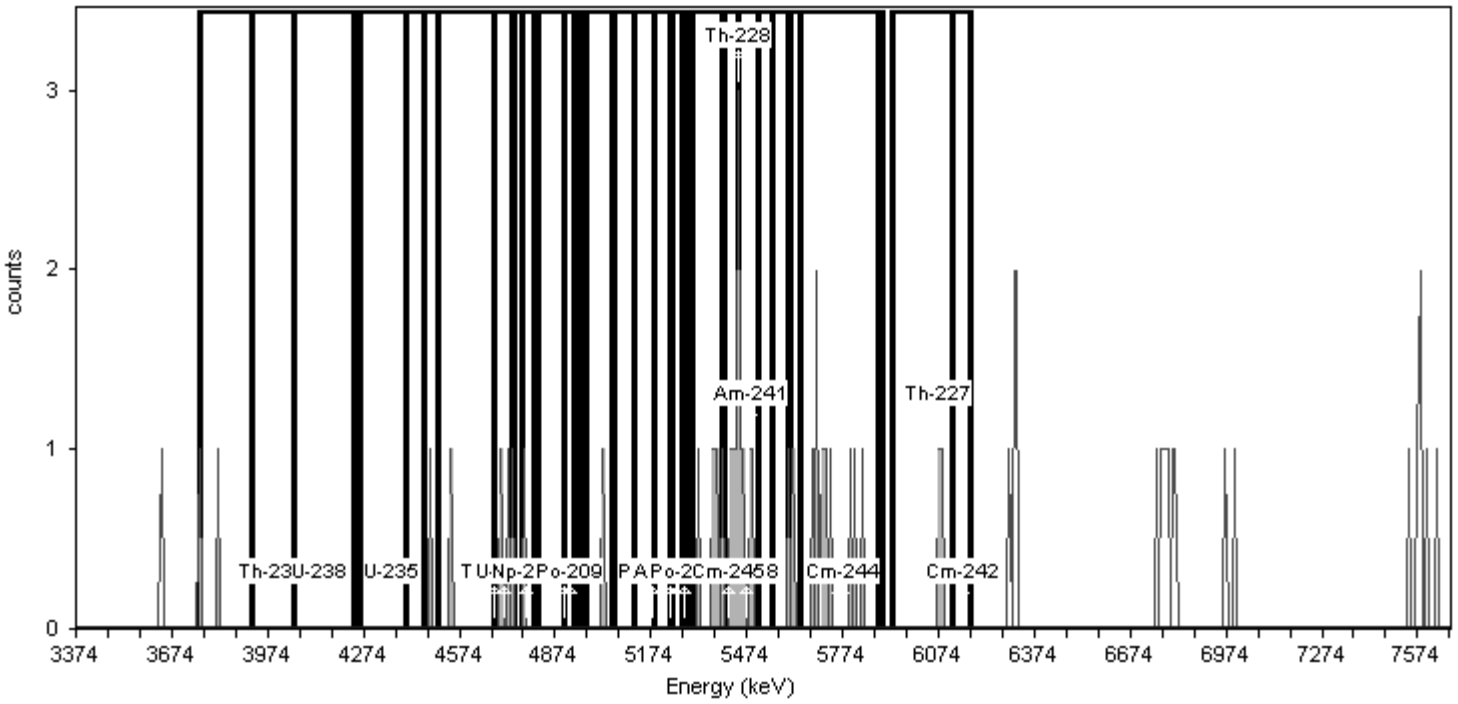
Acquisition

Detector: AV79 , SN: 46-033Q5
Acquisition Start Date: 5/15/2014 1:19:16AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV79-20140501
Calibration Date: 5/4/2014 5:31:27PM

Energy Calibration Equation:

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

Efficiency: 27.05% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 60.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	0.00	0.000E+000	1.473E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	15.00	1.563E-002	4.167E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	15.00	1.563E-002	4.167E-003
Am-241	5.48	5.30	5.60	16.00	1.667E-002	4.295E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	11.00	1.146E-002	3.608E-003
Cm-244	5.78	5.64	5.90	10.00	1.042E-002	3.455E-003
Th-227	6.07	5.93	6.18	3.00	3.125E-003	2.083E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:21:15PM 5/15/2014

Sample

Sample Name: ICB;AV82
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: May2014
Description:

Analyst: 60040

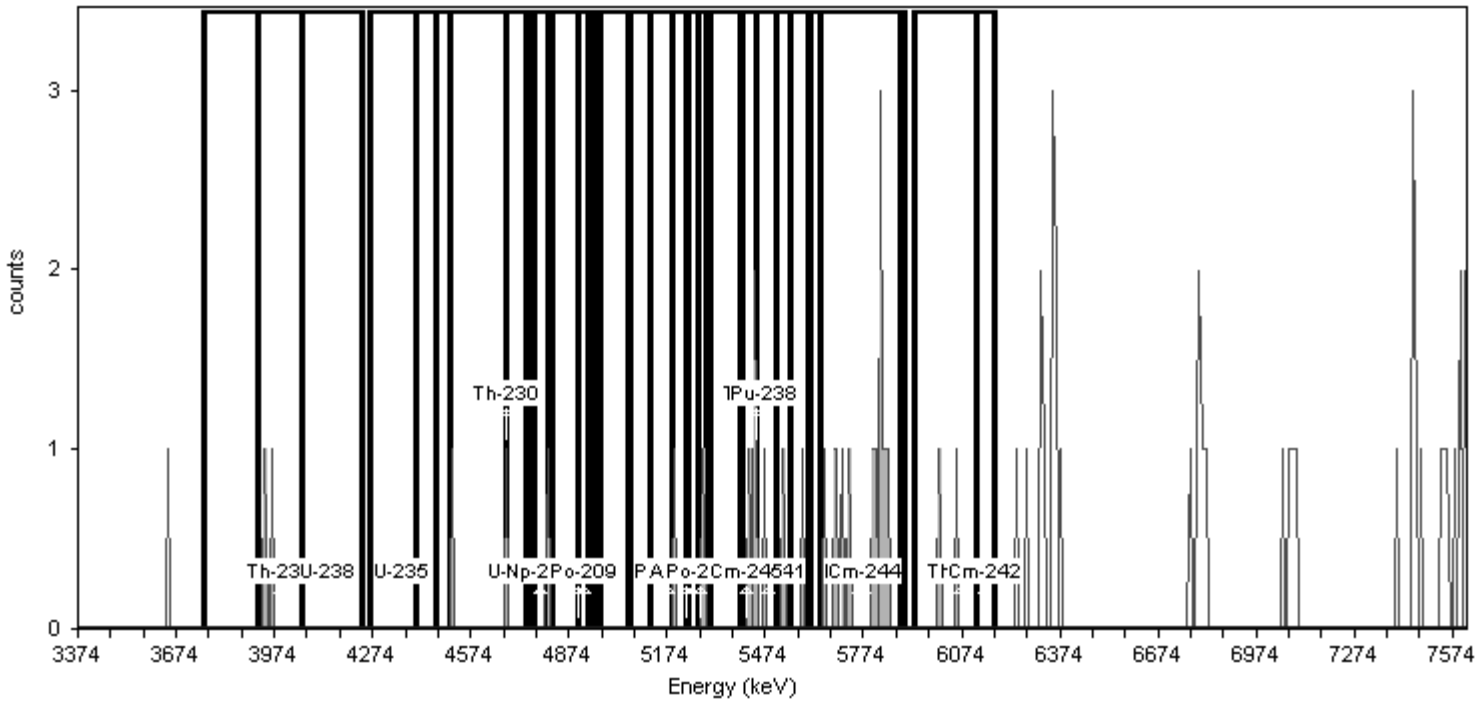
Acquisition

Detector: AV82 , SN: 46-032EE5
Acquisition Start Date: 5/15/2014 1:19:21AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8876;AV82-20140501
Calibration Date: 5/4/2014 5:31:49PM

Energy Calibration Equation:

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

Efficiency: 25.76% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 68.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	7.00	7.292E-003	2.946E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	7.00	7.292E-003	2.946E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	13.00	1.354E-002	3.898E-003
Cm-244	5.78	5.64	5.90	13.00	1.354E-002	3.898E-003
Th-227	6.07	5.93	6.18	2.00	2.083E-003	1.804E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

Run Logs

Alpha Spectroscopy Run Log

Detector: AV1

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:25	140	IC 160-120511/1		120511			PS
05/07/14 23:01	60	ICV 160-120846/1		120846			PS
05/15/14 01:20	960	ICB 160-122292/1		122292			PS
05/18/14 19:19	60	CCV 160-122944/1		122944			PS
05/28/14 09:33	1	PULSER 160-124262/1		124262			MLK
05/28/14 15:45	180	MB 160-123278/1-A		124262	123278	A-01-R	MLK

Detector: AV11

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120513/1		120513			PS
05/07/14 23:04	60	ICV 160-120848/1		120848			PS
05/15/14 01:18	960	ICB 160-122304/1		122304			PS
05/19/14 17:57	60	CCV 160-122963/1		122963			PS
05/23/14 08:54	1	PULSER 160-123762/1		123762			MLK
05/23/14 18:57	180	LCS 160-123278/2-A		123762	123278	A-01-R	MLK

Detector: AV13

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120515/1		120515			PS
05/07/14 23:04	60	ICV 160-120850/1		120850			PS
05/15/14 01:17	960	ICB 160-122325/1		122325			PS
05/18/14 20:51	60	CCV 160-122946/1		122946			PS
05/23/14 08:54	1	PULSER 160-123782/1		123782			MLK
05/23/14 18:57	180	ZZZZZ		123782			

Detector: AV15

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120517/1		120517			PS
05/07/14 23:04	60	ICV 160-120852/1		120852			PS
05/15/14 01:17	960	ICB 160-122336/1		122336			PS
05/18/14 19:22	60	CCV 160-122950/1		122950			PS
05/23/14 08:54	1	PULSER 160-123793/1		123793			MLK
05/23/14 18:57	180	160-6694-1	2222-SD01	123793	123278	A-01-R	MLK

Detector: AV16

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:27	140	IC 160-120398/1		120398			PS
05/08/14 00:14	60	ICV 160-121072/1		121072			PS
05/15/14 01:17	960	ICB 160-122337/1		122337			PS
05/18/14 20:51	60	CCV 160-122951/1		122951			PS
05/23/14 08:54	1	PULSER 160-123794/1		123794			MLK
05/23/14 18:57	180	160-6694-2	2222-SD02	123794	123278	A-01-R	MLK

Detector: AV17

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120399/1		120399			PS
05/08/14 00:14	60	ICV 160-121073/1		121073			PS

Alpha Spectroscopy Run Log

Detector: AV17 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/14 01:17	960	ICB 160-122338/1		122338			PS
05/18/14 19:22	60	CCV 160-122952/1		122952			PS
05/23/14 08:54	1	PULSER 160-123795/1		123795			MLK
05/23/14 18:57	180	160-6694-3	2222-SD03	123795	123278	A-01-R	MLK

Detector: AV18

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120400/1		120400			PS
05/08/14 00:14	60	ICV 160-121074/1		121074			PS
05/15/14 01:18	960	ICB 160-122339/1		122339			PS
05/18/14 20:51	60	CCV 160-122953/1		122953			PS
05/23/14 08:55	1	PULSER 160-123796/1		123796			MLK
05/23/14 18:57	180	160-6694-4	2222-SD04	123796	123278	A-01-R	MLK

Detector: AV19

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120401/1		120401			PS
05/08/14 14:33	60	ICV 160-121361/1		121361			PS
05/15/14 01:18	960	ICB 160-122340/1		122340			PS
05/19/14 17:58	60	CCV 160-122965/1		122965			PS
05/23/14 08:55	1	PULSER 160-123797/1		123797			MLK
05/23/14 18:57	180	160-6694-5	2222-SD05	123797	123278	A-01-R	MLK

Detector: AV20

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120402/1		120402			PS
05/07/14 23:05	60	ICV 160-120854/1		120854			PS
05/15/14 01:18	960	ICB 160-122342/1		122342			PS
05/18/14 20:52	60	CCV 160-122954/1		122954			PS
05/23/14 08:55	1	PULSER 160-123798/1		123798			MLK
05/23/14 18:57	180	160-6694-6	2222-SD06	123798	123278	A-01-R	MLK

Detector: AV43

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:30	140	IC 160-120406/1		120406			PS
05/08/14 00:16	60	ICV 160-121077/1		121077			PS
05/15/14 01:18	960	ICB 160-122348/1		122348			PS
05/15/14 19:01	60	CCV 160-122515/1		122515			PS
05/21/14 16:01	1	PULSER 160-123332/1		123332			RTM
05/21/14 19:04	180	MB 160-123197/1-A		123332	123197	A-01-R	RTM

Detector: AV44

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:30	140	IC 160-120407/1		120407			PS
05/08/14 00:17	60	ICV 160-121078/1		121078			PS
05/15/14 01:18	960	ICB 160-122349/1		122349			PS
05/15/14 19:01	60	CCV 160-122516/1		122516			PS

Alpha Spectroscopy Run Log

Detector: AV44 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/21/14 16:01	1	PULSER 160-123333/1		123333			RTM
05/21/14 19:04	180	LCS 160-123197/2-A		123333	123197	A-01-R	RTM

Detector: AV45

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:30	140	IC 160-120408/1		120408			PS
05/08/14 14:32	60	ICV 160-121363/1		121363			PS
05/15/14 01:18	960	ICB 160-122350/1		122350			PS
05/15/14 19:02	60	CCV 160-122517/1		122517			PS
05/23/14 08:55	1	PULSER 160-123806/1		123806			RTM
05/23/14 19:02	180	MB 160-123276/1-A		123806	123276	A-01-R	RTM

Detector: AV46

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:30	140	IC 160-120409/1		120409			PS
05/08/14 00:18	60	ICV 160-121079/1		121079			PS
05/15/14 01:18	960	ICB 160-122351/1		122351			PS
05/15/14 19:02	60	CCV 160-122518/1		122518			PS
05/23/14 08:55	1	PULSER 160-123807/1		123807			RTM
05/23/14 19:02	180	LCS 160-123276/2-A		123807	123276	A-01-R	RTM

Detector: AV48

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:32	140	IC 160-120411/1		120411			PS
05/08/14 00:18	60	ICV 160-121081/1		121081			PS
05/15/14 01:18	960	ICB 160-122353/1		122353			PS
05/15/14 19:03	60	CCV 160-122520/1		122520			PS
05/21/14 16:02	1	PULSER 160-123337/1		123337			RTM
05/21/14 19:04	180	160-6694-7	2222-RIN-01	123337	123197	A-01-R	RTM
05/23/14 08:55	1	PULSER 160-123809/1		123809			RTM
05/23/14 19:02	180	ZZZZZ		123809			

Detector: AV55

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:51	140	IC 160-120842/1		120842			PS
05/08/14 00:19	60	ICV 160-121083/1		121083			PS
05/15/14 01:18	960	ICB 160-122360/1		122360			PS
05/15/14 20:43	60	CCV 160-122529/1		122529			PS
05/21/14 16:01	1	PULSER 160-123339/1		123339			RTM
05/21/14 19:04	180	ZZZZZ		123339			

Detector: AV57

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:05	140	IC 160-120279/1		120279			PS
05/08/14 14:35	60	ICV 160-121370/1		121370			PS
05/15/14 01:18	960	ICB 160-122362/1		122362			PS
05/15/14 19:05	60	CCV 160-122526/1		122526			PS

Alpha Spectroscopy Run Log

Detector: AV57 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/23/14 08:55	1	PULSER 160-123811/1		123811			RTM
05/23/14 19:02	180	160-6694-1	2222-SD01	123811	123276	A-01-R	RTM

Detector: AV58

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:05	140	IC 160-120280/1		120280			PS
05/08/14 14:35	60	ICV 160-121371/1		121371			PS
05/15/14 01:18	960	ICB 160-122363/1		122363			PS
05/15/14 20:43	60	CCV 160-122530/1		122530			PS
05/23/14 08:55	1	PULSER 160-123812/1		123812			RTM
05/23/14 19:02	180	160-6694-2	2222-SD02	123812	123276	A-01-R	RTM

Detector: AV59

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:05	140	IC 160-120281/1		120281			PS
05/08/14 14:36	60	ICV 160-121372/1		121372			PS
05/15/14 01:18	960	ICB 160-122364/1		122364			PS
05/15/14 20:44	60	CCV 160-122531/1		122531			PS
05/23/14 08:55	1	PULSER 160-123813/1		123813			RTM
05/23/14 19:02	180	160-6694-3	2222-SD03	123813	123276	A-01-R	RTM

Detector: AV60

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120282/1		120282			PS
05/08/14 17:21	60	ICV 160-121373/1		121373			PS
05/15/14 01:18	960	ICB 160-122366/1		122366			PS
05/15/14 20:44	60	CCV 160-122532/1		122532			PS
05/23/14 08:55	1	PULSER 160-123815/1		123815			RTM
05/23/14 19:02	180	160-6694-4	2222-SD04	123815	123276	A-01-R	RTM

Detector: AV61

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120283/1		120283			PS
05/08/14 14:36	60	ICV 160-121374/1		121374			PS
05/15/14 01:18	960	ICB 160-122367/1		122367			PS
05/15/14 20:44	60	CCV 160-122533/1		122533			PS
05/23/14 08:55	1	PULSER 160-123816/1		123816			RTM
05/23/14 19:02	180	160-6694-5	2222-SD05	123816	123276	A-01-R	RTM

Detector: AV62

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120284/1		120284			PS
05/08/14 14:36	60	ICV 160-121375/1		121375			PS
05/15/14 01:18	960	ICB 160-122368/1		122368			PS
05/15/14 20:44	60	CCV 160-122534/1		122534			PS
05/23/14 08:55	1	PULSER 160-123817/1		123817			RTM
05/23/14 19:02	180	160-6694-6	2222-SD06	123817	123276	A-01-R	RTM

Alpha Spectroscopy Run Log

Detector: AV78

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:51	140	IC 160-120055/1		120055			PS
05/08/14 17:20	60	ICV 160-121385/1		121385			PS
05/15/14 01:19	960	ICB 160-122385/1		122385			PS
05/15/14 21:58	60	CCV 160-122550/1		122550			PS
05/21/14 16:01	1	PULSER 160-123362/1		123362			RTM
05/21/14 17:20	180	MB 160-123200/1-A		123362	123200	A-01-R	RTM

Detector: AV79

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 19:15	140	IC 160-119923/1		119923			PS
05/11/14 20:47	60	ICV 160-121432/1		121432			PS
05/15/14 01:19	960	ICB 160-122386/1		122386			PS
05/15/14 23:08	60	CCV 160-122647/1		122647			PS
05/21/14 16:01	1	PULSER 160-123363/1		123363			RTM
05/21/14 17:20	180	LCS 160-123200/2-A		123363	123200	A-01-R	RTM

Detector: AV82

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 19:15	140	IC 160-119926/1		119926			PS
05/11/14 20:48	60	ICV 160-121434/1		121434			PS
05/15/14 01:19	960	ICB 160-122390/1		122390			PS
05/16/14 15:28	60	CCV 160-122665/1		122665			PS
05/21/14 16:02	1	PULSER 160-123366/1		123366			RTM
05/21/14 17:20	180	160-6694-7	2222-RIN-01	123366	123200	A-01-R	RTM

Detector: AV84

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 19:16	140	IC 160-119928/1		119928			PS
05/11/14 19:34	60	ICV 160-121396/1		121396			PS
05/15/14 01:19	960	ICB 160-122392/1		122392			PS
05/15/14 23:08	60	CCV 160-122648/1		122648			PS
05/21/14 16:02	1	PULSER 160-123368/1		123368			RTM
05/21/14 17:20	180	ZZZZZ		123368			

GAMMA SPECTROSCOPY

Method GA-01-R
Cs-137

Cesium-137 & Other Gamma Emitters (GS) by Method GA-01-R

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122895 Batch Start Date: 05/19/14 12:24 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-0 Batch End Date: 05/19/14 13:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	GrossWeight	Geometry	1L Marn 00008		
MB 160-122895/1		Fill_Geo-0, GA-01-R		1000 mL	1000 mL	1L Marn			
LCS 160-122895/2		Fill_Geo-0, GA-01-R		1000 mL	1000 mL	1L Marn	# mL		
160-6694-A-7	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			
160-6694-A-7 DU	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			

Batch Notes	
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.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122895 Batch Start Date: 05/19/14 12:24 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-0 Batch End Date: 05/19/14 13:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	GrossWeight	Geometry	1L Marn 00008		
MB 160-122895/1		Fill_Geo-0, GA-01-R		1000 mL	1000 mL	1L Marn			
LCS 160-122895/2		Fill_Geo-0, GA-01-R		1000 mL	1000 mL	1L Marn	# mL		
160-6694-A-7	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			
160-6694-A-7 DU	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			

Batch Notes	
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.

Prep Batch: 122895

Fill Geometry, No In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 122895

Lab ID: MB 160-122895/1-A | Analyzed: 05/20/14 15:18 | Ts: 60 | Sigma: 2
Client ID: | Detector: GV7 | Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Cesium-137	1.139	6.53	6.53	U	pCi/L	20.0	12.3	123127

Lab ID: LCS 160-122895/2-A | Analyzed: 05/20/14 15:11 | Ts: 60 | Sigma: 2
Client ID: | Detector: GV11 | Decay Corrected: No

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	134000	655	15500		pCi/L		489	123145
Cesium-137	50940	366	5060		pCi/L	20.0	167	123145
Cobalt-60	56820	311	5610		pCi/L		89.8	123145

Lab ID: 160-6694-7 | Analyzed: 05/20/14 13:46 | Ts: 60 | Sigma: 2
Client ID: 2222-RIN-01 | Detector: GV18 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Cesium-137	-1.19	7.49	7.49	U	pCi/L	20.0	13.4	123230

Lab ID: 160-6694-7 DU | Analyzed: 05/20/14 15:11 | Ts: 60 | Sigma: 2
Client ID: 2222-RIN-01 | Detector: GV12 | Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Cesium-137	-0.2213	5.10	5.10	U	pCi/L	20.0	9.54	123147

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 160-122895/1-A	Cesium-137			1.139	U	pCi/L							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-122895/2-A	Americium-241		137000	134000		pCi/L	98	90 - 111					
LCS 160-122895/2-A	Cesium-137		50100	50940		pCi/L	102	90 - 111					
LCS 160-122895/2-A	Cobalt-60		57100	56820		pCi/L	100	89 - 110					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-6694-7	Cesium-137	-1.19		-0.2213	U	pCi/L			137	0.08	0.21	1	

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122895 Batch Start Date: 05/19/14 12:24 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-0 Batch End Date: 05/19/14 13:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	GrossWeight	Geometry	1L Marn 00008		
MB 160-122895/1		Fill_Geo-0, GA-01-R		1000 mL	1000 mL	1L Marn			
LCS 160-122895/2		Fill_Geo-0, GA-01-R		1000 mL	1000 mL	1L Marn	# mL		
160-6694-A-7	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			
160-6694-A-7 DU	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			

Batch Notes	
SOP Number	ST-RC-0025

Basis	Basis Description
T	Total/NA

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

Test America St. Louis Spectrum ID: 7_Gamma_20141010

Sample Description: 122895_Gamma_MB 160-122895~1-A
Detector: Ge 7 SN/154
Batch ID: 122895
Work Order Number: Gamma
Lot Number: MB 160-122895~1-A

Decay to Time: 5/20/2014 15:18 Live Time: 3600 sec
Acquisition Time: 5/20/2014 15:18:36 Real Time: 3656 sec
Analysis Time: 5/20/2014 16:19 Dead Time: 1.54 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Liquid_Marinelli 1L.Clb
Efficiency Cal Desc: 7_1Lmarn_90062_032612
Efficiency Cal Date: 3/28/2012 09:18
Energy Cal Date: 2/23/2012 08:40
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 7_2014-05-03_0622.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-6.164E-01	171.6	1.058E+00	1.058E+00	3.774E+00
K-40	-3.043E+00	2000.0	6.086E+01	6.086E+01	1.113E+01
CO-60	5.588E-02	155.9	8.709E-02	8.713E-02	3.178E-01
I-131	-1.952E-02	590.4	1.152E-01	1.153E-01	4.216E-01
CS-134	3.083E-02	89.5	2.761E-02	2.765E-02	5.324E-01
CS-137	4.216E-02	286.4	1.207E-01	1.208E-01	4.555E-01
EU-152	2.138E-01	94.7	2.024E-01	2.027E-01	1.066E+00
EU-154	1.140E+00	57.1	6.513E-01	6.537E-01	1.929E+00
EU-155	0.000E+00	1000.0	1.589E-01	1.589E-01	1.024E+00
TL-208	1.837E-01	78.9	1.449E-01	1.452E-01	3.630E-01
PB-210	-4.759E-01	399.3	1.900E+00	1.901E+00	6.933E+00
PB-212	-1.078E-01	378.8	4.081E-01	4.082E-01	7.540E-01
PB-214	6.286E-02	341.9	2.149E-01	2.149E-01	9.134E-01
BI-212	8.516E-01	167.8	1.429E+00	1.429E+00	5.270E+00
BI-214	3.683E-01	78.2	2.878E-01	2.884E-01	9.706E-01
AC-228	6.160E-01	68.4	4.213E-01	4.224E-01	1.534E+00
Pa-234	3.883E-01	110.2	4.279E-01	4.284E-01	8.910E-01
TH-234	2.517E+00	45.8	1.152E+00	1.160E+00	6.963E+00
PA-234M	-1.407E+01	2000.0	2.814E+02	2.814E+02	4.560E+01
U-235	3.056E-01	108.6	3.319E-01	3.323E-01	1.546E+00
AM-241	-1.738E-02	704.6	1.224E-01	1.224E-01	4.519E-01
Total	6.776E+00				

Analyst: April Bean

TestAmerica Spectrum name: 7_Gamma_20141010.An1

Sample description
122895_Gamma_MB 160-122895~1-A

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20141010.An1

Acquisition information
Start time: 5/20/2014 3:18:36 PM
Live time: 3600
Real time: 3656
Dead time: 1.54 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Liquid_Marinelli 1L.Clb
7_1Lmarn_90062_032612

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

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

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.12keV)
Peak rejection level: 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

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	5/20/2014 3:18:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2014-05-03_0622.PBC 5/3/2014 6:22:41 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1201

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.58	33.	25.89	0.55	3.379E-02	46.54	4.250	PBC<MDA	PB210
63.13	55.	21.09	0.40	4.063E-02	63.29	3.810	PBC<MDA	TH234
92.42	20.	16.64	0.92	4.410E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	PBC<MDA	U235
					93.35	5.561	PBC<MDA	AC228
122.89	5.	129.69	0.92	4.202E-02	121.78	28.580	PBC<MDA	EU152
					123.10	40.790	8.018E-02	EU154
123.04	6.	94.67	0.92	4.217E-02	121.78	28.580	PBC<MDA	EU152
					123.10	40.790	9.889E-02	EU154
163.25	7.	108.62	0.96	3.653E-02	163.38	5.080	PBC<MDA	U235
					163.38	5.080	9.916E-01	U235
238.81	-5.	102.89	1.04	2.757E-02	238.63	43.300	PBC<MDA	PB212
277.80	5.	138.91	1.08	2.454E-02	277.28	6.310	PBC<MDA	TL208
295.34	2.	428.27	1.10	2.337E-02	295.09	19.300	PBC<MDA	PB214
338.93	4.	147.04	1.14	2.097E-02	338.32	12.010	PBC<MDA	AC228
344.02	6.	96.80	1.15	2.067E-02	344.29	26.500	PBC<MDA	EU152
352.21	1.	533.03	1.16	2.031E-02	351.93	37.600	PBC<MDA	PB214
569.33	4.	130.67	1.37	1.366E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.054E+00	Pa234
569.40	5.	110.21	1.37	1.366E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.191E+00	Pa234
582.33	6.	78.87	1.38	1.339E-02	583.02	84.500	PBC<MDA	TL208
608.81	8.	78.15	1.41	1.290E-02	609.31	46.090	PBC<MDA	BI214
661.37	2.	286.39	1.46	1.202E-02	661.66	85.210	PBC<MDA	CS137

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
727.61	3.	167.78	1.51	1.108E-02	727.17	7.550	PBC<MDA	BI212
779.52	1.	456.91	1.56	1.043E-02	778.92	12.940	PBC<MDA	EU152
802.78	2.	196.94	1.58	1.017E-02	801.95	8.690	PBC<MDA	CS134
872.77	5.	57.12	1.64	9.435E-03	873.23	12.270	PBC<MDA	EU154
911.55	6.	68.39	1.68	9.087E-03	911.07	29.000	PBC<MDA	AC228
1002.03	2.	182.56	1.75	8.327E-03	1004.77	18.010	PBC<MDA	EU154
1173.61	3.	155.86	1.89	7.239E-03	1173.24	99.900	PBC<MDA	CO60
1410.21	1.	364.37	2.06	6.123E-03	1408.00	21.005	PBC<MDA	EU152

No unknown peaks passed sensitivity test.

This section based on library: Client_Routine Short Rev1.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.88	46.58	50.	-2.	-0.001	25.89	0.553s
AM-241	233.28	58.43	19.	-1.	0.000	704.58	0.850
TH-234	252.06	63.13	60.	16.	0.004	21.09	0.402s
EU-155	344.81	86.31	40.	-1.	0.000	800.04	0.880s
TH-234	369.24	92.42	63.	20.	0.006	16.64	0.923s
EU-152	491.74	123.04	14.	6.	0.002	94.67	0.918s
EU-154	491.13	122.89	18.	5.	0.001	129.69	0.919s
U-235	652.59	163.25	23.	7.	0.002	108.62	0.962s
U-235	820.18	205.14	29.	-5.	-0.001	165.24	1.007s
PB-212	954.87	238.81	41.	-5.	-0.001	102.89	1.041s
TL-208	1110.84	277.80	18.	5.	0.001	138.91	1.081s
PB-214	1181.01	295.34	20.	2.	0.000	428.27	1.100s
PB-212	1200.69	300.26	20.	-1.	0.000	720.37	1.105s
AC-228	1355.36	338.93	17.	4.	0.001	147.04	1.144s
EU-152	1375.72	344.02	15.	6.	0.002	96.80	1.150s
PB-214	1408.50	352.21	23.	1.	0.000	533.03	1.157s
I-131	1457.44	364.44	22.	-1.	0.000	590.39	1.170s
BE-7	1909.18	477.37	18.	-4.	-0.001	171.65	1.282s
CS-134	2277.01	569.33	13.	4.	0.001	130.67	1.369s
Pa-234	2277.31	569.40	12.	5.	0.001	110.21	1.370s
TL-208	2329.05	582.33	7.	6.	0.002	78.87	1.382s
CS-134	2420.03	605.08	21.	-5.	-0.002	127.62	1.403s
BI-214	2434.97	608.81	15.	8.	0.002	78.15	1.407s
CS-137	2645.19	661.37	9.	2.	0.000	286.39	1.455s
EU-154	2893.07	723.34	14.	-2.	-0.001	285.99	1.511s
BI-212	2910.17	727.61	8.	3.	0.001	167.78	1.515s
EU-152	3117.81	779.52	9.	1.	0.000	456.91	1.561s
CS-134	3182.55	795.70	12.	-1.	0.000	417.23	1.576s
CS-134	3210.88	802.78	11.	2.	0.001	196.94	1.581s
EU-154	3490.83	872.77	1.	5.	0.001	57.12	1.643s
AC-228	3645.93	911.55	6.	6.	0.002	68.39	1.675s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	4007.88	1002.03	9.	2.	0.001	182.56	1.753s
CO-60	4694.17	1173.61	9.	3.	0.001	155.86	1.887s
EU-152	5640.54	1410.21	5.	1.	0.000	364.37	2.059s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-6.1638E-01				5.31E+01	
			477.60	-6.164E-01	?(	3.774E+00	1.72E+02 1.05E+01 G
K-40	N	-3.0432E+00				4.66E+11	
			1460.83	-3.043E+00	%(P	1.113E+01	1.00E+03 1.07E+01 G
CO-60	F	5.5876E-02				1.93E+03	
			1332.50	0.000E+00	?(	3.178E-01	1.00E+03 1.00E+02 G
			1173.24	1.118E-01	&(	6.361E-01	1.56E+02 9.99E+01 G
I-131	I	-1.9521E-02				8.02E+00	
			364.48	-1.952E-02	?(	4.216E-01	5.90E+02 8.17E+01 G
			284.30	-9.850E-02	%	4.651E+00	1.28E+03 6.14E+00 G
			636.97	1.452E-01	%	6.287E+00	1.15E+03 7.17E+00 G
CS-134	I	3.0832E-02				7.54E+02	
			604.71	-1.194E-01	?(	5.324E-01	1.28E+02 9.76E+01 G
			795.87	-3.769E-02	+	5.915E-01	4.17E+02 8.55E+01 G
			569.32	5.617E-01	?(	2.604E+00	1.31E+02 1.54E+01 G
			801.95	7.790E-01	?(	5.637E+00	1.97E+02 8.69E+00 G
			563.24	1.024E-01	%	4.506E+00	1.15E+03 8.35E+00 G
CS-137	I	4.2160E-02				1.10E+04	
			661.66	4.216E-02	&(	4.555E-01	2.86E+02 8.52E+01 G
EU-152	F	2.1382E-01				4.94E+03	
			344.29	3.196E-01	(	1.066E+00	9.68E+01 2.65E+01 G
			121.78	1.406E-01	?(	4.591E-01	9.47E+01 2.86E+01 G
			778.92	1.988E-01	?(	3.475E+00	4.57E+02 1.29E+01 G
			964.11	-1.057E-01	%	4.281E+00	1.07E+03 1.46E+01 G
			1112.07	0.000E+00	-	1.974E+00	1.00E+03 1.36E+01 G
			1408.00	1.892E-01	?(	2.758E+00	3.64E+02 2.10E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	1.1402E+00					3.14E+03	
			873.23	1.140E+00	&(	1.929E+00	5.71E+01	1.23E+01 G
			123.10	8.018E-02	&	3.653E-01	1.30E+02	4.08E+01 G
			1274.54	0.000E+00	-	2.337E+00	1.00E+03	3.52E+01 G
			723.36	-2.376E-01	-	2.501E+00	2.86E+02	2.02E+01 G
			1004.77	4.567E-01	-	3.076E+00	1.83E+02	1.80E+01 G
			996.33	0.000E+00	-	5.555E+00	1.00E+03	1.06E+01 G
TL-208	N	1.8373E-01					6.98E+02	
			583.02	1.355E-01	&(	3.630E-01	7.89E+01	8.45E+01 G
			277.28	8.294E-01	&(	4.064E+00	1.39E+02	6.31E+00 G
			860.56	8.087E-02	%	4.095E+00	1.31E+03	1.24E+01 G
PB-210	N	-4.7591E-01					8.14E+03	
			46.54	-4.759E-01	(P	6.933E+00	2.59E+01	4.25E+00 G
PB-212	N	-1.0775E-01					6.98E+02	
			238.63	-1.077E-01	?(P	7.540E-01	1.03E+02	4.33E+01 G
			300.03	-3.250E-01	+	8.626E+00	7.20E+02	3.28E+00 G
PB-214	N	6.2855E-02					5.84E+05	
			351.93	4.704E-02	?(	9.134E-01	5.33E+02	3.76E+01 G
			295.09	9.367E-02	?(	1.465E+00	4.28E+02	1.93E+01 G
			242.00	-6.035E-02	&	3.841E+00	1.75E+03	7.43E+00 G
BI-212	N	8.5161E-01					6.98E+02	
			727.17	8.516E-01	?(	5.270E+00	1.68E+02	7.55E+00 G
			785.42	0.000E+00	-	3.329E+01	1.00E+03	1.28E+00 G
BI-214	N	3.6825E-01					5.84E+05	
			609.31	3.683E-01	(	9.706E-01	7.81E+01	4.61E+01 G
			1120.29	0.000E+00	-	6.169E+00	1.00E+03	1.51E+01 G
			1764.49	0.000E+00	-	2.682E+00	1.00E+03	1.54E+01 G
AC-228	N	6.1596E-01					2.10E+03	
			911.07	6.781E-01	?(	1.534E+00	6.84E+01	2.90E+01 G
			968.97	0.000E+00	-	4.340E+00	1.00E+03	1.75E+01 G
			338.32	4.659E-01	?(	2.429E+00	1.47E+02	1.20E+01 G
								Energy duplication
			93.35	0.000E+00	-	3.977E+00	1.00E+03	5.56E+00 XA
Pa-234	N	3.8827E-01					1.63E+12	
			131.29	2.265E-02	%(	8.910E-01	1.07E+03	1.80E+01 G
			569.47	1.191E+00	?(	4.609E+00	1.10E+02	8.20E+00 G
			946.02	0.000E+00	-	4.001E+00	1.00E+03	1.34E+01 G
			883.24	0.000E+00	-	5.127E+00	1.00E+03	9.60E+00 G
			880.53	-5.075E-02	%	6.189E+00	2.92E+03	6.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	2.5165E+00					1.63E+12	
			63.29	2.843E+00	(P	6.963E+00	2.11E+01	3.81E+00 G
			92.59	2.294E+00	*(P	4.467E+00	1.66E+01	5.58E+00 G
PA-234M	N	-1.4068E+01					1.63E+12	
			1001.00	-1.407E+01	%(P	4.560E+01	1.00E+03	8.37E-01 G
			766.41	-4.415E+01	% P	2.465E+02	1.00E+03	2.94E-01 G
U-235	N	3.0558E-01					2.57E+11	
			143.79	-1.240E-02	%(	1.546E+00	3.36E+03	1.10E+01 G
			205.33	-8.537E-01	+	4.952E+00	1.65E+02	5.01E+00 G
			163.38	9.916E-01	(	3.720E+00	1.09E+02	5.08E+00 G
								Energy duplication
			93.35	0.000E+00	-	3.806E+00	1.00E+03	5.81E+00 X
AM-241	T	-1.7377E-02					1.58E+05	
			59.54	-1.738E-02	(	4.519E-01	7.05E+02	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:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

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

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.58	50.	-2.	-0.001	25.89	-4.759E-01	P
AM-241	58.43	19.	-1.	0.000	704.58	-1.738E-02	
EU-155	86.31	40.	-1.	0.000	800.04	-2.306E-02	
EU-152	123.04	14.	6.	0.002	94.67	1.406E-01	
EU-154	122.89	18.	5.	0.001	129.69	8.018E-02	
U-235	163.25	23.	7.	0.002	108.62	9.916E-01	
U-235	205.14	29.	-5.	-0.001	165.24	-8.537E-01	
PB-212	238.81	41.	-5.	-0.001	102.89	-1.077E-01	P
TL-208	277.80	18.	5.	0.001	138.91	8.294E-01	
PB-214	295.34	20.	2.	0.000	428.27	9.367E-02	
PB-212	300.26	20.	-1.	0.000	720.37	-3.250E-01	
AC-228	338.93	17.	4.	0.001	147.04	4.659E-01	
EU-152	344.02	15.	6.	0.002	96.80	3.196E-01	
PB-214	352.21	23.	1.	0.000	533.03	4.704E-02	
I-131	364.44	22.	-1.	0.000	590.39	-1.952E-02	
BE-7	477.37	18.	-4.	-0.001	171.65	-6.164E-01	
CS-134	569.33	13.	4.	0.001	130.67	5.617E-01	
Pa-234	569.40	12.	5.	0.001	110.21	1.191E+00	
TL-208	582.33	7.	6.	0.002	78.87	1.355E-01	
CS-134	605.08	21.	-5.	-0.002	127.62	-1.194E-01	
BI-214	608.81	15.	8.	0.002	78.15	3.683E-01	
CS-137	661.37	9.	2.	0.000	286.39	4.216E-02	
EU-154	723.34	14.	-2.	-0.001	285.99	-2.376E-01	
BI-212	727.61	8.	3.	0.001	167.78	8.516E-01	
EU-152	779.52	9.	1.	0.000	456.91	1.988E-01	
CS-134	795.70	12.	-1.	0.000	417.23	-3.769E-02	
CS-134	802.78	11.	2.	0.001	196.94	7.790E-01	
EU-154	872.77	1.	5.	0.001	57.12	1.140E+00	
AC-228	911.55	6.	6.	0.002	68.39	6.781E-01	
EU-154	1002.03	9.	2.	0.001	182.56	4.567E-01	
CO-60	1173.61	9.	3.	0.001	155.86	1.118E-01	
EU-152	1410.21	5.	1.	0.000	364.37	1.892E-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	-6.1638E-01	-6.1638E-01	1.716E+02%	3.77E+00
K-40	#A	-3.0432E+00	-3.0432E+00	2.000E+03%	1.11E+01
CO-60	#A	5.5876E-02	5.5876E-02	1.559E+02%	3.18E-01
I-131	#A	-1.9520E-02	-1.9521E-02	5.904E+02%	4.22E-01

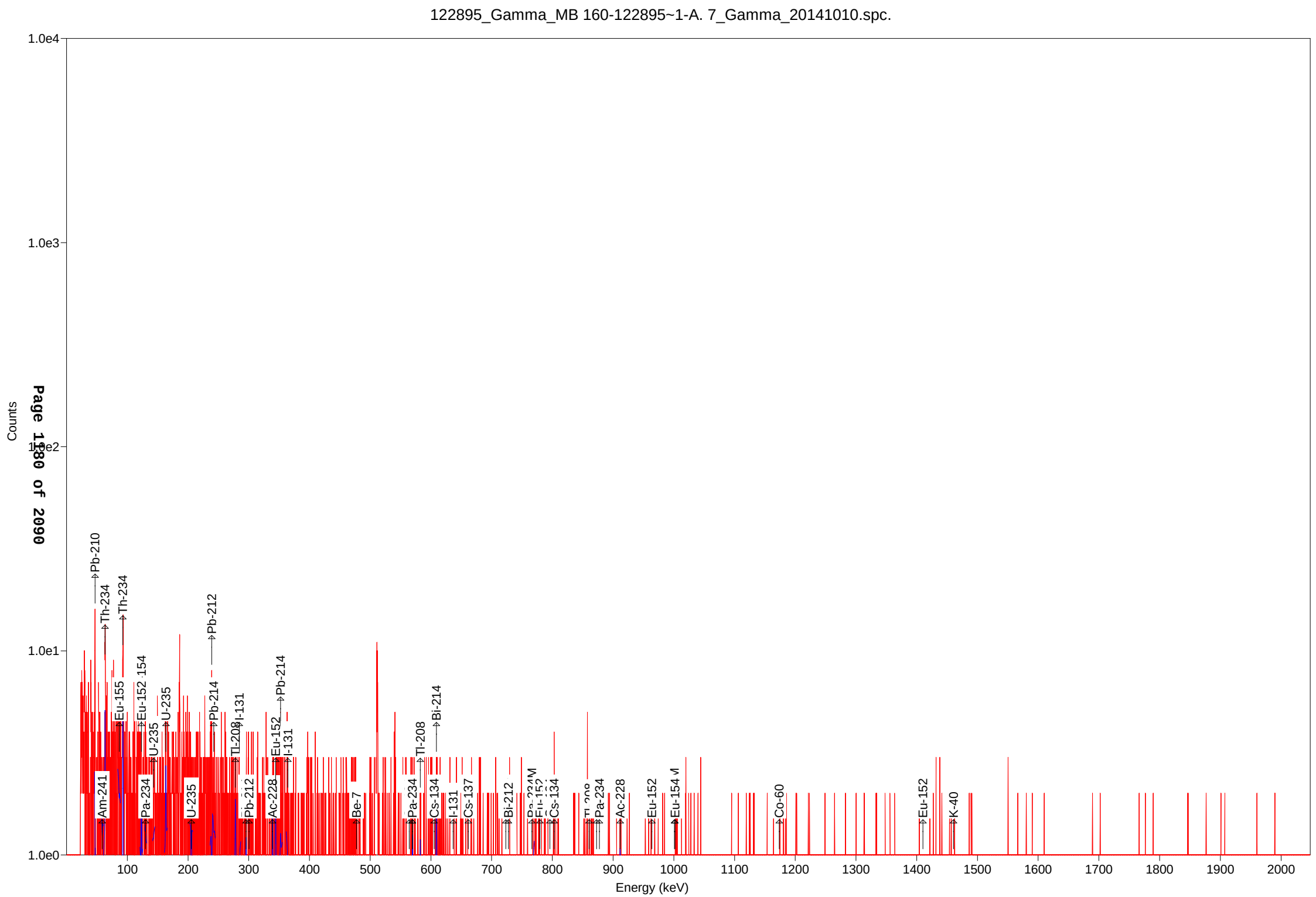
CS-134 #A	3.0832E-02	3.0832E-02	8.953E+01%	5.32E-01
CS-137 #A	4.2160E-02	4.2160E-02	2.864E+02%	4.55E-01
EU-152 #A	2.1382E-01	2.1382E-01	9.467E+01%	1.07E+00
EU-154 #A	1.1402E+00	1.1402E+00	5.712E+01%	1.93E+00
EU-155 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.02E+00
TL-208 #A	1.8373E-01	1.8373E-01	7.887E+01%	3.63E-01
PB-210 #A	-4.7591E-01	-4.7591E-01	3.993E+02%	6.93E+00
PB-212 #A	-1.0775E-01	-1.0775E-01	3.788E+02%	7.54E-01
PB-214 #A	6.2855E-02	6.2855E-02	3.419E+02%	9.13E-01
BI-212 #A	8.5161E-01	8.5161E-01	1.678E+02%	5.27E+00
BI-214 #A	3.6825E-01	3.6825E-01	7.815E+01%	9.71E-01
AC-228 #A	6.1596E-01	6.1596E-01	6.839E+01%	1.53E+00
Pa-234 #A	3.8827E-01	3.8827E-01	1.102E+02%	8.91E-01
TH-234 A	2.5165E+00	2.5165E+00	4.577E+01%	6.96E+00
PA-234M#A	-1.4068E+01	-1.4068E+01	2.000E+03%	4.56E+01
U-235 #A	3.0558E-01	3.0558E-01	1.086E+02%	1.55E+00
AM-241 #A	-1.7377E-02	-1.7377E-02	7.046E+02%	4.52E-01

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

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

Total Activity (37.6 to 2000.1 keV) 0.000E+00 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 0.0000000E+00 Bq/Sample

The library has energies which are not separable.


122895_Gamma_MB 160-122895~1-A. 7_Gamma_20141010.spc.
Counts
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Energy (keV)
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-210
Th-234
Th-234
Eu-155
Eu-152 154
U-235
U-235
Pb-214
Pb-212
I-131
Tl-208
Eu-152
Pb-214
I-131
Bi-214
Tl-208
Am-241
Pa-234
U-235
Pb-212
Ac-228
Be-7
Pa-234
Cs-134
I-131
Cs-137
Bi-212
Cs-134
Pa-234
Ac-228
Eu-152
Eu-154 M
Co-60
Eu-152
K-40

Test America St. Louis Spectrum ID: 11_Gamma_20140997

Sample Description: 122895_Gamma_LCS 160-122895~2-A
Detector: Ge11 S/N09363993
Batch ID: 122895
Work Order Number: Gamma
Lot Number: LCS 160-122895~2-A

Decay to Time: 5/20/2014 15:11 Live Time: 3600 sec
Acquisition Time: 5/20/2014 15:11:44 Real Time: 3829 sec
Analysis Time: 5/20/2014 16:15 Dead Time: 5.99 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 11_Liquid_Marinelli 1L.Clb
Efficiency Cal Desc: Ge11_1Lmarn_83924_334_101210
Efficiency Cal Date: 11/1/2011 11:27
Energy Cal Date: 2/28/2012 13:09
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 11_2014-05-03_0719.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	5.506E+00	265.7	1.463E+01	1.463E+01	4.844E+01
K-40	-5.791E+00	3200.0	1.853E+02	1.853E+02	2.506E+01
CO-60	2.102E+03	0.3	5.748E+00	1.038E+02	3.322E+00
I-131	2.348E+00	108.5	2.548E+00	2.551E+00	4.380E+00
CS-134	7.252E-02	2123.0	1.539E+00	1.539E+00	5.112E+00
CS-137	1.885E+03	0.4	6.765E+00	9.362E+01	6.166E+00
EU-152	1.221E+02	2.2	2.655E+00	6.733E+00	1.520E+01
EU-154	1.181E+02	1.5	1.791E+00	6.065E+00	5.916E+01
EU-155	2.106E+00	103.5	2.179E+00	2.183E+00	1.187E+01
TL-208	2.228E+00	56.6	1.260E+00	1.265E+00	4.155E+00
PB-210	-2.972E+02	20.9	6.219E+01	6.777E+01	1.934E+02
PB-212	2.600E+00	98.9	2.572E+00	2.577E+00	8.499E+00
PB-214	2.314E-01	1312.0	3.036E+00	3.036E+00	1.008E+01
BI-212	-1.439E+01	151.3	2.178E+01	2.179E+01	7.213E+01
BI-214	-3.645E-01	297.2	1.084E+00	1.084E+00	9.339E+00
AC-228	-3.205E-01	2555.0	8.187E+00	8.187E+00	2.716E+01
Pa-234	5.716E+00	108.6	6.208E+00	6.215E+00	8.999E+00
TH-234	-7.940E+01	40.5	3.218E+01	3.248E+01	9.070E+01
PA-234M	8.820E+01	326.7	2.882E+02	2.882E+02	9.553E+02
U-235	3.221E+00	233.1	7.506E+00	7.508E+00	2.458E+01
AM-241	4.960E+03	0.2	1.212E+01	2.866E+02	1.808E+01
Total	9.299E+03				

Analyst: April Bean

TestAmerica, Inc Spectrum name: 11_Gamma_20140997.An1

Sample description
122895_Gamma_LCS 160-122895~2-A

Spectrum Filename: C:\User\SPC\Det11\11_Gamma_20140997.An1

Acquisition information
Start time: 5/20/2014 3:11:44 PM
Live time: 3600
Real time: 3829
Dead time: 5.99 %
Detector ID: 11

Detector system
Ge11 S/N09363993

Calibration
Filename: 11_Liquid_Marinelli 1L.Clb
Ge11_1Lmarn_83924_334_101210

Energy Calibration
Created: 2/28/2012 1:09:34 PM
Zero offset: 0.055 keV
Gain: 0.250 keV/channel
Quadratic: -2.946E-08 keV/channel^2

Efficiency Calibration
Created: 11/1/2011 11:27:06 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.69 %
Log(Eff): -1.728738E+00 + (5.998209E-02*Log(E)) + (-6.399241E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.15 %
Log(Eff): -1.340909E+01 + (4.619770E+00*Log(E)) + (-5.089701E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.47keV)
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

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	5/20/2014 3:11:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	11_2014-05-03_0719.PBC 5/3/2014 7:19:01 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 25 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1226

***** 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	2682.	9.73	1.01	3.426E-02				
42.81	381.	58.91	0.71	3.929E-02				
49.53	12992.	3.90	1.65	4.364E-02				
59.49	309731.	0.24	0.88	4.830E-02	59.54	35.900	4.960E+03	AM241
74.98	386.	36.00	0.59	5.229E-02				
86.54	204.	103.47	0.94	5.345E-02	86.54	30.700	PBC<MDA	EU155
87.99	77861.	0.47	0.93	5.351E-02				
92.92	54.	124.17	0.94	5.361E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	PBC<MDA	AC228
					93.35	5.810	PBC<MDA	U235
					92.59	5.584	PBC<MDA	TH234
					93.35	5.810	PBC<MDA	U235
					93.35	5.561	PBC<MDA	AC228
98.81	194.	61.06	0.45	5.353E-02				
122.09	12122.	2.18	0.95	5.171E-02	121.78	28.580	2.277E+02	EU152
					123.10	40.790	1.600E+02	EU154
131.44	82.	108.60	0.98	5.056E-02	131.29	18.000	PBC<MDA	Pa234
133.65	190.	50.56	0.98	5.025E-02				
136.45	1277.	9.04	0.98	4.987E-02				
143.92	54.	264.97	0.99	4.880E-02	143.79	10.960	PBC<MDA	U235
					143.79	10.960	2.803E+00	U235
162.53	35.	383.49	1.01	4.576E-02	163.38	5.080	PBC<MDA	U235
					163.38	5.080	4.123E+00	U235
165.82	689.	19.11	1.14	4.537E-02				
238.25	147.	83.24	1.08	3.621E-02	238.63	43.300	PBC<MDA	PB212
285.45	115.	108.52	1.12	3.230E-02	284.30	6.140	PBC<MDA	I131
294.55	280.	35.68	0.46	3.155E-02				
344.90	304.	30.87	1.17	2.835E-02	344.29	26.500	1.123E+01	EU152
347.95	157.	55.82	1.18	2.816E-02				
353.57	9.	358.49	1.18	2.796E-02	351.93	37.600	PBC<MDA	PB214

					351.93	37.600	PBC<MDA	PB214
354.59	118.	72.50	0.32	2.781E-02				
359.82	130.	75.17	0.47	2.753E-02				
362.63	76.	139.81	1.19	2.729E-02	364.48	81.700	PBC<MDA	I131
453.26	214.	47.57	0.62	2.338E-02				
470.34	261.	56.91	0.37	2.276E-02				
477.80	47.	265.66	1.29	2.251E-02	477.60	10.520	PBC<MDA	BE7
545.96	387.	31.20	0.76	2.039E-02				
582.72	132.	51.04	1.38	1.941E-02	583.02	84.500	PBC<MDA	TL208
583.76	99.	70.61	1.38	1.938E-02				
584.06	287.	33.47	0.33	1.938E-02				
638.41	31.	318.41	1.43	1.815E-02	636.97	7.170	PBC<MDA	I131
661.79	101885.	0.36	1.40	1.762E-02	661.66	85.210	1.885E+03	CS137
723.31	250.	46.17	0.59	1.645E-02	723.36	20.220	2.088E+01	EU154
					723.36	20.220	2.088E+01	EU154
751.11	316.	29.99	0.38	1.597E-02				
779.80	56.	175.22	1.55	1.551E-02	778.92	12.940	PBC<MDA	EU152
834.99	10822.	1.50	1.58	1.468E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
872.96	116.	96.18	1.63	1.416E-02	873.23	12.270	PBC<MDA	EU154
					873.23	12.270	1.862E+01	EU154
883.35	57.	197.62	1.64	1.403E-02	883.24	9.600	PBC<MDA	Pa234
964.08	91.	133.41	1.71	1.306E-02	964.11	14.605	PBC<MDA	EU152
996.62	121.	91.17	1.73	1.272E-02	996.33	10.600	PBC<MDA	EU154
					996.33	10.600	2.488E+01	EU154
1000.97	34.	326.72	1.74	1.267E-02	1001.00	0.837	PBC<MDA	PA234M
1005.13	86.	127.30	1.74	1.263E-02	1004.77	18.010	PBC<MDA	EU154
					1004.77	18.010	1.049E+01	EU154
1092.14	315.	43.31	0.56	1.178E-02				
1108.74	19.	509.26	1.83	1.161E-02	1112.07	13.644	PBC<MDA	EU152
1115.67	4751.	4.34	1.71	1.158E-02				
1173.44	83157.	0.40	1.76	1.109E-02	1173.24	99.900	2.084E+03	CO60
1274.92	193.	21.50	1.96	1.034E-02	1274.54	35.190	1.472E+01	EU154
					1274.54	35.190	1.472E+01	EU154
1283.82	45.	55.91	0.51	1.028E-02				
1332.74	75985.	0.37	1.88	9.953E-03	1332.50	99.980	2.121E+03	CO60
1408.09	140.	22.82	0.33	9.491E-03	1408.00	21.005	1.953E+01	EU152
1420.97	138.	23.68	0.74	9.416E-03				
1540.38	28.	38.72	0.70	8.774E-03				
1764.82	7.	122.10	2.34	7.777E-03	1764.49	15.400	PBC<MDA	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.13	36.61	18668.	2682.	7.827E+04	9.73	1.008	-	sM
170.93	42.81	19995.	381.	9.698E+03	58.91	0.712	-	sM
197.77	49.53	70173.	13502.	3.094E+05	2.91	1.654	-	sM
299.49	74.98	8112.	386.	7.382E+03	36.00	0.590	-	s
351.54	87.99	14510.	77658.	1.451E+06	0.42	0.934	-	
394.78	98.81	5207.	194.	3.631E+03	61.06	0.453	-	s
534.36	133.58	5511.	161.	3.195E+03	65.87	0.981	-	sc
544.98	136.38	7565.	1245.	2.497E+04	13.37	0.844	-	
662.67	165.82	5550.	689.	1.519E+04	15.76	1.143	-	
1177.36	294.55	3646.	281.	8.897E+03	31.00	0.460	-	s
1390.92	347.95	2452.	89.	3.159E+03	85.65	0.685	-	sc
1417.45	354.59	2889.	109.	3.912E+03	70.51	0.321	-	sc
1438.37	359.82	3309.	128.	4.658E+03	64.05	0.467	-	sc
1812.04	453.26	3571.	214.	9.139E+03	47.57	0.616	-	s
1880.33	470.34	5672.	261.	1.145E+04	56.91	0.370	-	s
2182.75	545.96	3404.	387.	1.897E+04	31.20	0.762	-	s
2333.96	584.06	2396.	99.	5.109E+03	70.61	1.383	-	sc
2892.14	723.31	3045.	110.	6.675E+03	71.73	0.587	-	sc
3003.33	751.11	2252.	316.	1.976E+04	29.99	0.382	-	sM
3338.88	834.99	3468.	10822.	7.372E+05	1.50	1.583	-	M
4367.76	1092.14	3533.	315.	2.670E+04	43.31	0.563	-	sM
4461.90	1115.67	4087.	5819.	5.027E+05	2.03	1.709	-	M
5134.84	1283.82	196.	45.	4.379E+03	55.91	0.510	-	s
5683.79	1420.97	143.	138.	1.466E+04	23.68	0.742	-	s
6161.76	1540.38	37.	28.	3.153E+03	38.72	0.705	-	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_Routine Short Rev1.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	189.60	47.49	70237.	-1902.	-0.528	20.38	0.901
AM-241	237.59	59.49	58450.	309731.	86.036	0.24	0.879
TH-234	252.55	63.23	17383.	-540.	-0.150	37.63	0.916s
EU-155	345.74	86.54	22068.	204.	0.057	103.47	0.938s
TH-234	371.24	92.92	10205.	54.	0.015	124.17	0.943s
EU-152	487.85	122.09	11880.	12122.	3.367	2.18	0.954
EU-154	487.76	122.07	8847.	11212.	3.114	1.52	0.971s
Pa-234	524.63	131.29	3930.	82.	0.023	108.60	0.979D
U-235	575.11	143.92	10194.	54.	0.015	264.97	0.990s
U-235	649.55	162.53	8735.	35.	0.010	383.49	1.008s
U-235	820.55	205.31	10667.	-135.	-0.037	108.84	1.047s
PB-212	952.27	238.25	10477.	147.	0.041	83.24	1.077s
PB-214	966.51	241.81	10300.	-106.	-0.029	142.84	1.080s
TL-208	1111.59	278.10	9068.	-82.	-0.023	165.15	1.112s
I-131	1141.01	285.45	7752.	115.	0.032	108.52	1.118
PB-214	1186.41	296.81	7627.	-88.	-0.025	164.73	1.128s
AC-228	1350.34	337.81	7911.	-35.	-0.010	359.38	1.167s
EU-152	1376.59	344.37	7697.	219.	0.061	56.94	1.172s
I-131	1449.61	362.63	5602.	76.	0.021	139.81	1.190s
BE-7	1910.18	477.80	7749.	47.	0.013	265.66	1.290
CS-134	2256.33	564.35	4979.	-126.	-0.035	79.64	1.365s
CS-134	2276.79	569.47	5105.	-21.	-0.006	475.17	1.371s
Pa-234	2276.48	569.39	5095.	-13.	-0.004	784.87	1.371s
TL-208	2330.99	583.02	2710.	132.	0.037	51.04	1.382D
I-131	2552.52	638.41	4704.	31.	0.008	318.41	1.429s
CS-137	2646.04	661.79	5035.	101885.	28.301	0.36	1.398
EU-154	2891.78	723.22	4475.	140.	0.039	67.99	1.503s
BI-212	2908.20	727.33	4668.	-64.	-0.018	151.35	1.507s
PA-234M	3065.84	766.73	4815.	-79.	-0.022	125.04	1.540s
EU-152	3118.10	779.80	4845.	56.	0.016	175.22	1.551
BI-212	3140.32	785.36	4871.	-66.	-0.018	151.18	1.556s
CS-134	3185.87	796.74	5154.	-114.	-0.032	89.83	1.565s
CS-134	3207.86	802.24	5096.	-59.	-0.016	170.87	1.570s
EU-154	3490.80	872.96	6214.	116.	0.032	96.18	1.630s
Pa-234	3521.45	880.62	6430.	-50.	-0.014	228.47	1.637s
Pa-234	3532.36	883.35	6296.	57.	0.016	197.62	1.639
EU-152	3855.34	964.08	7376.	91.	0.025	133.41	1.706
AC-228	3875.10	969.02	6893.	-118.	-0.033	100.09	1.710s
EU-154	3985.55	996.62	5996.	121.	0.034	91.17	1.733s
PA-234M	4002.94	1000.97	6032.	34.	0.009	326.72	1.737s
EU-154	4019.58	1005.13	5934.	86.	0.024	127.30	1.740s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	4434.19	1108.74	4492.	19.	0.005	509.26	1.828
BI-214	4472.59	1118.34	8240.	-1083.	-0.301	12.33	1.834s
CO-60	4693.10	1173.44	3135.	83157.	23.099	0.40	1.762
EU-154	5099.22	1274.92	763.	193.	0.054	21.50	1.958
CO-60	5330.62	1332.74	623.	75985.	21.107	0.37	1.882
EU-152	5632.22	1408.09	171.	140.	0.039	22.82	0.334s
BI-214	7060.37	1764.82	207.	7.	0.002	122.10	2.336s

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	Peak MDA Value Bq/Sample	Peak COMMENTS
BE-7	C	5.5059E+00				5.31E+01	
			477.60	5.506E+00 ?(		4.844E+01 2.66E+02	1.05E+01 G
K-40	N	-5.7906E+00				4.66E+11	
			1460.83	-5.791E+00 %(P		2.506E+01 1.54E+03	1.07E+01 G
CO-60	F	2.1024E+03				1.93E+03	
			1332.50	2.121E+03 (		3.322E+00 3.74E-01	1.00E+02 G
			1173.24	2.084E+03 (		6.607E+00 3.98E-01	9.99E+01 G
I-131	I	2.3480E+00				8.02E+00	
			364.48	9.466E-01 &(		4.380E+00 1.40E+02	8.17E+01 G
			284.30	1.613E+01 (		5.785E+01 1.09E+02	6.14E+00 G
			636.97	6.514E+00 &(		6.881E+01 3.18E+02	7.17E+00 G
CS-134	I	7.2518E-02				7.54E+02	
			604.71	7.252E-02 %(		5.112E+00 2.12E+03	9.76E+01 G
			795.87	-2.420E+00 &		7.182E+00 8.98E+01	8.55E+01 G
			569.32	-1.945E+00 +		3.068E+01 4.75E+02	1.54E+01 G
			801.95	-1.249E+01 &		7.072E+01 1.71E+02	8.69E+00 G
			563.24	-2.106E+01 +		5.536E+01 7.96E+01	8.35E+00 G
CS-137	I	1.8846E+03				1.10E+04	
			661.66	1.885E+03 (		6.166E+00 3.59E-01	8.52E+01 G
EU-152	F	1.2205E+02				4.94E+03	
			344.29	8.105E+00 &(		1.520E+01 5.69E+01	2.65E+01 G
			121.78	2.277E+02 (		9.591E+00 2.18E+00	2.86E+01 G
			778.92	7.796E+00 -		4.526E+01 1.75E+02	1.29E+01 G
			964.11	1.330E+01 -		5.866E+01 1.33E+02	1.46E+01 G
			1112.07	3.268E+00 -		5.526E+01 5.09E+02	1.36E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1408.00	1.953E+01 -		8.864E+00	2.28E+01	2.10E+01 G
EU-154	I	1.1808E+02					3.14E+03	
			873.23	1.862E+01 ?(		5.916E+01	9.62E+01	1.23E+01 G
			123.10	1.480E+02 ?(		5.821E+00	1.52E+00	4.08E+01 G
			1274.54	1.472E+01 -		1.003E+01	2.15E+01	3.52E+01 G
			723.36	1.172E+01 -		2.627E+01	6.80E+01	2.02E+01 G
			1004.77	1.049E+01 -		4.418E+01	1.27E+02	1.80E+01 G
			996.33	2.488E+01 -		7.492E+01	9.12E+01	1.06E+01 G
EU-155	I	2.1061E+00					1.81E+03	
			105.31	1.667E-01 %(		1.187E+01	2.15E+03	2.12E+01 G
			86.54	3.445E+00 ?(		1.177E+01	1.03E+02	3.07E+01 G
TL-208	N	2.2275E+00					6.98E+02	
			583.02	2.228E+00 (P		4.155E+00	5.10E+01	8.45E+01 G
			277.28	-1.096E+01 -		5.985E+01	1.65E+02	6.31E+00 G
			860.56	8.980E-01 %		4.579E+01	1.53E+03	1.24E+01 G
PB-210	N	-2.9718E+02					8.14E+03	
			46.54	-2.972E+02 (P		1.934E+02	2.04E+01	4.25E+00 G
PB-212	N	2.5999E+00					6.98E+02	
			238.63	2.600E+00 @(P		8.499E+00	8.32E+01	4.33E+01 G
			300.03	2.762E-02 &		1.170E+02	1.28E+05	3.28E+00 G
PB-214	N	2.3138E-01					5.84E+05	
			351.93	2.314E-01 &(P		1.008E+01	3.58E+02	3.76E+01 G
			295.09	-4.033E+00 + P		1.871E+01	1.65E+02	1.93E+01 G
			242.00	-1.100E+01 + P		4.956E+01	1.43E+02	7.43E+00 G
BI-212	N	-1.4390E+01					6.98E+02	
			727.17	-1.439E+01 ?(		7.213E+01	1.51E+02	7.55E+00 G
			785.42	-9.224E+01 +		4.618E+02	1.51E+02	1.28E+00 G
BI-214	N	-3.6453E-01					5.84E+05	
			609.31	-1.015E+00 &(P		9.339E+00	2.13E+03	4.61E+01 G
			1120.29	-1.727E+02 + P		6.789E+01	1.23E+01	1.51E+01 G
			1764.49	1.581E+00 (P		1.617E+01	1.22E+02	1.54E+01 G
AC-228	N	-3.2050E-01					2.10E+03	
			911.07	-3.205E-01 &(		2.716E+01	2.55E+03	2.90E+01 G
			968.97	-1.441E+01 +		4.764E+01	1.00E+02	1.75E+01 G
			338.32	-2.821E+00 +		3.359E+01	3.59E+02	1.20E+01 G
							Energy duplication	
			93.35	9.981E-01 %		4.337E+01	1.31E+03	5.56E+00 XA

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
Pa-234	N	5.7161E+00						1.63E+12	
			131.29	2.505E+00	(8.999E+00		1.09E+02	1.80E+01	G
			569.47	-2.206E+00	& 5.749E+01		7.85E+02	8.20E+00	G
			946.02	-1.798E+00	% 6.308E+01		1.06E+03	1.34E+01	G
			883.24	1.174E+01	(7.682E+01		1.98E+02	9.60E+00	G
			880.53	-1.637E+01	+ 1.239E+02		2.28E+02	6.00E+00	G
TH-234	N	-7.9399E+01						1.63E+12	
			63.29	-7.940E+01	?(P 9.070E+01		3.76E+01	3.81E+00	G
			92.59	4.991E+00	+ P 4.394E+01		1.24E+02	5.58E+00	G
PA-234M	N	8.8197E+01						1.63E+12	
			1001.00	8.820E+01	(9.553E+02		3.27E+02	8.37E-01	G
			766.41	-4.738E+02	+ 1.961E+03		1.25E+02	2.94E-01	G
U-235	N	3.2207E+00						2.57E+11	
			143.79	2.803E+00	(2.458E+01		2.65E+02	1.10E+01	G
			205.33	-1.875E+01	+ 6.741E+01		1.09E+02	5.01E+00	G
			163.38	4.123E+00	?(5.237E+01		3.83E+02	5.08E+00	G
								Energy duplication	
			93.35	9.554E-01	% 4.151E+01		1.31E+03	5.81E+00	X
AM-241	T	4.9597E+03						1.58E+05	
			59.54	4.960E+03	(1.808E+01		2.44E-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:
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

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	
PB-210	47.49	70237.	-1902.	-0.528	20.38	-2.972E+02	P
TH-234	63.23	17383.	-540.	-0.150	37.63	-7.940E+01	P
EU-155	86.54	22068.	204.	0.057	103.47	3.445E+00	
TH-234	92.92	10205.	54.	0.015	124.17	4.991E+00	P
EU-154	122.07	8847.	11212.	3.114	1.52	1.480E+02	
U-235	143.92	10194.	54.	0.015	264.97	2.803E+00	
U-235	162.53	8735.	35.	0.010	383.49	4.123E+00	
U-235	205.31	10667.	-135.	-0.037	108.84	-1.875E+01	
PB-212	238.25	10477.	147.	0.041	83.24	2.600E+00	P
PB-214	241.81	10300.	-106.	-0.029	142.84	-1.100E+01	P
PB-214	296.81	7627.	-88.	-0.025	164.73	-4.033E+00	P
AC-228	337.81	7911.	-35.	-0.010	359.38	-2.821E+00	
BE-7	477.80	7749.	47.	0.013	265.66	5.506E+00	
CS-134	564.35	4979.	-126.	-0.035	79.64	-2.106E+01	
CS-134	569.47	5105.	-21.	-0.006	475.17	-1.945E+00	
EU-154	723.22	4475.	140.	0.039	67.99	1.172E+01	
BI-212	727.33	4668.	-64.	-0.018	151.35	-1.439E+01	
PA-234M	766.73	4815.	-79.	-0.022	125.04	-4.738E+02	
BI-212	785.36	4871.	-66.	-0.018	151.18	-9.224E+01	
CS-134	796.74	5154.	-114.	-0.032	89.83	-2.420E+00	
CS-134	802.24	5096.	-59.	-0.016	170.87	-1.249E+01	
EU-154	872.96	6214.	116.	0.032	96.18	1.862E+01	
AC-228	969.02	6893.	-118.	-0.033	100.09	-1.441E+01	
EU-154	996.62	5996.	121.	0.034	91.17	2.488E+01	
PA-234M	1000.97	6032.	34.	0.009	326.72	8.820E+01	
EU-154	1005.13	5934.	86.	0.024	127.30	1.049E+01	
BI-214	1118.34	8240.	-1083.	-0.301	12.33	-1.727E+02	P
EU-154	1274.92	763.	193.	0.054	21.50	1.472E+01	
BI-214	1764.82	207.	7.	0.002	122.10	1.581E+00	P

P - Peakbackground subtraction

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

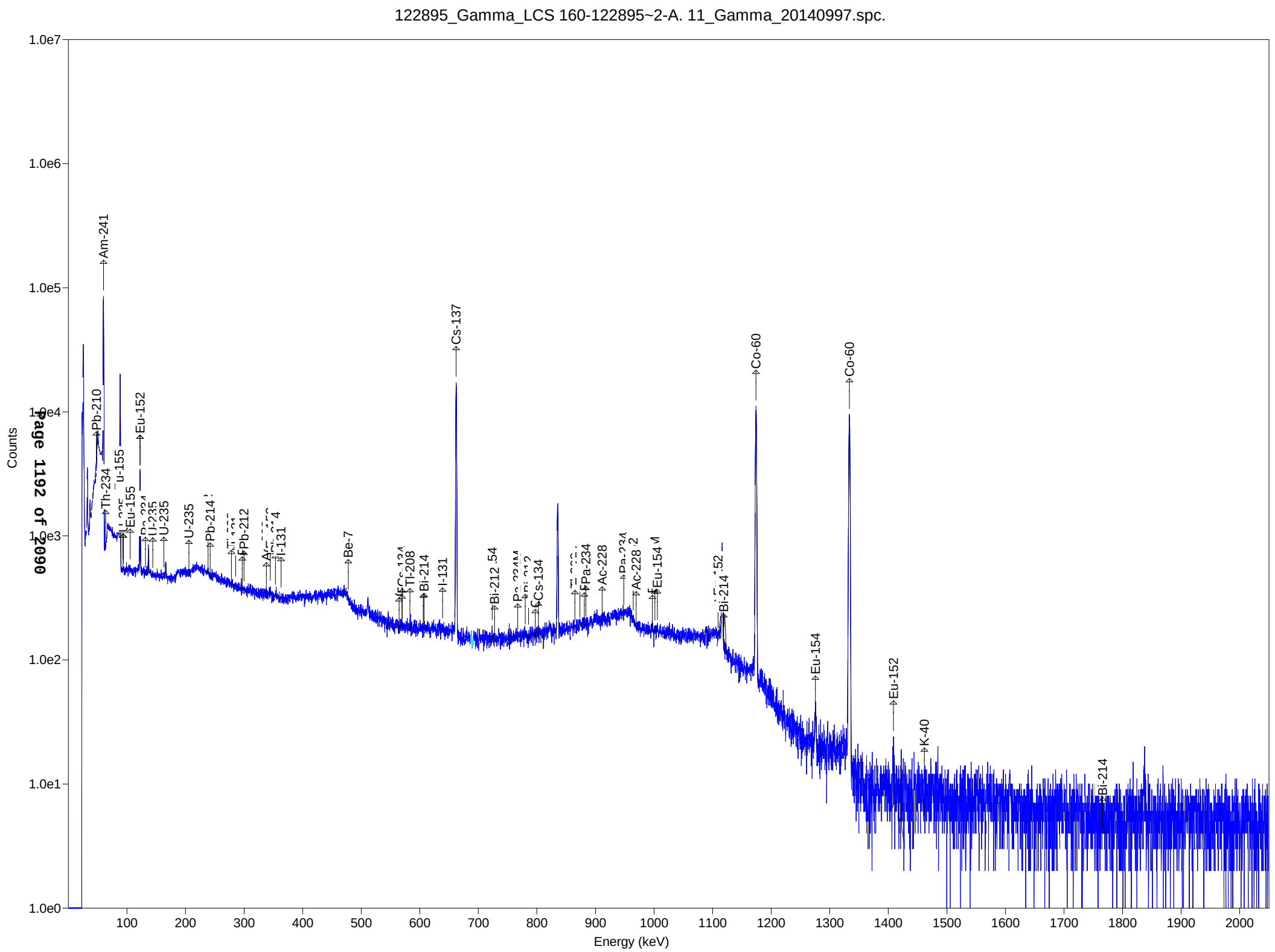
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	5.5058E+00	5.5059E+00	2.657E+02%	4.84E+01
K-40	#A	-5.7906E+00	-5.7906E+00	3.200E+03%	2.51E+01
CO-60		2.1024E+03	2.1024E+03	2.734E-01%	3.32E+00
I-131	A	2.3479E+00	2.3480E+00	1.085E+02%	4.38E+00
CS-134	#A	7.2518E-02	7.2518E-02	2.123E+03%	5.11E+00
CS-137		1.8846E+03	1.8846E+03	3.590E-01%	6.17E+00
EU-152		1.2205E+02	1.2205E+02	2.175E+00%	1.52E+01
EU-154	#C	1.1808E+02	1.1808E+02	1.516E+00%	5.92E+01
EU-155	#A	2.1061E+00	2.1061E+00	1.035E+02%	1.19E+01
TL-208	A	2.2275E+00	2.2275E+00	5.658E+01%	4.15E+00
PB-210	#A	-2.9718E+02	-2.9718E+02	2.093E+01%	1.93E+02
PB-212	#A	2.5999E+00	2.5999E+00	9.893E+01%	8.50E+00
PB-214	#A	2.3138E-01	2.3138E-01	1.312E+03%	1.01E+01
BI-212	#A	-1.4390E+01	-1.4390E+01	1.513E+02%	7.21E+01
BI-214	#A	-3.6453E-01	-3.6453E-01	2.972E+02%	9.34E+00
AC-228	#A	-3.2050E-01	-3.2050E-01	2.555E+03%	2.72E+01
Pa-234	A	5.7161E+00	5.7161E+00	1.086E+02%	9.00E+00
TH-234	#A	-7.9399E+01	-7.9399E+01	4.053E+01%	9.07E+01
PA-234M	#A	8.8197E+01	8.8197E+01	3.267E+02%	9.55E+02
U-235	#A	3.2207E+00	3.2207E+00	2.331E+02%	2.46E+01
AM-241		4.9597E+03	4.9597E+03	2.443E-01%	1.81E+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 (636.8 to 1999.5 keV) 9.071E+03 Bq/Sample
Total Decayed Activity (636.8 to 1999.5 keV) 9.0709473E+03 Bq/Sample

The library has energies which are not separable.


122895_Gamma_LCS 160-122895~2-A. 11_Gamma_20140997.spc.
Counts
Energy (keV)
Page 1192 of 2090
Am-241
Pb-210
Th-234
Eu-155
Eu-152
U-235
Pb-214
Pb-212
I-131
Be-7
Tl-208
Bi-214
Cs-137
Bi-212
Cs-134
Pa-234
Ac-228
Co-60
Eu-154
K-40

Test America St. Louis Spectrum ID: 18_Gamma_20140439

Sample Description: 122895_Gamma_160-6694-A-7-A
Detector: Ge18 SN/11164036
Batch ID: 122895
Work Order Number: Gamma
Lot Number: 160-6694-A-7-A

Decay to Time: 5/20/2014 13:46 Live Time: 3600 sec
Acquisition Time: 5/20/2014 13:46:18 Real Time: 3614 sec
Analysis Time: 5/20/2014 14:46 Dead Time: 0.38 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 18_1LMarinelli.Clb
Efficiency Cal Desc: 18_1Lmarn_83924-334_120711
Efficiency Cal Date: 12/8/2011 10:14
Energy Cal Date: 3/1/2012 13:27
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 18_2014-05-03_0602.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-7.696E-03	10580.0	8.142E-01	8.142E-01	3.001E+00
K-40	-2.624E-01	726.9	1.908E+00	1.908E+00	7.360E+00
CO-60	3.671E-02	377.5	1.386E-01	1.386E-01	5.204E-01
I-131	5.858E-02	168.9	9.896E-02	9.901E-02	3.476E-01
CS-134	2.101E-02	328.4	6.901E-02	6.902E-02	4.775E-01
CS-137	-4.394E-02	315.3	1.386E-01	1.386E-01	4.973E-01
EU-152	4.911E-01	72.4	3.556E-01	3.566E-01	1.004E+00
EU-154	1.704E-01	144.8	2.468E-01	2.470E-01	3.483E+00
EU-155	-2.352E-01	160.1	3.767E-01	3.769E-01	1.282E+00
TL-208	-1.802E-01	480.5	8.657E-01	8.658E-01	5.632E-01
PB-210	1.732E+00	162.9	2.823E+00	2.827E+00	8.303E+00
PB-212	1.924E-01	143.4	2.760E-01	2.765E-01	8.409E-01
PB-214	3.560E-01	63.4	2.258E-01	2.266E-01	8.336E-01
BI-212	7.512E-01	175.4	1.318E+00	1.318E+00	4.737E+00
BI-214	-1.777E-01	276.2	4.909E-01	4.910E-01	1.081E+00
AC-228	3.753E-01	82.3	3.090E-01	3.095E-01	1.538E+00
Pa-234	9.292E-02	361.5	3.359E-01	3.359E-01	1.175E+00
TH-234	2.863E+00	113.8	3.258E+00	3.262E+00	9.069E+00
PA-234M	5.142E+00	150.0	7.711E+00	7.715E+00	6.218E+01
U-235	1.279E+00	51.8	6.619E-01	6.651E-01	1.958E+00
AM-241	1.395E-02	1656.0	2.310E-01	2.310E-01	8.022E-01
Total	1.358E+01				

Analyst: April Bean

Test America Spectrum name: 18_Gamma_20140439.An1

Sample description
122895_Gamma_160-6694-A-7-A

Spectrum Filename: C:\User\SPC\Det18\18_Gamma_20140439.An1

Acquisition information
Start time: 5/20/2014 1:46:18 PM
Live time: 3600
Real time: 3614
Dead time: 0.38 %
Detector ID: 18

Detector system
Ge18 SN/11164036

Calibration
Filename: 18_1LMarinelli.Clb
18_1Lmarn_83924-334_120711

Energy Calibration
Created: 3/1/2012 1:27:55 PM
Zero offset: 0.007 keV
Gain: 0.250 keV/channel
Quadratic: -3.202E-08 keV/channel^2

Efficiency Calibration
Created: 12/8/2011 10:14:04 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.55 %
Log(Eff): -1.645931E+00 + (3.227669E-02*Log(E)) + (-6.187585E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.90 %
Log(Eff): -1.318185E+01 + (4.538566E+00*Log(E)) + (-5.017483E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.54keV)
Stop channel: 8000 (1999.55keV)
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

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	5/20/2014 1:46:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	18_2014-05-03_0602.PBC 5/3/2014 6:02:08 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 9 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0388

***** 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

No unknown peaks passed sensitivity test.

This section based on library: Client_Routine Short Rev1.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.70	46.47	123.	11.	0.003	28.41	1.014
TH-234	254.68	63.73	165.	20.	0.005	31.39	0.658s
EU-155	342.17	85.62	148.	-23.	-0.006	78.18	0.989s
TH-234	370.05	92.59	171.	-19.	-0.005	29.82	0.996D
U-235	373.09	93.35	132.	24.	0.007	70.91	0.996D
AC-228	373.09	93.35	123.	58.	0.016	29.92	0.997D
EU-155	420.80	105.29	114.	-10.	-0.003	160.13	1.009s
EU-152	486.33	121.68	110.	-10.	-0.003	156.17	1.026s
EU-154	491.39	122.95	99.	-3.	-0.001	444.56	1.028s
Pa-234	536.39	134.20	59.	3.	0.001	361.48	1.036s
U-235	579.17	144.90	57.	23.	0.006	51.77	1.049s
U-235	652.29	163.20	97.	13.	0.004	113.10	1.070s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	821.03	205.41	68.	2.	0.000	673.64	1.112
PB-212	954.17	238.71	91.	9.	0.002	33.30	1.146
PB-214	967.89	242.14	82.	-3.	-0.001	373.14	1.149s
I-131	1135.29	284.01	40.	-4.	-0.001	231.65	1.191s
PB-214	1184.73	296.38	46.	6.	0.002	166.51	1.202s
PB-212	1199.03	299.96	44.	2.	0.001	400.72	1.207s
AC-228	1353.21	338.52	24.	6.	0.002	127.66	1.244s
EU-152	1377.45	344.58	27.	11.	0.003	75.21	1.249s
PB-214	1408.38	352.32	38.	15.	0.004	63.42	1.257s
I-131	1457.21	364.53	29.	5.	0.001	168.94	1.269s
CS-134	2250.77	562.98	29.	-2.	0.000	430.22	1.451s
TL-208	2331.93	583.28	42.	-14.	-0.004	409.05	1.468s
BI-214	2438.06	609.82	43.	-5.	-0.002	65.51	1.491s
CS-137	2643.50	661.18	26.	-2.	-0.001	315.31	1.535s
BI-212	2908.91	727.54	15.	3.	0.001	175.40	1.590s
PA-234M	3069.55	767.70	10.	3.	0.001	149.95	1.621s
EU-152	3115.17	779.11	16.	5.	0.001	123.74	1.631s
BI-212	3146.24	786.87	21.	-3.	-0.001	210.00	1.637s
CS-134	3209.45	802.68	19.	2.	0.001	328.40	1.650s
TL-208	3439.33	860.15	22.	1.	0.000	480.53	1.695s
Pa-234	3531.27	883.13	21.	-2.	-0.001	338.50	1.713s
AC-228	3645.22	911.61	17.	4.	0.001	166.02	1.734s
Pa-234	3786.00	946.80	18.	-4.	-0.001	151.41	1.759s
EU-152	3854.95	964.03	18.	1.	0.000	523.17	1.773s
AC-228	3875.21	969.10	12.	4.	0.001	130.87	1.776s
EU-154	3983.12	996.07	17.	-1.	0.000	477.94	1.796s
EU-154	4011.72	1003.22	21.	-4.	-0.001	179.74	1.802s
CO-60	4695.84	1174.19	17.	-4.	-0.001	160.65	1.916s
EU-154	5096.95	1274.43	8.	3.	0.001	144.84	1.980s
CO-60	5332.17	1333.20	12.	1.	0.000	377.55	2.015s
EU-152	5630.22	1407.67	7.	1.	0.000	346.49	2.059s
K-40	5847.10	1461.85	25.	-1.	0.000	45.14	2.088s

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	-7.6956E-03				5.31E+01	
			477.60	-7.696E-03	%(	3.001E+00 1.06E+04	1.05E+01 G
K-40	N	-2.6244E-01				4.66E+11	
			1460.83	-2.624E-01	&(P	7.360E+00 4.51E+01	1.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-60	F	3.6707E-02					1.93E+03	
			1332.50	3.671E-02	?(	5.204E-01	3.78E+02	1.00E+02 G
			1173.24	-9.628E-02	+	5.515E-01	1.61E+02	9.99E+01 G
I-131	I	5.8578E-02					8.02E+00	
			364.48	5.858E-02	?(	3.476E-01	1.69E+02	8.17E+01 G
			284.30	-5.580E-01	+	4.540E+00	2.32E+02	6.14E+00 G
			636.97	3.018E-02	%	5.444E+00	4.90E+03	7.17E+00 G
CS-134	I	2.1014E-02					7.54E+02	
			604.71	-1.309E-02	%(	4.775E-01	1.02E+03	9.76E+01 G
			795.87	1.426E-03	%	5.125E-01	9.68E+03	8.55E+01 G
			569.32	0.000E+00	+	2.290E+00	1.00E+03	1.54E+01 G
			801.95	4.041E-01	?(	4.841E+00	3.28E+02	8.69E+00 G
			563.24	-3.016E-01	+	4.666E+00	4.30E+02	8.35E+00 G
CS-137	I	-4.3944E-02					1.10E+04	
			661.66	-4.394E-02	?(	4.973E-01	3.15E+02	8.52E+01 G
EU-152	F	4.9110E-01					4.94E+03	
			344.29	3.988E-01	?(	1.004E+00	7.52E+01	2.65E+01 G
			121.78	-1.818E-01	-	9.662E-01	1.56E+02	2.86E+01 G
			778.92	6.802E-01	&(	2.959E+00	1.24E+02	1.29E+01 G
			964.11	1.698E-01	&	3.278E+00	5.23E+02	1.46E+01 G
			1112.07	0.000E+00	-	5.360E+00	1.00E+03	1.36E+01 G
			1408.00	1.543E-01	-	2.074E+00	3.46E+02	2.10E+01 G
EU-154	I	1.7043E-01					3.14E+03	
			873.23	0.000E+00	?(	3.483E+00	1.00E+03	1.23E+01 G
			123.10	-4.189E-02	+	6.444E-01	4.45E+02	4.08E+01 G
			1274.54	2.299E-01	&(	1.214E+00	1.45E+02	3.52E+01 G
			723.36	0.000E+00	-	2.413E+00	1.00E+03	2.02E+01 G
			1004.77	-4.612E-01	+	2.950E+00	1.80E+02	1.80E+01 G
			996.33	-2.605E-01	+	4.593E+00	4.78E+02	1.06E+01 G
EU-155	I	-2.3523E-01					1.81E+03	
			105.31	-2.352E-01	?(	1.282E+00	1.60E+02	2.12E+01 G
			86.54	-3.831E-01	&	9.963E-01	7.82E+01	3.07E+01 G
TL-208	N	-1.8016E-01					6.98E+02	
			583.02	-2.389E-01	?(P	5.632E-01	4.09E+02	8.45E+01 G
			277.28	-1.705E-01	% P	4.211E+00	5.00E+02	6.31E+00 G
			860.56	2.196E-01	?(	3.849E+00	4.81E+02	1.24E+01 G
PB-210	N	1.7323E+00					8.14E+03	
			46.54	1.732E+00	(P	8.303E+00	2.84E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	1.9244E-01					6.98E+02	
			238.63	1.580E-01	(P	8.409E-01	3.33E+01	4.33E+01 G
			300.03	6.470E-01	?(	9.171E+00	4.01E+02	3.28E+00 G
PB-214	N	3.5604E-01					5.84E+05	
			351.93	3.990E-01	(	8.336E-01	6.34E+01	3.76E+01 G
			295.09	2.724E-01	&(	1.573E+00	1.67E+02	1.93E+01 G
			242.00	-3.641E-01	-	4.714E+00	3.73E+02	7.43E+00 G
BI-212	N	7.5121E-01					6.98E+02	
			727.17	7.512E-01	&(	4.737E+00	1.75E+02	7.55E+00 G
			785.42	-4.565E+00	+	3.430E+01	2.10E+02	1.28E+00 G
BI-214	N	-1.7773E-01					5.84E+05	
			609.31	-1.777E-01	(P	1.081E+00	6.55E+01	4.61E+01 G
			1120.29	-1.251E+00	% P	4.111E+00	2.86E+03	1.51E+01 G
			1764.49	-1.614E+00	% P	3.492E+00	1.00E+03	1.54E+01 G
AC-228	N	3.7532E-01					2.10E+03	
			911.07	2.594E-01	?(	1.538E+00	1.66E+02	2.90E+01 G
			968.97	5.054E-01	?(	2.352E+00	1.31E+02	1.75E+01 G
			338.32	4.661E-01	?(	2.073E+00	1.28E+02	1.20E+01 G
							Energy duplication	
			93.35	5.385E+00	&	5.024E+00	2.99E+01	5.56E+00 XA
Pa-234	N	9.2921E-02					1.63E+12	
			131.29	9.292E-02	?(	1.175E+00	3.61E+02	1.80E+01 G
			569.47	7.649E-02	%	4.655E+00	1.67E+03	8.20E+00 G
			946.02	-6.543E-01	+	3.515E+00	1.51E+02	1.34E+01 G
			883.24	-4.085E-01	+	5.018E+00	3.38E+02	9.60E+00 G
			880.53	0.000E+00	-	1.004E+01	1.00E+03	6.00E+00 G
TH-234	N	2.8626E+00					1.63E+12	
			63.29	2.863E+00	@(P	9.069E+00	3.14E+01	3.81E+00 G
			92.59	-1.791E+00	- P	5.869E+00	2.98E+01	5.58E+00 G
PA-234M	N	5.1422E+00					1.63E+12	
			1001.00	0.000E+00	?(	6.218E+01	1.00E+03	8.37E-01 G
			766.41	1.978E+01	?(	1.073E+02	1.50E+02	2.94E-01 G
U-235	N	1.2785E+00					2.57E+11	
			143.79	1.167E+00	?(	1.958E+00	5.18E+01	1.10E+01 G
			205.33	2.445E-01	-	5.772E+00	6.74E+02	5.01E+00 G
			163.38	1.520E+00	&(	5.810E+00	1.13E+02	5.08E+00 G
							Energy duplication	
			93.35	2.119E+00		4.980E+00	7.09E+01	5.81E+00 X

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	T 1.3951E-02					1.58E+05	
		59.54	1.395E-02	&(	8.022E-01	1.66E+03	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:
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	
EU-155	85.62	148.	-23.	-0.006	78.18	-3.831E-01	
AC-228	93.35	123.	58.	0.016	29.92	5.385E+00	
EU-155	105.29	114.	-10.	-0.003	160.13	-2.352E-01	
EU-152	121.68	110.	-10.	-0.003	156.17	-1.818E-01	
EU-154	122.95	99.	-3.	-0.001	444.56	-4.189E-02	
Pa-234	134.20	59.	3.	0.001	361.48	9.292E-02	
PB-212	238.71	91.	9.	0.002	33.30	1.580E-01	P
PB-214	242.14	82.	-3.	-0.001	373.14	-3.641E-01	
I-131	284.01	40.	-4.	-0.001	231.65	-5.580E-01	
PB-214	296.38	46.	6.	0.002	166.51	2.724E-01	
PB-212	299.96	44.	2.	0.001	400.72	6.470E-01	
AC-228	338.52	24.	6.	0.002	127.66	4.661E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-152	344.58	27.	11.	0.003	75.21	3.988E-01		
PB-214	352.32	38.	15.	0.004	63.42	3.990E-01		
I-131	364.53	29.	5.	0.001	168.94	5.858E-02		
CS-134	562.98	29.	-2.	0.000	430.22	-3.016E-01		
TL-208	583.28	42.	-14.	-0.004	409.05	-2.389E-01		P
BI-214	609.82	43.	-5.	-0.002	65.51	-1.777E-01		P
CS-137	661.18	26.	-2.	-0.001	315.31	-4.394E-02		
BI-212	727.54	15.	3.	0.001	175.40	7.512E-01		
PA-234M	767.70	10.	3.	0.001	149.95	1.978E+01		
EU-152	779.11	16.	5.	0.001	123.74	6.802E-01		
BI-212	786.87	21.	-3.	-0.001	210.00	-4.565E+00		
CS-134	802.68	19.	2.	0.001	328.40	4.041E-01		
TL-208	860.15	22.	1.	0.000	480.53	2.196E-01		
Pa-234	883.13	21.	-2.	-0.001	338.50	-4.085E-01		
AC-228	911.61	17.	4.	0.001	166.02	2.594E-01		
Pa-234	946.80	18.	-4.	-0.001	151.41	-6.543E-01		
EU-152	964.03	18.	1.	0.000	523.17	1.698E-01		
AC-228	969.10	12.	4.	0.001	130.87	5.054E-01		
EU-154	996.07	17.	-1.	0.000	477.94	-2.605E-01		
EU-154	1003.22	21.	-4.	-0.001	179.74	-4.612E-01		
CO-60	1174.19	17.	-4.	-0.001	160.65	-9.628E-02		
EU-154	1274.43	8.	3.	0.001	144.84	2.299E-01		
CO-60	1333.20	12.	1.	0.000	377.55	3.671E-02		
EU-152	1407.67	7.	1.	0.000	346.49	1.543E-01		
K-40	1461.85	25.	-1.	0.000	45.14	-2.624E-01		P

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-7.6956E-03	-7.6956E-03	1.058E+04%	3.00E+00
K-40	#A	-2.6244E-01	-2.6244E-01	7.269E+02%	7.36E+00
CO-60	#A	3.6707E-02	3.6707E-02	3.775E+02%	5.20E-01
I-131	#A	5.8577E-02	5.8578E-02	1.689E+02%	3.48E-01
CS-134	#A	2.1014E-02	2.1014E-02	3.284E+02%	4.77E-01
CS-137	#A	-4.3944E-02	-4.3944E-02	3.153E+02%	4.97E-01
EU-152	#A	4.9110E-01	4.9110E-01	7.240E+01%	1.00E+00
EU-154	#A	1.7043E-01	1.7043E-01	1.448E+02%	3.48E+00
EU-155	#A	-2.3523E-01	-2.3523E-01	1.601E+02%	1.28E+00
TL-208	#A	-1.8016E-01	-1.8016E-01	4.805E+02%	5.63E-01
PB-210	A	1.7323E+00	1.7323E+00	1.629E+02%	8.30E+00
PB-212	#A	1.9244E-01	1.9244E-01	1.434E+02%	8.41E-01
PB-214	#A	3.5604E-01	3.5604E-01	6.342E+01%	8.34E-01
BI-212	#A	7.5121E-01	7.5121E-01	1.754E+02%	4.74E+00
BI-214	#A	-1.7773E-01	-1.7773E-01	2.762E+02%	1.08E+00

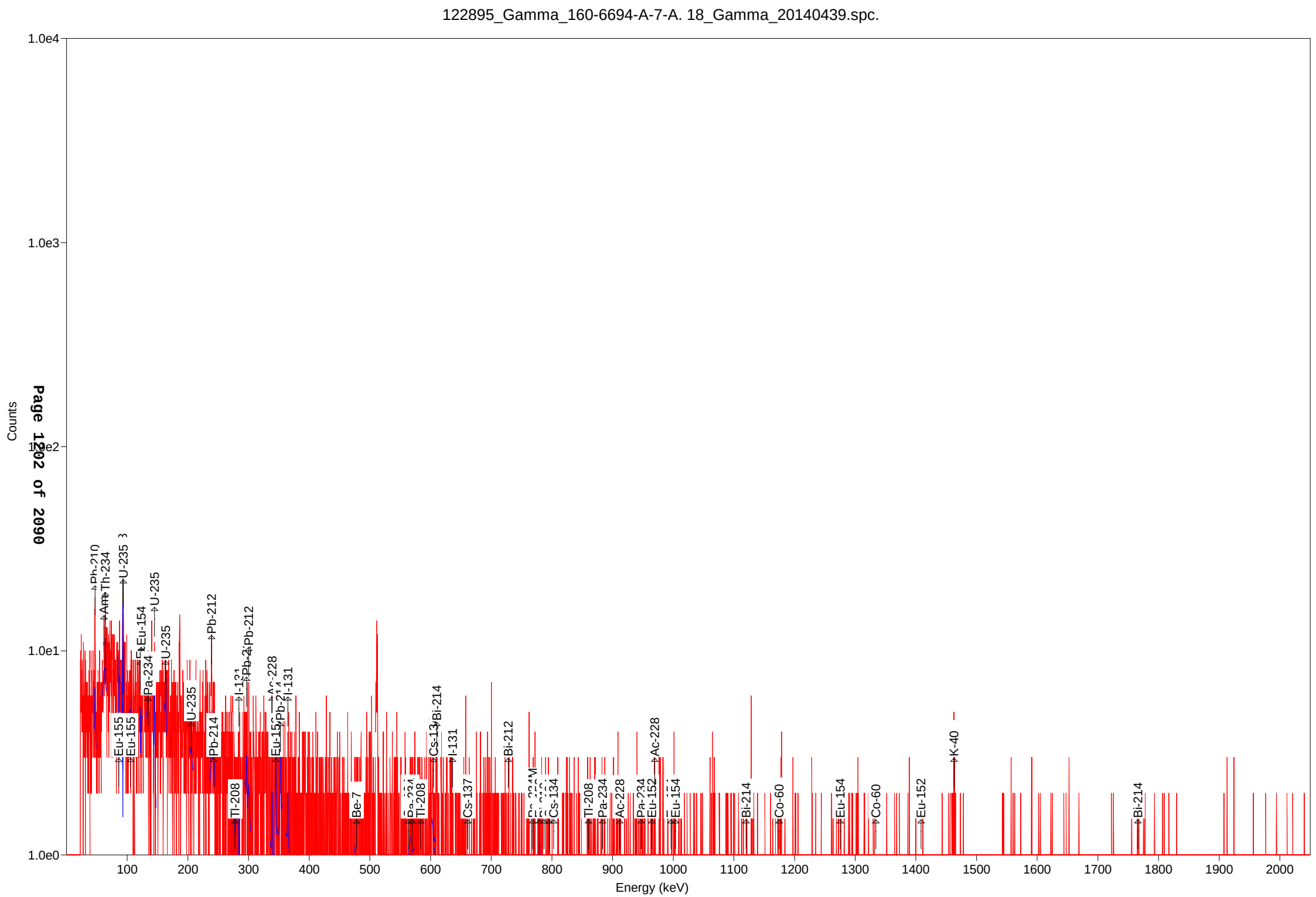
AC-228 #A	3.7532E-01	3.7532E-01	8.232E+01%	1.54E+00
Pa-234 #A	9.2921E-02	9.2921E-02	3.615E+02%	1.18E+00
TH-234 #A	2.8626E+00	2.8626E+00	1.138E+02%	9.07E+00
PA-234M#A	5.1422E+00	5.1422E+00	1.500E+02%	6.22E+01
U-235 A	1.2785E+00	1.2785E+00	5.177E+01%	1.96E+00
AM-241 #A	1.3951E-02	1.3951E-02	1.656E+03%	8.02E-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 (143.6 to 1999.5 keV) 0.000E+00 Bq/Sample
Total Decayed Activity (143.6 to 1999.5 keV) 0.0000000E+00 Bq/Sample

The library has energies which are not separable.


122895_Gamma_160-6694-A-7-A. 18_Gamma_20140439.spc.
Counts
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Pb-210
Am-241
Th-234
U-235
Eu-154
U-235
Pa-234
U-235
Pb-212
U-235
Eu-155
Eu-155
Pb-214
Tl-208
I-131
Pb-212
Eu-154
Pb-214
I-131
Be-7
Cs-134
Bi-214
Cs-137
I-131
Bi-212
Tl-208
Tl-208
Cs-134
Tl-208
Pa-234
Ac-228
Pa-234
Eu-152
Ac-228
Bi-214
Co-60
Eu-154
Co-60
Eu-152
K-40
Bi-214
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 12_Gamma_20141003

Sample Description: 122895_Gamma_160-6694-A-7-B DU
Detector: Ge12 S/N10034336
Batch ID: 122895
Work Order Number: Gamma
Lot Number: 160-6694-A-7-B DU

Decay to Time: 5/20/2014 15:10 Live Time: 3600 sec
Acquisition Time: 5/20/2014 15:11:10 Real Time: 3611 sec
Analysis Time: 5/20/2014 16:11 Dead Time: 0.30 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Liquid_Marinelli 1L.Clb
Efficiency Cal Desc: Ge12_Marn1LCal_90062_032612
Efficiency Cal Date: 4/2/2012 17:17
Energy Cal Date: 2/28/2012 13:26
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 12_2014-05-03_0618.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	8.707E-02	620.4	5.402E-01	5.402E-01	2.038E+00
K-40	-2.527E+00	2000.0	5.054E+01	5.054E+01	4.423E+00
CO-60	6.548E-02	152.0	9.951E-02	9.956E-02	3.673E-01
I-131	-8.778E-03	821.9	7.215E-02	7.215E-02	2.662E-01
CS-134	1.014E-01	56.5	5.729E-02	5.751E-02	4.028E-01
CS-137	-8.189E-03	1151.0	9.427E-02	9.427E-02	3.530E-01
EU-152	1.634E-01	149.7	2.445E-01	2.447E-01	8.823E-01
EU-154	6.429E-01	129.5	8.324E-01	8.330E-01	2.941E+00
EU-155	7.980E-02	332.7	2.655E-01	2.655E-01	9.268E-01
TL-208	-4.302E-02	335.8	1.445E-01	1.445E-01	4.094E-01
PB-210	5.717E+00	45.6	2.604E+00	2.655E+00	7.848E+00
PB-212	3.148E-01	78.2	2.462E-01	2.470E-01	6.828E-01
PB-214	3.750E-01	72.9	2.734E-01	2.741E-01	7.950E-01
BI-212	2.254E+00	61.6	1.388E+00	1.393E+00	3.805E+00
BI-214	-7.849E-02	386.5	3.033E-01	3.034E-01	9.264E-01
AC-228	-1.519E-01	289.9	4.403E-01	4.403E-01	1.347E+00
Pa-234	4.422E-01	56.5	2.500E-01	2.511E-01	1.082E+00
TH-234	3.493E+00	39.3	1.372E+00	1.385E+00	7.412E+00
PA-234M	3.639E-02	26750.0	9.737E+00	9.737E+00	4.296E+01
U-235	3.425E-01	73.1	2.505E-01	2.511E-01	1.832E+00
AM-241	1.826E-01	77.5	1.416E-01	1.420E-01	4.742E-01
Total	1.430E+01				

Analyst: April Bean

TestAmerica, Inc Spectrum name: 12_Gamma_20141003.An1

Sample description
122895_Gamma_160-6694-A-7-B DU

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20141003.An1

Acquisition information
Start time: 5/20/2014 3:11:10 PM
Live time: 3600
Real time: 3611
Dead time: 0.30 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Liquid_Marinelli 1L.Clb
Ge12_Marn1LCal_90062_032612

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 5:17:10 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.18 %
Log(Eff): -2.771167E+00 + (4.009767E-01*Log(E)) + (-8.911171E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.25 %
Log(Eff): -1.324587E+01 + (4.570937E+00*Log(E)) + (-5.039442E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 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

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	5/20/2014 3:10:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2014-05-03_0618.PBC 5/3/2014 6:18:35 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 10 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.2768

***** 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
46.84	38.	17.01	1.12	4.397E-02	46.54	4.250	PBC<MDA	PB210
61.84	12.	77.54	0.90	5.068E-02	59.54	35.900	PBC<MDA	AM241
63.18	18.	34.65	0.89	5.200E-02	63.29	3.810	PBC<MDA	TH234
92.89	90.	20.29	0.61	5.608E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	7.701E+00	U235
					93.35	5.561	6.999E+00	AC228
					93.35	5.810	7.701E+00	U235
					93.35	5.561	6.999E+00	AC228
105.52	3.	332.68	0.95	5.567E-02	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	7.980E-02	EU155
124.24	13.	76.00	0.96	5.394E-02	123.10	40.790	PBC<MDA	EU154
163.91	15.	73.13	1.00	4.786E-02	163.38	5.080	PBC<MDA	U235
					163.38	5.080	1.663E+00	U235
238.17	19.	30.15	0.62	3.889E-02	238.63	43.300	PBC<MDA	PB212
241.91	13.	66.84	1.07	3.858E-02	242.00	7.430	PBC<MDA	PB214
294.57	-4.	56.24	0.33	3.429E-02	295.09	19.300	PBC<MDA	PB214
352.22	9.	28.60	0.73	3.069E-02	351.93	37.600	PBC<MDA	PB214
476.45	1.	620.40	1.29	2.501E-02	477.60	10.520	PBC<MDA	BE7
570.31	11.	56.54	1.37	2.205E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.713E+00	Pa234
570.31	11.	56.47	1.37	2.206E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.714E+00	Pa234
583.75	-3.	59.01	1.38	2.168E-02	583.02	84.500	PBC<MDA	TL208
609.33	-3.	51.59	1.41	2.098E-02	609.31	46.090	PBC<MDA	BI214
727.32	6.	89.06	1.51	1.835E-02	727.17	7.550	PBC<MDA	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
767.56	-4.	292.38	1.54	1.762E-02	766.41	0.294	PBC<MDA	PA234M
786.62	7.	85.13	1.56	1.728E-02	785.42	1.280	PBC<MDA	BI212
796.72	5.	102.53	1.56	1.710E-02	795.87	85.530	PBC<MDA	CS134
801.79	4.	124.91	1.57	1.700E-02	801.95	8.690	PBC<MDA	CS134
874.34	5.	129.49	1.63	1.588E-02	873.23	12.270	PBC<MDA	EU154
911.59	-5.	108.06	1.66	1.535E-02	911.07	29.000	PBC<MDA	AC228
969.13	1.	93.49	1.71	1.459E-02	968.97	17.460	PBC<MDA	AC228
1002.03	0.	78.72	1.73	1.420E-02	1001.00	0.837	PBC<MDA	PA234M
1120.32	-5.	415.32	1.83	1.292E-02	1120.29	15.100	PBC<MDA	BI214
1332.68	3.	151.97	1.99	1.112E-02	1332.50	99.980	PBC<MDA	CO60
1408.04	3.	149.67	2.05	1.059E-02	1408.00	21.005	PBC<MDA	EU152

No unknown peaks passed sensitivity test.

This section based on library: Client_Routine Short Rev1.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	187.00	46.84	116.	38.	0.011	17.01	1.123s
AM-241	246.97	61.84	37.	12.	0.003	77.54	0.902s
TH-234	252.29	63.18	116.	18.	0.005	34.65	0.892
EU-155	345.41	86.48	82.	-9.	-0.002	147.09	0.928s
TH-234	371.03	92.89	100.	47.	0.013	20.29	0.607s
U-235	372.89	93.35	53.	64.	0.018	20.37	0.934D
AC-228	372.89	93.35	65.	52.	0.015	20.37	0.934D
EU-155	421.52	105.52	62.	3.	0.001	332.68	0.946s
EU-154	496.33	124.24	45.	13.	0.004	76.00	0.963s
Pa-234	525.51	131.54	54.	-5.	-0.001	227.66	0.970s
U-235	575.03	143.92	54.	-5.	-0.002	195.92	0.982s
U-235	654.92	163.91	49.	15.	0.004	73.13	1.001s
U-235	820.39	205.31	43.	-1.	0.000	876.01	1.040s
PB-212	951.73	238.17	69.	19.	0.005	30.15	0.619s
PB-214	966.69	241.91	57.	13.	0.003	66.84	1.075
PB-214	1177.22	294.57	34.	-4.	-0.001	56.24	0.327s
PB-212	1200.35	300.35	40.	-6.	-0.002	156.92	1.128s
PB-214	1407.70	352.22	42.	9.	0.002	28.60	0.734s
I-131	1467.81	367.25	20.	-1.	0.000	821.91	1.187s
BE-7	1904.45	476.45	13.	1.	0.000	620.40	1.289s
CS-134	2279.77	570.31	14.	11.	0.003	56.47	1.370s
Pa-234	2279.76	570.31	14.	11.	0.003	56.54	1.370s
TL-208	2333.52	583.75	27.	-3.	-0.001	59.01	1.382s
CS-134	2420.03	605.38	34.	-6.	-0.002	155.31	1.401s
BI-214	2435.81	609.33	40.	-3.	-0.001	51.59	1.405
EU-154	2902.00	725.88	22.	-4.	-0.001	174.14	1.503s
BI-212	2907.75	727.32	12.	6.	0.002	89.06	1.507s
PA-234M	3068.72	767.56	26.	-4.	-0.001	292.38	1.540s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	3144.94	786.62	12.	7.	0.002	85.13	1.556s
CS-134	3185.35	796.72	10.	5.	0.001	102.53	1.565s
CS-134	3205.63	801.79	9.	4.	0.001	124.91	1.570s
EU-154	3495.89	874.34	15.	5.	0.001	129.49	1.629s
Pa-234	3522.26	880.93	11.	-1.	0.000	750.25	1.635s
Pa-234	3530.10	882.89	15.	-3.	-0.001	214.66	1.637s
AC-228	3644.89	911.59	16.	-5.	-0.001	108.06	1.660s
EU-152	3854.80	964.05	22.	-4.	-0.001	186.32	1.703s
AC-228	3875.13	969.13	21.	1.	0.000	93.49	1.707s
EU-154	3969.30	992.66	10.	-3.	-0.001	154.05	1.729s
EU-154	4018.81	1005.04	15.	-3.	-0.001	174.55	1.736s
BI-214	4480.12	1120.32	20.	-5.	-0.001	415.32	1.828s
CO-60	4694.62	1173.91	15.	-2.	-0.001	246.95	1.869s
CO-60	5330.11	1332.68	7.	3.	0.001	151.97	1.990s
EU-152	5631.80	1408.04	8.	3.	0.001	149.67	2.046s

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	8.7069E-02				5.31E+01		
			477.60	8.707E-02	?(	2.038E+00	6.20E+02	1.05E+01 G
K-40	N	-2.5268E+00				4.66E+11		
			1460.83	-2.527E+00	%(P	4.423E+00	1.00E+03	1.07E+01 G
CO-60	F	6.5477E-02				1.93E+03		
			1332.50	6.548E-02	?(	3.673E-01	1.52E+02	1.00E+02 G
			1173.24	-5.234E-02	+	4.713E-01	2.47E+02	9.99E+01 G
I-131	I	-8.7783E-03				8.02E+00		
			364.48	-8.778E-03	&(	2.662E-01	8.22E+02	8.17E+01 G
			284.30	0.000E+00	&	3.817E+00	1.00E+03	6.14E+00 G
			636.97	1.051E-01	%	4.676E+00	1.21E+03	7.17E+00 G
CS-134	I	1.0144E-01				7.54E+02		
			604.71	-7.443E-02	?(	4.028E-01	1.55E+02	9.76E+01 G
			795.87	9.421E-02	&(	3.376E-01	1.03E+02	8.55E+01 G
			569.32	9.138E-01	&(	1.664E+00	5.65E+01	1.54E+01 G
			801.95	7.106E-01	&(	3.175E+00	1.25E+02	8.69E+00 G
			563.24	2.504E-02	%	3.270E+00	3.48E+03	8.35E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-137	I	-8.1885E-03					1.10E+04	
			661.66	-8.188E-03	%(	3.530E-01	1.15E+03	8.52E+01 G
EU-152	F	1.6336E-01					4.94E+03	
			344.29	1.078E-02	&(	8.823E-01	2.23E+03	2.65E+01 G
			121.78	-8.473E-03	%	7.172E-01	2.40E+03	2.86E+01 G
			778.92	-2.930E-02	%	2.471E+00	2.22E+03	1.29E+01 G
			964.11	-4.834E-01	+	3.202E+00	1.86E+02	1.46E+01 G
			1112.07	-4.160E-02	%	2.740E+00	1.70E+03	1.36E+01 G
			1408.00	3.558E-01	?(	1.950E+00	1.50E+02	2.10E+01 G
EU-154	I	6.4287E-01					3.14E+03	
			873.23	6.429E-01	&(	2.941E+00	1.29E+02	1.23E+01 G
			123.10	1.695E-01	&	4.305E-01	7.60E+01	4.08E+01 G
			1274.54	-2.794E-03	%	1.234E+00	1.14E+04	3.52E+01 G
			723.36	-2.982E-01	-	1.841E+00	1.74E+02	2.02E+01 G
			1004.77	-3.580E-01	-	2.249E+00	1.75E+02	1.80E+01 G
			996.33	-5.848E-01	+	3.263E+00	1.54E+02	1.06E+01 G
EU-155	I	7.9795E-02					1.81E+03	
			105.31	7.980E-02	?(	9.268E-01	3.33E+02	2.12E+01 G
			86.54	-1.449E-01	+	7.278E-01	1.47E+02	3.07E+01 G
TL-208	N	-4.3018E-02					6.98E+02	
			583.02	-4.302E-02	?(P	4.094E-01	5.90E+01	8.45E+01 G
			277.28	8.591E-02	%	3.910E+00	1.27E+03	6.31E+00 G
			860.56	0.000E+00	+	2.921E+00	1.00E+03	1.24E+01 G
PB-210	N	5.7165E+00					8.14E+03	
			46.54	5.717E+00	@(P	7.848E+00	1.70E+01	4.25E+00 G
PB-212	N	3.1477E-01					6.98E+02	
			238.63	3.148E-01	@(P	6.828E-01	3.02E+01	4.33E+01 G
			300.03	-1.482E+00	+	8.074E+00	1.57E+02	3.28E+00 G
PB-214	N	3.7504E-01					5.84E+05	
			351.93	2.086E-01	(P	7.950E-01	2.86E+01	3.76E+01 G
			295.09	-1.557E-01	- P	1.250E+00	5.62E+01	1.93E+01 G
			242.00	1.217E+00	(P	3.678E+00	6.68E+01	7.43E+00 G
BI-212	N	2.2536E+00					6.98E+02	
			727.17	1.245E+00	?(	3.805E+00	8.91E+01	7.55E+00 G
			785.42	8.202E+00	?(	2.384E+01	8.51E+01	1.28E+00 G
BI-214	N	-7.8489E-02					5.84E+05	
			609.31	-7.849E-02	(P	9.264E-01	5.16E+01	4.61E+01 G
			1120.29	-7.080E-01	+ P	3.352E+00	4.15E+02	1.51E+01 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
			1764.49	-1.308E+00 %	P	3.005E+00	1.00E+03	1.54E+01	G
AC-228	N	-1.5187E-01						2.10E+03	
			911.07	-3.240E-01 &(	P	1.347E+00	1.08E+02	2.90E+01	G
			968.97	1.341E-01 &(	P	2.608E+00	9.35E+01	1.75E+01	G
			338.32	-7.766E-01 %	P	2.308E+00	1.00E+03	1.20E+01	G
								Energy duplication	
			93.35	4.670E+00 *	P	3.592E+00	2.04E+01	5.56E+00	XA
Pa-234	N	4.4221E-01						1.63E+12	
			131.29	-1.365E-01 &(		1.082E+00	2.28E+02	1.80E+01	G
			569.47	1.713E+00 (		3.122E+00	5.65E+01	8.20E+00	G
			946.02	0.000E+00 -		1.027E+00	1.00E+03	1.34E+01	G
			883.24	-4.941E-01 +		3.849E+00	2.15E+02	9.60E+00	G
			880.53	-1.890E-01 +		5.404E+00	7.50E+02	6.00E+00	G
TH-234	N	3.4932E+00						1.63E+12	
			63.29	2.547E+00 (P		7.412E+00	3.46E+01	3.81E+00	G
			92.59	4.139E+00 *(P		4.381E+00	2.03E+01	5.58E+00	G
PA-234M	N	3.6394E-02						1.63E+12	
			1001.00	3.639E-02 &(P		4.296E+01	7.87E+01	8.37E-01	G
			766.41	-2.289E+01 + P		1.417E+02	2.92E+02	2.94E-01	G
U-235	N	3.4254E-01						2.57E+11	
			143.79	-2.694E-01 ?(		1.832E+00	1.96E+02	1.10E+01	G
			205.33	-1.394E-01 +		4.354E+00	8.76E+02	5.01E+00	G
			163.38	1.663E+00 &(		4.050E+00	7.31E+01	5.08E+00	G
								Energy duplication	
			93.35	5.471E+00 *		3.134E+00	2.04E+01	5.81E+00	X
AM-241	T	1.8258E-01						1.58E+05	
			59.54	1.826E-01 (		4.742E-01	7.75E+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:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

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

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	61.84	37.	12.	0.003	77.54	1.826E-01	
EU-155	86.48	82.	-9.	-0.002	147.09	-1.449E-01	
U-235	93.35	53.	64.	0.018	20.37	5.471E+00	
AC-228	93.35	65.	52.	0.015	20.37	4.670E+00	P
EU-155	105.52	62.	3.	0.001	332.68	7.980E-02	
EU-154	124.24	45.	13.	0.004	76.00	1.695E-01	
Pa-234	131.54	54.	-5.	-0.001	227.66	-1.365E-01	
U-235	143.92	54.	-5.	-0.002	195.92	-2.694E-01	
U-235	163.91	49.	15.	0.004	73.13	1.663E+00	
U-235	205.31	43.	-1.	0.000	876.01	-1.394E-01	
I-131	367.25	20.	-1.	0.000	821.91	-8.778E-03	
BE-7	476.45	13.	1.	0.000	620.40	8.707E-02	
CS-134	570.31	14.	11.	0.003	56.47	9.138E-01	
Pa-234	570.31	14.	11.	0.003	56.54	1.713E+00	
TL-208	583.75	27.	-3.	-0.001	59.01	-4.302E-02	P
CS-134	605.38	34.	-6.	-0.002	155.31	-7.443E-02	
BI-214	609.33	40.	-3.	-0.001	51.59	-7.849E-02	P
EU-154	725.88	22.	-4.	-0.001	174.14	-2.982E-01	
BI-212	727.32	12.	6.	0.002	89.06	1.245E+00	
PA-234M	767.56	26.	-4.	-0.001	292.38	-2.289E+01	P
BI-212	786.62	12.	7.	0.002	85.13	8.202E+00	
CS-134	796.72	10.	5.	0.001	102.53	9.421E-02	
CS-134	801.79	9.	4.	0.001	124.91	7.106E-01	
EU-154	874.34	15.	5.	0.001	129.49	6.429E-01	
Pa-234	880.93	11.	-1.	0.000	750.25	-1.890E-01	
Pa-234	882.89	15.	-3.	-0.001	214.66	-4.941E-01	
AC-228	911.59	16.	-5.	-0.001	108.06	-3.240E-01	P
EU-152	964.05	22.	-4.	-0.001	186.32	-4.834E-01	
AC-228	969.13	21.	1.	0.000	93.49	1.341E-01	P
EU-154	992.66	10.	-3.	-0.001	154.05	-5.848E-01	
EU-154	1005.04	15.	-3.	-0.001	174.55	-3.580E-01	
BI-214	1120.32	20.	-5.	-0.001	415.32	-7.080E-01	P
CO-60	1173.91	15.	-2.	-0.001	246.95	-5.234E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	1332.68		7.	3.	0.001	151.97	6.548E-02
EU-152	1408.04		8.	3.	0.001	149.67	3.558E-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 *****

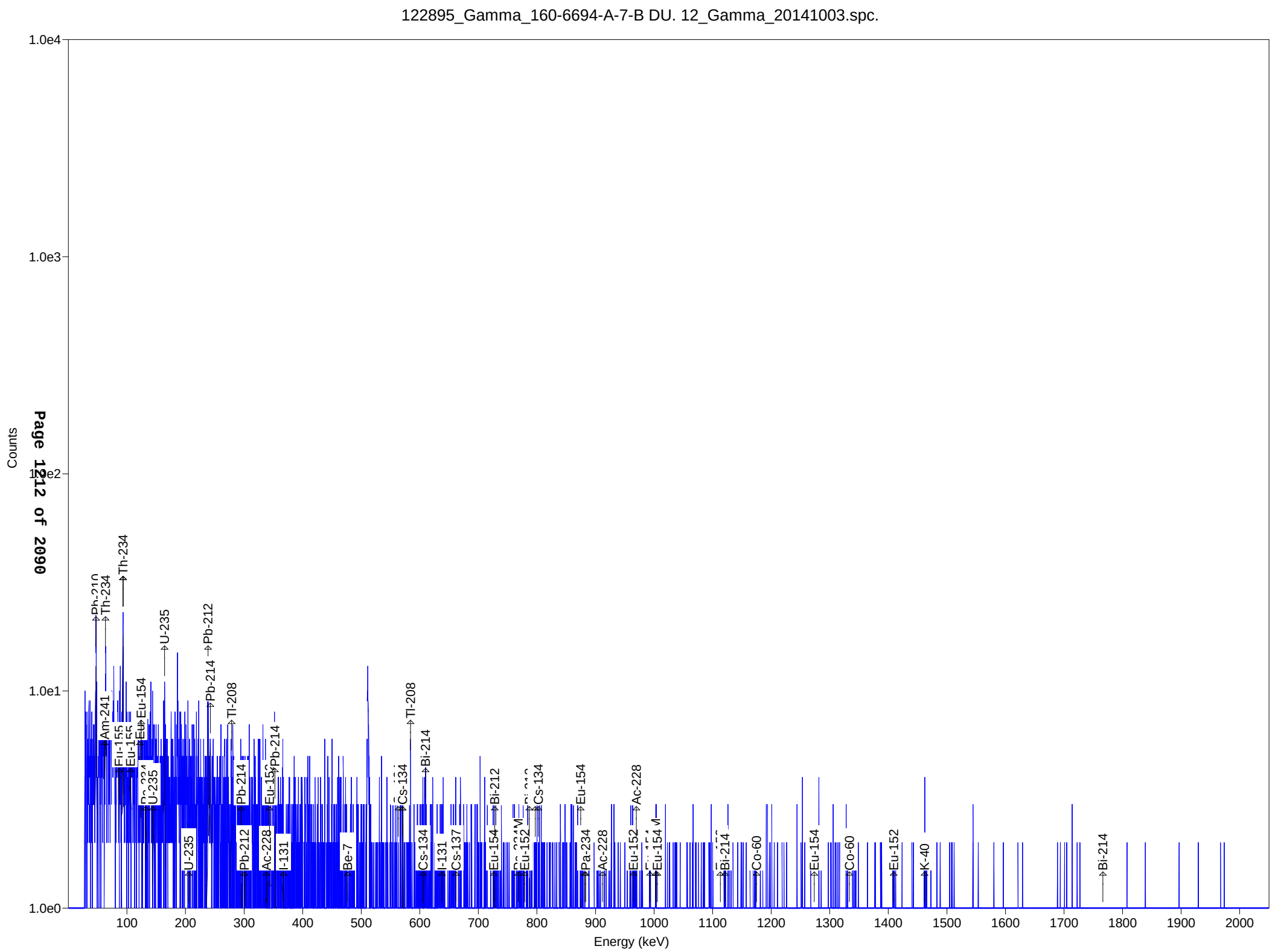
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	8.7068E-02	8.7069E-02	6.204E+02%	2.04E+00
K-40	#A	-2.5268E+00	-2.5268E+00	2.000E+03%	4.42E+00
CO-60	#A	6.5477E-02	6.5477E-02	1.520E+02%	3.67E-01
I-131	#A	-8.7777E-03	-8.7783E-03	8.219E+02%	2.66E-01
CS-134	#A	1.0144E-01	1.0144E-01	5.647E+01%	4.03E-01
CS-137	#A	-8.1885E-03	-8.1885E-03	1.151E+03%	3.53E-01
EU-152	#A	1.6336E-01	1.6336E-01	1.497E+02%	8.82E-01
EU-154	#A	6.4287E-01	6.4287E-01	1.295E+02%	2.94E+00
EU-155	#A	7.9795E-02	7.9795E-02	3.327E+02%	9.27E-01
TL-208	#A	-4.3018E-02	-4.3018E-02	3.358E+02%	4.09E-01
PB-210	#A	5.7165E+00	5.7165E+00	4.556E+01%	7.85E+00
PB-212	#A	3.1477E-01	3.1477E-01	7.821E+01%	6.83E-01
PB-214	A	3.7504E-01	3.7504E-01	7.290E+01%	7.95E-01
BI-212	#A	2.2536E+00	2.2536E+00	6.160E+01%	3.81E+00
BI-214	#A	-7.8489E-02	-7.8489E-02	3.865E+02%	9.26E-01
AC-228	#A	-1.5187E-01	-1.5187E-01	2.899E+02%	1.35E+00
Pa-234	#A	4.4221E-01	4.4221E-01	5.654E+01%	1.08E+00
TH-234	A	3.4932E+00	3.4932E+00	3.928E+01%	7.41E+00
PA-234M	#A	3.6394E-02	3.6394E-02	2.675E+04%	4.30E+01
U-235	#A	3.4254E-01	3.4254E-01	7.313E+01%	1.83E+00
AM-241	#A	1.8258E-01	1.8258E-01	7.754E+01%	4.74E-01

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

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

Total Activity (37.6 to 1999.4 keV) 5.717E+00 Bq/Sample
Total Decayed Activity (37.6 to 1999.4 keV) 5.7165465E+00 Bq/Sample

The library has energies which are not separable.


122895_Gamma_160-6694-A-7-B DU. 12_Gamma_20141003.spc.
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
Page 1212 of 2090
Pb-210
Th-234
Am-241
Th-234
Eu-155
Eu-155
Eu-154
Pa-234
U-235
U-235
Pb-214
Pb-212
Tl-208
Pb-214
Pb-212
Ac-228
Eu-152
Pb-214
I-131
Be-7
Cs-134
Tl-208
Cs-134
Bi-214
I-131
Cs-137
Eu-154
Bi-212
Eu-152
Cs-134
Eu-154
Pa-234
Ac-228
Ac-228
Eu-152
Eu-154
Bi-214
Co-60
Eu-154
Co-60
Eu-152
K-40
Bi-214
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122895 Batch Start Date: 05/19/14 12:24 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-0 Batch End Date: 05/19/14 13:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	GrossWeight	Geometry	1L Marn 00008		
MB 160-122895/1		Fill_Geo-0, GA-01-R		1000 mL	1000 mL	1L Marn			
LCS 160-122895/2		Fill_Geo-0, GA-01-R		1000 mL	1000 mL	1L Marn	# mL		
160-6694-A-7	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			
160-6694-A-7 DU	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			

Batch Notes	
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.

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160-6694-A-7	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			
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160-6694-A-7	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			
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LCS 160-122895/2		Fill_Geo-0, GA-01-R		1000 mL	1000 mL	1L Marn	# mL		
160-6694-A-7	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			
160-6694-A-7 DU	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			

Batch Notes	
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LCS 160-122895/2		Fill_Geo-0, GA-01-R		1000 mL	1000 mL	1L Marn	# mL		
160-6694-A-7	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			
160-6694-A-7 DU	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			

Batch Notes	
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LCS 160-122895/2		Fill_Geo-0, GA-01-R		1000 mL	1000 mL	1L Marn	# mL		
160-6694-A-7	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			
160-6694-A-7 DU	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			

Batch Notes	
SOP Number	ST-RC-0025

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SDG No.:

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Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	GrossWeight	Geometry	1L Marn 00008		
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LCS 160-122895/2		Fill_Geo-0, GA-01-R		1000 mL	1000 mL	1L Marn	# mL		
160-6694-A-7	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			
160-6694-A-7 DU	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			

Batch Notes	
SOP Number	ST-RC-0025

Basis	Basis Description
T	Total/NA

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Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

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Batch Method: Fill_Geo-0 Batch End Date: 05/19/14 13:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	GrossWeight	Geometry	1L Marn 00008		
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LCS 160-122895/2		Fill_Geo-0, GA-01-R		1000 mL	1000 mL	1L Marn	# mL		
160-6694-A-7	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			
160-6694-A-7 DU	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			

Batch Notes	
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.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122895 Batch Start Date: 05/19/14 12:24 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-0 Batch End Date: 05/19/14 13:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	GrossWeight	Geometry	1L Marn 00008		
MB 160-122895/1		Fill_Geo-0, GA-01-R		1000 mL	1000 mL	1L Marn			
LCS 160-122895/2		Fill_Geo-0, GA-01-R		1000 mL	1000 mL	1L Marn	# mL		
160-6694-A-7	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			
160-6694-A-7 DU	2222-RIN-01	Fill_Geo-0, GA-01-R	T	1000 mL	1000 mL	1L Marn			

Batch Notes	
SOP Number	ST-RC-0025

Basis	Basis Description
T	Total/NA

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Method GA-01-R
Ra-226

Radium-226 & Other Gamma Emitters (GS) by Method GA-01-R

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123290 Batch Start Date: 05/21/14 11:19 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-0 Batch End Date: 05/21/14 13:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	TareWeight	GrossWeight	Geometry	Tuna Can LCS 00003	
MB 160-123290/1		Fill_Geo-0, GA-01-R		291.18 g			tuna can		
LCS 160-123290/2		Fill_Geo-0, GA-01-R		341.9 g			tuna can	# g	
160-6694-A-1-A	2222-SD01	Fill_Geo-0, GA-01-R	T	331.8 g	46.02 g	377.82 g	tuna can		
160-6694-A-1-A DU	2222-SD01	Fill_Geo-0, GA-01-R	T	331.8 g	46.02 g	377.82 g	tuna can		
160-6694-A-2-A	2222-SD02	Fill_Geo-0, GA-01-R	T	401.13 g	45.92 g	447.05 g	tuna can		
160-6694-A-3-A	2222-SD03	Fill_Geo-0, GA-01-R	T	212.91 g	46.07 g	258.98 g	tuna can		
160-6694-A-4-A	2222-SD04	Fill_Geo-0, GA-01-R	T	192.24 g	46.46 g	238.70 g	tuna can		
160-6694-A-5-A	2222-SD05	Fill_Geo-0, GA-01-R	T	419.97 g	45.90 g	465.87 g	tuna can		
160-6694-A-6-A	2222-SD06	Fill_Geo-0, GA-01-R	T	204.66 g	46.10 g	250.76 g	tuna can		

Batch Notes	
Balance ID	1125353055
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.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123290 Batch Start Date: 05/21/14 11:19 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-0 Batch End Date: 05/21/14 13:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	TareWeight	GrossWeight	Geometry	Tuna Can LCS 00003	
MB 160-123290/1		Fill_Geo-0, GA-01-R		291.18 g			tuna can		
LCS 160-123290/2		Fill_Geo-0, GA-01-R		341.9 g			tuna can	# g	
160-6694-A-1-A	2222-SD01	Fill_Geo-0, GA-01-R	T	331.8 g	46.02 g	377.82 g	tuna can		
160-6694-A-1-A DU	2222-SD01	Fill_Geo-0, GA-01-R	T	331.8 g	46.02 g	377.82 g	tuna can		
160-6694-A-2-A	2222-SD02	Fill_Geo-0, GA-01-R	T	401.13 g	45.92 g	447.05 g	tuna can		
160-6694-A-3-A	2222-SD03	Fill_Geo-0, GA-01-R	T	212.91 g	46.07 g	258.98 g	tuna can		
160-6694-A-4-A	2222-SD04	Fill_Geo-0, GA-01-R	T	192.24 g	46.46 g	238.70 g	tuna can		
160-6694-A-5-A	2222-SD05	Fill_Geo-0, GA-01-R	T	419.97 g	45.90 g	465.87 g	tuna can		
160-6694-A-6-A	2222-SD06	Fill_Geo-0, GA-01-R	T	204.66 g	46.10 g	250.76 g	tuna can		

Batch Notes	
Balance ID	1125353055
SOP Number	ST-RC-0003, ST-RC-0025

Basis	Basis Description
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GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

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Batch Method: Fill_Geo-0 Batch End Date: 05/21/14 13:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	TareWeight	GrossWeight	Geometry	Tuna Can LCS 00003	
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160-6694-A-1-A	2222-SD01	Fill_Geo-0, GA-01-R	T	331.8 g	46.02 g	377.82 g	tuna can		
160-6694-A-1-A DU	2222-SD01	Fill_Geo-0, GA-01-R	T	331.8 g	46.02 g	377.82 g	tuna can		
160-6694-A-2-A	2222-SD02	Fill_Geo-0, GA-01-R	T	401.13 g	45.92 g	447.05 g	tuna can		
160-6694-A-3-A	2222-SD03	Fill_Geo-0, GA-01-R	T	212.91 g	46.07 g	258.98 g	tuna can		
160-6694-A-4-A	2222-SD04	Fill_Geo-0, GA-01-R	T	192.24 g	46.46 g	238.70 g	tuna can		
160-6694-A-5-A	2222-SD05	Fill_Geo-0, GA-01-R	T	419.97 g	45.90 g	465.87 g	tuna can		
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Batch Notes	
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160-6694-A-3-A	2222-SD03	Fill_Geo-0, GA-01-R	T	212.91 g	46.07 g	258.98 g	tuna can		
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160-6694-A-5-A	2222-SD05	Fill_Geo-0, GA-01-R	T	419.97 g	45.90 g	465.87 g	tuna can		
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Batch Notes	
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SOP Number	ST-RC-0003, ST-RC-0025

Basis	Basis Description
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LCS 160-123290/2		Fill_Geo-0, GA-01-R		341.9 g			tuna can	# g	
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160-6694-A-1-A DU	2222-SD01	Fill_Geo-0, GA-01-R	T	331.8 g	46.02 g	377.82 g	tuna can		
160-6694-A-2-A	2222-SD02	Fill_Geo-0, GA-01-R	T	401.13 g	45.92 g	447.05 g	tuna can		
160-6694-A-3-A	2222-SD03	Fill_Geo-0, GA-01-R	T	212.91 g	46.07 g	258.98 g	tuna can		
160-6694-A-4-A	2222-SD04	Fill_Geo-0, GA-01-R	T	192.24 g	46.46 g	238.70 g	tuna can		
160-6694-A-5-A	2222-SD05	Fill_Geo-0, GA-01-R	T	419.97 g	45.90 g	465.87 g	tuna can		
160-6694-A-6-A	2222-SD06	Fill_Geo-0, GA-01-R	T	204.66 g	46.10 g	250.76 g	tuna can		

Batch Notes	
Balance ID	1125353055
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.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123290 Batch Start Date: 05/21/14 11:19 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-0 Batch End Date: 05/21/14 13:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	TareWeight	GrossWeight	Geometry	Tuna Can LCS 00003	
MB 160-123290/1		Fill_Geo-0, GA-01-R		291.18 g			tuna can		
LCS 160-123290/2		Fill_Geo-0, GA-01-R		341.9 g			tuna can	# g	
160-6694-A-1-A	2222-SD01	Fill_Geo-0, GA-01-R	T	331.8 g	46.02 g	377.82 g	tuna can		
160-6694-A-1-A DU	2222-SD01	Fill_Geo-0, GA-01-R	T	331.8 g	46.02 g	377.82 g	tuna can		
160-6694-A-2-A	2222-SD02	Fill_Geo-0, GA-01-R	T	401.13 g	45.92 g	447.05 g	tuna can		
160-6694-A-3-A	2222-SD03	Fill_Geo-0, GA-01-R	T	212.91 g	46.07 g	258.98 g	tuna can		
160-6694-A-4-A	2222-SD04	Fill_Geo-0, GA-01-R	T	192.24 g	46.46 g	238.70 g	tuna can		
160-6694-A-5-A	2222-SD05	Fill_Geo-0, GA-01-R	T	419.97 g	45.90 g	465.87 g	tuna can		
160-6694-A-6-A	2222-SD06	Fill_Geo-0, GA-01-R	T	204.66 g	46.10 g	250.76 g	tuna can		

Batch Notes	
Balance ID	1125353055
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.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123290 Batch Start Date: 05/21/14 11:19 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-0 Batch End Date: 05/21/14 13:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	TareWeight	GrossWeight	Geometry	Tuna Can LCS 00003	
MB 160-123290/1		Fill_Geo-0, GA-01-R		291.18 g			tuna can		
LCS 160-123290/2		Fill_Geo-0, GA-01-R		341.9 g			tuna can	# g	
160-6694-A-1-A	2222-SD01	Fill_Geo-0, GA-01-R	T	331.8 g	46.02 g	377.82 g	tuna can		
160-6694-A-1-A DU	2222-SD01	Fill_Geo-0, GA-01-R	T	331.8 g	46.02 g	377.82 g	tuna can		
160-6694-A-2-A	2222-SD02	Fill_Geo-0, GA-01-R	T	401.13 g	45.92 g	447.05 g	tuna can		
160-6694-A-3-A	2222-SD03	Fill_Geo-0, GA-01-R	T	212.91 g	46.07 g	258.98 g	tuna can		
160-6694-A-4-A	2222-SD04	Fill_Geo-0, GA-01-R	T	192.24 g	46.46 g	238.70 g	tuna can		
160-6694-A-5-A	2222-SD05	Fill_Geo-0, GA-01-R	T	419.97 g	45.90 g	465.87 g	tuna can		
160-6694-A-6-A	2222-SD06	Fill_Geo-0, GA-01-R	T	204.66 g	46.10 g	250.76 g	tuna can		

Batch Notes	
Balance ID	1125353055
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.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123290 Batch Start Date: 05/21/14 11:19 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-0 Batch End Date: 05/21/14 13:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	TareWeight	GrossWeight	Geometry	Tuna Can LCS 00003	
MB 160-123290/1		Fill_Geo-0, GA-01-R		291.18 g			tuna can		
LCS 160-123290/2		Fill_Geo-0, GA-01-R		341.9 g			tuna can	# g	
160-6694-A-1-A	2222-SD01	Fill_Geo-0, GA-01-R	T	331.8 g	46.02 g	377.82 g	tuna can		
160-6694-A-1-A DU	2222-SD01	Fill_Geo-0, GA-01-R	T	331.8 g	46.02 g	377.82 g	tuna can		
160-6694-A-2-A	2222-SD02	Fill_Geo-0, GA-01-R	T	401.13 g	45.92 g	447.05 g	tuna can		
160-6694-A-3-A	2222-SD03	Fill_Geo-0, GA-01-R	T	212.91 g	46.07 g	258.98 g	tuna can		
160-6694-A-4-A	2222-SD04	Fill_Geo-0, GA-01-R	T	192.24 g	46.46 g	238.70 g	tuna can		
160-6694-A-5-A	2222-SD05	Fill_Geo-0, GA-01-R	T	419.97 g	45.90 g	465.87 g	tuna can		
160-6694-A-6-A	2222-SD06	Fill_Geo-0, GA-01-R	T	204.66 g	46.10 g	250.76 g	tuna can		

Batch Notes	
Balance ID	1125353055
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.

Prep Batch: 123290

Fill Geometry, No In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 123290

Lab ID: MB 160-123290/1-A | Analyzed: 05/21/14 12:20 | Ts: 30 | Sigma: 2
Client ID: | Detector: GV5 | Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.3399	0.705	0.707	U	pCi/g	1.00	1.23	123298
Radium-228	0.0000	0.0468	0.0468	U	pCi/g		0.173	123298
Lead-210	0.8642	0.905	0.911	U	pCi/g		1.57	123298
Lead-212	-0.007971	0.0561	0.0561	U	pCi/g		0.110	123298
Lead-214	-0.04299	1.29	1.29	U	pCi/g		0.192	123298

Lab ID: LCS 160-123290/2-A | Analyzed: 05/21/14 12:20 | Ts: 30 | Sigma: 2
Client ID: | Detector: GV4 | Decay Corrected: No

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	103.6	2.05	11.0		pCi/g		1.44	123327
Cesium-137	30.03	1.02	3.29		pCi/g		0.382	123327
Cobalt-60	22.05	0.728	2.33		pCi/g		0.0869	123327

Lab ID: 160-6694-1 | Analyzed: 05/21/14 12:22 | Ts: 30 | Sigma: 2
Client ID: 2222-SD01 | Detector: GV15 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.780	1.07	1.08	U	pCi/g	1.00	1.87	123296
Radium-228	0.628	0.189	0.199		pCi/g		0.322	123296
Lead-210	0.877	1.34	1.35	U	pCi/g		2.40	123296
Lead-212	0.586	0.159	0.176		pCi/g		0.161	123296
Lead-214	0.451	0.143	0.150		pCi/g		0.174	123296

Lab ID: 160-6694-1 DU | Analyzed: 05/21/14 14:28 | Ts: 30 | Sigma: 2
Client ID: 2222-SD01 | Detector: GV9 | Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	1.162	0.827	0.852	U	pCi/g	1.00	1.29	123245
Radium-228	0.7152	0.177	0.192		pCi/g		0.0811	123245
Lead-210	0.4692	0.966	0.968	U	pCi/g		1.64	123245
Lead-212	0.5914	0.107	0.131		pCi/g		0.0950	123245
Lead-214	0.5125	0.125	0.135		pCi/g		0.121	123245

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 123290

Lab ID: 160-6694-2 | Analyzed: 05/21/14 14:32 | Ts: 30 | Sigma: 2
Client ID: 2222-SD02 | Detector: GV12 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.231	0.799	0.800	U	pCi/g	1.00	1.44	123247
Radium-228	0.647	0.160	0.173		pCi/g		0.208	123247
Lead-210	-0.270	1.54	1.54	U	pCi/g		1.95	123247
Lead-212	0.472	0.110	0.126		pCi/g		0.119	123247
Lead-214	0.450	0.116	0.125		pCi/g		0.119	123247

Lab ID: 160-6694-3 | Analyzed: 05/21/14 14:26 | Ts: 30 | Sigma: 2
Client ID: 2222-SD03 | Detector: GV15 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	2.86	2.01	2.07		pCi/g	1.00	2.56	123296
Radium-228	0.913	0.302	0.316		pCi/g		0.507	123296
Lead-210	4.29	2.24	2.29		pCi/g		3.09	123296
Lead-212	0.619	0.197	0.213		pCi/g		0.219	123296
Lead-214	0.754	0.184	0.200		pCi/g		0.163	123296

Lab ID: 160-6694-4 | Analyzed: 05/21/14 14:27 | Ts: 30 | Sigma: 2
Client ID: 2222-SD04 | Detector: GV17 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	4.76	1.85	2.02		pCi/g	1.00	1.96	123294
Radium-228	0.763	0.243	0.255		pCi/g		0.369	123294
Lead-210	4.05	2.62	2.67		pCi/g		3.95	123294
Lead-212	0.767	0.169	0.196		pCi/g		0.195	123294
Lead-214	0.690	0.186	0.200		pCi/g		0.213	123294

Lab ID: 160-6694-5 | Analyzed: 05/21/14 15:46 | Ts: 30 | Sigma: 2
Client ID: 2222-SD05 | Detector: GV4 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.109	1.08	1.09	U	pCi/g	1.00	2.00	123327
Radium-228	0.554	0.221	0.229		pCi/g		0.176	123327
Lead-210	1.53	1.41	1.43	U	pCi/g		2.16	123327
Lead-212	0.450	0.121	0.134		pCi/g		0.121	123327
Lead-214	0.353	0.107	0.113		pCi/g		0.166	123327

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 123290

Lab ID: 160-6694-6 Analyzed: 05/21/14 15:45 Ts: 30 Sigma: 2
Client ID: 2222-SD06 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	2.93	1.63	1.71		pCi/g	1.00	1.92	123299
Radium-228	0.608	0.220	0.229		pCi/g		0.434	123299
Lead-210	3.67	1.60	1.66		pCi/g		2.17	123299
Lead-212	0.811	0.204	0.229		pCi/g		0.194	123299
Lead-214	0.664	0.159	0.174		pCi/g		0.155	123299

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 160-123290/1-A	Radium-226			0.3399	U	pCi/g							
MB 160-123290/1-A	Radium-228			0.0000	U	pCi/g							
MB 160-123290/1-A	Lead-210			0.8642	U	pCi/g							
MB 160-123290/1-A	Lead-212			-0.007971	U	pCi/g							
MB 160-123290/1-A	Lead-214			-0.04299	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-123290/2-A	Americium-241		97.4	103.6		pCi/g	106	87 - 116					
LCS 160-123290/2-A	Cesium-137		31.1	30.03		pCi/g	97	87 - 120					
LCS 160-123290/2-A	Cobalt-60		22.4	22.05		pCi/g	98	87 - 115					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-6694-1	Radium-226	0.780		1.162	U	pCi/g			39	0.20	0.56	1	
160-6694-1	Radium-228	0.628		0.7152		pCi/g			13	0.22	0.63	1	
160-6694-1	Lead-210	0.877		0.4692	U	pCi/g			61	0.18	0.49	1	
160-6694-1	Lead-212	0.586		0.5914		pCi/g			0.8	0.02	0.04	1	
160-6694-1	Lead-214	0.451		0.5125		pCi/g			13	0.22	0.61	1	

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123290 Batch Start Date: 05/21/14 11:19 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-0 Batch End Date: 05/21/14 13:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	TareWeight	GrossWeight	Geometry	Tuna Can LCS 00003	
MB 160-123290/1		Fill_Geo-0, GA-01-R		291.18 g			tuna can		
LCS 160-123290/2		Fill_Geo-0, GA-01-R		341.9 g			tuna can	# g	
160-6694-A-1-A	2222-SD01	Fill_Geo-0, GA-01-R	T	331.8 g	46.02 g	377.82 g	tuna can		
160-6694-A-1-A DU	2222-SD01	Fill_Geo-0, GA-01-R	T	331.8 g	46.02 g	377.82 g	tuna can		
160-6694-A-2-A	2222-SD02	Fill_Geo-0, GA-01-R	T	401.13 g	45.92 g	447.05 g	tuna can		
160-6694-A-3-A	2222-SD03	Fill_Geo-0, GA-01-R	T	212.91 g	46.07 g	258.98 g	tuna can		
160-6694-A-4-A	2222-SD04	Fill_Geo-0, GA-01-R	T	192.24 g	46.46 g	238.70 g	tuna can		
160-6694-A-5-A	2222-SD05	Fill_Geo-0, GA-01-R	T	419.97 g	45.90 g	465.87 g	tuna can		
160-6694-A-6-A	2222-SD06	Fill_Geo-0, GA-01-R	T	204.66 g	46.10 g	250.76 g	tuna can		

Batch Notes	
Balance ID	1125353055
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: 5_Gamma_20141021

Sample Description: 123290_Gamma_MB 160-123290~1-A
Detector: Ge 5 SN/157
Batch ID: 123290
Work Order Number: Gamma
Lot Number: MB 160-123290~1-A

Decay to Time: 5/21/2014 12:20 Live Time: 1800 sec
Acquisition Time: 5/21/2014 12:20:54 Real Time: 1805 sec
Analysis Time: 5/21/2014 18:51 Dead Time: 0.27 %
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_Short_no ingrowth Rev2.li
Bkgd Correction File: 5_2014-05-03_0559.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	-2.038E-02	7459.0	1.520E+00	1.520E+00	6.099E+00
K-40	-3.146E+00	2000.0	6.292E+01	6.292E+01	1.111E+01
CO-60	2.878E-01	95.6	2.752E-01	2.756E-01	9.854E-01
I-131	-3.229E-02	543.0	1.754E-01	1.754E-01	6.779E-01
CS-134	2.447E-01	97.7	2.392E-01	2.395E-01	8.368E-01
CS-137	-2.135E-01	2000.0	4.270E+00	4.270E+00	1.139E+00
EU-152	2.669E-02	2018.0	5.386E-01	5.386E-01	2.097E+00
EU-154	1.952E-01	160.6	3.134E-01	3.136E-01	4.242E+00
EU-155	2.171E-01	146.8	3.187E-01	3.189E-01	1.162E+00
TL-208	0.000E+00	1000.0	8.428E-02	8.428E-02	8.322E-01
PB-210	9.311E+00	52.4	4.877E+00	4.907E+00	1.693E+01
PB-212	-8.588E-02	352.0	3.023E-01	3.023E-01	1.185E+00
PB-214	-4.632E-01	1504.0	6.966E+00	6.966E+00	2.066E+00
BI-212	2.103E+00	136.2	2.863E+00	2.866E+00	1.058E+01
BI-214	-3.441E-01	364.3	1.254E+00	1.254E+00	2.191E+00
AC-228	0.000E+00	1000.0	2.524E-01	2.524E-01	1.860E+00
Pa-234	3.763E-01	81.9	3.080E-01	3.086E-01	1.993E+00
TH-234	-1.368E-01	2240.0	3.066E+00	3.066E+00	1.345E+01
PA-234M	5.525E+00	422.2	2.333E+01	2.333E+01	9.873E+01
Ra-226	3.662E+00	103.6	3.795E+00	3.809E+00	1.321E+01
U-235	-2.289E-01	234.8	5.373E-01	5.375E-01	3.245E+00
AM-241	2.259E-01	146.0	3.298E-01	3.300E-01	1.272E+00
Total	2.218E+01				

Analyst: Siobhan Perry

TestAmerica Spectrum name: 5_Gamma_20141021.An1

Sample description
123290_Gamma_MB 160-123290~1-A

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20141021.An1

Acquisition information
Start time:	5/21/2014 12:20:54 PM
Live time:	1800
Real time:	1805
Dead time:	0.27 %
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_Short_no ingrowth Rev2.li
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.62keV)
Stop channel:	8000 (2000.81keV)
Peak rejection level:	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

```
       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       5/21/2014 12:20:00 PM
       Decay during acquisition:       YES
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   YES       5_2014-05-03_0559.PBC
                                                 5/3/2014 5:59:07 AM

       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


total peaks alloc.    2 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       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    Bq/Sampl
```

No unknown peaks passed sensitivity test.

This section based on library: Client_Short_no ingrowth Rev2.li

********** 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	186.78	46.81	19.	13.	0.007	24.71	0.749s
AM-241	238.63	59.76	15.	4.	0.002	63.75	0.797s
TH-234	369.61	92.48	41.	-6.	-0.003	50.92	0.831s
U-235	373.09	93.35	17.	14.	0.008	48.06	0.832D
AC-228	373.09	93.35	17.	14.	0.008	48.06	0.832D
EU-155	422.26	105.63	8.	3.	0.002	146.82	0.844s
EU-152	486.72	121.73	22.	-4.	-0.002	158.69	0.861s
EU-154	492.28	123.12	12.	3.	0.002	160.61	0.862s
Pa-234	522.28	130.62	18.	-3.	-0.002	206.46	0.871s
U-235	652.87	163.24	12.	2.	0.001	234.75	0.903s
Ra-226	742.79	185.71	18.	6.	0.003	96.40	0.926s
PB-212	957.28	239.29	16.	-3.	-0.002	171.14	0.978s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1112.43	278.06	14.	-1.	-0.001	420.72	1.016s
I-131	1135.26	283.76	12.	-3.	-0.002	160.73	1.022s
PB-214	1180.62	295.09	20.	-8.	-0.004	204.79	1.033s
PB-212	1202.13	300.47	14.	1.	0.001	490.45	1.038s
AC-228	1351.86	337.88	12.	-4.	-0.002	140.38	1.074s
I-131	1453.97	363.40	8.	-1.	0.000	543.01	1.099s
Pa-234	2280.77	570.03	1.	3.	0.002	81.85	1.286s
CS-134	2420.48	604.95	8.	5.	0.003	97.74	1.317s
BI-214	2438.11	609.35	13.	-3.	-0.002	116.40	1.321s
I-131	2550.53	637.46	6.	-1.	-0.001	261.63	1.345s
BI-212	2903.81	725.77	5.	3.	0.001	136.15	1.421s
TL-208	3445.02	861.08	8.	-1.	-0.001	294.82	1.529s
AC-228	3881.93	970.33	8.	-2.	-0.001	261.23	1.612s
PA-234M	4004.85	1001.07	3.	1.	0.000	422.23	1.636s
EU-152	4445.52	1111.28	6.	-2.	-0.001	210.59	1.717s
BI-214	4478.30	1119.48	5.	-1.	-0.001	118.56	1.723s
EU-154	5100.04	1275.01	1.	1.	0.001	161.08	1.828s
CO-60	5329.15	1332.32	2.	3.	0.002	95.62	1.866s

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	-2.0382E-02				5.31E+01	
			477.60	-2.038E-02	%(	6.099E+00 7.46E+03 1.05E+01	G
K-40	N	-3.1458E+00				4.66E+11	
			1460.83	-3.146E+00	%(P	1.111E+01 1.00E+03 1.07E+01	G
CO-60	F	2.8779E-01				1.93E+03	
			1332.50	2.878E-01	?(	9.854E-01 9.56E+01 1.00E+02	G
			1173.24	0.000E+00	-	1.724E+00 1.00E+03 9.99E+01	G
I-131	I	-3.2292E-02				8.02E+00	
			364.48	-3.229E-02	?(	6.779E-01 5.43E+02 8.17E+01	G
			284.30	-1.451E+00	+	8.431E+00 1.61E+02 6.14E+00	G
			636.97	-1.049E+00	+	1.060E+01 2.62E+02 7.17E+00	G
CS-134	I	2.4470E-01				7.54E+02	
			604.71	2.447E-01	&(	8.368E-01 9.77E+01 9.76E+01	G
			795.87	0.000E+00	-	5.630E-01 1.00E+03 8.55E+01	G
			569.32	0.000E+00	-	2.366E+00 1.00E+03 1.54E+01	G
			801.95	0.000E+00	-	5.577E+00 1.00E+03 8.69E+00	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	-4.219E-02	%	6.836E+00	3.79E+03	8.35E+00 G
CS-137	I	-2.1351E-01					1.10E+04	
			661.66	-2.135E-01	%(P	1.139E+00	1.00E+03	8.52E+01 G
EU-152	F	2.6685E-02					4.94E+03	
			344.29	2.669E-02	&(	2.097E+00	2.02E+03	2.65E+01 G
			121.78	-2.390E-01	+	1.339E+00	1.59E+02	2.86E+01 G
			778.92	-1.723E-01	%	7.539E+00	1.10E+03	1.29E+01 G
			964.11	-4.381E-02	%	7.823E+00	4.45E+03	1.46E+01 G
			1112.07	-1.113E+00	+	8.928E+00	2.11E+02	1.36E+01 G
			1408.00	0.000E+00	-	3.703E+00	1.00E+03	2.10E+01 G
EU-154	I	1.9516E-01					3.14E+03	
			873.23	0.000E+00	?(	4.242E+00	1.00E+03	1.23E+01 G
			123.10	1.224E-01	?(	7.106E-01	1.61E+02	4.08E+01 G
			1274.54	3.476E-01	?(	2.284E+00	1.61E+02	3.52E+01 G
			723.36	0.000E+00	-	6.143E+00	1.00E+03	2.02E+01 G
			1004.77	0.000E+00	-	3.251E+00	1.00E+03	1.80E+01 G
			996.33	0.000E+00	-	1.288E+01	1.00E+03	1.06E+01 G
EU-155	I	2.1706E-01					1.81E+03	
			105.31	2.171E-01	?(	1.162E+00	1.47E+02	2.12E+01 G
			86.54	1.445E-02	%	1.120E+00	2.06E+03	3.07E+01 G
PB-210	N	9.3105E+00					8.14E+03	
			46.54	9.311E+00	@(P	1.693E+01	2.47E+01	4.25E+00 G
PB-212	N	-8.5880E-02					6.98E+02	
			238.63	-1.647E-01	&(P	1.185E+00	1.71E+02	4.33E+01 G
			300.03	9.542E-01	&(	1.751E+01	4.90E+02	3.28E+00 G
PB-214	N	-4.6316E-01					5.84E+05	
			351.93	-4.632E-01	%(P	2.066E+00	7.01E+02	3.76E+01 G
			295.09	-1.194E+00	+ P	3.514E+00	2.05E+02	1.93E+01 G
			242.00	1.278E-02	% P	6.180E+00	3.34E+02	7.43E+00 G
BI-212	N	2.1031E+00					6.98E+02	
			727.17	2.103E+00	?(	1.058E+01	1.36E+02	7.55E+00 G
			785.42	0.000E+00	&	1.263E+02	1.00E+03	1.28E+00 G
BI-214	N	-3.4410E-01					5.84E+05	
			609.31	-3.441E-01	?(P	2.191E+00	1.16E+02	4.61E+01 G
			1120.29	-5.736E-01	+ P	7.520E+00	1.19E+02	1.51E+01 G
			1764.49	-1.364E+00	% P	7.203E+00	1.00E+03	1.54E+01 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
Pa-234	N	3.7630E-01						1.63E+12	
			131.29	-2.684E-01	?(	1.993E+00	2.06E+02	1.80E+01	G
			569.47	1.792E+00	&(	5.043E+00	8.19E+01	8.20E+00	G
			946.02	0.000E+00	-	4.154E+00	1.00E+03	1.34E+01	G
			883.24	0.000E+00	-	1.208E+01	1.00E+03	9.60E+00	G
			880.53	0.000E+00	-	2.591E+01	1.00E+03	6.00E+00	G
TH-234	N	-1.3683E-01						1.63E+12	
			63.29	-1.368E-01	%(P	1.345E+01	3.70E+01	3.81E+00	G
			92.59	-1.654E+00	+ P	9.222E+00	5.09E+01	5.58E+00	G
PA-234M	N	5.5254E+00						1.63E+12	
			1001.00	5.525E+00	?(	9.873E+01	4.22E+02	8.37E-01	G
			766.41	8.085E-01	%	3.961E+02	1.27E+04	2.94E-01	G
Ra-226	N	3.6624E+00						5.84E+05	
			185.99	3.662E+00	(P	1.321E+01	9.64E+01	3.28E+00	G
U-235	N	-2.2889E-01						2.57E+11	
			143.79	-6.969E-01	%(P	3.245E+00	4.75E+04	1.10E+01	G
			205.33	-1.849E-02	%	7.679E+00	1.07E+04	5.01E+00	G
			163.38	7.808E-01	?(	6.743E+00	2.35E+02	5.08E+00	G
								Energy duplication	
			93.35	3.912E+00	&	5.920E+00	4.81E+01	5.81E+00	X
AM-241	T	2.2591E-01						1.58E+05	
			59.54	2.259E-01	(P	1.272E+00	6.37E+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:
T - Thermal Neutron Activation

Peak Codes:
G - Gamma Ray

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

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

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	59.76	15.	4.	0.002	63.75	2.259E-01	P
TH-234	92.48	41.	-6.	-0.003	50.92	-1.654E+00	P
U-235	93.35	17.	14.	0.008	48.06	3.912E+00	
AC-228	93.35	17.	14.	0.008	48.06	4.087E+00	
EU-155	105.63	8.	3.	0.002	146.82	2.171E-01	
EU-152	121.73	22.	-4.	-0.002	158.69	-2.390E-01	
EU-154	123.12	12.	3.	0.002	160.61	1.224E-01	
Pa-234	130.62	18.	-3.	-0.002	206.46	-2.684E-01	
U-235	163.24	12.	2.	0.001	234.75	7.808E-01	
Ra-226	185.71	18.	6.	0.003	96.40	3.662E+00	P
PB-212	239.29	16.	-3.	-0.002	171.14	-1.647E-01	P
TL-208	278.06	14.	-1.	-0.001	420.72	-5.583E-01	
I-131	283.76	12.	-3.	-0.002	160.73	-1.451E+00	
PB-214	295.09	20.	-8.	-0.004	204.79	-1.194E+00	P
PB-212	300.47	14.	1.	0.001	490.45	9.542E-01	
AC-228	337.88	12.	-4.	-0.002	140.38	-9.874E-01	
I-131	363.40	8.	-1.	0.000	543.01	-3.229E-02	
Pa-234	570.03	1.	3.	0.002	81.85	1.792E+00	
CS-134	604.95	8.	5.	0.003	97.74	2.447E-01	
BI-214	609.35	13.	-3.	-0.002	116.40	-3.441E-01	P
I-131	637.46	6.	-1.	-0.001	261.63	-1.049E+00	
BI-212	725.77	5.	3.	0.001	136.15	2.103E+00	
TL-208	861.08	8.	-1.	-0.001	294.82	-7.959E-01	
AC-228	970.33	8.	-2.	-0.001	261.23	-6.910E-01	
PA-234M	1001.07	3.	1.	0.000	422.23	5.525E+00	
EU-152	1111.28	6.	-2.	-0.001	210.59	-1.113E+00	
BI-214	1119.48	5.	-1.	-0.001	118.56	-5.736E-01	P
EU-154	1275.01	1.	1.	0.001	161.08	3.476E-01	
CO-60	1332.32	2.	3.	0.002	95.62	2.878E-01	

P - Peakbackground subtraction

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

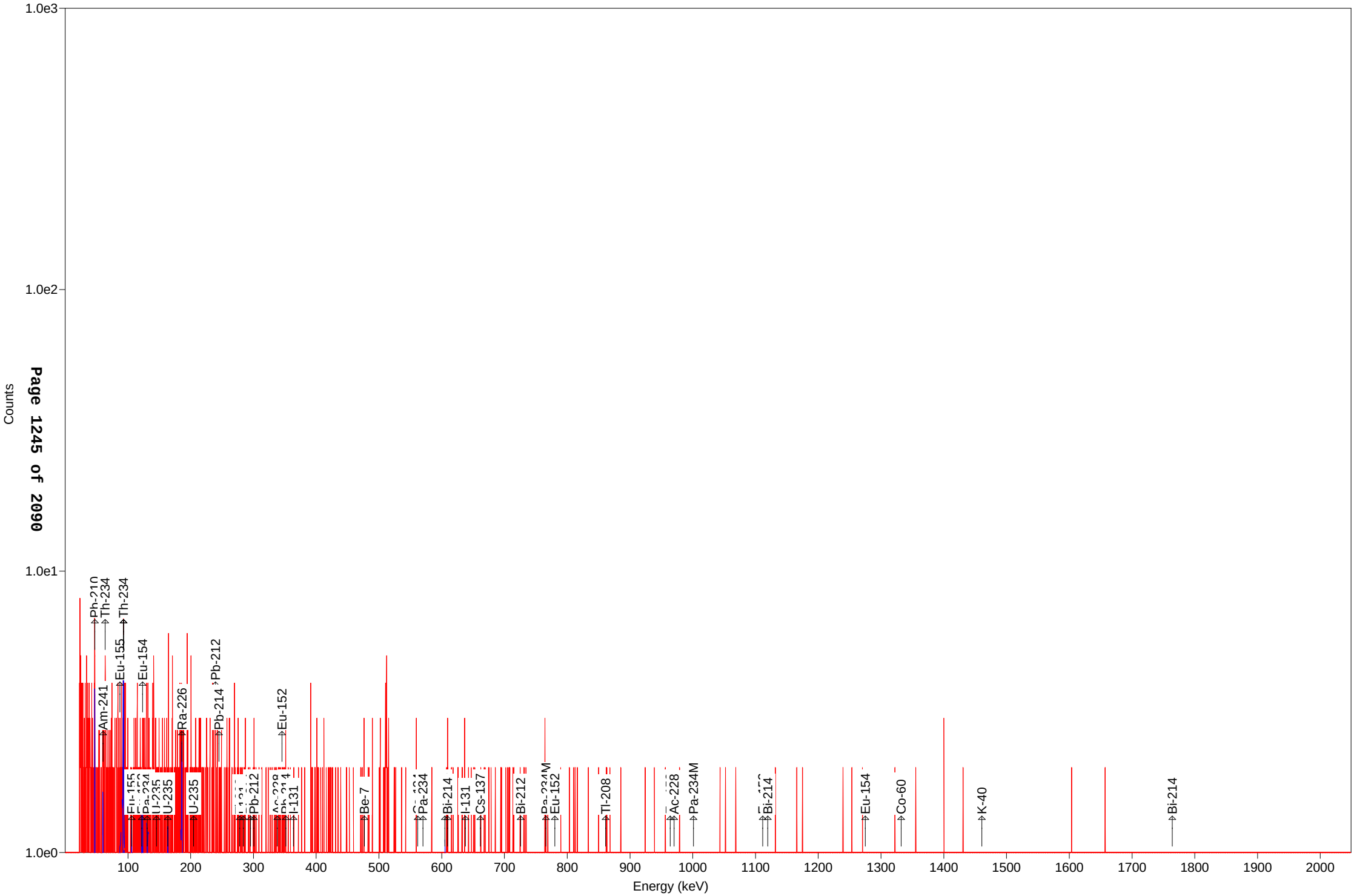
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-2.0382E-02	-2.0382E-02	7.459E+03%	6.10E+00
K-40	#A	-3.1458E+00	-3.1458E+00	2.000E+03%	1.11E+01
CO-60	#A	2.8779E-01	2.8779E-01	9.562E+01%	9.85E-01
I-131	#A	-3.2291E-02	-3.2292E-02	5.430E+02%	6.78E-01
CS-134	#A	2.4470E-01	2.4470E-01	9.774E+01%	8.37E-01
CS-137	#A	-2.1351E-01	-2.1351E-01	2.000E+03%	1.14E+00
EU-152	#A	2.6685E-02	2.6685E-02	2.018E+03%	2.10E+00
EU-154	#A	1.9516E-01	1.9516E-01	1.606E+02%	4.24E+00
EU-155	#A	2.1706E-01	2.1706E-01	1.468E+02%	1.16E+00
TL-208	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.32E-01
PB-210	#A	9.3105E+00	9.3105E+00	5.238E+01%	1.69E+01
PB-212	#A	-8.5880E-02	-8.5880E-02	3.520E+02%	1.18E+00
PB-214	#A	-4.6316E-01	-4.6316E-01	1.504E+03%	2.07E+00
BI-212	#A	2.1031E+00	2.1031E+00	1.362E+02%	1.06E+01
BI-214	#A	-3.4410E-01	-3.4410E-01	3.643E+02%	2.19E+00
AC-228	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.86E+00
Pa-234	#A	3.7630E-01	3.7630E-01	8.185E+01%	1.99E+00
TH-234	#A	-1.3683E-01	-1.3683E-01	2.240E+03%	1.34E+01
PA-234M	#A	5.5254E+00	5.5254E+00	4.222E+02%	9.87E+01
Ra-226	#A	3.6624E+00	3.6624E+00	1.036E+02%	1.32E+01
U-235	#A	-2.2889E-01	-2.2889E-01	2.348E+02%	3.24E+00
AM-241	#A	2.2591E-01	2.2591E-01	1.460E+02%	1.27E+00

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

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

Total Activity (37.6 to 2000.8 keV) 9.311E+00 Bq/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 9.3105164E+00 Bq/Sample

The library has energies which are not separable.


123290_Gamma_MB 160-123290~1-A. 5_Gamma_20141021.spc.
Counts
1.0e3
1.0e2
1.0e1
1.0e0
Energy (keV)
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-210
Th-234
Th-234
Eu-155
Eu-154
Am-241
Ra-226
U-235
Pb-214
Pb-212
Eu-152
Be-7
Pa-234
Bi-214
I-131
Cs-137
Bi-212
Eu-152
Tl-208
Ac-228
Pa-234M
Bi-214
Eu-154
Co-60
K-40
Bi-214

Test America St. Louis Spectrum ID: 4_Gamma_20140888

Sample Description: 123290_Gamma_LCS 160-123290~2-A
Detector: Ge 4 SN/181
Batch ID: 123290
Work Order Number: Gamma
Lot Number: LCS 160-123290~2-A

Decay to Time: 5/21/2014 12:20 Live Time: 1800 sec
Acquisition Time: 5/21/2014 12:20:36 Real Time: 1812 sec
Analysis Time: 5/21/2014 12:51 Dead Time: 0.67 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 4_Soil_TunaCan.Clb
Efficiency Cal Desc: 4_Soil_TunaCan_90099_033012
Efficiency Cal Date: 4/2/2012 13:19
Energy Cal Date: 2/28/2012 14:55
Library: Client_Short_no ingrowth Rev2.li
Bkgd Correction File: 4_2014-05-03_0556.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-3.760E+00	326.2	1.226E+01	1.227E+01	4.172E+01
K-40	-2.901E+00	2000.0	5.801E+01	5.801E+01	3.408E+01
CO-60	2.789E+02	1.7	4.603E+00	1.474E+01	1.099E+00
I-131	-3.254E-01	462.6	1.505E+00	1.505E+00	5.103E+00
CS-134	1.314E+00	107.2	1.409E+00	1.411E+00	2.820E+00
CS-137	3.799E+02	1.7	6.454E+00	2.079E+01	4.830E+00
EU-152	2.596E+00	104.6	2.715E+00	2.719E+00	1.372E+01
EU-154	1.664E+01	74.0	1.231E+01	1.234E+01	4.092E+01
EU-155	1.712E+00	75.4	1.291E+00	1.294E+00	9.080E+00
TL-208	2.871E+00	52.6	1.510E+00	1.518E+00	4.815E+00
PB-210	1.252E+04	1.3	1.574E+02	7.520E+02	2.672E+02
PB-212	1.360E+01	22.6	3.069E+00	3.193E+00	7.137E+00
PB-214	7.170E+00	45.2	3.239E+00	3.260E+00	1.023E+01
BI-212	2.746E+01	66.2	1.817E+01	1.823E+01	5.575E+01
BI-214	4.655E+00	57.7	2.687E+00	2.698E+00	9.896E+00
AC-228	3.296E+00	206.6	6.810E+00	6.813E+00	2.346E+01
Pa-234	1.871E+00	131.9	2.467E+00	2.469E+00	1.399E+01
TH-234	-2.791E+00	176.8	4.936E+00	4.938E+00	1.013E+02
PA-234M	3.439E+02	53.8	1.848E+02	1.857E+02	7.807E+02
Ra-226	-2.386E+01	197.6	4.715E+01	4.719E+01	9.072E+01
U-235	7.978E+00	89.6	7.151E+00	7.163E+00	2.276E+01
AM-241	1.311E+03	1.0	1.295E+01	6.926E+01	1.823E+01
Total	1.493E+04				

Analyst: April Bean

TestAmerica Spectrum name: 4_Gamma_20140888.An1

Sample description
123290_Gamma_LCS 160-123290~2-A

Spectrum Filename: C:\User\SPC\Det4\4_Gamma_20140888.An1

Acquisition information
Start time: 5/21/2014 12:20:36 PM
Live time: 1800
Real time: 1812
Dead time: 0.67 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Soil_TunaCan.Clb
4_Soil_TunaCan_90099_033012

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 1:19:41 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.78 %
Log(Eff): -3.983609E-01 + (-5.746278E-01*Log(E)) +
(-2.046438E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.80 %
Log(Eff): -2.546791E+01 + (9.285295E+00*Log(E)) +
(-9.904428E-01*Log(E)^2)

Library Files
Main analysis library: Client_Short_no ingrowth Rev2.li
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
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

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	5/21/2014 12:20:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	4_2014-05-03_0556.PBC 5/3/2014 5:56:46 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1817

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.53	11584.	1.26	0.75	1.207E-02	46.54	4.250	1.252E+04	PB210
59.58	14565.	0.99	0.76	1.721E-02	59.54	35.900	1.311E+03	AM241
83.22	46.	53.87	0.43	2.292E-02				
86.58	38.	75.39	0.84	2.336E-02	86.54	30.700	PBC<MDA	EU155
88.06	463.	12.33	0.97	2.354E-02				
92.67	15.	80.57	0.84	2.397E-02	92.59	5.584	PBC<MDA	TH234
93.04	41.	82.40	0.84	2.403E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	1.629E+01	U235
					93.35	5.561	1.701E+01	AC228
93.43	36.	78.36	0.84	2.403E-02	93.35	5.810	PBC<MDA	U235
					93.35	5.561	1.508E+01	AC228
122.56	23.	132.75	0.87	2.426E-02	121.78	28.580	PBC<MDA	EU152
					121.78	28.580	1.854E+00	EU152
143.26	14.	221.58	0.89	2.273E-02	143.79	10.960	PBC<MDA	U235
204.61	30.	89.64	0.95	1.763E-02	205.33	5.010	PBC<MDA	U235
238.30	166.	21.65	0.99	1.564E-02	238.63	43.300	1.360E+01	PB212
242.31	36.	77.25	0.98	1.547E-02	242.00	7.430	PBC<MDA	PB214
					242.00	7.430	1.727E+01	PB214
277.40	6.	425.77	1.01	1.387E-02	277.28	6.310	PBC<MDA	TL208
					277.28	6.310	3.770E+00	TL208
295.44	17.	154.04	1.03	1.319E-02	295.09	19.300	PBC<MDA	PB214
					295.09	19.300	3.683E+00	PB214
344.21	12.	187.34	1.07	1.164E-02	344.29	26.500	PBC<MDA	EU152
					344.29	26.500	2.169E+00	EU152
351.94	54.	45.17	1.08	1.143E-02	351.93	37.600	PBC<MDA	PB214
					351.93	37.600	6.964E+00	PB214
567.52	10.	131.89	1.27	7.689E-03	569.47	8.200	PBC<MDA	Pa234
					569.47	8.200	8.718E+00	Pa234
569.26	8.	201.52	1.27	7.690E-03				
583.23	32.	52.60	1.28	7.539E-03	583.02	84.500	PBC<MDA	TL208
					583.02	84.500	2.804E+00	TL208
600.94	6.	163.84	1.30	7.312E-03	604.71	97.620	PBC<MDA	CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
608.98	26.	69.06	1.30	7.266E-03	609.31	46.090	PBC<MDA	BI214
661.38	3951.	1.70	1.29	6.783E-03	661.66	85.210	3.799E+02	CS137
717.47	22.	38.83	0.60	6.334E-03				
727.17	2.	684.93	1.40	6.262E-03	727.17	7.550	PBC<MDA	BI212
768.92	17.	64.79	1.44	5.990E-03	766.41	0.294	PBC<MDA	PA234M
778.64	7.	213.93	1.45	5.909E-03	778.92	12.940	PBC<MDA	EU152
					778.92	12.940	5.107E+00	EU152
785.45	24.	66.19	1.45	5.867E-03	785.42	1.280	PBC<MDA	BI212
795.94	15.	107.21	1.46	5.802E-03	795.87	85.530	PBC<MDA	CS134
797.81	2.	531.63	1.47	5.765E-03	801.95	8.690	PBC<MDA	CS134
871.55	20.	73.97	1.53	5.362E-03	873.23	12.270	PBC<MDA	EU154
910.15	9.	206.61	1.56	5.172E-03	911.07	29.000	PBC<MDA	AC228
967.03	5.	358.66	1.60	4.906E-03	968.97	17.460	PBC<MDA	AC228
1001.11	20.	85.79	1.63	4.771E-03	1001.00	0.837	PBC<MDA	PA234M
1120.06	2.	768.00	1.73	4.331E-03	1120.29	15.100	PBC<MDA	BI214
1173.03	2128.	2.33	1.78	4.163E-03	1173.24	99.900	2.843E+02	CO60
1332.27	1835.	2.33	1.78	3.728E-03	1332.50	99.980	2.736E+02	CO60
1763.77	5.	92.52	2.21	2.916E-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	
332.34	83.22	260.	46.	2.000E+03	53.87	0.429	-	sM
351.81	88.06	471.	396.	1.685E+04	9.22	0.839	-	D
2868.75	717.47	23.	22.	3.526E+03	38.83	0.604	-	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_Short_no ingrowth Rev2.li

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.65	46.53	2745.	11569.	6.427	1.26	0.753
AM-241	237.81	59.58	1839.	14565.	8.092	0.99	0.763
TH-234	256.25	64.19	723.	-20.	-0.011	522.96	0.816
EU-155	345.61	86.54	385.	38.	0.021	75.39	0.837D
TH-234	369.79	92.59	370.	15.	0.009	80.57	0.843D
U-235	372.83	93.35	386.	36.	0.020	78.36	0.844D
AC-228	372.83	93.35	548.	41.	0.023	82.40	0.843D
EU-152	489.62	122.56	460.	23.	0.013	132.75	0.870s
EU-154	495.00	123.91	492.	-18.	-0.010	171.50	0.871s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Pa-234	528.50	132.29	506.	-10.	-0.005	333.13	0.878s
U-235	572.36	143.26	455.	14.	0.008	221.58	0.890s
U-235	654.00	163.68	446.	-27.	-0.015	111.13	0.908s
Ra-226	746.79	186.89	455.	-27.	-0.015	155.14	0.928s
U-235	817.66	204.61	342.	30.	0.017	89.64	0.946
PB-212	952.36	238.30	327.	166.	0.092	21.65	0.993s
PB-214	968.39	242.31	363.	36.	0.020	77.25	0.979s
TL-208	1108.71	277.40	317.	6.	0.003	425.77	1.011s
PB-214	1180.82	295.44	329.	17.	0.009	154.04	1.027s
PB-212	1199.37	300.07	291.	-17.	-0.009	149.37	1.032s
AC-228	1354.25	338.81	298.	-7.	-0.004	363.49	1.066s
EU-152	1375.86	344.21	249.	12.	0.007	187.34	1.071s
PB-214	1406.76	351.94	269.	54.	0.030	45.17	1.078s
I-131	1460.01	365.25	300.	-5.	-0.003	462.56	1.089s
BE-7	1899.38	475.12	210.	-6.	-0.004	326.16	1.189s
CS-134	2275.88	569.26	116.	8.	0.004	201.52	1.269s
Pa-234	2268.94	567.52	80.	10.	0.005	131.89	1.269s
TL-208	2331.76	583.23	127.	32.	0.018	52.60	1.281s
CS-134	2402.60	600.94	52.	6.	0.004	163.84	1.300s
BI-214	2434.78	608.98	149.	26.	0.014	69.06	1.304s
I-131	2550.09	637.81	128.	-18.	-0.010	92.99	1.327s
CS-137	2644.34	661.38	104.	3951.	2.195	1.70	1.293
EU-154	2892.15	723.32	140.	-9.	-0.005	180.76	1.401s
BI-212	2907.53	727.17	92.	2.	0.001	684.93	1.404s
PA-234M	3074.54	768.92	54.	17.	0.010	64.79	1.437s
EU-152	3113.41	778.64	110.	7.	0.004	213.93	1.448s
BI-212	3140.67	785.45	112.	24.	0.013	66.19	1.453
CS-134	3182.62	795.94	127.	15.	0.009	107.21	1.462s
CS-134	3190.12	797.81	70.	2.	0.001	531.63	1.467s
TL-208	3452.83	863.48	144.	-6.	-0.003	279.73	1.516s
EU-154	3485.13	871.55	96.	20.	0.011	73.97	1.526s
Pa-234	3524.08	881.29	148.	-7.	-0.004	246.70	1.532s
AC-228	3639.56	910.15	169.	9.	0.005	206.61	1.557s
Pa-234	3774.01	943.75	196.	-20.	-0.011	103.26	1.586s
AC-228	3867.15	967.03	156.	5.	0.003	358.66	1.605s
EU-154	3978.62	994.89	141.	-8.	-0.004	217.89	1.627s
PA-234M	4003.52	1001.11	131.	20.	0.011	85.79	1.631s
EU-152	4448.13	1112.22	135.	-11.	-0.006	152.52	1.720s
BI-214	4479.50	1120.06	125.	2.	0.001	768.00	1.727s
CO-60	4691.45	1173.03	48.	2128.	1.182	2.33	1.779
CO-60	5328.76	1332.27	0.	1835.	1.019	2.33	1.783
BI-214	7056.22	1763.77	7.	5.	0.003	92.52	2.214s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV		Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-3.7600E+00					5.31E+01	
			477.60	-3.760E+00	&(	4.172E+01	3.26E+02	1.05E+01 G
K-40	N	-2.9006E+00					4.66E+11	
			1460.83	-2.901E+00	%(P	3.408E+01	1.00E+03	1.07E+01 G
CO-60	F	2.7894E+02					1.93E+03	
			1332.50	2.736E+02	(	1.099E+00	2.33E+00	1.00E+02 G
			1173.24	2.843E+02	(	4.676E+00	2.33E+00	9.99E+01 G
I-131	I	-3.2536E-01					8.02E+00	
			364.48	-3.254E-01	&(	5.103E+00	4.63E+02	8.17E+01 G
			284.30	3.808E-01	&	5.833E+01	4.51E+03	6.14E+00 G
			636.97	-1.968E+01	+	6.130E+01	9.30E+01	7.17E+00 G
CS-134	I	1.3141E+00					7.54E+02	
			604.71	4.980E-01	&(	2.820E+00	1.64E+02	9.76E+01 G
			795.87	1.715E+00	&(	6.186E+00	1.07E+02	8.55E+01 G
			569.32	3.601E+00	?(	2.480E+01	2.02E+02	1.54E+01 G
			801.95	2.493E+00	&(	4.633E+01	5.32E+02	8.69E+00 G
			563.24	7.683E-01	%	4.576E+01	1.72E+03	8.35E+00 G
CS-137	I	3.7989E+02					1.10E+04	
			661.66	3.799E+02	(	4.830E+00	1.70E+00	8.52E+01 G
EU-152	F	2.5957E+00					4.94E+03	
			344.29	2.169E+00	?(	1.372E+01	1.87E+02	2.65E+01 G
			121.78	1.854E+00	?(	8.226E+00	1.33E+02	2.86E+01 G
			778.92	5.107E+00	&(	3.741E+01	2.14E+02	1.29E+01 G
			964.11	9.740E-01	%	5.453E+01	1.64E+03	1.46E+01 G
			1112.07	-1.026E+01	+	5.308E+01	1.53E+02	1.36E+01 G
			1408.00	0.000E+00	-	5.487E+00	1.00E+03	2.10E+01 G
EU-154	I	1.6639E+01					3.14E+03	
			873.23	1.664E+01	?(	4.092E+01	7.40E+01	1.23E+01 G
			123.10	-1.039E+00	-	5.971E+00	1.72E+02	4.08E+01 G
			1274.54	0.000E+00	-	1.671E+01	1.00E+03	3.52E+01 G
			723.36	-4.110E+00	-	2.526E+01	1.81E+02	2.02E+01 G
			1004.77	-2.803E-01	%	3.963E+01	4.10E+03	1.80E+01 G
			996.33	-8.557E+00	&	6.357E+01	2.18E+02	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	1.7121E+00					1.81E+03	
			105.31	-3.878E-02	&(	9.080E+00	6.88E+03	2.12E+01 G
			86.54	2.921E+00	(	7.296E+00	7.54E+01	3.07E+01 G
TL-208	N	2.8712E+00					6.98E+02	
			583.02	2.804E+00	(	4.815E+00	5.26E+01	8.45E+01 G
			277.28	3.770E+00	?(	5.436E+01	4.26E+02	6.31E+00 G
			860.56	-5.058E+00	-	4.837E+01	2.80E+02	1.24E+01 G
PB-210	N	1.2523E+04					8.14E+03	
			46.54	1.252E+04	(P	2.672E+02	1.26E+00	4.25E+00 G
PB-212	N	1.3596E+01					6.98E+02	
			238.63	1.360E+01	*(P	7.137E+00	2.17E+01	4.33E+01 G
			300.03	-2.170E+01	- P	1.071E+02	1.49E+02	3.28E+00 G
PB-214	N	7.1700E+00					5.84E+05	
			351.93	6.964E+00	(	1.023E+01	4.52E+01	3.76E+01 G
			295.09	3.683E+00	?(	1.905E+01	1.54E+02	1.93E+01 G
			242.00	1.727E+01	&(	4.423E+01	7.73E+01	7.43E+00 G
BI-212	N	2.7456E+01					6.98E+02	
			727.17	2.342E+00	?(	5.575E+01	6.85E+02	7.55E+00 G
			785.42	1.756E+02	(	3.841E+02	6.62E+01	1.28E+00 G
BI-214	N	4.6553E+00					5.84E+05	
			609.31	4.329E+00	?(	9.896E+00	6.91E+01	4.61E+01 G
			1120.29	1.758E+00	-	4.660E+01	7.68E+02	1.51E+01 G
			1764.49	5.633E+00	&(	1.816E+01	9.25E+01	1.54E+01 G
AC-228	N	3.2963E+00					2.10E+03	
			911.07	3.341E+00	?(	2.346E+01	2.07E+02	2.90E+01 G
			968.97	3.221E+00	(	3.953E+01	3.59E+02	1.75E+01 G
			338.32	-2.645E+00	+	3.257E+01	3.63E+02	1.20E+01 G
							Energy duplication	
			93.35	1.701E+01		4.649E+01	8.24E+01	5.56E+00 XA
Pa-234	N	1.8707E+00					1.63E+12	
			131.29	-1.248E+00	?(	1.399E+01	3.33E+02	1.80E+01 G
			569.47	8.718E+00	?(	3.916E+01	1.32E+02	8.20E+00 G
			946.02	-1.628E+01	&	5.631E+01	1.03E+02	1.34E+01 G
			883.24	9.202E-01	%	6.632E+01	2.09E+03	9.60E+00 G
			880.53	-1.227E+01	+	1.033E+02	2.47E+02	6.00E+00 G
TH-234	N	-2.7912E+00					1.63E+12	
			63.29	-1.622E+01	?(P	1.013E+02	5.23E+02	3.81E+00 G
			92.59	6.369E+00	(P	3.831E+01	8.06E+01	5.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234M	N	3.4385E+02					1.63E+12	
			1001.00	2.724E+02	?(	7.807E+02	8.58E+01	8.37E-01 G
			766.41	5.472E+02	&(	1.171E+03	6.48E+01	2.94E-01 G
Ra-226	N	-2.3856E+01					5.84E+05	
			185.99	-2.386E+01	&(P	9.072E+01	1.55E+02	3.28E+00 G
U-235	N	7.9779E+00					2.57E+11	
			143.79	3.057E+00	&(	2.276E+01	2.22E+02	1.10E+01 G
			205.33	1.874E+01	(	5.590E+01	8.96E+01	5.01E+00 G
			163.38	-1.432E+01	+	5.306E+01	1.11E+02	5.08E+00 G
								Energy duplication
			93.35	1.443E+01		3.749E+01	7.84E+01	5.81E+00 X
AM-241	T	1.3111E+03					1.58E+05	
			59.54	1.311E+03	(	1.823E+01	9.88E-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:
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	
AC-228	93.35	548.	41.	0.023	82.40	1.701E+01	
EU-152	122.56	460.	23.	0.013	132.75	1.854E+00	
EU-154	123.91	492.	-18.	-0.010	171.50	-1.039E+00	
Pa-234	132.29	506.	-10.	-0.005	333.13	-1.248E+00	
Ra-226	186.89	455.	-27.	-0.015	155.14	-2.386E+01	P
PB-214	242.31	363.	36.	0.020	77.25	1.727E+01	
TL-208	277.40	317.	6.	0.003	425.77	3.770E+00	
PB-214	295.44	329.	17.	0.009	154.04	3.683E+00	
AC-228	338.81	298.	-7.	-0.004	363.49	-2.645E+00	
EU-152	344.21	249.	12.	0.007	187.34	2.169E+00	
PB-214	351.94	269.	54.	0.030	45.17	6.964E+00	
I-131	365.25	300.	-5.	-0.003	462.56	-3.254E-01	
BE-7	475.12	210.	-6.	-0.004	326.16	-3.760E+00	
CS-134	569.26	116.	8.	0.004	201.52	3.601E+00	
Pa-234	567.52	80.	10.	0.005	131.89	8.718E+00	
TL-208	583.23	127.	32.	0.018	52.60	2.804E+00	
CS-134	600.94	52.	6.	0.004	163.84	4.980E-01	
BI-214	608.98	149.	26.	0.014	69.06	4.329E+00	
I-131	637.81	128.	-18.	-0.010	92.99	-1.968E+01	
EU-154	723.32	140.	-9.	-0.005	180.76	-4.110E+00	
EU-152	778.64	110.	7.	0.004	213.93	5.107E+00	
CS-134	795.94	127.	15.	0.009	107.21	1.715E+00	
CS-134	797.81	70.	2.	0.001	531.63	2.493E+00	
TL-208	863.48	144.	-6.	-0.003	279.73	-5.058E+00	
EU-154	871.55	96.	20.	0.011	73.97	1.664E+01	
Pa-234	881.29	148.	-7.	-0.004	246.70	-1.227E+01	
AC-228	910.15	169.	9.	0.005	206.61	3.341E+00	
Pa-234	943.75	196.	-20.	-0.011	103.26	-1.628E+01	
AC-228	967.03	156.	5.	0.003	358.66	3.221E+00	
EU-154	994.89	141.	-8.	-0.004	217.89	-8.557E+00	
EU-152	1112.22	135.	-11.	-0.006	152.52	-1.026E+01	
BI-214	1120.06	125.	2.	0.001	768.00	1.758E+00	
BI-214	1763.77	7.	5.	0.003	92.52	5.633E+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 *****

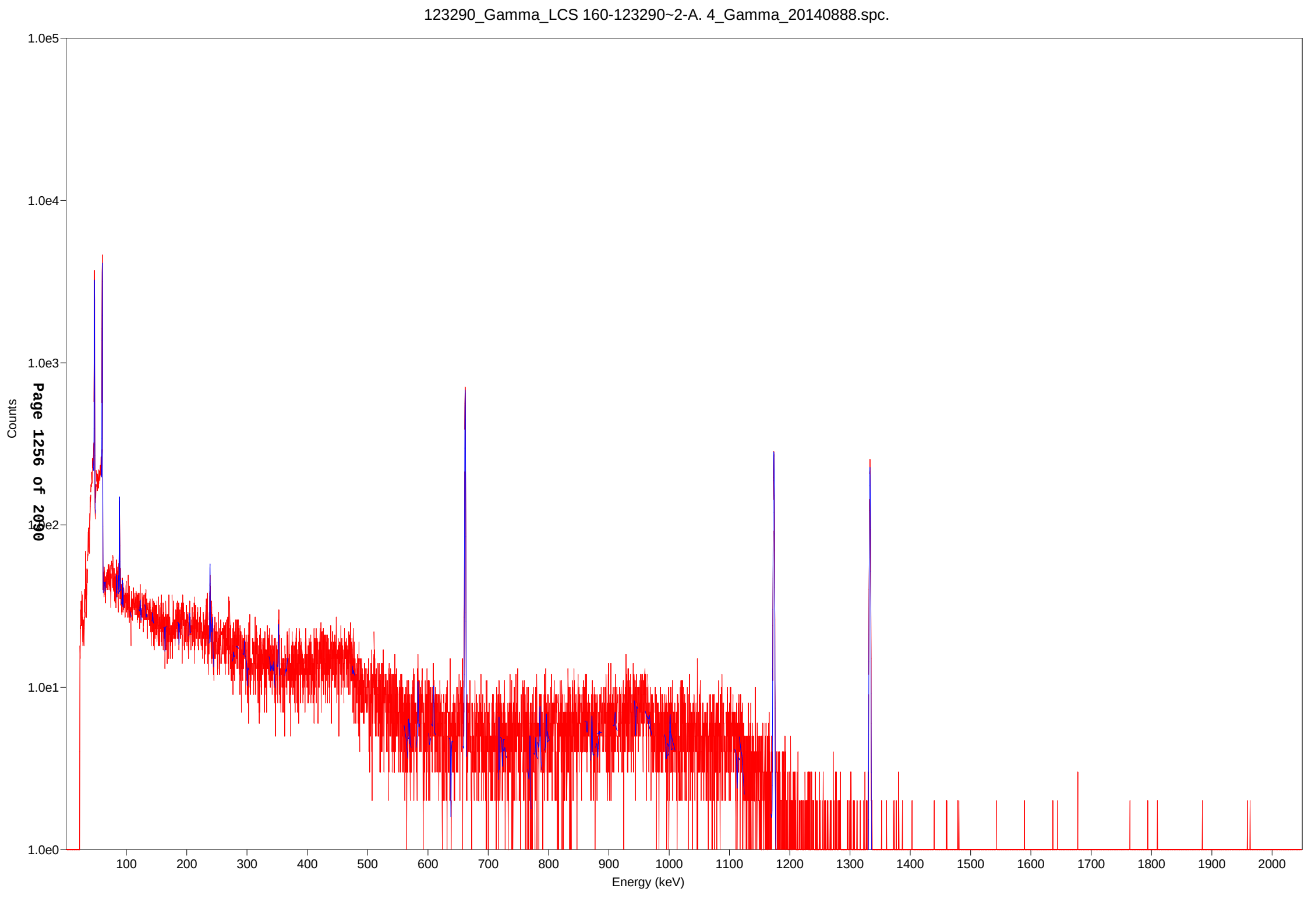
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-3.7599E+00	-3.7600E+00	3.262E+02%	4.17E+01
K-40	#A	-2.9006E+00	-2.9006E+00	2.000E+03%	3.41E+01
CO-60		2.7894E+02	2.7894E+02	1.650E+00%	1.10E+00
I-131	#A	-3.2535E-01	-3.2536E-01	4.626E+02%	5.10E+00
CS-134	#A	1.3141E+00	1.3141E+00	1.072E+02%	2.82E+00
CS-137		3.7989E+02	3.7989E+02	1.699E+00%	4.83E+00
EU-152	#A	2.5957E+00	2.5957E+00	1.046E+02%	1.37E+01
EU-154	#A	1.6639E+01	1.6639E+01	7.397E+01%	4.09E+01
EU-155	A	1.7121E+00	1.7121E+00	7.539E+01%	9.08E+00
TL-208	#A	2.8712E+00	2.8712E+00	5.260E+01%	4.82E+00
PB-210		1.2523E+04	1.2523E+04	1.257E+00%	2.67E+02
PB-212	#	1.3596E+01	1.3596E+01	2.258E+01%	7.14E+00
PB-214	#A	7.1700E+00	7.1700E+00	4.517E+01%	1.02E+01
BI-212	A	2.7456E+01	2.7456E+01	6.619E+01%	5.58E+01
BI-214	#A	4.6553E+00	4.6553E+00	5.773E+01%	9.90E+00
AC-228	#A	3.2963E+00	3.2963E+00	2.066E+02%	2.35E+01
Pa-234	#A	1.8707E+00	1.8707E+00	1.319E+02%	1.40E+01
TH-234	A	-2.7912E+00	-2.7912E+00	1.768E+02%	1.01E+02
PA-234M	#A	3.4385E+02	3.4385E+02	5.375E+01%	7.81E+02
Ra-226	#A	-2.3856E+01	-2.3856E+01	1.976E+02%	9.07E+01
U-235	A	7.9779E+00	7.9779E+00	8.964E+01%	2.28E+01
AM-241		1.3111E+03	1.3111E+03	9.877E-01%	1.82E+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 (105.1 to 1999.4 keV) 1.451E+04 Bq/Sample
Total Decayed Activity (105.1 to 1999.4 keV) 1.4506853E+04 Bq/Sample

The library has energies which are not separable.


123290_Gamma_LCS 160-123290~2-A. 4_Gamma_20140888.spc.
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
Page 1256 of 2000
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 15_Gamma_20140929

Sample Description: 123290_Gamma_160-6694-A-1-D
Detector: Ge15 SN/11012216
Batch ID: 123290
Work Order Number: Gamma
Lot Number: 160-6694-A-1-D

Decay to Time: 5/21/2014 12:21 Live Time: 1800 sec
Acquisition Time: 5/21/2014 12:22:50 Real Time: 1801 sec
Analysis Time: 5/21/2014 12:53 Dead Time: 0.07 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 15_Soil_TunaCan.Clb
Efficiency Cal Desc: 15_TunaCan_90099_032212
Efficiency Cal Date: 3/22/2012 13:03
Energy Cal Date: 2/28/2012 16:29
Library: Client_Short_no ingrowth Rev2.li
Bkgd Correction File: 15_2014-05-03_0613.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	1.888E+00	103.8	1.961E+00	1.963E+00	6.828E+00
K-40	1.473E+02	7.9	1.158E+01	1.382E+01	9.781E+00
CO-60	5.325E-02	298.5	1.589E-01	1.589E-01	1.401E+00
I-131	1.472E-01	151.2	2.225E-01	2.226E-01	7.909E-01
CS-134	2.253E-01	95.7	2.156E-01	2.159E-01	1.042E+00
CS-137	3.407E-01	117.6	4.006E-01	4.010E-01	1.391E+00
EU-152	2.444E-01	54.5	1.332E-01	1.338E-01	2.479E+00
EU-154	-3.022E-01	864.9	2.614E+00	2.614E+00	9.860E+00
EU-155	-7.133E-01	133.9	9.555E-01	9.563E-01	3.247E+00
TL-208	2.406E+00	16.9	4.071E-01	4.258E-01	8.459E-01
PB-210	1.077E+01	76.5	8.241E+00	8.265E+00	2.949E+01
PB-212	7.200E+00	13.5	9.735E-01	1.079E+00	1.973E+00
PB-214	5.536E+00	15.8	8.770E-01	9.229E-01	2.140E+00
BI-212	4.744E+00	86.1	4.086E+00	4.093E+00	1.394E+01
BI-214	5.862E+00	13.3	7.784E-01	8.359E-01	1.513E+00
AC-228	7.712E+00	15.0	1.158E+00	1.223E+00	3.947E+00
Pa-234	1.060E+00	78.0	8.270E-01	8.288E-01	3.390E+00
TH-234	1.018E+01	73.9	7.524E+00	7.543E+00	2.610E+01
PA-234M	6.744E+01	58.9	3.971E+01	3.986E+01	1.464E+02
Ra-226	9.571E+00	68.8	6.581E+00	6.634E+00	2.300E+01
U-235	1.962E+00	87.8	1.722E+00	1.724E+00	5.366E+00
AM-241	7.200E-01	97.3	7.001E-01	7.011E-01	2.362E+00
Total	2.854E+02				

Analyst: April Bean

TestAmerica, Inc. Spectrum name: 15_Gamma_20140929.An1

Sample description
123290_Gamma_160-6694-A-1-D

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20140929.An1

Acquisition information
Start time:	5/21/2014 12:22:50 PM
Live time:	1800
Real time:	1801
Dead time:	0.07 %
Detector ID:	15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_Soil_TunaCan.Clb
15_TunaCan_90099_032212

Energy Calibration
Created:	2/28/2012 4:29:17 PM
Zero offset:	0.044 keV
Gain:	0.250 keV/channel
Quadratic:	-3.267E-08 keV/channel^2

Efficiency Calibration
Created:	3/22/2012 1:03:01 PM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 1.00 %
Log(Eff):	-6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.13 %
Log(Eff):	-2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-01*Log(E)^2)

Library Files
Main analysis library:	Client_Short_no ingrowth Rev2.li
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.57keV)
Stop channel:	8000 (1999.52keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

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	5/21/2014 12:21:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2014-05-03_0613.PBC 5/3/2014 6:13:31 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 10 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0727

***** 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
46.66	16.	32.32	0.95	1.957E-02	46.54	4.250	PBC<MDA	PB210
59.69	13.	97.25	0.96	2.737E-02	59.54	35.900	PBC<MDA	AM241
63.64	20.	37.69	0.96	2.924E-02	63.29	3.810	PBC<MDA	TH234
					63.29	3.810	PBC<MDA	TH234
74.73	66.	32.18	0.63	3.378E-02				
90.17	24.	36.74	0.34	3.741E-02				
92.75	42.	32.13	0.99	3.785E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	1.065E+01	U235
					93.35	5.561	1.113E+01	AC228
					92.59	5.584	3.872E+00	TH234
92.75	42.	32.13	0.99	3.785E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	1.065E+01	U235
					93.35	5.561	1.113E+01	AC228
92.76	11.	38.47	0.99	3.776E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	PBC<MDA	U235
					93.35	5.561	PBC<MDA	AC228
119.88	16.	54.51	1.02	3.848E-02	121.78	28.580	PBC<MDA	EU152
131.42	16.	78.03	1.02	3.775E-02	131.29	18.000	PBC<MDA	Pa234
143.18	13.	90.10	1.04	3.639E-02	143.79	10.960	PBC<MDA	U235
163.27	7.	150.62	1.05	3.367E-02	163.38	5.080	PBC<MDA	U235
185.77	18.	36.64	1.07	3.120E-02	185.99	3.280	PBC<MDA	Ra226
238.60	156.	12.63	1.29	2.592E-02	238.63	43.300	7.200E+00	PB212
					242.00	7.430	4.538E+01	PB214
276.99	8.	82.12	1.15	2.313E-02	277.28	6.310	PBC<MDA	TL208
295.02	30.	33.54	1.17	2.205E-02	295.09	19.300	PBC<MDA	PB214
					295.09	19.300	3.981E+00	PB214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
338.74	51.	19.84	0.96	1.983E-02	338.32	12.010	1.190E+01	AC228
351.92	72.	15.84	1.22	1.923E-02	351.93	37.600	5.536E+00	PB214
					351.93	37.600	5.536E+00	PB214
364.47	4.	151.16	1.23	1.871E-02	364.48	81.700	PBC<MDA	I131
477.70	5.	103.84	1.32	1.508E-02	477.60	10.520	PBC<MDA	BE7
562.39	4.	122.48	1.39	1.319E-02	563.24	8.350	PBC<MDA	CS134
583.17	46.	14.91	1.20	1.282E-02	583.02	84.500	2.372E+00	TL208
609.35	63.	11.87	0.50	1.236E-02	609.31	46.090	6.187E+00	BI214
662.03	6.	117.57	1.47	1.155E-02	661.66	85.210	PBC<MDA	CS137
727.49	7.	86.12	1.52	1.067E-02	727.17	7.550	PBC<MDA	BI212
768.27	7.	68.39	1.55	1.021E-02	766.41	0.294	PBC<MDA	PA234M
794.90	5.	95.70	1.57	9.887E-03	795.87	85.530	PBC<MDA	CS134
861.56	3.	182.19	1.62	9.252E-03	860.56	12.420	PBC<MDA	TL208
884.55	1.	512.00	1.64	9.048E-03	883.24	9.600	PBC<MDA	Pa234
911.06	26.	26.56	1.66	8.811E-03	911.07	29.000	5.674E+00	AC228
969.02	22.	30.52	1.70	8.357E-03	968.97	17.460	8.217E+00	AC228
1001.04	5.	95.87	1.72	8.125E-03	1001.00	0.837	PBC<MDA	PA234M
1120.94	6.	66.40	1.80	7.368E-03	1120.29	15.100	PBC<MDA	BI214
1173.31	2.	298.47	1.84	7.076E-03	1173.24	99.900	PBC<MDA	CO60
1461.01	165.	7.72	1.27	5.828E-03	1460.83	10.670	1.473E+02	K40
1765.09	7.	39.59	2.18	4.916E-03	1764.49	15.400	PBC<MDA	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.51	74.73	110.	66.	1.954E+03	32.18	0.633	- s
360.22	90.17	26.	24.	6.495E+02	35.81	0.340	- 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_Short_no ingrowth Rev2.li

********** 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	186.30	46.66	79.	16.	0.009	32.32	0.946s
AM-241	238.39	59.69	70.	13.	0.007	97.25	0.958s
TH-234	254.20	63.64	113.	20.	0.011	37.69	0.962s
TH-234	370.60	92.76	119.	11.	0.006	38.47	0.989s
U-235	372.95	93.35	71.	42.	0.023	32.13	0.989D
AC-228	372.95	93.35	71.	42.	0.023	32.13	0.989D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-155	420.79	105.32	95.	-11.	-0.006	133.94	1.000s
EU-152	479.00	119.88	28.	16.	0.009	54.51	1.015s
Pa-234	525.13	131.42	69.	16.	0.009	78.03	1.024
U-235	572.15	143.18	59.	13.	0.007	90.10	1.036s
U-235	652.46	163.27	57.	7.	0.004	150.62	1.053s
Ra-226	742.40	185.77	72.	18.	0.010	36.64	1.074s
PB-212	953.60	238.60	64.	145.	0.081	12.63	1.292s
PB-214	954.20	238.75	67.	47.	0.026	28.64	1.123
TL-208	1107.09	276.99	23.	8.	0.004	82.12	1.154s
PB-214	1179.18	295.02	37.	30.	0.017	33.54	1.170s
AC-228	1353.97	338.74	11.	51.	0.028	19.84	0.961s
EU-152	1376.18	344.30	19.	-3.	-0.002	201.37	1.212s
PB-214	1406.64	351.92	29.	72.	0.040	15.84	1.219
I-131	1456.85	364.47	17.	4.	0.002	151.16	1.229s
BE-7	1909.61	477.70	13.	5.	0.003	103.84	1.324s
CS-134	2248.28	562.39	12.	4.	0.002	122.48	1.394s
CS-134	2274.18	568.87	24.	-1.	0.000	869.98	1.399s
TL-208	2331.38	583.17	9.	46.	0.026	14.91	1.202
CS-134	2416.26	604.39	19.	-1.	-0.001	568.38	1.427s
BI-214	2436.08	609.35	8.	63.	0.035	11.87	0.495s
I-131	2547.41	637.18	16.	-1.	-0.001	432.46	1.452s
CS-137	2646.80	662.03	22.	6.	0.003	117.57	1.472s
EU-154	2892.31	723.41	26.	-3.	-0.002	226.39	1.519s
BI-212	2908.62	727.49	14.	7.	0.004	86.12	1.522s
PA-234M	3071.73	768.27	9.	7.	0.004	68.39	1.552s
CS-134	3178.26	794.90	10.	5.	0.003	95.70	1.574s
TL-208	3444.92	861.56	18.	3.	0.002	182.19	1.622s
EU-154	3488.09	872.35	14.	-1.	0.000	864.87	1.631s
Pa-234	3536.90	884.55	11.	1.	0.001	512.00	1.638s
AC-228	3642.95	911.06	11.	26.	0.014	26.56	1.658s
Pa-234	3781.51	945.69	17.	-3.	-0.002	216.42	1.683s
EU-152	3866.23	966.87	28.	-7.	-0.004	116.31	1.696s
AC-228	3874.83	969.02	11.	22.	0.012	30.52	1.699s
EU-154	3990.98	998.05	23.	-1.	-0.001	565.14	1.718s
PA-234M	4002.93	1001.04	11.	5.	0.003	95.87	1.722s
EU-154	4019.94	1005.29	17.	-4.	-0.002	171.97	1.724s
BI-214	4482.68	1120.94	15.	6.	0.003	66.40	1.803s
CO-60	4692.26	1173.31	14.	2.	0.001	298.47	1.838s
EU-154	5097.27	1274.51	9.	-1.	-0.001	330.48	1.903s
CO-60	5330.43	1332.77	8.	0.	0.000	930.42	1.938s
K-40	5843.74	1461.01	3.	165.	0.092	7.72	1.270s
BI-214	7061.18	1765.09	5.	7.	0.004	39.59	2.180s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	1.8882E+00				5.31E+01	
			477.60	1.888E+00 ?(		6.828E+00 1.04E+02	1.05E+01 G
K-40	N	1.4730E+02				4.66E+11	
			1460.83	1.473E+02 (P		9.781E+00 7.72E+00	1.07E+01 G
CO-60	F	5.3245E-02				1.93E+03	
			1332.50	-3.843E-02 &(		1.401E+00 9.30E+02	1.00E+02 G
			1173.24	1.450E-01 ?(		1.595E+00 2.98E+02	9.99E+01 G
I-131	I	1.4719E-01				8.02E+00	
			364.48	1.472E-01 ?(		7.909E-01 1.51E+02	8.17E+01 G
			284.30	-9.553E-02 &		1.234E+01 3.58E+03	6.14E+00 G
			636.97	-8.684E-01 +		1.389E+01 4.32E+02	7.17E+00 G
CS-134	I	2.2525E-01				7.54E+02	
			604.71	-4.972E-02 ?(		1.042E+00 5.68E+02	9.76E+01 G
			795.87	3.434E-01 ?(		1.141E+00 9.57E+01	8.55E+01 G
			569.32	-2.205E-01 +		7.017E+00 8.70E+02	1.54E+01 G
			801.95	0.000E+00 -		1.040E+01 1.00E+03	8.69E+00 G
			563.24	2.230E+00 ?(		9.662E+00 1.22E+02	8.35E+00 G
CS-137	I	3.4072E-01				1.10E+04	
			661.66	3.407E-01 ?(		1.391E+00 1.18E+02	8.52E+01 G
EU-152	F	2.4441E-01				4.94E+03	
			344.29	-3.433E-01 ?(		2.479E+00 2.01E+02	2.65E+01 G
			121.78	7.894E-01 ?(		1.393E+00 5.45E+01	2.86E+01 G
			778.92	3.029E-02 %		8.575E+00 7.44E+03	1.29E+01 G
			964.11	-3.073E+00 +		1.235E+01 1.16E+02	1.46E+01 G
			1112.07	0.000E+00 -		1.010E+01 1.00E+03	1.36E+01 G
			1408.00	0.000E+00 -		1.247E+01 1.00E+03	2.10E+01 G
EU-154	I	-3.0220E-01				3.14E+03	
			873.23	-3.022E-01 ?(		9.860E+00 8.65E+02	1.23E+01 G
			123.10	-4.313E-03 %		1.316E+00 8.59E+03	4.08E+01 G
			1274.54	-3.232E-01 +		4.048E+00 3.30E+02	3.52E+01 G
			723.36	-8.471E-01 +		6.825E+00 2.26E+02	2.02E+01 G
			1004.77	-1.363E+00 +		8.381E+00 1.72E+02	1.80E+01 G
			996.33	-7.827E-01 +		1.613E+01 5.65E+02	1.06E+01 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
EU-155	I	-7.1334E-01						1.81E+03	
			105.31	-7.133E-01	?(	3.247E+00	1.34E+02	2.12E+01	G
			86.54	1.462E-02	&	2.143E+00	4.18E+03	3.07E+01	G
TL-208	N	2.4055E+00						6.98E+02	
			583.02	2.372E+00	(P	8.459E-01	1.49E+01	8.45E+01	G
			277.28	2.856E+00	&(P	9.615E+00	8.21E+01	6.31E+00	G
			860.56	1.653E+00	-	1.079E+01	1.82E+02	1.24E+01	G
PB-210	N	1.0768E+01						8.14E+03	
			46.54	1.077E+01	(P	2.949E+01	3.23E+01	4.25E+00	G
PB-212	N	7.2002E+00						6.98E+02	
			238.63	7.200E+00	@(P	1.973E+00	1.26E+01	4.33E+01	G
			300.03	0.000E+00	-	2.888E+01	1.00E+03	3.28E+00	G
PB-214	N	5.5364E+00						5.84E+05	
			351.93	5.536E+00	(	2.140E+00	1.58E+01	3.76E+01	G
			295.09	3.981E+00	-	4.057E+00	3.35E+01	1.93E+01	G
			242.00	1.373E+01	+	1.194E+01	2.86E+01	7.43E+00	G
BI-212	N	4.7444E+00						6.98E+02	
			727.17	4.744E+00	&(	1.394E+01	8.61E+01	7.55E+00	G
			785.42	0.000E+00	-	1.504E+02	1.00E+03	1.28E+00	G
BI-214	N	5.8617E+00						5.84E+05	
			609.31	6.187E+00	(P	1.513E+00	1.19E+01	4.61E+01	G
			1120.29	3.045E+00	- P	1.032E+01	6.64E+01	1.51E+01	G
			1764.49	4.889E+00	?(P	9.813E+00	3.96E+01	1.54E+01	G
AC-228	N	7.7116E+00						2.10E+03	
			911.07	5.674E+00	?(	3.947E+00	2.66E+01	2.90E+01	G
			968.97	8.217E+00	?(	6.892E+00	3.05E+01	1.75E+01	G
			338.32	1.190E+01	@(	4.237E+00	1.98E+01	1.20E+01	G
								Energy duplication	
			93.35	1.113E+01	&	1.106E+01	3.21E+01	5.56E+00	XA
Pa-234	N	1.0599E+00						1.63E+12	
			131.29	1.301E+00	(	3.390E+00	7.80E+01	1.80E+01	G
			569.47	-3.391E-02	%	1.301E+01	1.04E+04	8.20E+00	G
			946.02	-1.350E+00	-	1.057E+01	2.16E+02	1.34E+01	G
			883.24	6.076E-01	?(	1.178E+01	5.12E+02	9.60E+00	G
			880.53	-3.994E-01	%	2.099E+01	1.39E+03	6.00E+00	G
TH-234	N	1.0176E+01						1.63E+12	
			63.29	1.018E+01	(P	2.610E+01	3.77E+01	3.81E+00	G
			92.59	2.945E+00	- P	1.409E+01	3.85E+01	5.58E+00	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234M	N	6.7443E+01					1.63E+12	
			1001.00	4.402E+01	?(	1.464E+02	9.59E+01	8.37E-01 G
			766.41	1.341E+02	?(	3.040E+02	6.84E+01	2.94E-01 G
Ra-226	N	9.5709E+00					5.84E+05	
			185.99	9.571E+00	(P	2.300E+01	3.66E+01	3.28E+00 G
U-235	N	1.9618E+00					2.57E+11	
			143.79	1.768E+00	?(	5.366E+00	9.01E+01	1.10E+01 G
			205.33	8.158E-02	%	1.418E+01	4.89E+03	5.01E+00 G
			163.38	2.379E+00	?(	1.233E+01	1.51E+02	5.08E+00 G
								Energy duplication
			93.35	1.065E+01	&	1.058E+01	3.21E+01	5.81E+00 X
AM-241	T	7.1995E-01					1.58E+05	
			59.54	7.199E-01	(	2.362E+00	9.72E+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:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

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

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.66	79.	16.	0.009	32.32	1.077E+01	P
AM-241	59.69	70.	13.	0.007	97.25	7.199E-01	
TH-234	63.64	113.	20.	0.011	37.69	1.018E+01	P
TH-234	92.76	119.	11.	0.006	38.47	2.945E+00	P
U-235	93.35	71.	42.	0.023	32.13	1.065E+01	
EU-155	105.32	95.	-11.	-0.006	133.94	-7.133E-01	
Pa-234	131.42	69.	16.	0.009	78.03	1.301E+00	
U-235	143.18	59.	13.	0.007	90.10	1.768E+00	
U-235	163.27	57.	7.	0.004	150.62	2.379E+00	
Ra-226	185.77	72.	18.	0.010	36.64	9.571E+00	P
PB-214	238.75	67.	47.	0.026	28.64	1.373E+01	
PB-214	295.02	37.	30.	0.017	33.54	3.981E+00	
PB-214	351.92	29.	72.	0.040	15.84	5.536E+00	
I-131	364.47	17.	4.	0.002	151.16	1.472E-01	
BE-7	477.70	13.	5.	0.003	103.84	1.888E+00	
CS-134	562.39	12.	4.	0.002	122.48	2.230E+00	
CS-134	568.87	24.	-1.	0.000	869.98	-2.205E-01	
CS-134	604.39	19.	-1.	-0.001	568.38	-4.972E-02	
I-131	637.18	16.	-1.	-0.001	432.46	-8.684E-01	
CS-137	662.03	22.	6.	0.003	117.57	3.407E-01	
EU-154	723.41	26.	-3.	-0.002	226.39	-8.471E-01	
BI-212	727.49	14.	7.	0.004	86.12	4.744E+00	
PA-234M	768.27	9.	7.	0.004	68.39	1.341E+02	
CS-134	794.90	10.	5.	0.003	95.70	3.434E-01	
EU-154	872.35	14.	-1.	0.000	864.87	-3.022E-01	
Pa-234	884.55	11.	1.	0.001	512.00	6.076E-01	
Pa-234	945.69	17.	-3.	-0.002	216.42	-1.350E+00	
EU-154	998.05	23.	-1.	-0.001	565.14	-7.827E-01	
PA-234M	1001.04	11.	5.	0.003	95.87	4.402E+01	
EU-154	1005.29	17.	-4.	-0.002	171.97	-1.363E+00	
CO-60	1173.31	14.	2.	0.001	298.47	1.450E-01	
EU-154	1274.51	9.	-1.	-0.001	330.48	-3.232E-01	
CO-60	1332.77	8.	0.	0.000	930.42	-3.843E-02	

P - Peakbackground subtraction

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

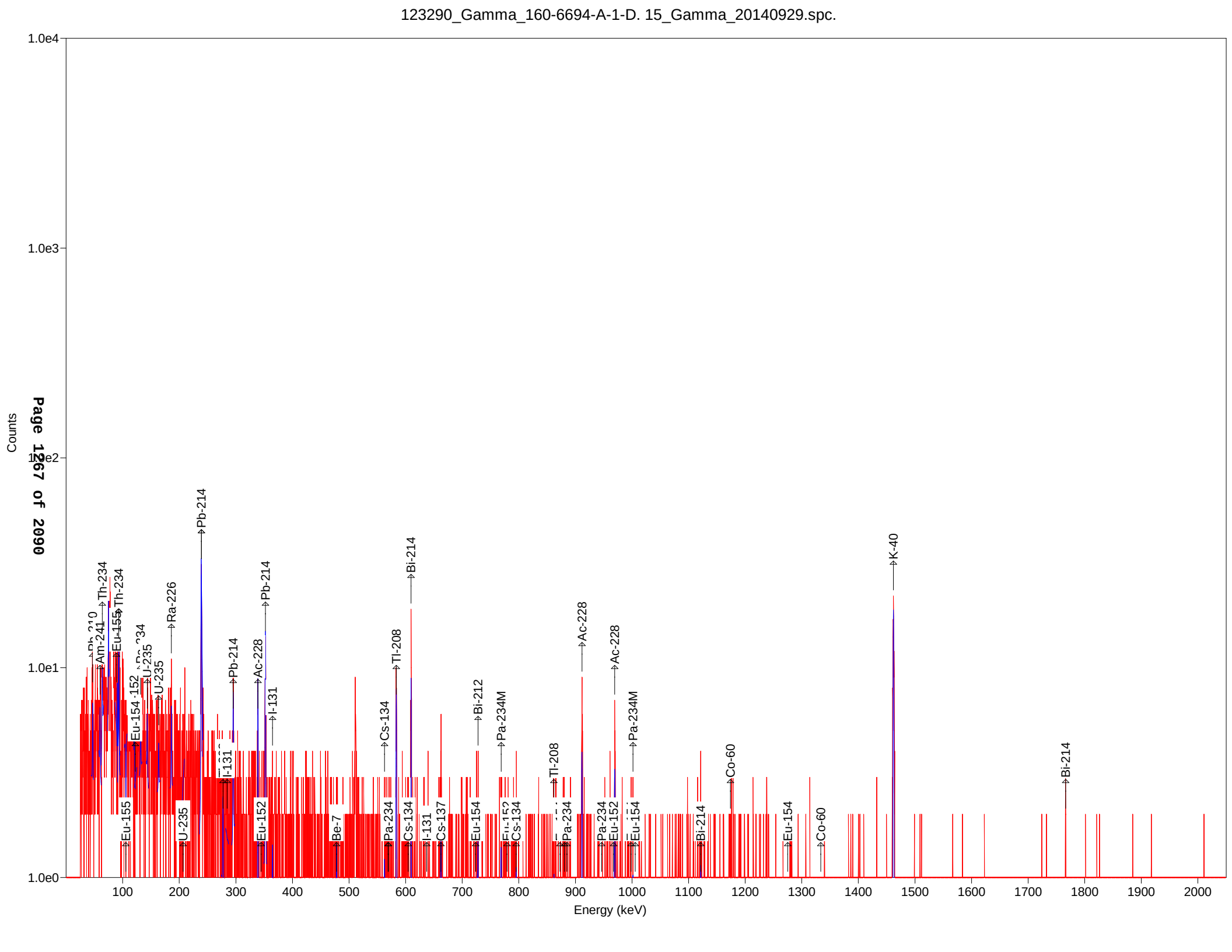
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	1.8882E+00	1.8882E+00	1.038E+02%	6.83E+00
K-40		1.4730E+02	1.4730E+02	7.861E+00%	9.78E+00
CO-60	#A	5.3245E-02	5.3245E-02	2.985E+02%	1.40E+00
I-131	#A	1.4717E-01	1.4719E-01	1.512E+02%	7.91E-01
CS-134	#A	2.2525E-01	2.2525E-01	9.570E+01%	1.04E+00
CS-137	#A	3.4072E-01	3.4072E-01	1.176E+02%	1.39E+00
EU-152	#A	2.4441E-01	2.4441E-01	5.451E+01%	2.48E+00
EU-154	#A	-3.0220E-01	-3.0220E-01	8.649E+02%	9.86E+00
EU-155	#A	-7.1334E-01	-7.1334E-01	1.339E+02%	3.25E+00
TL-208		2.4055E+00	2.4055E+00	1.692E+01%	8.46E-01
PB-210	#A	1.0768E+01	1.0768E+01	7.653E+01%	2.95E+01
PB-212	#	7.2002E+00	7.2002E+00	1.352E+01%	1.97E+00
PB-214	#	5.5364E+00	5.5364E+00	1.584E+01%	2.14E+00
BI-212	#A	4.7444E+00	4.7444E+00	8.612E+01%	1.39E+01
BI-214		5.8617E+00	5.8617E+00	1.328E+01%	1.51E+00
AC-228	#	7.7116E+00	7.7116E+00	1.502E+01%	3.95E+00
Pa-234	#A	1.0599E+00	1.0599E+00	7.803E+01%	3.39E+00
TH-234	#A	1.0176E+01	1.0176E+01	7.394E+01%	2.61E+01
PA-234M	#A	6.7443E+01	6.7443E+01	5.888E+01%	1.46E+02
Ra-226	#A	9.5709E+00	9.5709E+00	6.876E+01%	2.30E+01
U-235	#A	1.9618E+00	1.9618E+00	8.775E+01%	5.37E+00
AM-241	#A	7.1995E-01	7.1995E-01	9.725E+01%	2.36E+00

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

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

Total Activity (37.6 to 1999.5 keV) 1.705E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 1.7048320E+02 Bq/Sample

The library has energies which are not separable.


123290_Gamma_160-6694-A-1-D. 15_Gamma_20140929.spc.
Counts
Energy (keV)
Page 1267 of 2090
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-210
Am-241
Th-234
Eu-155
Th-234
Eu-154
U-235
U-235
Ra-226
Pb-214
Pb-214
Ac-228
Pb-214
I-131
Eu-155
U-235
Eu-152
Be-7
Pa-234
Cs-134
Tl-208
Cs-134
I-131
Cs-137
Bi-214
Eu-154
Bi-212
Eu-152
Cs-134
Pa-234M
Tl-208
Pa-234
Ac-228
Pa-234
Eu-152
Ac-228
Eu-154
Pa-234M
Bi-214
K-40
Co-60
Eu-154
Co-60
Bi-214

Test America St. Louis Spectrum ID: 9_Gamma_20140914

Sample Description: 123290_Gamma_160-6694-A-1-E DU
Detector: Ge9 S/N100228730
Batch ID: 123290
Work Order Number: Gamma
Lot Number: 160-6694-A-1-E DU

Decay to Time: 5/21/2014 14:28 Live Time: 1800 sec
Acquisition Time: 5/21/2014 14:28:25 Real Time: 1803 sec
Analysis Time: 5/21/2014 14:58 Dead Time: 0.15 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 9_Soil_TunaCan.Clb
Efficiency Cal Desc: 9_Soil_TunaCan_90099_050312
Efficiency Cal Date: 6/14/2012 10:19
Energy Cal Date: 3/1/2012 13:57
Library: Client_Short_no ingrowth Rev2.li
Bkgd Correction File: 9_2014-05-03_0559.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	1.786E+00	94.5	1.688E+00	1.691E+00	5.770E+00
K-40	1.441E+02	6.2	8.905E+00	1.156E+01	8.590E+00
CO-60	0.000E+00	1000.0	1.058E-01	1.058E-01	3.900E-01
I-131	2.612E-01	72.8	1.902E-01	1.907E-01	6.125E-01
CS-134	-2.957E-01	90.3	2.669E-01	2.674E-01	1.116E+00
CS-137	6.682E-01	40.1	2.676E-01	2.699E-01	8.163E-01
EU-152	6.537E-01	72.0	4.705E-01	4.718E-01	1.870E+00
EU-154	0.000E+00	707.1	3.090E-01	3.090E-01	9.661E+00
EU-155	7.780E-01	88.1	6.854E-01	6.867E-01	2.298E+00
TL-208	2.744E+00	12.9	3.537E-01	3.813E-01	4.972E-01
PB-210	5.760E+00	103.0	5.930E+00	5.940E+00	2.009E+01
PB-212	7.260E+00	9.0	6.547E-01	8.058E-01	1.166E+00
PB-214	6.292E+00	12.2	7.646E-01	8.315E-01	1.484E+00
BI-212	1.615E+01	16.4	2.655E+00	2.785E+00	3.217E+00
BI-214	5.566E+00	13.2	7.340E-01	7.890E-01	1.446E+00
AC-228	8.781E+00	12.4	1.089E+00	1.178E+00	9.956E-01
Pa-234	8.992E-01	68.2	6.132E-01	6.150E-01	2.499E+00
TH-234	1.779E+01	48.4	8.609E+00	8.659E+00	1.976E+01
PA-234M	1.152E+01	295.5	3.404E+01	3.405E+01	1.230E+02
Ra-226	1.426E+01	35.6	5.077E+00	5.227E+00	1.588E+01
U-235	7.360E-01	90.4	6.655E-01	6.665E-01	5.406E+00
AM-241	4.700E-01	140.5	6.604E-01	6.608E-01	2.241E+00
Total	2.465E+02				

Analyst: April Bean

TestAmerica, Inc Spectrum name: 9_Gamma_20140914.An1

Sample description
123290_Gamma_160-6694-A-1-E DU

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20140914.An1

Acquisition information
Start time: 5/21/2014 2:28:25 PM
Live time: 1800
Real time: 1803
Dead time: 0.15 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

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

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

Library Files
Main analysis library: Client_Short_no ingrowth Rev2.li
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.59keV)
Stop channel: 8000 (1999.34keV)
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

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	5/21/2014 2:28:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2014-05-03_0559.PBC 5/3/2014 5:59:24 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0918

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.34	11.	102.95	1.00	2.577E-02	46.54	4.250	PBC<MDA	PB210
60.12	11.	140.52	1.01	3.659E-02	59.54	35.900	PBC<MDA	AM241
63.27	48.	48.40	0.49	3.921E-02	63.29	3.810	PBC<MDA	TH234
74.99	94.	17.26	1.03	4.581E-02				
77.28	137.	13.50	1.03	4.683E-02				
92.53	15.	85.54	1.04	5.156E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	2.809E+00	U235
					93.35	5.810	2.809E+00	U235
92.92	36.	42.47	1.04	5.171E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	6.743E+00	U235
					93.35	5.561	7.044E+00	AC228
93.29	41.	29.28	1.04	5.171E-02	93.35	5.810	7.556E+00	U235
					93.35	5.561	7.894E+00	AC228
105.49	16.	88.10	1.05	5.318E-02	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	7.779E-01	EU155
121.93	17.	71.97	1.07	5.305E-02	121.78	28.580	PBC<MDA	EU152
160.57	10.	90.42	1.11	4.676E-02	163.38	5.080	PBC<MDA	U235
					163.38	5.080	2.324E+00	U235
186.17	37.	35.60	1.13	4.399E-02	185.99	3.280	PBC<MDA	Ra226
238.51	216.	8.82	1.17	3.733E-02	238.63	43.300	7.260E+00	PB212
242.10	70.	24.12	1.37	3.697E-02	242.00	7.430	1.415E+01	PB214
276.67	5.	219.53	1.21	3.372E-02	277.28	6.310	PBC<MDA	TL208
285.39	1.	620.40	1.22	3.315E-02	284.30	6.140	PBC<MDA	I131
295.05	73.	18.91	0.80	3.232E-02	295.09	19.300	6.489E+00	PB214
301.72	6.	151.57	1.24	3.195E-02	300.03	3.280	PBC<MDA	PB212
338.49	76.	15.34	0.54	2.940E-02	338.32	12.010	1.196E+01	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
344.37	5.	136.18	1.27	2.905E-02	344.29	26.500	PBC<MDA	EU152
351.62	128.	12.36	1.27	2.862E-02	351.93	37.600	6.191E+00	PB214
365.01	10.	72.82	1.29	2.791E-02	364.48	81.700	PBC<MDA	I131
478.21	8.	94.54	1.39	2.301E-02	477.60	10.520	PBC<MDA	BE7
583.28	83.	12.89	0.95	1.989E-02	583.02	84.500	2.744E+00	TL208
608.98	89.	11.68	1.48	1.925E-02	609.31	46.090	5.566E+00	BI214
661.59	19.	40.06	1.55	1.810E-02	661.66	85.210	PBC<MDA	CS137
727.42	37.	16.44	0.36	1.686E-02	727.17	7.550	1.615E+01	BI212
778.35	4.	109.85	1.64	1.600E-02	778.92	12.940	PBC<MDA	EU152
785.27	1.	673.04	1.65	1.590E-02	785.42	1.280	PBC<MDA	BI212
794.93	9.	48.96	1.66	1.574E-02	795.87	85.530	PBC<MDA	CS134
802.62	1.	441.76	1.66	1.565E-02	801.95	8.690	PBC<MDA	CS134
860.62	5.	115.61	1.71	1.482E-02	860.56	12.420	PBC<MDA	TL208
911.05	65.	12.40	0.65	1.418E-02	911.07	29.000	8.781E+00	AC228
947.03	7.	68.20	1.77	1.377E-02	946.02	13.400	PBC<MDA	Pa234
963.94	3.	238.79	1.79	1.357E-02	964.11	14.605	PBC<MDA	EU152
999.90	2.	295.51	1.81	1.318E-02	1001.00	0.837	PBC<MDA	PA234M
1120.56	4.	92.58	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
1460.53	270.	6.00	2.02	9.749E-03	1460.83	10.670	1.441E+02	K40

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.57	74.97	86.	94.	2.061E+03	17.26	1.025	-	D
308.71	77.26	102.	137.	2.923E+03	13.50	1.027	-	D

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

This section based on library: Client_Short_no ingrowth Rev2.li

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	184.99	46.34	63.	11.	0.006	102.95	0.998s
AM-241	240.11	60.12	116.	11.	0.006	140.52	1.010s
TH-234	252.68	63.27	117.	48.	0.027	48.40	0.493s
TH-234	369.94	92.59	77.	15.	0.008	85.54	1.042D
U-235	372.98	93.35	102.	36.	0.020	42.47	1.043D
AC-228	372.98	93.35	51.	41.	0.023	29.28	1.043D
EU-155	421.53	105.49	89.	16.	0.009	88.10	1.054s
EU-152	487.27	121.93	63.	17.	0.009	71.97	1.070s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	492.25	123.17	82.	-10.	-0.005	135.16	1.071s
U-235	641.77	160.57	35.	10.	0.006	90.42	1.109s
Ra-226	744.17	186.17	68.	37.	0.021	35.60	1.130s
U-235	820.09	205.15	83.	-13.	-0.007	99.42	1.148s
PB-212	953.50	238.51	45.	211.	0.117	8.82	1.166
PB-214	967.85	242.10	47.	70.	0.039	24.12	1.365s
TL-208	1106.11	276.67	50.	5.	0.003	219.53	1.214
I-131	1140.96	285.39	38.	1.	0.001	620.40	1.221s
PB-214	1179.59	295.05	37.	73.	0.040	18.91	0.798s
PB-212	1206.30	301.72	40.	6.	0.003	151.57	1.235s
AC-228	1353.36	338.49	12.	76.	0.042	15.34	0.538s
EU-152	1376.86	344.37	25.	5.	0.003	136.18	1.275s
PB-214	1405.87	351.62	31.	120.	0.067	12.36	1.271s
I-131	1459.43	365.01	23.	10.	0.006	72.82	1.293s
BE-7	1912.19	478.21	23.	8.	0.004	94.54	1.392s
CS-134	2257.81	564.61	29.	-6.	-0.003	132.65	1.466s
TL-208	2332.47	583.28	7.	83.	0.046	12.89	0.950s
CS-134	2422.44	605.77	57.	-12.	-0.007	90.25	1.500s
BI-214	2435.28	608.98	19.	89.	0.049	11.68	1.475s
CS-137	2645.75	661.59	18.	19.	0.010	40.06	1.548s
EU-154	2898.20	724.69	35.	-7.	-0.004	118.18	1.598s
BI-212	2909.12	727.42	0.	37.	0.021	16.44	0.365s
EU-152	3112.88	778.35	9.	4.	0.002	109.85	1.643s
BI-212	3140.55	785.27	15.	1.	0.000	673.04	1.648s
CS-134	3179.22	794.93	6.	9.	0.005	48.96	1.656s
CS-134	3209.95	802.62	14.	1.	0.001	441.76	1.661s
TL-208	3442.03	860.62	15.	5.	0.003	115.61	1.707s
Pa-234	3515.84	879.07	11.	-2.	-0.001	257.72	1.724s
AC-228	3643.78	911.05	0.	65.	0.036	12.40	0.650s
Pa-234	3787.76	947.03	8.	7.	0.004	68.20	1.772s
EU-152	3855.45	963.94	19.	3.	0.002	238.79	1.786s
PA-234M	3999.31	999.90	22.	2.	0.001	295.51	1.814s
BI-214	4482.17	1120.56	20.	4.	0.002	92.58	1.901s
EU-154	5096.70	1274.12	19.	-1.	0.000	798.96	2.008s
EU-152	5632.39	1407.96	14.	-3.	-0.001	218.68	2.097s
K-40	5842.83	1460.53	8.	270.	0.150	6.00	2.016

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	Peak MDA Value Bq/Sample		COMMENTS
BE-7	C	1.7860E+00				5.31E+01		
			477.60	1.786E+00	&(	5.770E+00	9.45E+01	1.05E+01 G
K-40	N	1.4408E+02				4.66E+11		
			1460.83	1.441E+02	(P	8.590E+00	6.00E+00	1.07E+01 G
I-131	I	2.6122E-01				8.02E+00		
			364.48	2.519E-01	&(	6.125E-01	7.28E+01	8.17E+01 G
			284.30	3.856E-01	?(	8.550E+00	6.20E+02	6.14E+00 G
			636.97	9.626E-02	%	1.051E+01	2.96E+03	7.17E+00 G
CS-134	I	-2.9573E-01				7.54E+02		
			604.71	-3.671E-01	?(	1.116E+00	9.03E+01	9.76E+01 G
			795.87	3.915E-01	+	5.847E-01	4.90E+01	8.55E+01 G
			569.32	0.000E+00	+	2.524E+00	1.00E+03	1.54E+01 G
			801.95	5.055E-01	?(	8.312E+00	4.42E+02	8.69E+00 G
			563.24	-1.982E+00	+	9.133E+00	1.33E+02	8.35E+00 G
CS-137	I	6.6820E-01				1.10E+04		
			661.66	6.682E-01	?(	8.163E-01	4.01E+01	8.52E+01 G
EU-152	F	6.5374E-01				4.94E+03		
			344.29	3.930E-01	?(	1.870E+00	1.36E+02	2.65E+01 G
			121.78	6.087E-01	(	1.456E+00	7.20E+01	2.86E+01 G
			778.92	1.171E+00	?(	4.541E+00	1.10E+02	1.29E+01 G
			964.11	7.570E-01	?(	6.519E+00	2.39E+02	1.46E+01 G
			1112.07	0.000E+00	-	6.672E+00	1.00E+03	1.36E+01 G
			1408.00	-6.586E-01	+	5.257E+00	2.19E+02	2.10E+01 G
EU-155	I	7.7795E-01				1.81E+03		
			105.31	7.779E-01	(	2.298E+00	8.81E+01	2.12E+01 G
			86.54	1.535E-02	%	2.016E+00	3.80E+03	3.07E+01 G
TL-208	N	2.7439E+00				6.98E+02		
			583.02	2.744E+00	(	4.972E-01	1.29E+01	8.45E+01 G
			277.28	1.216E+00	-	9.308E+00	2.20E+02	6.31E+00 G
			860.56	1.538E+00	-	6.230E+00	1.16E+02	1.24E+01 G
PB-210	N	5.7603E+00				8.14E+03		
			46.54	5.760E+00	?(	2.009E+01	1.03E+02	4.25E+00 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
PB-212	N	7.2601E+00						6.98E+02	
			238.63	7.260E+00	(	P	1.166E+00	8.82E+00	4.33E+01 G
			300.03	3.261E+00	-		1.714E+01	1.52E+02	3.28E+00 G
PB-214	N	6.2917E+00						5.84E+05	
			351.93	6.191E+00	@(	P	1.484E+00	1.24E+01	3.76E+01 G
			295.09	6.489E+00	(	P	2.771E+00	1.89E+01	1.93E+01 G
			242.00	1.415E+01	+	P	7.013E+00	2.41E+01	7.43E+00 G
BI-212	N	1.6152E+01						6.98E+02	
			727.17	1.615E+01	(		3.217E+00	1.64E+01	7.55E+00 G
			785.42	2.289E+00	-		5.748E+01	6.73E+02	1.28E+00 G
BI-214	N	5.5662E+00						5.84E+05	
			609.31	5.566E+00	@(	P	1.446E+00	1.17E+01	4.61E+01 G
			1120.29	1.343E+00	-	P	7.214E+00	9.26E+01	1.51E+01 G
			1764.49	-1.134E+00	%	P	4.433E+00	1.00E+03	1.54E+01 G
AC-228	N	8.7806E+00						2.10E+03	
			911.07	8.781E+00	(		9.956E-01	1.24E+01	2.90E+01 G
			968.97	0.000E+00	-		4.188E+00	1.00E+03	1.75E+01 G
			338.32	1.196E+01	+		2.966E+00	1.53E+01	1.20E+01 G
								Energy duplication	
			93.35	7.894E+00			6.962E+00	2.93E+01	5.56E+00 XA
Pa-234	N	8.9918E-01						1.63E+12	
			131.29	1.532E-02	%(		2.499E+00	4.64E+03	1.80E+01 G
			569.47	0.000E+00	-		4.826E+00	1.00E+03	8.20E+00 G
			946.02	2.086E+00	?(		4.710E+00	6.82E+01	1.34E+01 G
			883.24	-7.524E-01	+		7.209E+00	2.58E+02	9.60E+00 G
			880.53	2.030E-01	%		1.197E+01	1.54E+03	6.00E+00 G
TH-234	N	1.7787E+01						1.63E+12	
			63.29	1.779E+01	(		1.976E+01	4.84E+01	3.81E+00 G
			92.59	2.931E+00	-		8.404E+00	8.55E+01	5.58E+00 G
PA-234M	N	1.1520E+01						1.63E+12	
			1001.00	1.152E+01	?(		1.230E+02	2.96E+02	8.37E-01 G
			766.41	0.000E+00	-		3.439E+02	1.00E+03	2.94E-01 G
Ra-226	N	1.4261E+01						5.84E+05	
			185.99	1.426E+01	(		1.588E+01	3.56E+01	3.28E+00 G
U-235	N	7.3597E-01						2.57E+11	
			143.79	0.000E+00	(		5.406E+00	1.00E+03	1.10E+01 G
			205.33	-3.627E+00	+		1.216E+01	9.94E+01	5.01E+00 G
			163.38	2.324E+00	(		7.117E+00	9.04E+01	5.08E+00 G
								Energy duplication	
			93.35	6.743E+00	?		9.189E+00	4.25E+01	5.81E+00 X

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	T 4.6997E-01					1.58E+05	
		59.54	4.700E-01	(	2.241E+00	1.41E+02	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:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

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

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
PB-210	46.34	63.	11.	0.006	102.95	5.760E+00
AM-241	60.12	116.	11.	0.006	140.52	4.700E-01
U-235	93.35	102.	36.	0.020	42.47	6.743E+00
EU-155	105.49	89.	16.	0.009	88.10	7.779E-01
EU-152	121.93	63.	17.	0.009	71.97	6.087E-01
EU-154	123.17	82.	-10.	-0.005	135.16	-2.511E-01
U-235	160.57	35.	10.	0.006	90.42	2.324E+00
Ra-226	186.17	68.	37.	0.021	35.60	1.426E+01
U-235	205.15	83.	-13.	-0.007	99.42	-3.627E+00
I-131	285.39	38.	1.	0.001	620.40	3.856E-01
EU-152	344.37	25.	5.	0.003	136.18	3.930E-01
I-131	365.01	23.	10.	0.006	72.82	2.519E-01

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BE-7	478.21	23.	8.	0.004	94.54	1.786E+00	
CS-134	564.61	29.	-6.	-0.003	132.65	-1.982E+00	
CS-134	605.77	57.	-12.	-0.007	90.25	-3.671E-01	
CS-137	661.59	18.	19.	0.010	40.06	6.682E-01	
EU-154	724.69	35.	-7.	-0.004	118.18	-1.211E+00	
EU-152	778.35	9.	4.	0.002	109.85	1.171E+00	
CS-134	794.93	6.	9.	0.005	48.96	3.915E-01	
CS-134	802.62	14.	1.	0.001	441.76	5.055E-01	
EU-152	963.94	19.	3.	0.002	238.79	7.570E-01	
PA-234M	999.90	22.	2.	0.001	295.51	1.152E+01	
EU-154	1274.12	19.	-1.	0.000	798.96	-1.140E-01	
EU-152	1407.96	14.	-3.	-0.001	218.68	-6.586E-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	1.7860E+00	1.7860E+00	9.454E+01%	5.77E+00
K-40	1.4408E+02	1.4408E+02	6.181E+00%	8.59E+00
CO-60 #A	0.0000E+00	0.0000E+00	1.000E+03%	3.90E-01
I-131 #A	2.6121E-01	2.6122E-01	7.282E+01%	6.13E-01
CS-134 #A	-2.9573E-01	-2.9573E-01	9.025E+01%	1.12E+00
CS-137 #A	6.6820E-01	6.6820E-01	4.006E+01%	8.16E-01
EU-152 #A	6.5374E-01	6.5374E-01	7.197E+01%	1.87E+00
EU-154 #A	0.0000E+00	0.0000E+00	7.071E+02%	9.66E+00
EU-155 #A	7.7795E-01	7.7795E-01	8.810E+01%	2.30E+00
TL-208	2.7439E+00	2.7439E+00	1.289E+01%	4.97E-01
PB-210 #A	5.7603E+00	5.7603E+00	1.030E+02%	2.01E+01
PB-212	7.2601E+00	7.2601E+00	9.018E+00%	1.17E+00
PB-214	6.2917E+00	6.2917E+00	1.215E+01%	1.48E+00
BI-212	1.6152E+01	1.6152E+01	1.644E+01%	3.22E+00
BI-214 #	5.5662E+00	5.5662E+00	1.319E+01%	1.45E+00
AC-228	8.7806E+00	8.7806E+00	1.240E+01%	9.96E-01
Pa-234 #A	8.9918E-01	8.9918E-01	6.820E+01%	2.50E+00
TH-234 A	1.7787E+01	1.7787E+01	4.840E+01%	1.98E+01
PA-234M#A	1.1520E+01	1.1520E+01	2.955E+02%	1.23E+02
Ra-226 #A	1.4261E+01	1.4261E+01	3.560E+01%	1.59E+01
U-235 #A	7.3597E-01	7.3597E-01	9.042E+01%	5.41E+00
AM-241 #A	4.6997E-01	4.6997E-01	1.405E+02%	2.24E+00

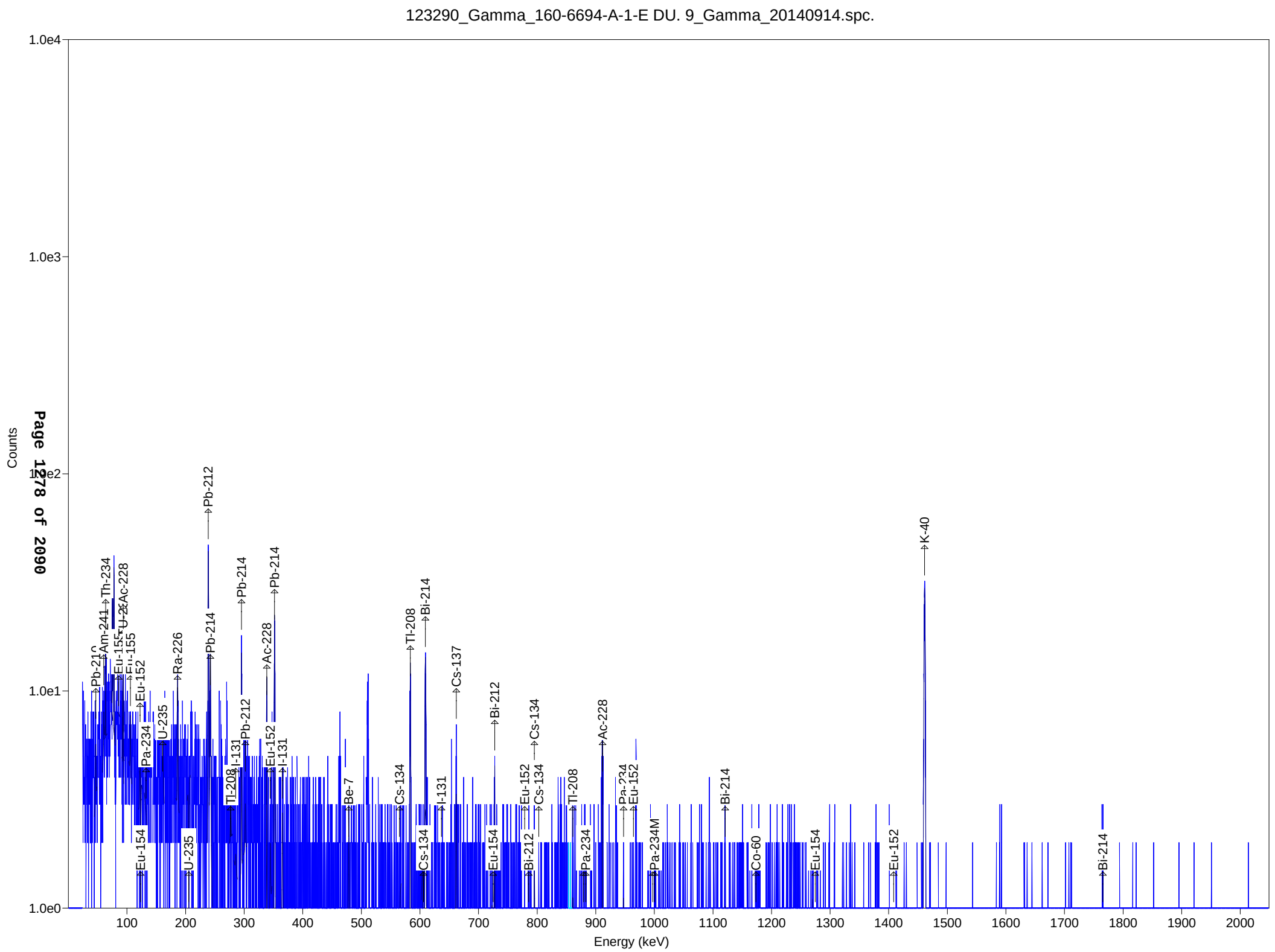
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

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

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

Total Activity (131.1 to 1999.3 keV) 2.087E+02 Bq/Sample
Total Decayed Activity (131.1 to 1999.3 keV) 2.0866092E+02 Bq/Sample

The library has energies which are not separable.


123290_Gamma_160-6694-A-1-E DU. 9_Gamma_20140914.spc.
Counts
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)
Pb-210
Am-241
Th-234
Eu-155
U-235
Ac-228
Eu-155
Eu-152
Pa-234
U-235
Ra-226
Pb-212
Pb-214
Tl-208
I-131
Pb-212
Pb-214
Ac-228
Eu-152
I-131
Be-7
Cs-134
Tl-208
Bi-214
I-131
Cs-137
Bi-212
Eu-152
Cs-134
Tl-208
Ac-228
Pa-234
Eu-152
Eu-154
U-235
Cs-134
Eu-154
Bi-212
Pa-234
Pa-234M
Bi-214
Co-60
Eu-154
Eu-152
K-40
Bi-214

Test America St. Louis Spectrum ID: 12_Gamma_20141015

Sample Description: 123290_Gamma_160-6694-A-2-D
Detector: Ge12 S/N10034336
Batch ID: 123290
Work Order Number: Gamma
Lot Number: 160-6694-A-2-D

Decay to Time: 5/21/2014 14:31 Live Time: 1800 sec
Acquisition Time: 5/21/2014 14:32:00 Real Time: 1805 sec
Analysis Time: 5/21/2014 15:02 Dead Time: 0.28 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCanCal_90099_100212
Efficiency Cal Date: 10/4/2012 09:05
Energy Cal Date: 2/28/2012 13:26
Library: Client_Short_no ingrowth Rev2.li
Bkgd Correction File: 12_2014-05-03_0618.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-3.551E-01	521.2	1.851E+00	1.851E+00	6.733E+00
K-40	1.465E+02	6.9	1.009E+01	1.257E+01	1.426E+01
CO-60	-6.553E-02	512.0	3.356E-01	3.356E-01	1.249E+00
I-131	3.985E-01	86.1	3.429E-01	3.435E-01	7.147E-01
CS-134	2.036E-01	131.1	2.669E-01	2.671E-01	8.633E-01
CS-137	2.608E-01	92.8	2.421E-01	2.425E-01	8.328E-01
EU-152	3.371E-01	127.6	4.303E-01	4.306E-01	3.303E+00
EU-154	3.708E-01	101.8	3.777E-01	3.781E-01	8.319E+00
EU-155	7.685E-01	68.6	5.268E-01	5.285E-01	2.502E+00
TL-208	2.599E+00	15.4	4.006E-01	4.227E-01	8.064E-01
PB-210	-4.014E+00	285.5	1.146E+01	1.146E+01	2.895E+01
PB-212	7.006E+00	11.6	8.153E-01	9.328E-01	1.771E+00
PB-214	6.676E+00	12.9	8.621E-01	9.293E-01	1.770E+00
BI-212	6.555E+00	62.0	4.063E+00	4.077E+00	1.126E+01
BI-214	4.703E+00	13.2	6.212E-01	6.675E-01	1.198E+00
AC-228	9.598E+00	12.4	1.188E+00	1.285E+00	3.080E+00
Pa-234	8.621E-01	106.9	9.212E-01	9.223E-01	3.137E+00
TH-234	-3.609E+00	546.9	1.973E+01	1.973E+01	2.678E+01
PA-234M	-1.416E+01	7411.0	1.049E+03	1.049E+03	1.473E+02
Ra-226	3.422E+00	173.2	5.926E+00	5.934E+00	2.133E+01
U-235	2.963E+00	50.9	1.507E+00	1.515E+00	4.420E+00
AM-241	-6.340E-02	1213.0	7.688E-01	7.688E-01	2.661E+00
Total	1.932E+02				

Analyst: April Bean

TestAmerica, Inc Spectrum name: 12_Gamma_20141015.An1

Sample description
123290_Gamma_160-6694-A-2-D

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20141015.An1

Acquisition information
Start time: 5/21/2014 2:32:00 PM
Live time: 1800
Real time: 1805
Dead time: 0.28 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCanCal_90099_100212

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 10/4/2012 9:05:44 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.70 %
Log(Eff): -7.827468E-01 + (-3.001271E-01*Log(E)) + (-3.369562E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.96 %
Log(Eff): -2.288409E+01 + (8.352717E+00*Log(E)) + (-8.812368E-01*Log(E)^2)

Library Files
Main analysis library: Client_Short_no ingrowth Rev2.li
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 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

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	5/21/2014 2:31:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2014-05-03_0618.PBC 5/3/2014 6:18:35 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1090

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.63	-7.	49.96	0.89	2.229E-02	46.54	4.250	PBC<MDA	PB210
63.37	-8.	170.40	0.91	3.338E-02	63.29	3.810	PBC<MDA	TH234
77.02	108.	18.88	1.06	3.959E-02				
87.88	13.	125.59	0.93	4.243E-02	86.54	30.700	PBC<MDA	EU155
92.68	38.	41.94	0.93	4.382E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	8.372E+00	U235
93.13	84.	21.86	1.03	4.382E-02	93.35	5.561	1.907E+01	AC228
					93.35	5.810	1.825E+01	U235
105.09	19.	68.55	0.95	4.516E-02	105.31	21.200	PBC<MDA	EU155
121.45	3.	411.88	0.96	4.528E-02	121.78	28.580	PBC<MDA	EU152
					121.78	28.580	1.360E-01	EU152
123.75	8.	161.50	0.96	4.522E-02	123.10	40.790	PBC<MDA	EU154
131.48	3.	438.68	0.97	4.468E-02	131.29	18.000	PBC<MDA	Pa234
144.47	23.	50.87	0.98	4.338E-02	143.79	10.960	PBC<MDA	U235
164.06	13.	101.40	1.00	4.061E-02	163.38	5.080	PBC<MDA	U235
185.45	8.	50.73	1.02	3.796E-02	185.99	3.280	PBC<MDA	Ra226
238.44	191.	10.71	1.21	3.221E-02	238.63	43.300	7.006E+00	PB212
295.03	70.	19.57	0.88	2.789E-02	295.09	19.300	7.240E+00	PB214
299.94	24.	34.90	0.91	2.757E-02	300.03	3.280	1.444E+01	PB212
338.24	58.	15.63	1.22	2.538E-02	338.32	12.010	1.055E+01	AC228
351.79	107.	11.98	1.36	2.470E-02	351.93	37.600	6.386E+00	PB214
364.59	4.	166.69	1.19	2.410E-02	364.48	81.700	PBC<MDA	I131
583.15	68.	14.05	0.61	1.724E-02	583.02	84.500	2.606E+00	TL208

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
604.07	6.	131.13	1.40	1.679E-02	604.71	97.620	PBC<MDA	CS134
609.18	65.	11.62	1.20	1.669E-02	609.31	46.090	4.703E+00	BI214
637.11	7.	86.05	1.43	1.616E-02	636.97	7.170	PBC<MDA	I131
661.21	6.	92.84	1.45	1.571E-02	661.66	85.210	PBC<MDA	CS137
727.70	8.	81.30	1.51	1.465E-02	727.17	7.550	PBC<MDA	BI212
786.33	7.	93.60	1.56	1.383E-02	785.42	1.280	PBC<MDA	BI212
802.93	1.	784.65	1.57	1.362E-02	801.95	8.690	PBC<MDA	CS134
861.35	7.	73.50	1.62	1.291E-02	860.56	12.420	PBC<MDA	TL208
880.53	2.	180.22	1.63	1.269E-02	880.53	6.000	PBC<MDA	Pa234
883.24	4.	106.86	1.64	1.266E-02	883.24	9.600	PBC<MDA	Pa234
911.19	59.	16.65	0.55	1.237E-02	911.07	29.000	9.205E+00	AC228
968.63	13.	46.01	1.71	1.180E-02	968.97	17.460	PBC<MDA	AC228
995.68	5.	119.78	1.73	1.155E-02	996.33	10.600	PBC<MDA	EU154
1004.79	2.	255.49	1.74	1.148E-02	1004.77	18.010	PBC<MDA	EU154
1120.54	23.	26.64	0.65	1.055E-02	1120.29	15.100	7.913E+00	BI214
1407.06	3.	127.63	2.05	8.829E-03	1408.00	21.005	PBC<MDA	EU152
					1408.00	21.005	1.036E+00	EU152
1460.76	241.	6.75	2.08	8.576E-03	1460.83	10.670	1.465E+02	K40

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
307.63	77.02	108.	108.	2.723E+03	18.88	1.061	-

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_Short_no ingrowth Rev2.li

********** 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	186.16	46.63	100.	-7.	-0.004	49.96	0.889s
TH-234	253.05	63.37	158.	-8.	-0.005	170.40	0.905s
EU-155	351.04	87.88	119.	13.	0.007	125.59	0.928s
TH-234	377.23	94.44	106.	-8.	-0.004	95.84	0.934s
AC-228	372.89	93.35	82.	84.	0.046	21.86	1.028D
U-235	372.89	93.35	110.	38.	0.021	41.94	0.934D
EU-155	419.80	105.09	75.	19.	0.011	68.55	0.946s
EU-152	485.20	121.45	84.	3.	0.002	411.88	0.961s
EU-154	494.39	123.75	73.	8.	0.004	161.50	0.963s
Pa-234	525.28	131.48	84.	3.	0.002	438.68	0.970s
U-235	577.20	144.47	57.	23.	0.013	50.87	0.982s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	655.50	164.06	83.	13.	0.007	101.40	1.001
Ra-226	741.02	185.45	94.	8.	0.004	50.73	1.022s
PB-212	952.82	238.44	80.	176.	0.098	10.71	1.208
PB-214	971.26	243.05	103.	-5.	-0.003	456.59	1.075s
PB-214	1179.05	295.03	41.	70.	0.039	19.57	0.882s
PB-212	1198.70	299.94	12.	24.	0.013	34.90	0.907s
AC-228	1351.81	338.24	16.	58.	0.032	15.63	1.221
PB-214	1405.97	351.79	33.	107.	0.059	11.98	1.358s
I-131	1457.16	364.59	24.	4.	0.002	166.69	1.187s
BE-7	1909.92	477.82	24.	-1.	-0.001	521.20	1.289s
CS-134	2254.22	563.92	32.	-3.	-0.002	281.64	1.365s
CS-134	2273.53	568.75	23.	-1.	0.000	979.08	1.370s
Pa-234	2273.51	568.74	23.	-1.	0.000	958.59	1.370
TL-208	2331.13	583.15	16.	68.	0.038	14.05	0.608s
CS-134	2414.79	604.07	24.	6.	0.003	131.13	1.401s
BI-214	2435.22	609.18	9.	65.	0.036	11.62	1.199
I-131	2546.93	637.11	17.	7.	0.004	86.05	1.429s
CS-137	2643.33	661.21	14.	6.	0.003	92.84	1.451s
EU-154	2894.01	723.89	26.	-4.	-0.002	189.20	1.503s
BI-212	2909.25	727.70	18.	8.	0.005	81.30	1.507s
EU-152	3114.82	779.09	21.	-2.	-0.001	394.59	1.550s
BI-212	3143.80	786.33	16.	7.	0.004	93.60	1.556s
CS-134	3210.21	802.93	19.	1.	0.000	784.65	1.570s
TL-208	3443.93	861.35	11.	7.	0.004	73.50	1.618s
EU-154	3489.29	872.69	20.	-4.	-0.002	164.76	1.629s
Pa-234	3520.65	880.53	7.	2.	0.001	180.22	1.635D
Pa-234	3531.49	883.24	5.	4.	0.002	106.86	1.637D
AC-228	3643.32	911.19	14.	59.	0.033	16.65	0.547s
AC-228	3873.11	968.63	21.	13.	0.007	46.01	1.707s
EU-154	3981.35	995.68	18.	5.	0.003	119.78	1.729s
EU-154	4017.82	1004.79	15.	2.	0.001	255.49	1.736s
EU-152	4439.89	1110.26	15.	-1.	0.000	760.97	1.821s
BI-214	4481.03	1120.54	7.	23.	0.013	26.64	0.649s
CO-60	4690.35	1172.85	24.	-3.	-0.002	219.63	1.869s
EU-154	5094.82	1273.90	19.	-4.	-0.002	181.14	1.946s
CO-60	5332.87	1333.37	15.	-1.	-0.001	512.02	1.990s
EU-152	5627.88	1407.06	8.	3.	0.002	127.63	2.046s
K-40	5842.87	1460.76	20.	241.	0.134	6.75	2.085s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-3.5510E-01				5.31E+01	
			477.60	-3.551E-01	?(	6.733E+00 5.21E+02 1.05E+01	G
K-40	N	1.4652E+02				4.66E+11	
			1460.83	1.465E+02	(P	1.426E+01 6.75E+00 1.07E+01	G
CO-60	F	-6.5534E-02				1.93E+03	
			1332.50	-6.553E-02	?(	1.249E+00 5.12E+02 1.00E+02	G
			1173.24	-1.763E-01	+	1.383E+00 2.20E+02 9.99E+01	G
I-131	I	3.9845E-01				8.02E+00	
			364.48	1.214E-01	@(	7.147E-01 1.67E+02 8.17E+01	G
			284.30	3.896E-02	&	8.092E+00 5.64E+03 6.14E+00	G
			636.97	3.556E+00	(	1.042E+01 8.60E+01 7.17E+00	G
CS-134	I	2.0357E-01				7.54E+02	
			604.71	1.887E-01	(	8.633E-01 1.31E+02 9.76E+01	G
			795.87	-4.698E-04	%	1.129E+00 6.46E+04 8.55E+01	G
			569.32	-1.422E-01	&	5.112E+00 9.79E+02 1.54E+01	G
			801.95	3.709E-01	?(	1.076E+01 7.85E+02 8.69E+00	G
			563.24	-1.089E+00	+	1.091E+01 2.82E+02 8.35E+00	G
CS-137	I	2.6076E-01				1.10E+04	
			661.66	2.608E-01	?(	8.328E-01 9.28E+01 8.52E+01	G
EU-152	F	3.3713E-01				4.94E+03	
			344.29	0.000E+00	&(	3.303E+00 1.00E+03 2.65E+01	G
			121.78	1.360E-01	?(	1.945E+00 4.12E+02 2.86E+01	G
			778.92	-5.133E-01	&	7.380E+00 3.95E+02 1.29E+01	G
			964.11	0.000E+00	-	1.924E+01 1.00E+03 1.46E+01	G
			1112.07	-2.820E-01	+	8.028E+00 7.61E+02 1.36E+01	G
			1408.00	1.036E+00	?(	4.763E+00 1.28E+02 2.10E+01	G
EU-154	I	3.7082E-01				3.14E+03	
			873.23	-1.422E+00	?(	8.319E+00 1.65E+02 1.23E+01	G
			123.10	2.318E-01	+	1.284E+00 1.62E+02 4.08E+01	G
			1274.54	-5.928E-01	+	3.833E+00 1.81E+02 3.52E+01	G
			723.36	-7.417E-01	&	4.964E+00 1.89E+02 2.02E+01	G
			1004.77	5.898E-01	&	5.517E+00 2.55E+02 1.80E+01	G
			996.33	2.446E+00	?(	1.024E+01 1.20E+02 1.06E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	7.6854E-01					1.81E+03	
			105.31	1.102E+00	&(	2.502E+00	6.85E+01	2.12E+01 G
			86.54	5.384E-01	&(	2.287E+00	1.26E+02	3.07E+01 G
TL-208	N	2.5989E+00					6.98E+02	
			583.02	2.606E+00	(P	8.064E-01	1.40E+01	8.45E+01 G
			277.28	0.000E+00	-	1.179E+01	1.00E+03	6.31E+00 G
			860.56	2.547E+00	?(	6.275E+00	7.35E+01	1.24E+01 G
PB-210	N	-4.0139E+00					8.14E+03	
			46.54	-4.014E+00	?(P	2.895E+01	5.00E+01	4.25E+00 G
PB-212	N	7.0056E+00					6.98E+02	
			238.63	7.006E+00	(P	1.771E+00	1.07E+01	4.33E+01 G
			300.03	1.444E+01	+	1.179E+01	3.49E+01	3.28E+00 G
PB-214	N	6.6756E+00					5.84E+05	
			351.93	6.386E+00	*(P	1.770E+00	1.20E+01	3.76E+01 G
			295.09	7.240E+00	*(P	3.354E+00	1.96E+01	1.93E+01 G
			242.00	-1.209E+00	& P	1.174E+01	4.57E+02	7.43E+00 G
BI-212	N	6.5546E+00					6.98E+02	
			727.17	4.093E+00	&(	1.126E+01	8.13E+01	7.55E+00 G
			785.42	2.107E+01	?(	6.772E+01	9.36E+01	1.28E+00 G
BI-214	N	4.7030E+00					5.84E+05	
			609.31	4.703E+00	(P	1.198E+00	1.16E+01	4.61E+01 G
			1120.29	7.913E+00	+ P	5.333E+00	2.66E+01	1.51E+01 G
			1764.49	-1.528E+00	% P	5.354E+00	1.00E+03	1.54E+01 G
AC-228	N	9.5979E+00					2.10E+03	
			911.07	9.205E+00	(P	3.080E+00	1.66E+01	2.90E+01 G
			968.97	3.495E+00	- P	6.441E+00	4.60E+01	1.75E+01 G
			338.32	1.055E+01	(P	3.903E+00	1.56E+01	1.20E+01 G
								Energy duplication
			93.35	1.907E+01	+ P	1.026E+01	2.19E+01	5.56E+00 XA
Pa-234	N	8.6209E-01					1.63E+12	
			131.29	2.059E-01	?(	3.137E+00	4.39E+02	1.80E+01 G
			569.47	-2.727E-01	+	9.593E+00	9.59E+02	8.20E+00 G
			946.02	0.000E+00	-	7.888E+00	1.00E+03	1.34E+01 G
			883.24	1.626E+00	(	6.208E+00	1.07E+02	9.60E+00 G
			880.53	1.609E+00	(	1.084E+01	1.80E+02	6.00E+00 G
TH-234	N	-3.6086E+00					1.63E+12	
			63.29	-3.609E+00	?(P	2.678E+01	1.70E+02	3.81E+00 G
			92.59	-1.766E+00	+ P	1.154E+01	9.58E+01	5.58E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234M	N -1.4161E+01					1.63E+12	
		1001.00	-1.416E+01	%(P	1.473E+02	3.57E+03	8.37E-01 G
		766.41	-5.149E+01	& P	3.128E+02	9.47E+02	2.94E-01 G
Ra-226	N 3.4216E+00					5.84E+05	
		185.99	3.422E+00	(P	2.133E+01	5.07E+01	3.28E+00 G
U-235	N 2.9625E+00					2.57E+11	
		143.79	2.684E+00	?(	4.420E+00	5.09E+01	1.10E+01 G
		205.33	6.972E-03	%	9.967E+00	3.97E+04	5.01E+00 G
		163.38	3.563E+00	?(	1.219E+01	1.01E+02	5.08E+00 G
							Energy duplication
		93.35	8.372E+00	*	1.127E+01	4.19E+01	5.81E+00 X
AM-241	T -6.3396E-02					1.58E+05	
		59.54	-6.340E-02	%(	2.661E+00	1.21E+03	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:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

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

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.63	100.	-7.	-0.004	49.96	-4.014E+00	P
TH-234	63.37	158.	-8.	-0.005	170.40	-3.609E+00	P
EU-155	87.88	119.	13.	0.007	125.59	5.384E-01	
TH-234	94.44	106.	-8.	-0.004	95.84	-1.766E+00	P
U-235	93.35	110.	38.	0.021	41.94	8.372E+00	
EU-155	105.09	75.	19.	0.011	68.55	1.102E+00	
EU-152	121.45	84.	3.	0.002	411.88	1.360E-01	
EU-154	123.75	73.	8.	0.004	161.50	2.318E-01	
U-235	144.47	57.	23.	0.013	50.87	2.684E+00	
U-235	164.06	83.	13.	0.007	101.40	3.563E+00	
Ra-226	185.45	94.	8.	0.004	50.73	3.422E+00	P
I-131	364.59	24.	4.	0.002	166.69	1.214E-01	
BE-7	477.82	24.	-1.	-0.001	521.20	-3.551E-01	
CS-134	563.92	32.	-3.	-0.002	281.64	-1.089E+00	
CS-134	568.75	23.	-1.	0.000	979.08	-1.422E-01	
CS-134	604.07	24.	6.	0.003	131.13	1.887E-01	
I-131	637.11	17.	7.	0.004	86.05	3.556E+00	
CS-137	661.21	14.	6.	0.003	92.84	2.608E-01	
EU-154	723.89	26.	-4.	-0.002	189.20	-7.417E-01	
BI-212	727.70	18.	8.	0.005	81.30	4.093E+00	
EU-152	779.09	21.	-2.	-0.001	394.59	-5.133E-01	
BI-212	786.33	16.	7.	0.004	93.60	2.107E+01	
CS-134	802.93	19.	1.	0.000	784.65	3.709E-01	
EU-154	872.69	20.	-4.	-0.002	164.76	-1.422E+00	
EU-154	995.68	18.	5.	0.003	119.78	2.446E+00	
EU-154	1004.79	15.	2.	0.001	255.49	5.898E-01	
EU-152	1110.26	15.	-1.	0.000	760.97	-2.820E-01	
CO-60	1172.85	24.	-3.	-0.002	219.63	-1.763E-01	
EU-154	1273.90	19.	-4.	-0.002	181.14	-5.928E-01	
CO-60	1333.37	15.	-1.	-0.001	512.02	-6.553E-02	
EU-152	1407.06	8.	3.	0.002	127.63	1.036E+00	
K-40	1460.76	20.	241.	0.134	6.75	1.465E+02	P

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-3.5509E-01	-3.5510E-01	5.212E+02%	6.73E+00
K-40	#	1.4652E+02	1.4652E+02	6.885E+00%	1.43E+01
CO-60	#A	-6.5534E-02	-6.5534E-02	5.120E+02%	1.25E+00
I-131	#A	3.9843E-01	3.9845E-01	8.605E+01%	7.15E-01

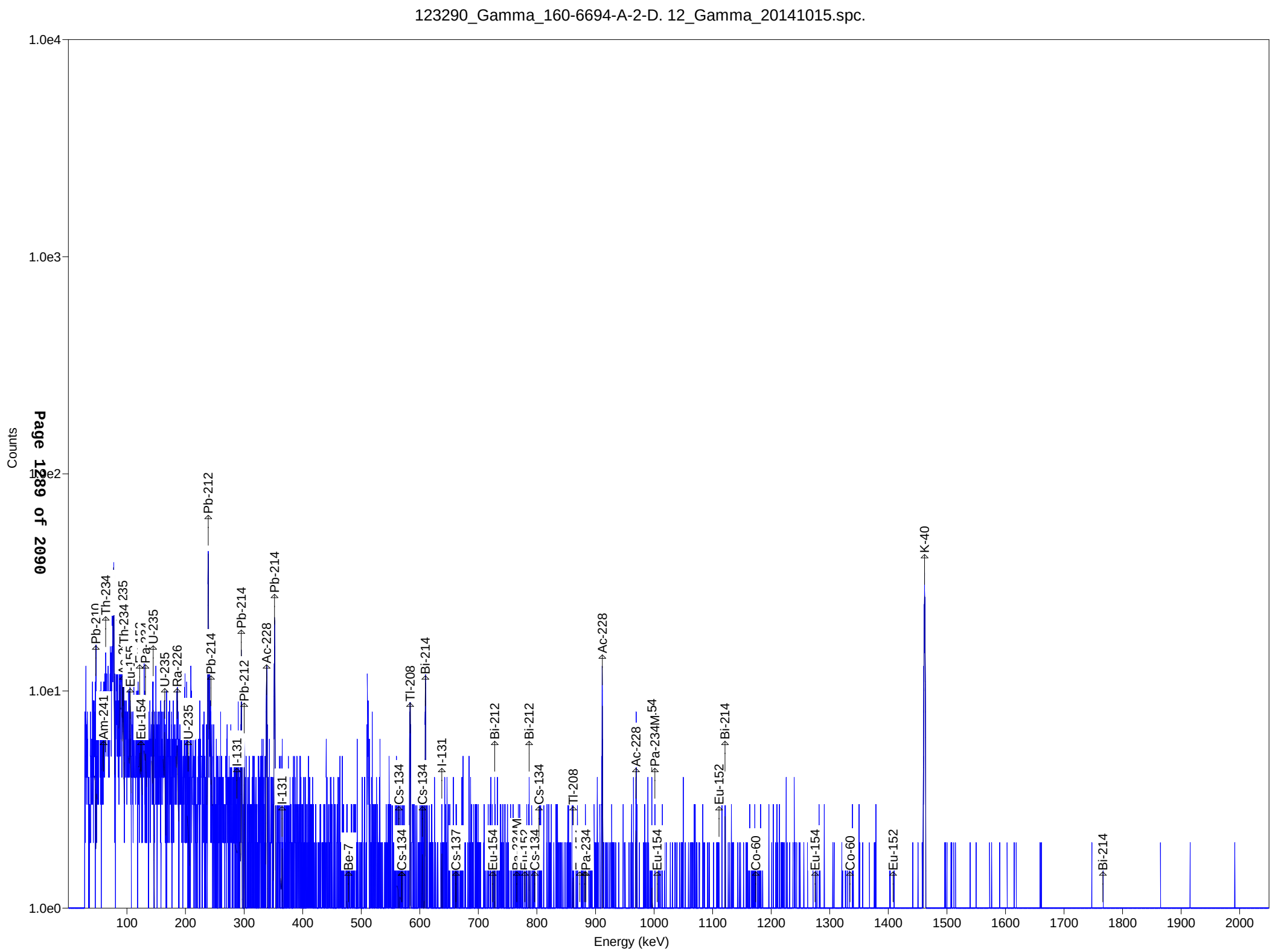
CS-134 #A	2.0357E-01	2.0357E-01	1.311E+02%	8.63E-01
CS-137 #A	2.6076E-01	2.6076E-01	9.284E+01%	8.33E-01
EU-152 #A	3.3713E-01	3.3713E-01	1.276E+02%	3.30E+00
EU-154 #A	3.7082E-01	3.7082E-01	1.018E+02%	8.32E+00
EU-155 #A	7.6854E-01	7.6854E-01	6.855E+01%	2.50E+00
TL-208	2.5989E+00	2.5989E+00	1.541E+01%	8.06E-01
PB-210 #A	-4.0139E+00	-4.0139E+00	2.855E+02%	2.90E+01
PB-212	7.0056E+00	7.0056E+00	1.164E+01%	1.77E+00
PB-214 #	6.6756E+00	6.6756E+00	1.291E+01%	1.77E+00
BI-212 #A	6.5546E+00	6.5546E+00	6.199E+01%	1.13E+01
BI-214	4.7030E+00	4.7030E+00	1.321E+01%	1.20E+00
AC-228	9.5979E+00	9.5979E+00	1.237E+01%	3.08E+00
Pa-234 A	8.6209E-01	8.6209E-01	1.069E+02%	3.14E+00
TH-234 #A	-3.6086E+00	-3.6086E+00	5.469E+02%	2.68E+01
PA-234M#A	-1.4161E+01	-1.4161E+01	7.411E+03%	1.47E+02
Ra-226 #A	3.4216E+00	3.4216E+00	1.732E+02%	2.13E+01
U-235 #A	2.9625E+00	2.9625E+00	5.087E+01%	4.42E+00
AM-241 #A	-6.3396E-02	-6.3396E-02	1.213E+03%	2.66E+00

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

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

Total Activity (910.9 to 1999.4 keV) 3.058E+01 Bq/Sample
Total Decayed Activity (910.9 to 1999.4 keV) 3.0581013E+01 Bq/Sample

The library has energies which are not separable.


123290_Gamma_160-6694-A-2-D. 12_Gamma_20141015.spc.
Counts
Energy (keV)
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-210
Th-234
Th-234 235
Eu-155
Pa-234
U-235
Ra-226
Am-241
Eu-154
U-235
Pb-212
Pb-214
Pb-212
I-131
Ac-228
Pb-214
I-131
Be-7
Cs-134
Cs-134
Tl-208
Bi-214
Cs-134
I-131
Cs-137
Eu-154
Bi-212
Pa-234M
Eu-152
Bi-212
Cs-134
Tl-208
Pa-234
Ac-228
Ac-228
Pa-234M
Eu-154
Eu-152
Bi-214
Co-60
Eu-154
Co-60
Eu-152
K-40
Bi-214

Test America St. Louis Spectrum ID: 15_Gamma_20140931

Sample Description: 123290_Gamma_160-6694-A-3-D
Detector: Ge15 SN/11012216
Batch ID: 123290
Work Order Number: Gamma
Lot Number: 160-6694-A-3-D

Decay to Time: 5/21/2014 14:25 Live Time: 1800 sec
Acquisition Time: 5/21/2014 14:26:18 Real Time: 1801 sec
Analysis Time: 5/21/2014 14:56 Dead Time: 0.06 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 15_Soil_TunaCan.Clb
Efficiency Cal Desc: 15_TunaCan_90099_032212
Efficiency Cal Date: 3/22/2012 13:03
Energy Cal Date: 2/28/2012 16:29
Library: Client_Short_no ingrowth Rev2.li
Bkgd Correction File: 15_2014-05-03_0613.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-5.045E-01	438.9	2.214E+00	2.214E+00	8.112E+00
K-40	9.907E+01	9.7	9.582E+00	1.084E+01	1.035E+01
CO-60	2.699E-01	69.2	1.867E-01	1.872E-01	6.475E-01
I-131	-7.549E-02	286.4	2.162E-01	2.162E-01	7.897E-01
CS-134	-9.726E-02	190.9	1.857E-01	1.857E-01	1.118E+00
CS-137	9.938E-01	38.1	3.785E-01	3.820E-01	1.126E+00
EU-152	-1.889E-02	214.4	4.051E-02	4.052E-02	2.465E+00
EU-154	7.988E-01	297.3	2.375E+00	2.375E+00	8.888E+00
EU-155	1.148E+00	39.7	4.556E-01	4.599E-01	3.153E+00
TL-208	2.183E+00	16.4	3.575E-01	3.750E-01	7.364E-01
PB-210	3.381E+01	26.1	8.806E+00	9.027E+00	2.434E+01
PB-212	4.874E+00	15.9	7.757E-01	8.373E-01	1.725E+00
PB-214	5.939E+00	12.2	7.252E-01	7.881E-01	1.282E+00
BI-212	4.530E+00	78.3	3.548E+00	3.555E+00	1.200E+01
BI-214	4.933E+00	17.0	8.402E-01	8.785E-01	1.819E+00
AC-228	7.189E+00	16.5	1.188E+00	1.244E+00	3.991E+00
Pa-234	5.669E-01	113.9	6.459E-01	6.465E-01	3.010E+00
TH-234	8.859E+00	46.5	4.122E+00	4.148E+00	2.468E+01
PA-234M	1.665E+00	1869.0	3.112E+01	3.112E+01	1.240E+02
Ra-226	2.255E+01	35.1	7.924E+00	8.165E+00	2.014E+01
U-235	2.445E+00	63.9	1.563E+00	1.568E+00	4.626E+00
AM-241	1.168E+00	46.2	5.395E-01	5.429E-01	1.716E+00
Total	2.030E+02				

Analyst: April Bean

TestAmerica, Inc. Spectrum name: 15_Gamma_20140931.An1

Sample description
123290_Gamma_160-6694-A-3-D

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20140931.An1

Acquisition information
Start time:	5/21/2014 2:26:18 PM
Live time:	1800
Real time:	1801
Dead time:	0.06 %
Detector ID:	15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_Soil_TunaCan.Clb
15_TunaCan_90099_032212

Energy Calibration
Created:	2/28/2012 4:29:17 PM
Zero offset:	0.044 keV
Gain:	0.250 keV/channel
Quadratic:	-3.267E-08 keV/channel^2

Efficiency Calibration
Created:	3/22/2012 1:03:01 PM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 1.00 %
Log(Eff):	-6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.13 %
Log(Eff):	-2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-01*Log(E)^2)

Library Files
Main analysis library:	Client_Short_no ingrowth Rev2.li
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.57keV)
Stop channel:	8000 (1999.52keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

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	5/21/2014 2:25:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2014-05-03_0613.PBC 5/3/2014 6:13:31 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0648

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.44	73.	18.14	0.91	1.950E-02	46.54	4.250	3.381E+01	PB210
58.78	21.	46.20	0.96	2.737E-02	59.54	35.900	PBC<MDA	AM241
63.08	18.	37.88	0.96	2.924E-02	63.29	3.810	PBC<MDA	TH234
					63.29	3.810	PBC<MDA	TH234
74.74	68.	23.57	0.97	3.378E-02				
77.23	99.	16.71	0.97	3.455E-02				
87.12	39.	39.67	0.98	3.679E-02	86.54	30.700	PBC<MDA	EU155
					86.54	30.700	1.941E+00	EU155
92.58	63.	23.42	0.99	3.785E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	1.586E+01	U235
					93.35	5.561	1.657E+01	AC228
					92.59	5.584	9.301E+00	TH234
					93.35	5.810	1.586E+01	U235
92.58	63.	23.42	0.99	3.785E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	1.586E+01	U235
					93.35	5.561	1.657E+01	AC228
92.60	34.	26.26	0.99	3.776E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	PBC<MDA	U235
					93.35	5.561	PBC<MDA	AC228
121.78	4.	320.46	1.02	3.848E-02	121.78	28.580	PBC<MDA	EU152
123.57	1.	887.11	1.02	3.840E-02	123.10	40.790	PBC<MDA	EU154
143.76	16.	63.93	1.04	3.639E-02	143.79	10.960	PBC<MDA	U235
					143.79	10.960	2.194E+00	U235
185.83	42.	25.60	0.80	3.120E-02	185.99	3.280	2.255E+01	Ra226
205.01	8.	129.67	1.09	2.900E-02	205.33	5.010	PBC<MDA	U235
					205.33	5.010	2.992E+00	U235
238.66	109.	14.42	1.04	2.592E-02	238.63	43.300	4.874E+00	PB212
277.27	5.	109.31	1.15	2.313E-02	277.28	6.310	PBC<MDA	TL208
295.29	55.	19.38	1.32	2.210E-02	295.09	19.300	7.181E+00	PB214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
338.25	39.	22.21	0.88	1.983E-02	338.32	12.010	9.097E+00	AC228
351.91	69.	14.85	1.47	1.923E-02	351.93	37.600	5.302E+00	PB214
563.66	1.	411.46	1.39	1.319E-02	563.24	8.350	PBC<MDA	CS134
583.19	43.	14.29	0.81	1.282E-02	583.02	84.500	2.192E+00	TL208
609.37	53.	14.92	1.07	1.236E-02	609.31	46.090	5.196E+00	BI214
662.12	18.	38.09	1.47	1.155E-02	661.66	85.210	PBC<MDA	CS137
727.30	7.	78.32	1.52	1.067E-02	727.17	7.550	PBC<MDA	BI212
860.81	3.	139.13	1.62	9.252E-03	860.56	12.420	PBC<MDA	TL208
873.58	2.	297.27	1.63	9.137E-03	873.23	12.270	PBC<MDA	EU154
881.19	4.	135.78	1.64	9.072E-03	880.53	6.000	PBC<MDA	Pa234
911.68	29.	24.50	1.66	8.811E-03	911.07	29.000	6.398E+00	AC228
968.90	11.	56.48	1.70	8.357E-03	968.97	17.460	PBC<MDA	AC228
1119.93	5.	71.22	1.80	7.368E-03	1120.29	15.100	PBC<MDA	BI214
1331.70	3.	69.19	1.94	6.325E-03	1332.50	99.980	PBC<MDA	CO60
1461.03	111.	9.41	2.02	5.828E-03	1460.83	10.670	9.907E+01	K40
1764.76	6.	44.19	2.18	4.916E-03	1764.49	15.400	PBC<MDA	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.54	74.74	100.	63.	1.875E+03	30.74	0.359	- s
308.50	77.23	81.	85.	2.470E+03	20.76	0.492	- 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_Short_no ingrowth Rev2.li

********** 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	185.44	46.44	52.	51.	0.028	18.14	0.907s
AM-241	234.76	58.78	35.	21.	0.011	46.20	0.958s
TH-234	251.96	63.08	101.	18.	0.010	37.88	0.962s
EU-155	348.05	87.12	103.	39.	0.022	39.67	0.983
TH-234	369.94	92.60	126.	34.	0.019	26.26	0.989s
U-235	372.95	93.35	77.	63.	0.035	23.42	0.989D
AC-228	372.95	93.35	77.	63.	0.035	23.42	0.989D
EU-152	486.59	121.78	67.	4.	0.002	320.46	1.015s
EU-154	493.74	123.57	66.	1.	0.001	887.11	1.017s
Pa-234	521.92	130.62	54.	-6.	-0.003	182.98	1.024s
U-235	574.44	143.76	43.	16.	0.009	63.93	1.036

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ra-226	742.63	185.83	54.	42.	0.023	25.60	0.798s
U-235	819.31	205.01	48.	8.	0.004	129.67	1.091s
PB-212	953.84	238.66	48.	98.	0.055	14.42	1.039
PB-214	959.04	239.96	114.	-37.	-0.021	44.05	1.123s
TL-208	1108.18	277.27	25.	5.	0.003	109.31	1.154
PB-214	1180.24	295.29	16.	55.	0.031	19.38	1.324s
PB-212	1202.00	300.73	24.	-2.	-0.001	321.35	1.174
AC-228	1352.01	338.25	9.	39.	0.022	22.21	0.884s
EU-152	1383.10	346.03	19.	-2.	-0.001	284.90	1.212s
PB-214	1406.61	351.91	9.	69.	0.038	14.85	1.472s
I-131	1445.29	361.58	17.	-2.	-0.001	286.37	1.229s
BE-7	1908.43	477.41	19.	-1.	-0.001	438.87	1.324s
CS-134	2253.36	563.66	15.	1.	0.001	411.46	1.394s
CS-134	2277.65	569.73	15.	-2.	-0.001	302.11	1.399s
Pa-234	2277.17	569.61	15.	-2.	-0.001	302.20	1.399s
TL-208	2331.47	583.19	6.	43.	0.024	14.29	0.813s
CS-134	2419.74	605.26	22.	-4.	-0.002	190.89	1.427s
BI-214	2436.18	609.37	12.	53.	0.030	14.92	1.072s
CS-137	2647.14	662.12	14.	18.	0.010	38.09	1.472s
EU-154	2890.59	722.99	15.	-4.	-0.002	146.45	1.519s
BI-212	2907.84	727.30	10.	7.	0.004	78.32	1.522s
PA-234M	3063.01	766.09	20.	-4.	-0.002	151.88	1.552s
BI-212	3138.84	785.05	13.	-4.	-0.002	150.46	1.566s
CS-134	3181.89	795.81	16.	-1.	-0.001	436.93	1.574s
CS-134	3204.91	801.56	18.	-2.	-0.001	310.10	1.578s
TL-208	3441.92	860.81	9.	3.	0.002	139.13	1.621s
EU-154	3492.99	873.58	11.	2.	0.001	297.27	1.631s
Pa-234	3523.45	881.19	10.	4.	0.002	135.78	1.636s
Pa-234	3534.02	883.83	16.	-3.	-0.002	182.85	1.638s
AC-228	3645.44	911.68	11.	29.	0.016	24.50	1.658
EU-152	3865.61	966.71	23.	-4.	-0.002	164.52	1.696s
AC-228	3874.36	968.90	13.	11.	0.006	56.48	1.699s
EU-152	4428.52	1107.40	10.	-1.	-0.001	482.32	1.797s
BI-214	4478.66	1119.93	13.	5.	0.003	71.22	1.803s
CO-60	4692.34	1173.33	10.	-1.	-0.001	325.47	1.838s
CO-60	5326.14	1331.70	1.	3.	0.002	69.19	1.938s
K-40	5843.81	1461.03	4.	111.	0.062	9.41	2.015s
BI-214	7059.87	1764.76	6.	6.	0.003	44.19	2.180s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-5.0448E-01				5.31E+01	
			477.60	-5.045E-01	?(	8.112E+00	4.39E+02 1.05E+01 G
K-40	N	9.9073E+01				4.66E+11	
			1460.83	9.907E+01	?(P	1.035E+01	9.41E+00 1.07E+01 G
CO-60	F	2.6990E-01				1.93E+03	
			1332.50	2.699E-01	&(	6.475E-01	6.92E+01 1.00E+02 G
			1173.24	-1.095E-01	-	1.347E+00	3.25E+02 9.99E+01 G
I-131	I	-7.5494E-02				8.02E+00	
			364.48	-7.549E-02	?(	7.897E-01	2.86E+02 8.17E+01 G
			284.30	0.000E+00	&	1.309E+01	1.00E+03 6.14E+00 G
			636.97	1.940E-01	%	9.993E+00	1.30E+03 7.17E+00 G
CS-134	I	-9.7255E-02				7.54E+02	
			604.71	-1.644E-01	?(	1.118E+00	1.91E+02 9.76E+01 G
			795.87	-8.619E-02	+	1.394E+00	4.37E+02 8.55E+01 G
			569.32	-5.172E-01	+	5.745E+00	3.02E+02 1.54E+01 G
			801.95	-1.279E+00	+	1.448E+01	3.10E+02 8.69E+00 G
			563.24	6.880E-01	&(	1.049E+01	4.11E+02 8.35E+00 G
CS-137	I	9.9383E-01				1.10E+04	
			661.66	9.938E-01	?(	1.126E+00	3.81E+01 8.52E+01 G
EU-152	F	-1.8894E-02				4.94E+03	
			344.29	-2.383E-01	?(	2.465E+00	2.85E+02 2.65E+01 G
			121.78	1.845E-01	?(	2.059E+00	3.20E+02 2.86E+01 G
			778.92	2.142E-01	&	8.163E+00	1.00E+03 1.29E+01 G
			964.11	-1.960E+00	+	1.139E+01	1.65E+02 1.46E+01 G
			1112.07	-5.333E-01	+	9.773E+00	4.82E+02 1.36E+01 G
			1408.00	0.000E+00	+	3.237E+00	1.00E+03 2.10E+01 G
EU-154	I	7.9878E-01				3.14E+03	
			873.23	7.988E-01	?(	8.888E+00	2.97E+02 1.23E+01 G
			123.10	4.622E-02	&	1.441E+00	8.87E+02 4.08E+01 G
			1274.54	-2.242E-02	%	4.121E+00	4.71E+03 3.52E+01 G
			723.36	-1.014E+00	+	5.289E+00	1.46E+02 2.02E+01 G
			1004.77	0.000E+00	-	9.068E+00	1.00E+03 1.80E+01 G
			996.33	0.000E+00	-	1.142E+01	1.00E+03 1.06E+01 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
EU-155	I	1.1484E+00						1.81E+03	
			105.31	0.000E+00	&(3.153E+00		1.00E+03	2.12E+01	G
			86.54	1.941E+00	&(2.458E+00		3.97E+01	3.07E+01	G
TL-208	N	2.1831E+00						6.98E+02	
			583.02	2.192E+00	(P 7.364E-01		1.43E+01	8.45E+01	G
			277.28	2.059E+00	(P 9.964E+00		1.09E+02	6.31E+00	G
			860.56	1.618E+00	- 8.133E+00		1.39E+02	1.24E+01	G
PB-210	N	3.3809E+01						8.14E+03	
			46.54	3.381E+01	*(P 2.434E+01		1.81E+01	4.25E+00	G
PB-212	N	4.8736E+00						6.98E+02	
			238.63	4.874E+00	(P 1.725E+00		1.44E+01	4.33E+01	G
			300.03	-1.730E+00	- 2.003E+01		3.21E+02	3.28E+00	G
PB-214	N	5.9392E+00						5.84E+05	
			351.93	5.302E+00	(1.282E+00		1.49E+01	3.76E+01	G
			295.09	7.181E+00	(2.787E+00		1.94E+01	1.93E+01	G
			242.00	-1.076E+01	- 1.528E+01		4.41E+01	7.43E+00	G
BI-212	N	4.5298E+00						6.98E+02	
			727.17	4.530E+00	&(1.200E+01		7.83E+01	7.55E+00	G
			785.42	-1.557E+01	+ 8.407E+01		1.50E+02	1.28E+00	G
BI-214	N	4.9334E+00						5.84E+05	
			609.31	5.196E+00	(P 1.819E+00		1.49E+01	4.61E+01	G
			1120.29	2.453E+00	- P 9.771E+00		7.12E+01	1.51E+01	G
			1764.49	4.149E+00	?(P 1.016E+01		4.42E+01	1.54E+01	G
AC-228	N	7.1886E+00						2.10E+03	
			911.07	6.398E+00	?(3.991E+00		2.45E+01	2.90E+01	G
			968.97	4.048E+00	- 7.359E+00		5.65E+01	1.75E+01	G
			338.32	9.097E+00	(3.893E+00		2.22E+01	1.20E+01	G
								Energy duplication	
			93.35	1.657E+01	+ 1.149E+01		2.34E+01	5.56E+00	XA
Pa-234	N	5.6690E-01						1.63E+12	
			131.29	-4.748E-01	?(3.010E+00		1.83E+02	1.80E+01	G
			569.47	-9.746E-01	+ 1.082E+01		3.02E+02	8.20E+00	G
			946.02	0.000E+00	+ 8.242E+00		1.00E+03	1.34E+01	G
			883.24	-2.072E+00	+ 1.362E+01		1.83E+02	9.60E+00	G
			880.53	3.692E+00	?(1.800E+01		1.36E+02	6.00E+00	G
TH-234	N	8.8592E+00						1.63E+12	
			63.29	8.815E+00	(P 2.468E+01		3.79E+01	3.81E+00	G
			92.59	8.889E+00	(P 1.450E+01		2.63E+01	5.58E+00	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234M	N	1.6652E+00					1.63E+12	
			1001.00	1.665E+00	%(	1.240E+02	1.87E+03	8.37E-01 G
			766.41	-8.068E+01	+	4.333E+02	1.52E+02	2.94E-01 G
Ra-226	N	2.2554E+01					5.84E+05	
			185.99	2.255E+01	(P	2.014E+01	2.56E+01	3.28E+00 G
U-235	N	2.4445E+00					2.57E+11	
			143.79	2.194E+00	?(	4.626E+00	6.39E+01	1.10E+01 G
			205.33	2.992E+00	?(	1.332E+01	1.30E+02	5.01E+00 G
			163.38	4.593E-02	&	1.238E+01	7.60E+03	5.08E+00 G
								Energy duplication
			93.35	1.586E+01	?	1.100E+01	2.34E+01	5.81E+00 X
AM-241	T	1.1679E+00					1.58E+05	
			59.54	1.168E+00	&(	1.716E+00	4.62E+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:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

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

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	58.78	35.	21.	0.011	46.20	1.168E+00	
TH-234	63.08	101.	18.	0.010	37.88	8.815E+00	P
EU-155	87.12	103.	39.	0.022	39.67	1.941E+00	
TH-234	92.60	126.	34.	0.019	26.26	8.889E+00	P
U-235	93.35	77.	63.	0.035	23.42	1.586E+01	
EU-152	121.78	67.	4.	0.002	320.46	1.845E-01	
EU-154	123.57	66.	1.	0.001	887.11	4.622E-02	
Pa-234	130.62	54.	-6.	-0.003	182.98	-4.748E-01	
U-235	143.76	43.	16.	0.009	63.93	2.194E+00	
U-235	205.01	48.	8.	0.004	129.67	2.992E+00	
EU-152	346.03	19.	-2.	-0.001	284.90	-2.383E-01	
I-131	361.58	17.	-2.	-0.001	286.37	-7.549E-02	
BE-7	477.41	19.	-1.	-0.001	438.87	-5.045E-01	
CS-134	563.66	15.	1.	0.001	411.46	6.880E-01	
CS-134	569.73	15.	-2.	-0.001	302.11	-5.172E-01	
Pa-234	569.61	15.	-2.	-0.001	302.20	-9.746E-01	
CS-134	605.26	22.	-4.	-0.002	190.89	-1.644E-01	
EU-154	722.99	15.	-4.	-0.002	146.45	-1.014E+00	
BI-212	727.30	10.	7.	0.004	78.32	4.530E+00	
PA-234M	766.09	20.	-4.	-0.002	151.88	-8.068E+01	
BI-212	785.05	13.	-4.	-0.002	150.46	-1.557E+01	
CS-134	795.81	16.	-1.	-0.001	436.93	-8.619E-02	
CS-134	801.56	18.	-2.	-0.001	310.10	-1.279E+00	
EU-154	873.58	11.	2.	0.001	297.27	7.988E-01	
Pa-234	881.19	10.	4.	0.002	135.78	3.692E+00	
Pa-234	883.83	16.	-3.	-0.002	182.85	-2.072E+00	
EU-152	966.71	23.	-4.	-0.002	164.52	-1.960E+00	
EU-152	1107.40	10.	-1.	-0.001	482.32	-5.333E-01	
CO-60	1173.33	10.	-1.	-0.001	325.47	-1.095E-01	
CO-60	1331.70	1.	3.	0.002	69.19	2.699E-01	

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-5.0447E-01	-5.0448E-01	4.389E+02%	8.11E+00
K-40	#	9.9073E+01	9.9073E+01	9.672E+00%	1.04E+01
CO-60	#A	2.6990E-01	2.6990E-01	6.919E+01%	6.47E-01
I-131	#A	-7.5488E-02	-7.5494E-02	2.864E+02%	7.90E-01
CS-134	#A	-9.7255E-02	-9.7255E-02	1.909E+02%	1.12E+00
CS-137	#A	9.9383E-01	9.9383E-01	3.809E+01%	1.13E+00

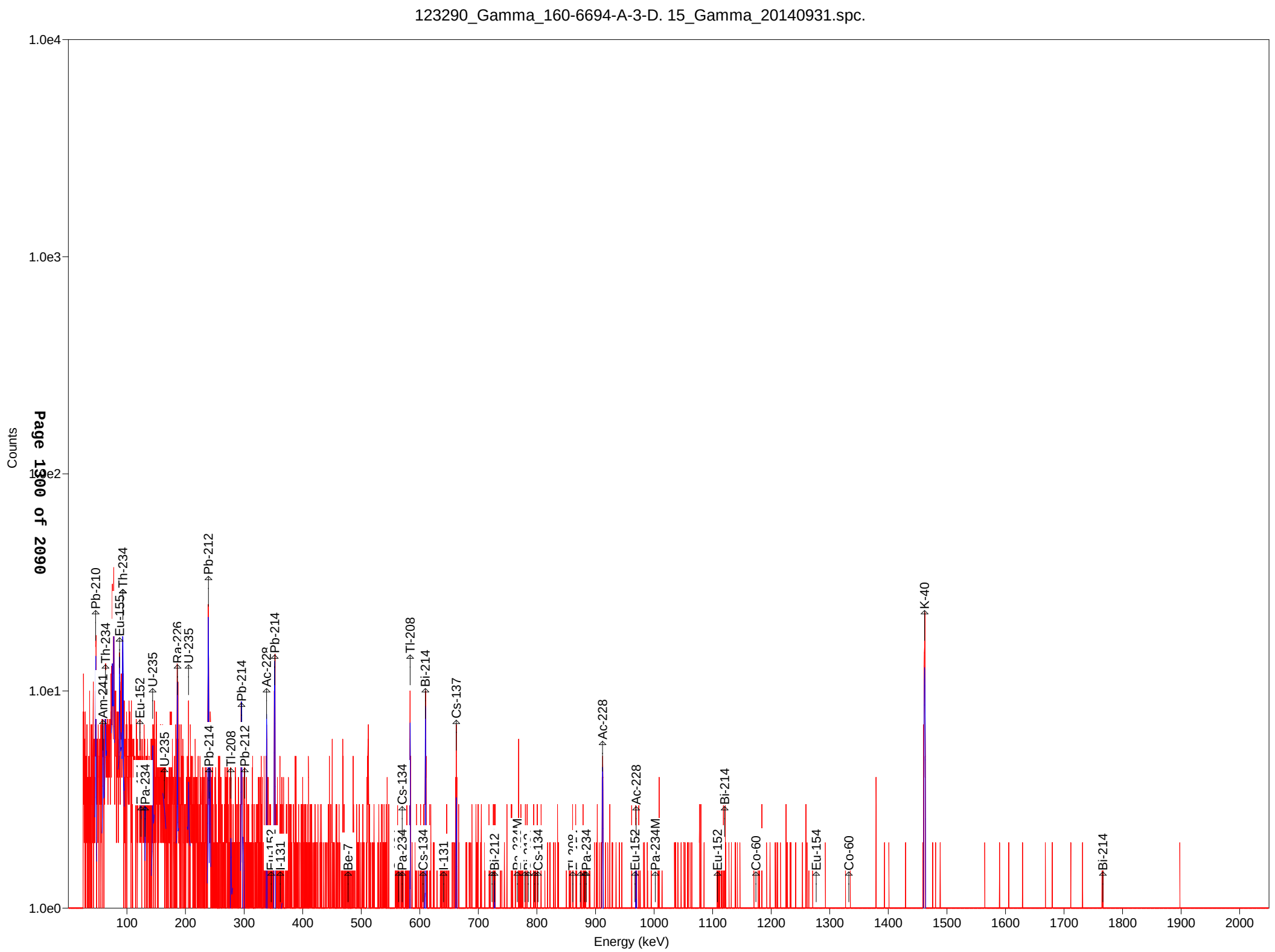
EU-152 #A	-1.8894E-02	-1.8894E-02	2.144E+02%	2.46E+00
EU-154 #A	7.9878E-01	7.9878E-01	2.973E+02%	8.89E+00
EU-155 #A	1.1484E+00	1.1484E+00	3.967E+01%	3.15E+00
TL-208	2.1831E+00	2.1831E+00	1.637E+01%	7.36E-01
PB-210 #	3.3809E+01	3.3809E+01	2.605E+01%	2.43E+01
PB-212	4.8736E+00	4.8736E+00	1.592E+01%	1.72E+00
PB-214	5.9392E+00	5.9392E+00	1.221E+01%	1.28E+00
BI-212 #A	4.5298E+00	4.5298E+00	7.832E+01%	1.20E+01
BI-214	4.9334E+00	4.9334E+00	1.703E+01%	1.82E+00
AC-228	7.1886E+00	7.1886E+00	1.653E+01%	3.99E+00
Pa-234 #A	5.6690E-01	5.6690E-01	1.139E+02%	3.01E+00
TH-234 #A	8.8592E+00	8.8592E+00	4.653E+01%	2.47E+01
PA-234M#A	1.6652E+00	1.6652E+00	1.869E+03%	1.24E+02
Ra-226	2.2554E+01	2.2554E+01	3.513E+01%	2.01E+01
U-235 #A	2.4445E+00	2.4445E+00	6.393E+01%	4.63E+00
AM-241 #A	1.1679E+00	1.1679E+00	4.620E+01%	1.72E+00

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

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

Total Activity (37.6 to 1999.5 keV) 1.815E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 1.8154678E+02 Bq/Sample

The library has energies which are not separable.


123290_Gamma_160-6694-A-3-D. 15_Gamma_20140931.spc.
Counts
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Energy (keV)
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-210
Am-241
Th-234
Eu-155
Th-234
Eu-152
U-235
Pa-234
U-235
Ra-226
U-235
Pb-212
Pb-214
Tl-208
Pb-212
Ac-228
Pb-214
Eu-152
I-131
Be-7
Tl-208
Cs-134
Pa-234
Cs-134
Bi-214
I-131
Cs-137
Bi-212
Cs-134
Ac-228
Pa-234
Eu-152
Ac-228
Pa-234M
Eu-152
Bi-214
Co-60
Eu-154
Co-60
K-40
Bi-214

Test America St. Louis Spectrum ID: 17_Gamma_20140807

Sample Description: 123290_Gamma_160-6694-A-4-D
Detector: Ge17 SN/11080671
Batch ID: 123290
Work Order Number: Gamma
Lot Number: 160-6694-A-4-D

Decay to Time: 5/21/2014 14:27 Live Time: 1800 sec
Acquisition Time: 5/21/2014 14:27:45 Real Time: 1805 sec
Analysis Time: 5/21/2014 14:57 Dead Time: 0.29 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 17_Soil_TunaCan.Clb
Efficiency Cal Desc: 17_TunaCan_90099_032612
Efficiency Cal Date: 4/12/2012 09:28
Energy Cal Date: 2/29/2012 10:33
Library: Client_Short_no ingrowth Rev2.li
Bkgd Correction File: 17_2014-05-03_0615.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	0.000E+00	1000.0	4.077E-01	4.077E-01	7.879E+00
K-40	8.219E+01	9.2	7.549E+00	8.641E+00	9.556E+00
CO-60	1.788E-01	154.2	2.757E-01	2.759E-01	1.013E+00
I-131	2.684E-03	7429.0	1.994E-01	1.994E-01	7.392E-01
CS-134	3.805E-01	69.0	2.624E-01	2.631E-01	1.189E+00
CS-137	2.049E+00	20.0	4.102E-01	4.238E-01	7.056E-01
EU-152	7.878E-01	66.7	5.252E-01	5.268E-01	1.905E+00
EU-154	3.919E-01	429.3	1.682E+00	1.682E+00	6.440E+00
EU-155	2.309E-01	292.5	6.754E-01	6.755E-01	2.357E+00
TL-208	3.035E+00	14.5	4.387E-01	4.661E-01	7.797E-01
PB-210	2.878E+01	32.4	9.335E+00	9.487E+00	2.807E+01
PB-212	5.457E+00	11.0	6.003E-01	6.964E-01	1.385E+00
PB-214	4.909E+00	13.5	6.625E-01	7.099E-01	1.518E+00
BI-212	7.511E+00	51.9	3.896E+00	3.915E+00	9.384E+00
BI-214	7.791E+00	12.8	9.966E-01	1.076E+00	1.627E+00
AC-228	5.430E+00	15.9	8.649E-01	9.082E-01	2.626E+00
Pa-234	8.747E-01	63.4	5.545E-01	5.563E-01	3.287E+00
TH-234	7.731E+00	42.7	3.298E+00	3.323E+00	2.277E+01
PA-234M	6.695E+01	56.2	3.761E+01	3.776E+01	1.209E+02
Ra-226	3.382E+01	19.4	6.563E+00	7.197E+00	1.396E+01
U-235	4.791E-01	74.8	3.582E-01	3.590E-01	5.903E+00
AM-241	8.119E-03	9178.0	7.452E-01	7.452E-01	2.596E+00
Total	2.590E+02				

Analyst: April Bean

TestAmerica, Inc. Spectrum name: 17_Gamma_20140807.An1

Sample description
123290_Gamma_160-6694-A-4-D

Spectrum Filename: C:\User\SPC\Det17\17_Gamma_20140807.An1

Acquisition information
Start time:	5/21/2014 2:27:45 PM
Live time:	1800
Real time:	1805
Dead time:	0.29 %
Detector ID:	17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Soil_TunaCan.Clb
17_TunaCan_90099_032612

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

Efficiency Calibration
Created:	4/12/2012 9:28:42 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 0.91 %
Log(Eff):	-5.264190E-01 + (-4.024164E-01*Log(E)) + (-2.604461E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.00 %
Log(Eff):	-2.343889E+01 + (8.582715E+00*Log(E)) + (-9.075430E-01*Log(E)^2)

Library Files
Main analysis library:	Client_Short_no ingrowth Rev2.li
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.63keV)
Stop channel:	8000 (1999.54keV)
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

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	5/21/2014 2:27:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2014-05-03_0615.PBC 5/3/2014 6:15:46 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0996

***** 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
46.69	81.	18.52	0.51	2.111E-02	46.54	4.250	2.878E+01	PB210
63.55	50.	33.56	0.88	3.178E-02	63.29	3.810	PBC<MDA	TH234
74.84	65.	21.06	0.80	3.681E-02				
77.23	97.	15.08	0.80	3.765E-02				
92.61	26.	22.42	0.82	4.144E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	PBC<MDA	U235
					93.35	5.810	PBC<MDA	U235
92.75	72.	20.14	0.82	4.156E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	1.664E+01	U235
93.37	21.	73.18	0.82	4.156E-02	93.35	5.561	PBC<MDA	AC228
105.66	4.	292.48	0.83	4.278E-02	105.31	21.200	PBC<MDA	EU155
185.67	71.	19.33	1.02	3.546E-02	185.99	3.280	3.382E+01	Ra226
204.76	11.	67.42	0.92	3.312E-02	205.33	5.010	PBC<MDA	U235
					205.33	5.010	PBC<MDA	U235
238.49	151.	9.67	0.77	2.990E-02	238.63	43.300	5.966E+00	PB212
241.86	12.	74.11	0.96	2.960E-02	242.00	7.430	PBC<MDA	PB214
295.24	47.	20.23	1.12	2.580E-02	295.09	19.300	5.218E+00	PB214
300.22	22.	33.90	0.42	2.550E-02	300.03	3.280	1.472E+01	PB212
338.26	32.	26.41	1.05	2.344E-02	338.32	12.010	6.321E+00	AC228
344.70	10.	66.67	1.05	2.315E-02	344.29	26.500	PBC<MDA	EU152
351.79	79.	14.64	0.82	2.280E-02	351.93	37.600	4.750E+00	PB214
561.72	6.	87.45	1.25	1.624E-02	563.24	8.350	PBC<MDA	CS134
569.10	9.	63.39	1.25	1.611E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.777E+00	Pa234
569.10	9.	68.96	1.25	1.612E-02	569.32	15.380	PBC<MDA	CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					569.47	8.200	3.592E+00	Pa234
583.19	73.	13.24	1.13	1.584E-02	583.02	84.500	3.035E+00	TL208
609.25	104.	12.15	1.03	1.533E-02	609.31	46.090	7.791E+00	BI214
661.75	45.	20.02	1.02	1.443E-02	661.66	85.210	2.049E+00	CS137
727.33	10.	55.11	1.39	1.345E-02	727.17	7.550	PBC<MDA	BI212
785.15	6.	87.88	1.44	1.270E-02	785.42	1.280	PBC<MDA	BI212
873.09	1.	429.27	1.51	1.172E-02	873.23	12.270	PBC<MDA	EU154
					873.23	12.270	3.919E-01	EU154
880.88	2.	255.43	1.52	1.165E-02	880.53	6.000	PBC<MDA	Pa234
911.58	31.	21.97	1.55	1.135E-02	911.07	29.000	5.216E+00	AC228
946.38	2.	245.73	1.57	1.103E-02	946.02	13.400	PBC<MDA	Pa234
969.11	18.	33.21	1.59	1.083E-02	968.97	17.460	5.172E+00	AC228
1001.03	11.	56.17	1.62	1.057E-02	1001.00	0.837	PBC<MDA	PA234M
1112.56	2.	344.03	1.71	9.752E-03	1112.07	13.644	PBC<MDA	EU152
1120.19	10.	55.31	1.72	9.697E-03	1120.29	15.100	PBC<MDA	BI214
1332.36	3.	154.21	1.89	8.481E-03	1332.50	99.980	PBC<MDA	CO60
1460.81	125.	8.74	0.69	7.894E-03	1460.83	10.670	8.219E+01	K40
1764.75	11.	27.38	2.21	6.804E-03	1764.49	15.400	PBC<MDA	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.74	74.83	63.	60.	1.621E+03	25.34	0.825	-	
308.30	77.22	55.	99.	2.629E+03	16.12	0.980	-	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_Short_no ingrowth Rev2.li

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.23	46.69	83.	46.	0.026	18.52	0.507s
TH-234	252.94	63.38	100.	22.	0.012	29.53	0.791
TH-234	369.74	92.59	109.	26.	0.014	22.42	0.818D
U-235	372.78	93.35	70.	72.	0.040	20.14	0.819D
AC-228	372.78	93.35	111.	21.	0.012	73.18	0.819D
EU-155	421.99	105.66	59.	4.	0.002	292.48	0.830s
EU-154	490.26	122.73	62.	-9.	-0.005	128.54	0.847s
Pa-234	523.33	131.00	82.	-7.	-0.004	179.04	0.855s
U-235	652.84	163.39	35.	-2.	-0.001	377.15	0.885s
Ra-226	741.92	185.67	32.	71.	0.039	19.33	1.021s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	818.21	204.76	27.	11.	0.006	67.42	0.924s
PB-212	953.18	238.51	40.	127.	0.071	10.05	0.954
PB-214	966.58	241.86	42.	12.	0.007	74.11	0.958s
I-131	1137.01	284.48	41.	-3.	-0.002	278.85	0.996s
PB-214	1180.03	295.24	20.	47.	0.026	20.23	1.117
PB-212	1199.96	300.22	11.	22.	0.012	33.90	0.424s
AC-228	1352.05	338.26	20.	32.	0.018	26.41	1.046
EU-152	1377.80	344.70	15.	10.	0.005	66.67	1.051s
PB-214	1406.18	351.79	20.	73.	0.041	14.64	0.819s
CS-134	2245.73	561.72	10.	6.	0.003	87.45	1.247s
CS-134	2275.26	569.10	13.	9.	0.005	68.96	1.252s
Pa-234	2275.26	569.10	12.	9.	0.005	63.39	1.253s
TL-208	2331.63	583.19	12.	73.	0.041	13.24	1.128s
CS-134	2432.32	608.36	40.	-1.	-0.001	908.89	1.283s
BI-214	2435.88	609.25	15.	99.	0.055	12.15	1.027
I-131	2540.94	635.52	17.	-1.	0.000	732.27	1.312s
CS-137	2645.86	661.75	8.	45.	0.025	20.02	1.022
EU-154	2890.71	722.96	18.	-4.	-0.002	171.01	1.386s
BI-212	2908.17	727.33	10.	10.	0.005	55.11	1.390s
PA-234M	3055.88	764.25	15.	-2.	-0.001	269.92	1.423s
BI-212	3139.49	785.15	11.	6.	0.003	87.88	1.439s
EU-154	3491.28	873.09	9.	1.	0.001	429.27	1.514s
Pa-234	3522.45	880.88	8.	2.	0.001	255.43	1.520s
AC-228	3645.30	911.58	8.	31.	0.017	21.97	1.545s
Pa-234	3784.51	946.38	12.	2.	0.001	245.73	1.574s
AC-228	3875.47	969.11	8.	18.	0.010	33.21	1.594
EU-154	3983.63	996.14	24.	-4.	-0.002	163.86	1.616s
PA-234M	4003.17	1001.03	13.	11.	0.006	56.17	1.620s
EU-154	4017.90	1004.71	22.	-6.	-0.003	121.88	1.623s
EU-152	4449.43	1112.56	13.	2.	0.001	344.03	1.710s
BI-214	4479.98	1120.19	11.	10.	0.006	55.31	1.717s
CO-60	4694.63	1173.83	11.	-1.	-0.001	470.84	1.760s
CO-60	5329.04	1332.36	7.	3.	0.002	154.21	1.886s
K-40	5843.17	1460.81	6.	125.	0.069	8.74	0.687s
BI-214	7059.90	1764.75	3.	11.	0.006	27.38	2.211s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	Peak MDA Value Bq/Sample	COMMENTS
K-40	N	8.2188E+01				4.66E+11	
			1460.83	8.219E+01	(P	9.556E+00 8.74E+00 1.07E+01 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-60	F 1.7879E-01					1.93E+03	
		1332.50	1.788E-01	?(	1.013E+00	1.54E+02	1.00E+02 G
		1173.24	-5.993E-02	-	1.070E+00	4.71E+02	9.99E+01 G
I-131	I 2.6837E-03					8.02E+00	
		364.48	2.684E-03	&(	7.392E-01	7.43E+03	8.17E+01 G
		284.30	-1.128E+00	+	1.109E+01	2.79E+02	6.14E+00 G
		636.97	-4.206E-01	+	1.145E+01	7.32E+02	7.17E+00 G
CS-134	I 3.8045E-01					7.54E+02	
		604.71	-3.660E-02	&(	1.189E+00	9.09E+02	9.76E+01 G
		795.87	4.431E-03	%	1.008E+00	5.95E+03	8.55E+01 G
		569.32	1.915E+00	(	4.385E+00	6.90E+01	1.54E+01 G
		801.95	1.745E-01	%	1.047E+01	1.59E+03	8.69E+00 G
		563.24	2.430E+00	?(	7.293E+00	8.75E+01	8.35E+00 G
CS-137	I 2.0486E+00					1.10E+04	
		661.66	2.049E+00	(	7.056E-01	2.00E+01	8.52E+01 G
EU-152	F 7.8778E-01					4.94E+03	
		344.29	8.639E-01	&(	1.905E+00	6.67E+01	2.65E+01 G
		121.78	-8.832E-04	&	1.464E+00	4.61E+04	2.86E+01 G
		778.92	2.091E-02	%	6.845E+00	8.62E+03	1.29E+01 G
		964.11	0.000E+00	-	1.620E+01	1.00E+03	1.46E+01 G
		1112.07	6.399E-01	?(	8.182E+00	3.44E+02	1.36E+01 G
		1408.00	0.000E+00	-	2.399E+00	1.00E+03	2.10E+01 G
EU-154	I 3.9191E-01					3.14E+03	
		873.23	3.919E-01	?(	6.440E+00	4.29E+02	1.23E+01 G
		123.10	-2.861E-01	+	1.257E+00	1.29E+02	4.08E+01 G
		1274.54	0.000E+00	-	1.325E+00	1.00E+03	3.52E+01 G
		723.36	-7.574E-01	+	4.619E+00	1.71E+02	2.02E+01 G
		1004.77	-1.711E+00	+	7.255E+00	1.22E+02	1.80E+01 G
		996.33	-2.185E+00	+	1.263E+01	1.64E+02	1.06E+01 G
EU-155	I 2.3093E-01					1.81E+03	
		105.31	2.309E-01	&(	2.357E+00	2.92E+02	2.12E+01 G
		86.54	0.000E+00	-	2.339E+00	1.00E+03	3.07E+01 G
TL-208	N 3.0346E+00					6.98E+02	
		583.02	3.035E+00	*(P	7.797E-01	1.32E+01	8.45E+01 G
		277.28	-3.903E-01	& P	8.664E+00	1.00E+03	6.31E+00 G
		860.56	0.000E+00	-	2.781E+00	1.00E+03	1.24E+01 G
PB-210	N 2.8780E+01					8.14E+03	
		46.54	2.878E+01	@(P	2.807E+01	1.85E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	5.4569E+00					6.98E+02	
			238.63	5.457E+00	?(P	1.385E+00	1.01E+01	4.33E+01 G
			300.03	1.472E+01	+	1.199E+01	3.39E+01	3.28E+00 G
PB-214	N	4.9088E+00					5.84E+05	
			351.93	4.750E+00	(P	1.518E+00	1.46E+01	3.76E+01 G
			295.09	5.218E+00	(P	2.641E+00	2.02E+01	1.93E+01 G
			242.00	2.956E+00	& P	8.320E+00	7.41E+01	7.43E+00 G
BI-212	N	7.5114E+00					6.98E+02	
			727.17	5.344E+00	?(	9.384E+00	5.51E+01	7.55E+00 G
			785.42	2.030E+01	?(	6.124E+01	8.79E+01	1.28E+00 G
BI-214	N	7.7909E+00					5.84E+05	
			609.31	7.791E+00	(P	1.627E+00	1.22E+01	4.61E+01 G
			1120.29	3.937E+00	-	6.968E+00	5.53E+01	1.51E+01 G
			1764.49	5.774E+00	- P	5.915E+00	2.74E+01	1.54E+01 G
AC-228	N	5.4299E+00					2.10E+03	
			911.07	5.216E+00	?(	2.626E+00	2.20E+01	2.90E+01 G
			968.97	5.172E+00	(	4.739E+00	3.32E+01	1.75E+01 G
			338.32	6.321E+00	(	4.624E+00	2.64E+01	1.20E+01 G
							Energy duplication	
			93.35	5.117E+00		1.244E+01	7.32E+01	5.56E+00 XA
Pa-234	N	8.7466E-01					1.63E+12	
			131.29	-5.350E-01	?(	3.287E+00	1.79E+02	1.80E+01 G
			569.47	3.777E+00	(	7.848E+00	6.34E+01	8.20E+00 G
			946.02	7.848E-01	&(	7.116E+00	2.46E+02	1.34E+01 G
			883.24	0.000E+00	-	1.232E+01	1.00E+03	9.60E+00 G
			880.53	1.338E+00	?(	1.289E+01	2.55E+02	6.00E+00 G
TH-234	N	7.7310E+00					1.63E+12	
			63.29	1.006E+01	?(P	2.277E+01	2.95E+01	3.81E+00 G
			92.59	6.145E+00	(P	1.235E+01	2.24E+01	5.58E+00 G
PA-234M	N	6.6954E+01					1.63E+12	
			1001.00	6.695E+01	&(	1.209E+02	5.62E+01	8.37E-01 G
			766.41	-3.066E+01	-	3.032E+02	2.70E+02	2.94E-01 G
Ra-226	N	3.3824E+01					5.84E+05	
			185.99	3.382E+01	(P	1.396E+01	1.93E+01	3.28E+00 G
U-235	N	4.7908E-01					2.57E+11	
			143.79	-9.198E-01	%(P	5.903E+00	1.00E+03	1.10E+01 G
			205.33	3.539E+00	&(P	8.943E+00	6.74E+01	5.01E+00 G
			163.38	-6.450E-01	+	8.668E+00	3.77E+02	5.08E+00 G
							Energy duplication	
			93.35	1.664E+01	?	9.587E+00	2.01E+01	5.81E+00 X

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	T 8.1188E-03					1.58E+05	
		59.54	8.119E-03	&(	2.596E+00	9.18E+03	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:
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	
U-235	93.35	70.	72.	0.040	20.14	1.664E+01	
EU-155	105.66	59.	4.	0.002	292.48	2.309E-01	
EU-154	122.73	62.	-9.	-0.005	128.54	-2.861E-01	
Pa-234	131.00	82.	-7.	-0.004	179.04	-5.350E-01	
U-235	163.39	35.	-2.	-0.001	377.15	-6.450E-01	
U-235	204.76	27.	11.	0.006	67.42	3.539E+00	P
I-131	284.48	41.	-3.	-0.002	278.85	-1.128E+00	
EU-152	344.70	15.	10.	0.005	66.67	8.639E-01	
CS-134	561.72	10.	6.	0.003	87.45	2.430E+00	
CS-134	569.10	13.	9.	0.005	68.96	1.915E+00	
Pa-234	569.10	12.	9.	0.005	63.39	3.777E+00	
CS-134	608.36	40.	-1.	-0.001	908.89	-3.660E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	635.52	17.	-1.	0.000	732.27	-4.206E-01	
EU-154	722.96	18.	-4.	-0.002	171.01	-7.574E-01	
BI-212	727.33	10.	10.	0.005	55.11	5.344E+00	
PA-234M	764.25	15.	-2.	-0.001	269.92	-3.066E+01	
BI-212	785.15	11.	6.	0.003	87.88	2.030E+01	
EU-154	873.09	9.	1.	0.001	429.27	3.919E-01	
Pa-234	880.88	8.	2.	0.001	255.43	1.338E+00	
Pa-234	946.38	12.	2.	0.001	245.73	7.848E-01	
EU-154	996.14	24.	-4.	-0.002	163.86	-2.185E+00	
PA-234M	1001.03	13.	11.	0.006	56.17	6.695E+01	
EU-154	1004.71	22.	-6.	-0.003	121.88	-1.711E+00	
EU-152	1112.56	13.	2.	0.001	344.03	6.399E-01	
CO-60	1173.83	11.	-1.	-0.001	470.84	-5.993E-02	
CO-60	1332.36	7.	3.	0.002	154.21	1.788E-01	

P - Peakbackground subtraction

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

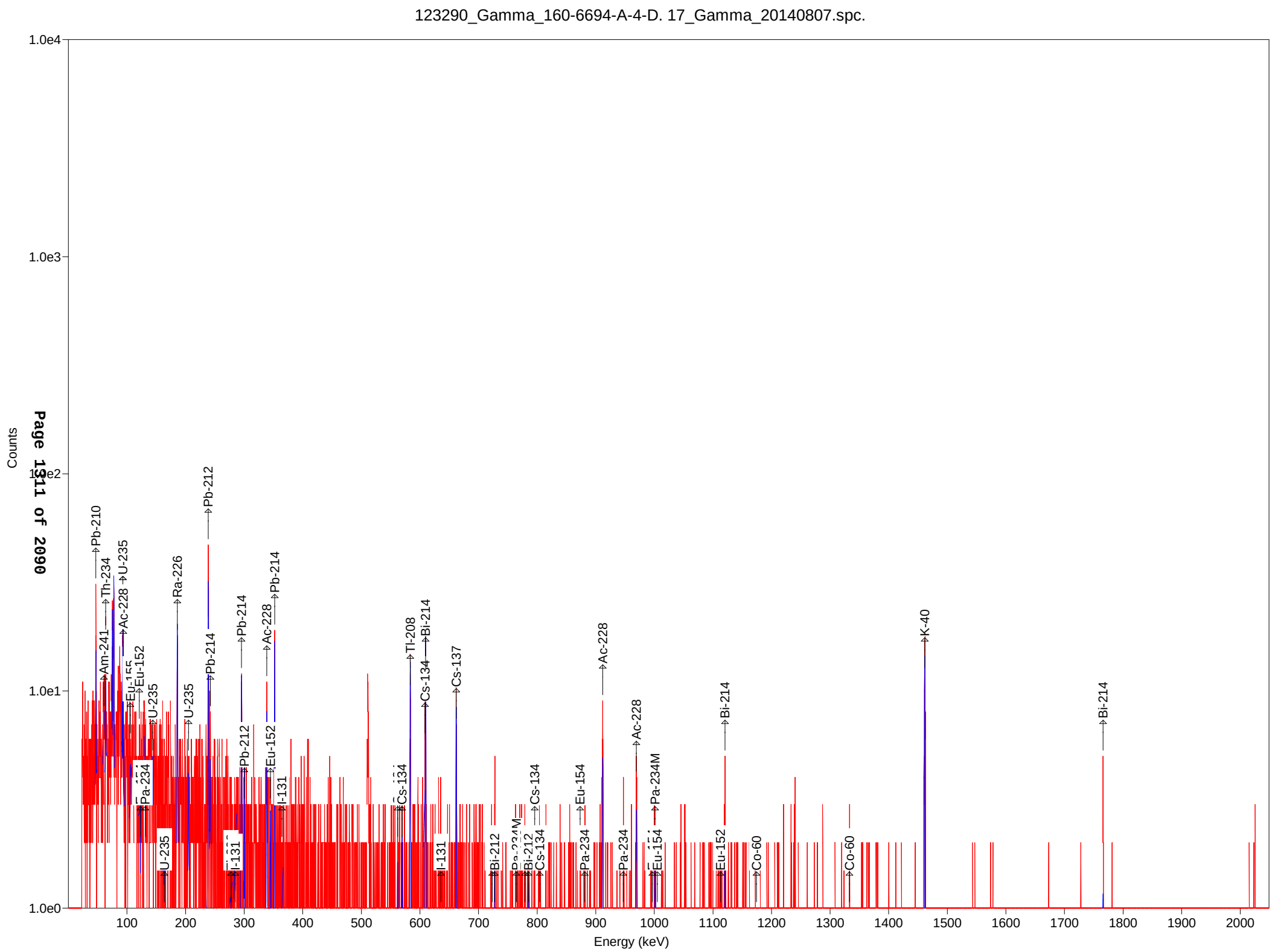
Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7 #A	0.0000E+00	0.0000E+00	1.000E+03%	7.88E+00
K-40	8.2188E+01	8.2188E+01	9.185E+00%	9.56E+00
CO-60 #A	1.7879E-01	1.7879E-01	1.542E+02%	1.01E+00
I-131 #A	2.6836E-03	2.6837E-03	7.429E+03%	7.39E-01
CS-134 #A	3.8045E-01	3.8045E-01	6.896E+01%	1.19E+00
CS-137	2.0486E+00	2.0486E+00	2.002E+01%	7.06E-01
EU-152 #A	7.8778E-01	7.8778E-01	6.667E+01%	1.90E+00
EU-154 #A	3.9191E-01	3.9191E-01	4.293E+02%	6.44E+00
EU-155 #A	2.3093E-01	2.3093E-01	2.925E+02%	2.36E+00
TL-208 #	3.0346E+00	3.0346E+00	1.446E+01%	7.80E-01
PB-210 #	2.8780E+01	2.8780E+01	3.244E+01%	2.81E+01
PB-212 #	5.4569E+00	5.4569E+00	1.100E+01%	1.39E+00
PB-214	4.9088E+00	4.9088E+00	1.350E+01%	1.52E+00
BI-212 #A	7.5114E+00	7.5114E+00	5.187E+01%	9.38E+00
BI-214	7.7909E+00	7.7909E+00	1.279E+01%	1.63E+00
AC-228	5.4299E+00	5.4299E+00	1.593E+01%	2.63E+00
Pa-234 #A	8.7466E-01	8.7466E-01	6.339E+01%	3.29E+00
TH-234 A	7.7310E+00	7.7310E+00	4.266E+01%	2.28E+01
PA-234M#A	6.6954E+01	6.6954E+01	5.617E+01%	1.21E+02
Ra-226 #	3.3824E+01	3.3824E+01	1.940E+01%	1.40E+01
U-235 #A	4.7908E-01	4.7908E-01	7.477E+01%	5.90E+00
AM-241 #A	8.1188E-03	8.1188E-03	9.178E+03%	2.60E+00

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

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

Total Activity (185.9 to 1999.5 keV) 1.680E+02 Bq/Sample
Total Decayed Activity (185.9 to 1999.5 keV) 1.6803157E+02 Bq/Sample

The library has energies which are not separable.


123290_Gamma_160-6694-A-4-D. 17_Gamma_20140807.spc.
Counts
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Energy (keV)
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-210
Th-234
Am-241
Ac-228
U-235
Eu-152
Pa-234
U-235
Ra-226
U-235
Pb-212
Pb-214
Pb-212
Pb-214
Ac-228
Eu-152
I-131
Cs-134
Tl-208
Bi-214
Cs-134
Cs-137
I-131
Bi-212
Cs-134
Bi-212
Cs-134
Eu-154
Ac-228
Pa-234
Ac-228
Pa-234M
Eu-154
Bi-214
Eu-152
Co-60
Co-60
K-40
Bi-214

Test America St. Louis Spectrum ID: 4_Gamma_20140891

Sample Description: 123290_Gamma_160-6694-A-5-D
Detector: Ge 4 SN/181
Batch ID: 123290
Work Order Number: Gamma
Lot Number: 160-6694-A-5-D

Decay to Time: 5/21/2014 15:46 Live Time: 1800 sec
Acquisition Time: 5/21/2014 15:46:31 Real Time: 1802 sec
Analysis Time: 5/21/2014 16:17 Dead Time: 0.13 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 4_Soil_TunaCan.Clb
Efficiency Cal Desc: 4_Soil_TunaCan_90099_033012
Efficiency Cal Date: 4/2/2012 13:19
Energy Cal Date: 2/28/2012 14:55
Library: Client_Short_no ingrowth Rev2.li
Bkgd Correction File: 4_2014-05-03_0556.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.177E+00	85.8	2.725E+00	2.730E+00	9.365E+00
K-40	1.560E+02	9.9	1.551E+01	1.744E+01	1.386E+01
CO-60	4.522E-02	494.6	2.237E-01	2.237E-01	2.989E+00
I-131	6.314E-02	385.7	2.435E-01	2.435E-01	1.299E+00
CS-134	1.672E-01	277.7	4.644E-01	4.644E-01	1.481E+00
CS-137	-2.972E-01	192.1	5.710E-01	5.712E-01	2.058E+00
EU-152	8.064E-02	112.3	9.054E-02	9.064E-02	3.435E+00
EU-154	1.552E+00	278.6	4.322E+00	4.323E+00	1.602E+01
EU-155	1.156E+00	61.3	7.083E-01	7.111E-01	2.947E+00
TL-208	2.084E+00	36.6	7.620E-01	7.696E-01	1.704E+00
PB-210	2.377E+01	46.2	1.099E+01	1.107E+01	3.363E+01
PB-212	6.993E+00	13.4	9.396E-01	1.043E+00	1.877E+00
PB-214	5.481E+00	15.1	8.275E-01	8.751E-01	2.584E+00
BI-212	7.975E+00	85.4	6.810E+00	6.822E+00	1.803E+01
BI-214	2.960E+00	41.9	1.241E+00	1.250E+00	3.104E+00
AC-228	8.604E+00	20.0	1.721E+00	1.776E+00	2.730E+00
Pa-234	1.594E+00	57.1	9.102E-01	9.139E-01	2.922E+00
TH-234	1.364E+01	64.1	8.738E+00	8.767E+00	3.046E+01
PA-234M	0.000E+00	1000.0	1.967E+01	1.967E+01	2.441E+02
Ra-226	1.697E+00	496.6	8.429E+00	8.430E+00	3.101E+01
U-235	1.419E+00	127.0	1.802E+00	1.804E+00	5.437E+00
AM-241	3.603E-02	1846.0	6.649E-01	6.650E-01	2.427E+00
Total	2.385E+02				

Analyst: April Bean

TestAmerica Spectrum name: 4_Gamma_20140891.An1

Sample description
123290_Gamma_160-6694-A-5-D

Spectrum Filename: C:\User\SPC\Det4\4_Gamma_20140891.An1

Acquisition information
Start time: 5/21/2014 3:46:31 PM
Live time: 1800
Real time: 1802
Dead time: 0.13 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Soil_TunaCan.Clb
4_Soil_TunaCan_90099_033012

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 1:19:41 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.78 %
Log(Eff): -3.983609E-01 + (-5.746278E-01*Log(E)) +
(-2.046438E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.80 %
Log(Eff): -2.546791E+01 + (9.285295E+00*Log(E)) +
(-9.904428E-01*Log(E)^2)

Library Files
Main analysis library: Client_Short_no ingrowth Rev2.li
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
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

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	5/21/2014 3:46:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	4_2014-05-03_0556.PBC 5/3/2014 5:56:46 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 10 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1719

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.75	37.	27.43	0.43	1.217E-02	46.54	4.250	PBC<MDA	PB210
63.44	17.	36.20	0.82	1.842E-02	63.29	3.810	PBC<MDA	TH234
					63.29	3.810	PBC<MDA	TH234
77.20	66.	22.22	0.40	2.191E-02				
87.36	18.	64.45	0.84	2.336E-02	86.54	30.700	PBC<MDA	EU155
92.87	48.	24.25	1.09	2.403E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	1.995E+01	AC228
					93.35	5.810	1.910E+01	U235
					92.59	5.584	1.231E+01	TH234
92.93	29.	36.30	0.84	2.403E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	1.192E+01	AC228
					93.35	5.810	1.141E+01	U235
92.95	12.	33.60	0.84	2.397E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	PBC<MDA	AC228
					93.35	5.810	PBC<MDA	U235
104.93	8.	104.22	0.85	2.456E-02	105.31	21.200	PBC<MDA	EU155
119.55	6.	112.28	0.87	2.426E-02	121.78	28.580	PBC<MDA	EU152
130.37	12.	57.10	0.88	2.372E-02	131.29	18.000	PBC<MDA	Pa234
142.47	3.	200.66	0.89	2.273E-02	143.79	10.960	PBC<MDA	U235
163.40	1.	759.28	0.91	2.083E-02	163.38	5.080	PBC<MDA	U235
186.26	2.	102.40	0.93	1.906E-02	185.99	3.280	PBC<MDA	Ra226
205.19	6.	127.04	0.95	1.763E-02	205.33	5.010	PBC<MDA	U235
238.39	92.	12.41	1.00	1.565E-02	238.63	43.300	6.993E+00	PB212
277.11	4.	178.21	1.01	1.387E-02	277.28	6.310	PBC<MDA	TL208

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
294.91	33.	20.33	1.18	1.319E-02	295.09	19.300	7.202E+00	PB214
299.91	4.	153.56	1.03	1.301E-02	300.03	3.280	PBC<MDA	PB212
338.20	18.	40.90	1.07	1.181E-02	338.32	12.010	PBC<MDA	AC228
351.38	36.	22.33	1.08	1.143E-02	351.93	37.600	4.597E+00	PB214
477.22	5.	85.78	1.19	8.899E-03	477.60	10.520	PBC<MDA	BE7
566.34	1.	452.54	1.26	7.760E-03	563.24	8.350	PBC<MDA	CS134
582.65	18.	36.56	1.28	7.539E-03	583.02	84.500	PBC<MDA	TL208
604.75	2.	321.91	1.30	7.312E-03	604.71	97.620	PBC<MDA	CS134
608.99	15.	41.91	1.30	7.266E-03	609.31	46.090	PBC<MDA	BI214
637.34	1.	385.69	1.33	7.001E-03	636.97	7.170	PBC<MDA	I131
729.67	4.	121.36	1.40	6.262E-03	727.17	7.550	PBC<MDA	BI212
785.55	4.	120.16	1.45	5.867E-03	785.42	1.280	PBC<MDA	BI212
859.54	6.	68.43	1.52	5.429E-03	860.56	12.420	PBC<MDA	TL208
872.95	2.	278.57	1.53	5.362E-03	873.23	12.270	PBC<MDA	EU154
910.81	25.	20.00	0.42	5.172E-03	911.07	29.000	9.261E+00	AC228
945.60	2.	189.91	1.59	5.008E-03	946.02	13.400	PBC<MDA	Pa234
969.25	7.	61.10	1.60	4.906E-03	968.97	17.460	PBC<MDA	AC228
1120.39	5.	80.06	1.73	4.331E-03	1120.29	15.100	PBC<MDA	BI214
1171.17	1.	494.58	1.77	4.162E-03	1173.24	99.900	PBC<MDA	CO60
1460.53	103.	9.76	0.41	3.441E-03	1460.83	10.670	1.560E+02	K40

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
308.25	77.20	48.	66.	3.028E+03	22.22	0.398	- 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_Short_no ingrowth Rev2.li

********** 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	186.52	46.75	37.	22.	0.012	27.43	0.426s
TH-234	253.24	63.44	59.	17.	0.010	36.20	0.816s
EU-155	348.87	87.36	57.	18.	0.010	64.45	0.837s
TH-234	371.22	92.95	55.	12.	0.007	33.60	0.843s
AC-228	372.83	93.35	25.	48.	0.027	24.25	1.086D
U-235	372.83	93.35	40.	29.	0.016	36.30	0.843D
EU-155	419.13	104.93	29.	8.	0.004	104.22	0.855s
EU-152	477.56	119.55	18.	6.	0.003	112.28	0.870s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Pa-234	520.82	130.37	18.	12.	0.007	57.10	0.878s
U-235	569.20	142.47	22.	3.	0.002	200.66	0.890s
U-235	652.87	163.40	33.	1.	0.001	759.28	0.908s
Ra-226	744.30	186.26	48.	2.	0.001	102.40	0.928s
U-235	819.98	205.19	25.	6.	0.003	127.04	0.946s
PB-212	952.71	238.39	19.	85.	0.047	12.41	1.004
PB-214	968.43	242.32	33.	-3.	-0.002	265.67	0.979s
TL-208	1107.53	277.11	20.	4.	0.002	178.21	1.011
I-131	1135.64	284.14	25.	-3.	-0.001	286.83	1.018s
PB-214	1178.71	294.91	4.	33.	0.018	20.33	1.179
PB-212	1198.72	299.91	19.	4.	0.002	153.56	1.032
AC-228	1351.84	338.20	18.	18.	0.010	40.90	1.066
EU-152	1374.77	343.94	12.	-2.	-0.001	279.23	1.071s
PB-214	1404.53	351.38	14.	36.	0.020	22.33	1.078s
BE-7	1907.77	477.22	8.	5.	0.003	85.78	1.189s
CS-134	2264.23	566.34	6.	1.	0.000	452.54	1.264s
Pa-234	2279.15	570.07	17.	-1.	-0.001	625.95	1.269s
TL-208	2329.45	582.65	13.	18.	0.010	36.56	1.281s
CS-134	2417.86	604.75	12.	2.	0.001	321.91	1.300s
BI-214	2434.82	608.99	12.	15.	0.008	41.91	1.304s
I-131	2548.20	637.34	6.	1.	0.001	385.69	1.327s
CS-137	2645.44	661.65	16.	-3.	-0.002	192.09	1.348s
BI-212	2917.55	729.67	7.	4.	0.002	121.36	1.404s
PA-234M	3059.03	765.04	5.	-2.	-0.001	195.87	1.437s
EU-152	3110.29	777.85	8.	-1.	0.000	617.08	1.448s
BI-212	3141.06	785.55	10.	4.	0.002	120.16	1.453s
CS-134	3216.01	804.28	10.	-3.	-0.002	164.44	1.467s
TL-208	3437.09	859.54	7.	6.	0.004	68.43	1.516s
EU-154	3490.71	872.95	12.	2.	0.001	278.57	1.526s
Pa-234	3517.87	879.73	10.	-3.	-0.002	159.54	1.532s
AC-228	3642.20	910.81	0.	25.	0.014	20.00	0.417s
Pa-234	3781.42	945.60	6.	2.	0.001	189.91	1.586s
AC-228	3876.01	969.25	7.	7.	0.004	61.10	1.605s
EU-152	4441.98	1110.69	7.	-2.	-0.001	222.10	1.720s
BI-214	4480.82	1120.39	6.	5.	0.003	80.06	1.727s
CO-60	4684.02	1171.17	5.	1.	0.000	494.58	1.769s
K-40	5842.18	1460.53	2.	103.	0.057	9.76	0.406s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	3.1771E+00				5.31E+01		
			477.60	3.177E+00	?(	9.365E+00	8.58E+01	1.05E+01 G
K-40	N	1.5600E+02				4.66E+11		
			1460.83	1.560E+02	(P	1.386E+01	9.76E+00	1.07E+01 G
CO-60	F	4.5222E-02				1.93E+03		
			1332.50	0.000E+00	?(	2.989E+00	1.00E+03	1.00E+02 G
			1173.24	9.048E-02	?(	1.791E+00	4.95E+02	9.99E+01 G
I-131	I	6.3136E-02				8.02E+00		
			364.48	-2.135E-02	%(	1.299E+00	1.62E+03	8.17E+01 G
			284.30	-1.681E+00	+	1.731E+01	2.87E+02	6.14E+00 G
			636.97	1.026E+00	?(	1.555E+01	3.86E+02	7.17E+00 G
CS-134	I	1.6723E-01				7.54E+02		
			604.71	1.235E-01	?(	1.481E+00	3.22E+02	9.76E+01 G
			795.87	0.000E+00	-	1.752E+00	1.00E+03	8.55E+01 G
			569.32	-2.797E-02	%	9.228E+00	8.64E+03	1.54E+01 G
			801.95	-3.248E+00	+	1.946E+01	1.64E+02	8.69E+00 G
			563.24	6.780E-01	?(	1.212E+01	4.53E+02	8.35E+00 G
CS-137	I	-2.9723E-01				1.10E+04		
			661.66	-2.972E-01	?(	2.058E+00	1.92E+02	8.52E+01 G
EU-152	F	8.0637E-02				4.94E+03		
			344.29	-3.320E-01	?(	3.435E+00	2.79E+02	2.65E+01 G
			121.78	4.632E-01	?(	1.809E+00	1.12E+02	2.86E+01 G
			778.92	-4.870E-01	+	1.168E+01	6.17E+02	1.29E+01 G
			964.11	0.000E+00	-	2.489E+01	1.00E+03	1.46E+01 G
			1112.07	-1.681E+00	+	1.412E+01	2.22E+02	1.36E+01 G
			1408.00	0.000E+00	-	1.571E+01	1.00E+03	2.10E+01 G
EU-154	I	1.5517E+00				3.14E+03		
			873.23	1.552E+00	?(	1.602E+01	2.79E+02	1.23E+01 G
			123.10	-3.550E-02	&	1.744E+00	1.37E+03	4.08E+01 G
			1274.54	0.000E+00	-	8.082E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	6.706E+00	1.00E+03	2.02E+01 G
			1004.77	0.000E+00	-	4.780E+00	1.00E+03	1.80E+01 G
			996.33	0.000E+00	-	1.916E+01	1.00E+03	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	1.1560E+00					1.81E+03	
			105.31	8.245E-01	@(	2.947E+00	1.04E+02	2.12E+01 G
			86.54	1.385E+00	&(	2.946E+00	6.45E+01	3.07E+01 G
TL-208	N	2.0843E+00					6.98E+02	
			583.02	1.587E+00	?(	1.704E+00	3.66E+01	8.45E+01 G
			277.28	2.338E+00	(	1.485E+01	1.78E+02	6.31E+00 G
			860.56	5.337E+00	?(	1.209E+01	6.84E+01	1.24E+01 G
PB-210	N	2.3770E+01					8.14E+03	
			46.54	2.377E+01	(P	3.363E+01	2.74E+01	4.25E+00 G
PB-212	N	6.9928E+00					6.98E+02	
			238.63	6.993E+00	(P	1.877E+00	1.24E+01	4.33E+01 G
			300.03	5.118E+00	- P	3.011E+01	1.54E+02	3.28E+00 G
PB-214	N	5.4808E+00					5.84E+05	
			351.93	4.597E+00	&(	2.584E+00	2.23E+01	3.76E+01 G
			295.09	7.202E+00	(	2.626E+00	2.03E+01	1.93E+01 G
			242.00	-1.524E+00	-	1.435E+01	2.66E+02	7.43E+00 G
BI-212	N	7.9745E+00					6.98E+02	
			727.17	4.132E+00	?(	1.803E+01	1.21E+02	7.55E+00 G
			785.42	3.064E+01	&(	1.308E+02	1.20E+02	1.28E+00 G
BI-214	N	2.9603E+00					5.84E+05	
			609.31	2.451E+00	?(	3.104E+00	4.19E+01	4.61E+01 G
			1120.29	4.514E+00	&(	1.231E+01	8.01E+01	1.51E+01 G
			1764.49	0.000E+00	&	9.119E+00	1.00E+03	1.54E+01 G
AC-228	N	8.6036E+00					2.10E+03	
			911.07	9.261E+00	(	2.730E+00	2.00E+01	2.90E+01 G
			968.97	4.828E+00	-	9.535E+00	6.11E+01	1.75E+01 G
			338.32	7.017E+00	?(	8.782E+00	4.09E+01	1.20E+01 G
							Energy duplication	
			93.35	1.995E+01	+	1.081E+01	2.43E+01	5.56E+00 XA
Pa-234	N	1.5940E+00					1.63E+12	
			131.29	1.579E+00	?(	2.922E+00	5.71E+01	1.80E+01 G
			569.47	-8.409E-01	-	1.950E+01	6.26E+02	8.20E+00 G
			946.02	1.614E+00	?(	1.160E+01	1.90E+02	1.34E+01 G
			883.24	0.000E+00	-	1.789E+01	1.00E+03	9.60E+00 G
			880.53	-5.318E+00	-	3.081E+01	1.60E+02	6.00E+00 G
TH-234	N	1.3636E+01					1.63E+12	
			63.29	1.364E+01	(P	3.046E+01	3.62E+01	3.81E+00 G
			92.59	4.980E+00	- P	1.548E+01	3.36E+01	5.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ra-226	N	1.6972E+00					5.84E+05	
			185.99	1.697E+00	?(P	3.101E+01	1.02E+02	3.28E+00 G
U-235	N	1.4185E+00					2.57E+11	
			143.79	7.592E-01	?(	5.437E+00	2.01E+02	1.10E+01 G
			205.33	3.728E+00	(	1.647E+01	1.27E+02	5.01E+00 G
			163.38	5.638E-01	?(	1.541E+01	7.59E+02	5.08E+00 G
							Energy	duplication
			93.35	1.141E+01	*	1.278E+01	3.63E+01	5.81E+00 X
AM-241	T	3.6029E-02					1.58E+05	
			59.54	3.603E-02	%(	2.427E+00	1.85E+03	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:
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-234	63.44	59.	17.	0.010	36.20	1.364E+01	P
EU-155	87.36	57.	18.	0.010	64.45	1.385E+00	
TH-234	92.95	55.	12.	0.007	33.60	4.980E+00	P
U-235	93.35	40.	29.	0.016	36.30	1.141E+01	
EU-155	104.93	29.	8.	0.004	104.22	8.245E-01	
EU-152	119.55	18.	6.	0.003	112.28	4.632E-01	
Pa-234	130.37	18.	12.	0.007	57.10	1.579E+00	
U-235	142.47	22.	3.	0.002	200.66	7.592E-01	
U-235	163.40	33.	1.	0.001	759.28	5.638E-01	
Ra-226	186.26	48.	2.	0.001	102.40	1.697E+00	P
U-235	205.19	25.	6.	0.003	127.04	3.728E+00	
I-131	284.14	25.	-3.	-0.001	286.83	-1.681E+00	
EU-152	343.94	12.	-2.	-0.001	279.23	-3.320E-01	
BE-7	477.22	8.	5.	0.003	85.78	3.177E+00	
CS-134	566.34	6.	1.	0.000	452.54	6.780E-01	
Pa-234	570.07	17.	-1.	-0.001	625.95	-8.409E-01	
CS-134	604.75	12.	2.	0.001	321.91	1.235E-01	
I-131	637.34	6.	1.	0.001	385.69	1.026E+00	
CS-137	661.65	16.	-3.	-0.002	192.09	-2.972E-01	
BI-212	729.67	7.	4.	0.002	121.36	4.132E+00	
PA-234M	765.04	5.	-2.	-0.001	195.87	-5.655E+01	
EU-152	777.85	8.	-1.	0.000	617.08	-4.870E-01	
BI-212	785.55	10.	4.	0.002	120.16	3.064E+01	
CS-134	804.28	10.	-3.	-0.002	164.44	-3.248E+00	
EU-154	872.95	12.	2.	0.001	278.57	1.552E+00	
Pa-234	879.73	10.	-3.	-0.002	159.54	-5.318E+00	
Pa-234	945.60	6.	2.	0.001	189.91	1.614E+00	
EU-152	1110.69	7.	-2.	-0.001	222.10	-1.681E+00	
CO-60	1171.17	5.	1.	0.000	494.58	9.048E-02	

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	3.1771E+00	3.1771E+00	8.578E+01%	9.36E+00
K-40		1.5600E+02	1.5600E+02	9.940E+00%	1.39E+01
CO-60	#A	4.5222E-02	4.5222E-02	4.946E+02%	2.99E+00
I-131	#A	6.3134E-02	6.3136E-02	3.857E+02%	1.30E+00
CS-134	#A	1.6723E-01	1.6723E-01	2.777E+02%	1.48E+00
CS-137	#A	-2.9723E-01	-2.9723E-01	1.921E+02%	2.06E+00
EU-152	#A	8.0637E-02	8.0637E-02	1.123E+02%	3.43E+00

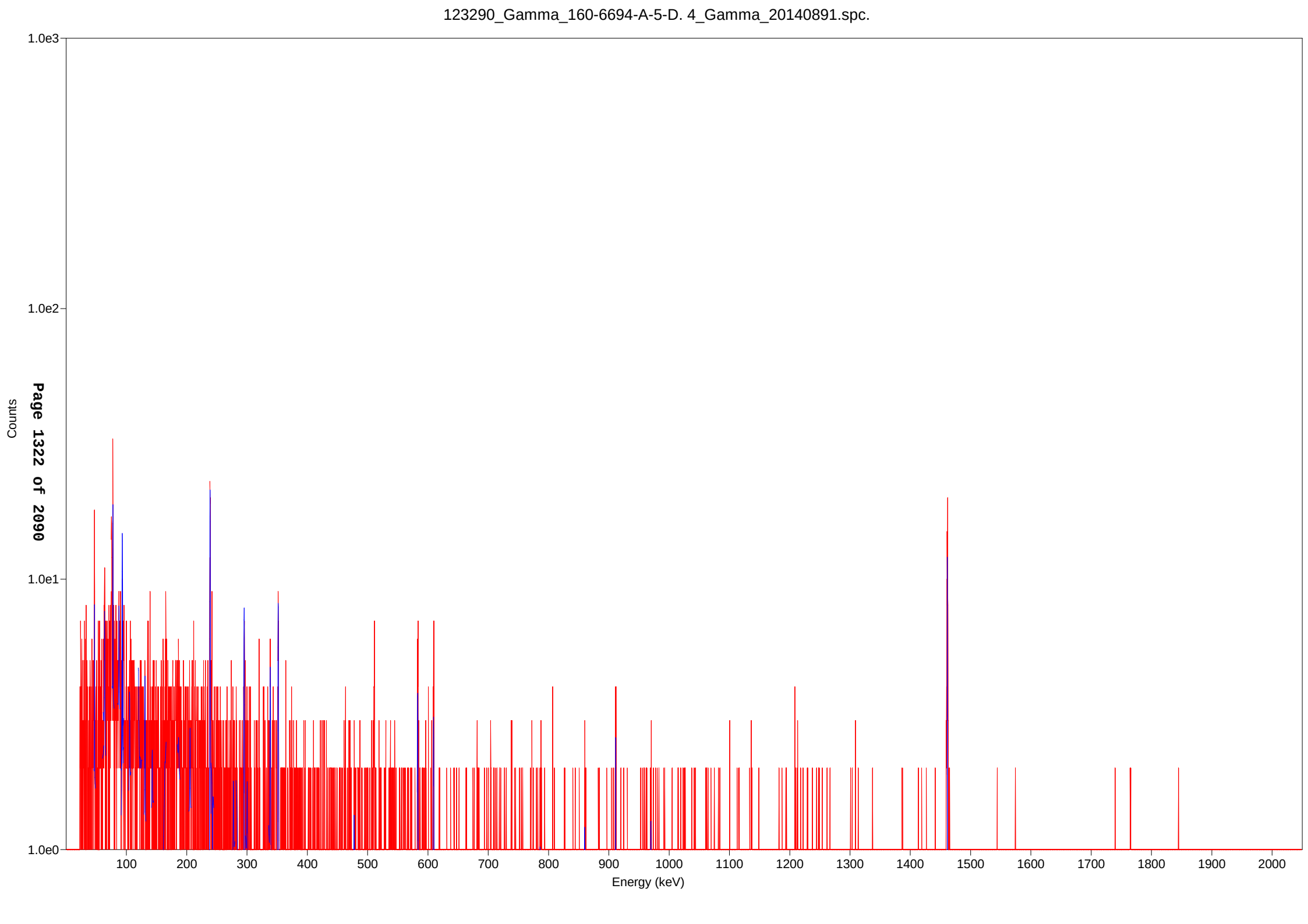
EU-154 #A	1.5517E+00	1.5517E+00	2.786E+02%	1.60E+01
EU-155 #A	1.1560E+00	1.1560E+00	6.127E+01%	2.95E+00
TL-208	2.0843E+00	2.0843E+00	3.656E+01%	1.70E+00
PB-210 A	2.3770E+01	2.3770E+01	4.622E+01%	3.36E+01
PB-212	6.9928E+00	6.9928E+00	1.344E+01%	1.88E+00
PB-214	5.4808E+00	5.4808E+00	1.510E+01%	2.58E+00
BI-212 #A	7.9745E+00	7.9745E+00	8.539E+01%	1.80E+01
BI-214 #A	2.9603E+00	2.9603E+00	4.191E+01%	3.10E+00
AC-228	8.6036E+00	8.6036E+00	2.000E+01%	2.73E+00
Pa-234 #A	1.5940E+00	1.5940E+00	5.710E+01%	2.92E+00
TH-234 #A	1.3636E+01	1.3636E+01	6.408E+01%	3.05E+01
PA-234M#A	0.0000E+00	0.0000E+00	1.000E+03%	2.44E+02
Ra-226 #A	1.6972E+00	1.6972E+00	4.966E+02%	3.10E+01
U-235 #A	1.4185E+00	1.4185E+00	1.270E+02%	5.44E+00
AM-241 #A	3.6029E-02	3.6029E-02	1.846E+03%	2.43E+00

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

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

Total Activity (37.6 to 1999.4 keV) 2.059E+02 Bq/Sample
Total Decayed Activity (37.6 to 1999.4 keV) 2.0589240E+02 Bq/Sample

The library has energies which are not separable.


123290_Gamma_160-6694-A-5-D. 4_Gamma_20140891.spc.
1.0e3
1.0e2
1.0e1
1.0e0
Counts
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 7_Gamma_20141023

Sample Description: 123290_Gamma_160-6694-A-6-D
Detector: Ge 7 SN/154
Batch ID: 123290
Work Order Number: Gamma
Lot Number: 160-6694-A-6-D

Decay to Time: 5/21/2014 15:45 Live Time: 1800 sec
Acquisition Time: 5/21/2014 15:45:52 Real Time: 1828 sec
Analysis Time: 5/21/2014 16:16 Dead Time: 1.56 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Soil_TunaCan.Clb
Efficiency Cal Desc: 7_TunaCan_90099_032712
Efficiency Cal Date: 3/16/2012 11:45
Energy Cal Date: 2/23/2012 08:40
Library: Client_Short_no ingrowth Rev2.li
Bkgd Correction File: 7_2014-05-03_0622.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	1.038E+00	161.1	1.672E+00	1.673E+00	5.950E+00
K-40	1.194E+02	7.8	9.316E+00	1.114E+01	8.104E+00
CO-60	0.000E+00	707.1	6.989E-02	6.989E-02	1.419E+00
I-131	6.724E-02	140.3	9.431E-02	9.437E-02	6.661E-01
CS-134	0.000E+00	1000.0	1.318E-01	1.318E-01	2.351E+00
CS-137	7.444E-01	40.4	3.006E-01	3.031E-01	9.108E-01
EU-152	5.243E-01	86.6	4.540E-01	4.549E-01	2.493E+00
EU-154	1.540E-01	107.1	1.649E-01	1.651E-01	9.968E+00
EU-155	2.874E-01	88.1	2.533E-01	2.538E-01	1.360E+00
TL-208	1.989E+00	16.1	3.207E-01	3.369E-01	4.420E-01
PB-210	2.778E+01	21.8	6.055E+00	6.271E+00	1.640E+01
PB-212	6.143E+00	12.6	7.719E-01	8.682E-01	1.471E+00
PB-214	5.031E+00	12.0	6.033E-01	6.575E-01	1.174E+00
BI-212	8.109E+00	41.6	3.376E+00	3.402E+00	1.020E+01
BI-214	6.830E+00	12.0	8.185E-01	8.921E-01	9.729E-01
AC-228	4.604E+00	18.1	8.337E-01	8.662E-01	3.286E+00
Pa-234	6.430E-01	176.1	1.132E+00	1.133E+00	1.994E+00
TH-234	7.928E+00	63.0	4.994E+00	5.011E+00	1.734E+01
PA-234M	-1.140E+01	2000.0	2.280E+02	2.280E+02	1.213E+02
Ra-226	2.219E+01	27.8	6.159E+00	6.457E+00	1.456E+01
U-235	2.018E+00	40.7	8.218E-01	8.282E-01	2.489E+00
AM-241	-4.977E-01	109.9	5.471E-01	5.477E-01	1.852E+00
Total	2.154E+02				

Analyst: April Bean

TestAmerica Spectrum name: 7_Gamma_20141023.An1

Sample description
123290_Gamma_160-6694-A-6-D

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20141023.An1

Acquisition information
Start time: 5/21/2014 3:45:52 PM
Live time: 1800
Real time: 1828
Dead time: 1.56 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/16/2012 11:45:14 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.716580E-01 + (-6.166540E-01*Log(E)) + (-2.065917E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): -2.689695E+01 + (1.019544E+01*Log(E)) + (-1.081671E+00*Log(E)^2)

Library Files
Main analysis library: Client_Short_no ingrowth Rev2.li
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.12keV)
Peak rejection level: 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

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	5/21/2014 3:45:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2014-05-03_0622.PBC 5/3/2014 6:22:41 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 20 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1731

***** 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
46.43	70.	16.31	0.64	2.472E-02	46.54	4.250	2.778E+01	PB210
63.31	43.	34.73	0.73	4.006E-02	63.29	3.810	PBC<MDA	TH234
77.18	138.	14.64	0.89	4.891E-02				
86.54	5.	341.81	0.88	5.281E-02	86.54	30.700	PBC<MDA	EU155
					86.54	30.700	1.712E-01	EU155
87.13	59.	20.71	0.45	5.300E-02				
92.61	32.	46.16	0.89	5.470E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	5.579E+00	U235
					93.35	5.561	5.829E+00	AC228
					93.35	5.810	5.579E+00	U235
92.61	32.	46.16	0.89	5.470E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	5.579E+00	U235
					93.35	5.561	5.829E+00	AC228
92.65	13.	41.88	0.89	5.452E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	PBC<MDA	U235
					93.35	5.561	PBC<MDA	AC228
105.64	10.	88.14	0.90	5.638E-02	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	4.558E-01	EU155
122.65	8.	107.11	0.92	5.596E-02	123.10	40.790	PBC<MDA	EU154
130.99	3.	319.02	0.93	5.494E-02	131.29	18.000	PBC<MDA	Pa234
143.14	21.	40.73	0.94	5.271E-02	143.79	10.960	PBC<MDA	U235
					143.79	10.960	1.975E+00	U235
163.20	8.	101.69	0.96	4.826E-02	163.38	5.080	PBC<MDA	U235
					163.38	5.080	1.776E+00	U235
185.99	73.	22.21	0.54	4.438E-02	185.99	3.280	2.219E+01	Ra226
205.24	9.	93.80	1.01	4.086E-02	205.33	5.010	PBC<MDA	U235
					205.33	5.010	2.355E+00	U235
238.66	179.	12.13	1.12	3.601E-02	238.63	43.300	6.143E+00	PB212
277.56	9.	90.63	1.08	3.172E-02	277.28	6.310	PBC<MDA	TL208

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
295.15	48.	21.67	1.10	3.009E-02	295.09	19.300	4.625E+00	PB214
					295.09	19.300	4.625E+00	PB214
300.34	25.	26.23	0.29	2.966E-02	300.03	3.280	1.427E+01	PB212
338.27	24.	33.83	1.14	2.677E-02	338.32	12.010	PBC<MDA	AC228
352.01	111.	10.88	0.83	2.587E-02	351.93	37.600	6.318E+00	PB214
					351.93	37.600	6.318E+00	PB214
477.70	4.	161.10	1.28	1.987E-02	477.60	10.520	PBC<MDA	BE7
583.19	50.	16.12	0.64	1.669E-02	583.02	84.500	1.957E+00	TL208
609.47	91.	11.98	1.57	1.605E-02	609.31	46.090	6.846E+00	BI214
637.10	3.	140.26	1.43	1.543E-02	636.97	7.170	PBC<MDA	I131
661.81	17.	40.38	1.46	1.492E-02	661.66	85.210	PBC<MDA	CS137
727.80	15.	41.63	1.51	1.373E-02	727.17	7.550	PBC<MDA	BI212
860.22	3.	141.83	1.63	1.181E-02	860.56	12.420	PBC<MDA	TL208
880.48	3.	211.70	1.65	1.157E-02	880.53	6.000	PBC<MDA	Pa234
911.44	23.	30.44	1.68	1.122E-02	911.07	29.000	3.883E+00	AC228
946.15	2.	363.99	1.70	1.085E-02	946.02	13.400	PBC<MDA	Pa234
969.41	20.	29.67	1.72	1.062E-02	968.97	17.460	6.145E+00	AC228
1112.33	5.	86.60	1.84	9.373E-03	1112.07	13.644	PBC<MDA	EU152
1120.67	8.	66.41	1.85	9.311E-03	1120.29	15.100	PBC<MDA	BI214
1408.44	1.	277.48	2.06	7.560E-03	1408.00	21.005	PBC<MDA	EU152
1460.96	168.	7.65	1.57	7.309E-03	1460.83	10.670	1.194E+02	K40
1764.50	12.	32.92	2.29	6.141E-03	1764.49	15.400	6.780E+00	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
308.29	77.18	84.	138.	2.811E+03	14.64	0.885	-	s
348.07	87.13	38.	54.	1.019E+03	21.12	0.452	-	s
1407.71	352.01	99.	19.	7.305E+02	77.95	0.832	-	sc

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

This section based on library: Client_Short_no ingrowth Rev2.li

********** 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	185.26	46.43	37.	53.	0.029	16.31	0.644	s
AM-241	236.53	59.24	80.	-12.	-0.007	109.92	0.850	s
TH-234	252.95	63.35	93.	22.	0.012	33.31	0.854	
EU-155	345.74	86.54	143.	5.	0.003	341.81	0.880	s
TH-234	370.15	92.65	123.	13.	0.007	41.88	0.886	s
U-235	372.97	93.35	93.	32.	0.018	46.16	0.887	D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	372.97	93.35	93.	32.	0.018	46.16	0.887D
EU-155	422.12	105.64	32.	10.	0.005	88.14	0.900s
EU-154	490.19	122.65	35.	8.	0.005	107.11	0.919s
Pa-234	523.54	130.99	49.	3.	0.002	319.02	0.928s
U-235	572.17	143.14	25.	21.	0.011	40.73	0.941s
U-235	652.40	163.20	28.	8.	0.004	101.69	0.962
Ra-226	743.58	185.99	58.	58.	0.032	22.21	0.541s
U-235	820.58	205.24	29.	9.	0.005	93.80	1.007s
PB-212	954.28	238.66	69.	172.	0.096	12.13	1.118
TL-208	1109.87	277.56	27.	9.	0.005	90.63	1.081
PB-214	1180.22	295.15	31.	48.	0.027	21.67	1.100s
PB-212	1201.01	300.34	6.	25.	0.014	26.23	0.291s
AC-228	1352.72	338.27	20.	24.	0.013	33.83	1.144
PB-214	1407.48	351.96	15.	92.	0.051	11.99	1.157s
I-131	1456.49	364.21	22.	-2.	-0.001	283.82	1.170s
BE-7	1910.48	477.70	18.	4.	0.002	161.10	1.282s
TL-208	2332.46	583.19	3.	50.	0.028	16.12	0.644s
BI-214	2437.60	609.47	5.	91.	0.051	11.98	1.571s
I-131	2548.11	637.10	8.	3.	0.002	140.26	1.433s
CS-137	2646.98	661.81	15.	17.	0.009	40.38	1.455s
BI-212	2910.93	727.80	12.	15.	0.008	41.63	1.515s
PA-234M	3059.19	764.86	20.	-6.	-0.003	165.11	1.550s
BI-212	3134.81	783.77	18.	-4.	-0.002	162.78	1.567s
CS-134	3182.33	795.65	20.	-3.	-0.002	228.95	1.576s
CS-134	3206.96	801.81	20.	-5.	-0.003	125.67	1.581s
TL-208	3440.63	860.22	10.	3.	0.002	141.83	1.632s
Pa-234	3521.65	880.48	15.	3.	0.002	211.70	1.649s
AC-228	3645.50	911.44	13.	23.	0.013	30.44	1.675
Pa-234	3784.33	946.15	14.	2.	0.001	363.99	1.704s
EU-152	3867.27	966.88	42.	-14.	-0.008	71.01	1.719s
AC-228	3877.40	969.41	8.	20.	0.011	29.67	1.724
EU-154	3983.91	996.04	19.	-2.	-0.001	271.94	1.746s
EU-154	4019.06	1004.83	20.	-4.	-0.002	153.84	1.753s
EU-152	4449.07	1112.33	7.	5.	0.003	86.60	1.839s
BI-214	4482.43	1120.67	10.	8.	0.004	66.41	1.845s
EU-154	5104.73	1276.25	16.	-1.	-0.001	425.12	1.963s
EU-152	5633.46	1408.44	6.	1.	0.001	277.48	2.059s
K-40	5843.53	1460.96	3.	168.	0.093	7.65	1.573s
BI-214	7057.62	1764.50	1.	12.	0.006	32.92	2.290s

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

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

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	1.0378E+00				5.31E+01	
			477.60	1.038E+00	&(	5.950E+00 1.61E+02	1.05E+01 G
K-40	N	1.1936E+02				4.66E+11	
			1460.83	1.194E+02	(P	8.104E+00 7.65E+00	1.07E+01 G
I-131	I	6.7239E-02				8.02E+00	
			364.48	-6.508E-02	?(	6.661E-01 2.84E+02	8.17E+01 G
			284.30	1.568E-02	%	6.876E+00 1.18E+04	6.14E+00 G
			636.97	1.575E+00	?(	8.024E+00 1.40E+02	7.17E+00 G
CS-137	I	7.4435E-01				1.10E+04	
			661.66	7.444E-01	?(	9.108E-01 4.04E+01	8.52E+01 G
EU-152	F	5.2426E-01				4.94E+03	
			344.29	0.000E+00	?(	2.493E+00 1.00E+03	2.65E+01 G
			121.78	6.392E-03	&	1.012E+00 4.37E+03	2.86E+01 G
			778.92	0.000E+00	&(	6.922E+00 1.00E+03	1.29E+01 G
			964.11	-4.976E+00	&	1.175E+01 7.10E+01	1.46E+01 G
			1112.07	2.137E+00	?(	6.384E+00 8.66E+01	1.36E+01 G
			1408.00	4.611E-01	?(	4.951E+00 2.77E+02	2.10E+01 G
EU-154	I	1.5397E-01				3.14E+03	
			873.23	0.000E+00	?(	9.968E+00 1.00E+03	1.23E+01 G
			123.10	2.003E-01	&(	7.344E-01 1.07E+02	4.08E+01 G
			1274.54	-2.551E-01	+	4.016E+00 4.25E+02	3.52E+01 G
			723.36	7.376E-02	&	5.221E+00 1.93E+03	2.02E+01 G
			1004.77	-1.288E+00	+	7.012E+00 1.54E+02	1.80E+01 G
			996.33	-1.169E+00	+	1.153E+01 2.72E+02	1.06E+01 G
EU-155	I	2.8744E-01				1.81E+03	
			105.31	4.558E-01	(	1.360E+00 8.81E+01	2.12E+01 G
			86.54	1.712E-01	?(	2.004E+00 3.42E+02	3.07E+01 G
TL-208	N	1.9893E+00				6.98E+02	
			583.02	1.957E+00	(	4.420E-01 1.61E+01	8.45E+01 G
			277.28	2.423E+00	(	7.465E+00 9.06E+01	6.31E+00 G
			860.56	1.295E+00	-	6.623E+00 1.42E+02	1.24E+01 G
PB-210	N	2.7784E+01				8.14E+03	
			46.54	2.778E+01	(P	1.640E+01 1.63E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	6.1433E+00					6.98E+02	
			238.63	6.143E+00	(P	1.471E+00	1.21E+01	4.33E+01 G
			300.03	1.427E+01	+	8.065E+00	2.62E+01	3.28E+00 G
PB-214	N	5.0309E+00					5.84E+05	
			351.93	5.239E+00	(	1.174E+00	1.20E+01	3.76E+01 G
			295.09	4.625E+00	*(	2.729E+00	2.17E+01	1.93E+01 G
			242.00	-2.265E-01	%	1.330E+01	1.71E+03	7.43E+00 G
BI-212	N	8.1086E+00					6.98E+02	
			727.17	8.109E+00	?(	1.020E+01	4.16E+01	7.55E+00 G
			785.42	-1.331E+01	-	7.705E+01	1.63E+02	1.28E+00 G
BI-214	N	6.8297E+00					5.84E+05	
			609.31	6.846E+00	@(	9.729E-01	1.20E+01	4.61E+01 G
			1120.29	3.187E+00	-	6.985E+00	6.64E+01	1.51E+01 G
			1764.49	6.780E+00	?(	4.885E+00	3.29E+01	1.54E+01 G
AC-228	N	4.6040E+00					2.10E+03	
			911.07	3.883E+00	(	3.286E+00	3.04E+01	2.90E+01 G
			968.97	6.145E+00	(	4.824E+00	2.97E+01	1.75E+01 G
			338.32	4.107E+00	(	4.108E+00	3.38E+01	1.20E+01 G
							Energy duplication	
			93.35	5.829E+00		8.683E+00	4.62E+01	5.56E+00 XA
Pa-234	N	6.4296E-01					1.63E+12	
			131.29	1.780E-01	?(	1.994E+00	3.19E+02	1.80E+01 G
			569.47	2.924E-02	&	6.812E+00	5.96E+03	8.20E+00 G
			946.02	5.746E-01	?(	7.752E+00	3.64E+02	1.34E+01 G
			883.24	3.650E-02	%	9.593E+00	6.86E+03	9.60E+00 G
			880.53	2.191E+00	&(	1.681E+01	2.12E+02	6.00E+00 G
TH-234	N	7.9280E+00					1.63E+12	
			63.29	7.928E+00	?(P	1.734E+01	3.33E+01	3.81E+00 G
			92.59	2.315E+00	& P	9.908E+00	4.19E+01	5.58E+00 G
PA-234M	N	-1.1401E+01					1.63E+12	
			1001.00	-1.140E+01	%(P	1.213E+02	1.00E+03	8.37E-01 G
			766.41	-9.077E+01	+ P	3.431E+02	1.65E+02	2.94E-01 G
Ra-226	N	2.2194E+01					5.84E+05	
			185.99	2.219E+01	*(P	1.456E+01	2.22E+01	3.28E+00 G
U-235	N	2.0176E+00					2.57E+11	
			143.79	1.975E+00	?(	2.489E+00	4.07E+01	1.10E+01 G
			205.33	2.355E+00	?(	7.520E+00	9.38E+01	5.01E+00 G
			163.38	1.776E+00	?(	6.187E+00	1.02E+02	5.08E+00 G
							Energy duplication	
			93.35	5.579E+00	*	8.311E+00	4.62E+01	5.81E+00 X

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	T -4.9773E-01					1.58E+05	
		59.54	-4.977E-01	?(	1.852E+00	1.10E+02	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:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

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

- -

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

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
AM-241	59.24	80.	-12.	-0.007	109.92	-4.977E-01
EU-155	86.54	143.	5.	0.003	341.81	1.712E-01
U-235	93.35	93.	32.	0.018	46.16	5.579E+00
EU-155	105.64	32.	10.	0.005	88.14	4.558E-01
EU-154	122.65	35.	8.	0.005	107.11	2.003E-01
Pa-234	130.99	49.	3.	0.002	319.02	1.780E-01
U-235	143.14	25.	21.	0.011	40.73	1.975E+00
U-235	163.20	28.	8.	0.004	101.69	1.776E+00
U-235	205.24	29.	9.	0.005	93.80	2.355E+00
PB-214	295.15	31.	48.	0.027	21.67	4.625E+00
PB-214	351.96	15.	92.	0.051	11.99	5.239E+00
I-131	364.21	22.	-2.	-0.001	283.82	-6.508E-02

TestAmerica Spectrum name: 7_Gamma_20141023.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
BE-7	477.70	18.	4.	0.002	161.10	1.038E+00		
I-131	637.10	8.	3.	0.002	140.26	1.575E+00		
PA-234M	764.86	20.	-6.	-0.003	165.11	-9.077E+01		P
CS-134	795.65	20.	-3.	-0.002	228.95	-1.479E-01		
CS-134	801.81	20.	-5.	-0.003	125.67	-2.741E+00		
Pa-234	880.48	15.	3.	0.002	211.70	2.191E+00		
Pa-234	946.15	14.	2.	0.001	363.99	5.746E-01		
EU-152	966.88	42.	-14.	-0.008	71.01	-4.976E+00		
EU-154	996.04	19.	-2.	-0.001	271.94	-1.169E+00		
EU-154	1004.83	20.	-4.	-0.002	153.84	-1.288E+00		
EU-152	1112.33	7.	5.	0.003	86.60	2.137E+00		
EU-154	1276.25	16.	-1.	-0.001	425.12	-2.551E-01		
EU-152	1408.44	6.	1.	0.001	277.48	4.611E-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	1.0378E+00	1.0378E+00	1.611E+02%	5.95E+00
K-40		1.1936E+02	1.1936E+02	7.805E+00%	8.10E+00
CO-60	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.42E+00
I-131	#A	6.7235E-02	6.7239E-02	1.403E+02%	6.66E-01
CS-134	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.35E+00
CS-137	#A	7.4435E-01	7.4435E-01	4.038E+01%	9.11E-01
EU-152	#A	5.2426E-01	5.2426E-01	8.660E+01%	2.49E+00
EU-154	#A	1.5397E-01	1.5397E-01	1.071E+02%	9.97E+00
EU-155	#A	2.8744E-01	2.8744E-01	8.814E+01%	1.36E+00
TL-208		1.9893E+00	1.9893E+00	1.612E+01%	4.42E-01
PB-210	#	2.7784E+01	2.7784E+01	2.179E+01%	1.64E+01
PB-212		6.1433E+00	6.1433E+00	1.256E+01%	1.47E+00
PB-214	#	5.0309E+00	5.0309E+00	1.199E+01%	1.17E+00
BI-212	#A	8.1086E+00	8.1086E+00	4.163E+01%	1.02E+01
BI-214	#	6.8297E+00	6.8297E+00	1.198E+01%	9.73E-01
AC-228		4.6040E+00	4.6040E+00	1.811E+01%	3.29E+00
Pa-234	#A	6.4296E-01	6.4296E-01	1.761E+02%	1.99E+00
TH-234	#A	7.9280E+00	7.9280E+00	6.299E+01%	1.73E+01
PA-234M	#A	-1.1401E+01	-1.1401E+01	2.000E+03%	1.21E+02
Ra-226	#	2.2194E+01	2.2194E+01	2.775E+01%	1.46E+01
U-235	#A	2.0176E+00	2.0176E+00	4.073E+01%	2.49E+00
AM-241	#A	-4.9773E-01	-4.9773E-01	1.099E+02%	1.85E+00

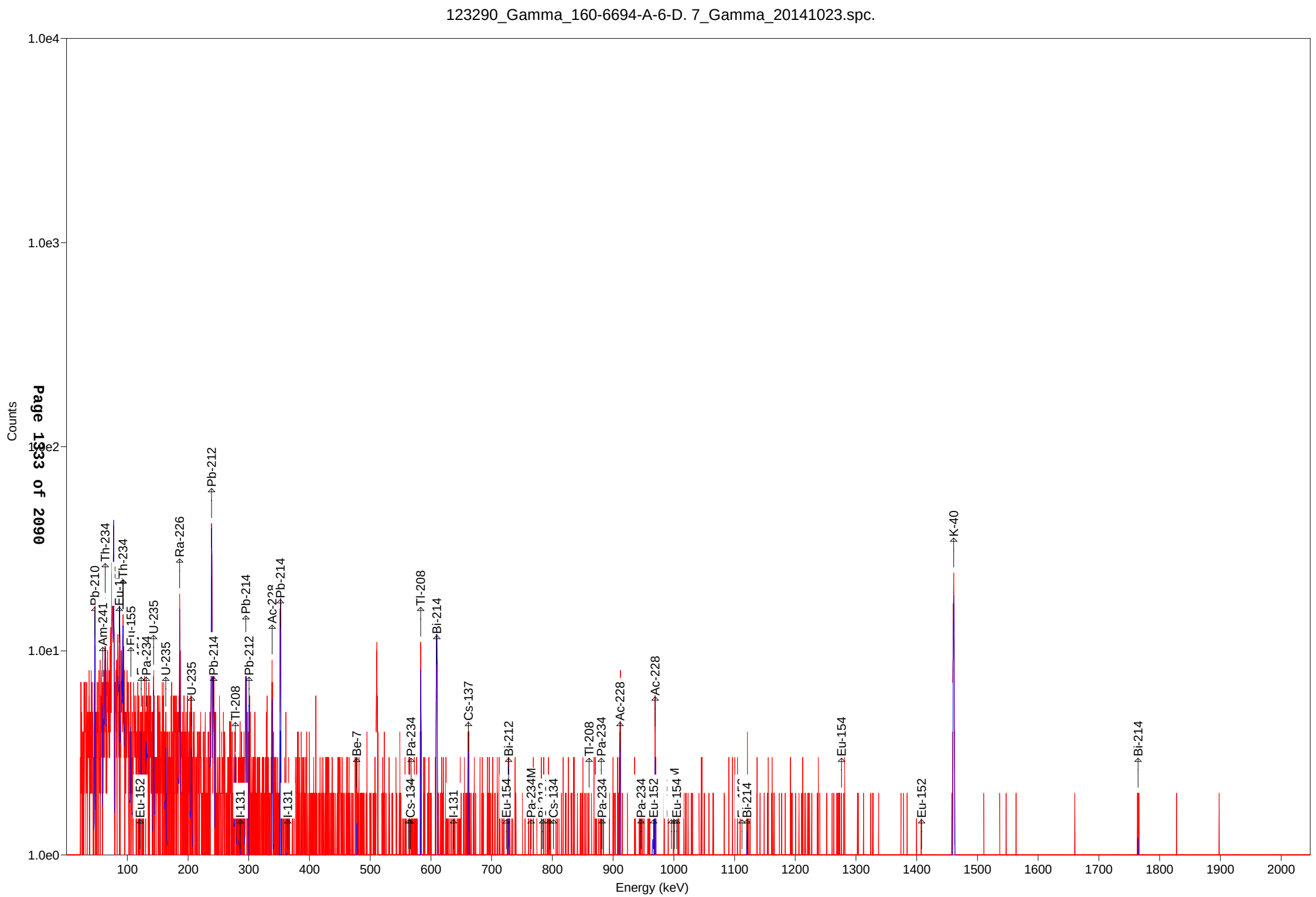
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

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

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

Total Activity (	37.6 to	2000.1 keV)	1.931E+02 Bq/Sample
Total Decayed Activity (	37.6 to	2000.1 keV)	1.9314903E+02 Bq/Sample

The library has energies which are not separable.


123290_Gamma_160-6694-A-6-D. 7_Gamma_20141023.spc.
Counts
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Energy (keV)
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-210
Am-241
Th-234
Eu-152
Th-234
Eu-155
Pa-234
U-235
U-235
Ra-226
U-235
Pb-212
Pb-214
Tl-208
Pb-212
Pb-214
Ac-228
Pb-214
I-131
Be-7
I-131
Cs-134
Pa-234
Tl-208
Bi-214
I-131
Cs-137
Eu-154
Bi-212
Pa-234M
Cs-134
Tl-208
Pa-234
Ac-228
Pa-234
Eu-152
Ac-228
Eu-154
Bi-214
Eu-152
K-40
Eu-154
Bi-214

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123290 Batch Start Date: 05/21/14 11:19 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-0 Batch End Date: 05/21/14 13:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	TareWeight	GrossWeight	Geometry	Tuna Can LCS 00003	
MB 160-123290/1		Fill_Geo-0, GA-01-R		291.18 g			tuna can		
LCS 160-123290/2		Fill_Geo-0, GA-01-R		341.9 g			tuna can	# g	
160-6694-A-1-A	2222-SD01	Fill_Geo-0, GA-01-R	T	331.8 g	46.02 g	377.82 g	tuna can		
160-6694-A-1-A DU	2222-SD01	Fill_Geo-0, GA-01-R	T	331.8 g	46.02 g	377.82 g	tuna can		
160-6694-A-2-A	2222-SD02	Fill_Geo-0, GA-01-R	T	401.13 g	45.92 g	447.05 g	tuna can		
160-6694-A-3-A	2222-SD03	Fill_Geo-0, GA-01-R	T	212.91 g	46.07 g	258.98 g	tuna can		
160-6694-A-4-A	2222-SD04	Fill_Geo-0, GA-01-R	T	192.24 g	46.46 g	238.70 g	tuna can		
160-6694-A-5-A	2222-SD05	Fill_Geo-0, GA-01-R	T	419.97 g	45.90 g	465.87 g	tuna can		
160-6694-A-6-A	2222-SD06	Fill_Geo-0, GA-01-R	T	204.66 g	46.10 g	250.76 g	tuna can		

Batch Notes	
Balance ID	1125353055
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.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 123290 Batch Start Date: 05/21/14 11:19 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-0 Batch End Date: 05/21/14 13:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	TareWeight	GrossWeight	Geometry	Tuna Can LCS 00003	
MB 160-123290/1		Fill_Geo-0, GA-01-R		291.18 g			tuna can		
LCS 160-123290/2		Fill_Geo-0, GA-01-R		341.9 g			tuna can	# g	
160-6694-A-1-A	2222-SD01	Fill_Geo-0, GA-01-R	T	331.8 g	46.02 g	377.82 g	tuna can		
160-6694-A-1-A DU	2222-SD01	Fill_Geo-0, GA-01-R	T	331.8 g	46.02 g	377.82 g	tuna can		
160-6694-A-2-A	2222-SD02	Fill_Geo-0, GA-01-R	T	401.13 g	45.92 g	447.05 g	tuna can		
160-6694-A-3-A	2222-SD03	Fill_Geo-0, GA-01-R	T	212.91 g	46.07 g	258.98 g	tuna can		
160-6694-A-4-A	2222-SD04	Fill_Geo-0, GA-01-R	T	192.24 g	46.46 g	238.70 g	tuna can		
160-6694-A-5-A	2222-SD05	Fill_Geo-0, GA-01-R	T	419.97 g	45.90 g	465.87 g	tuna can		
160-6694-A-6-A	2222-SD06	Fill_Geo-0, GA-01-R	T	204.66 g	46.10 g	250.76 g	tuna can		

Batch Notes	
Balance ID	1125353055
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.

Daily Checks

Test America
St. Louis
Quality Control Check

Spectrum: 4_20140521001_QCAsLeft
Acquired: 5/21/2014 12:21:36 AM
Detector: Ge 4 SN/181
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	59.22	59.29	59.59	59.79	59.86	PASS
FWHM	0.77	0.00	0.00	0.77	1.87	1.97	PASS
ActivityDiff	650.60	-5.00	-4.00	-2.72	4.00	5.00	PASS
QA-662							
FWHM	1.34	0.00	0.00	1.34	3.04	3.14	PASS
ActivityDiff	609.90	-5.00	-4.00	-3.97	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5328.70	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.25	1333.01	1333.26	PASS
FWHM	1.84	0.00	0.00	1.83	4.04	4.14	PASS
ActivityDiff	1189.70	-5.00	-4.00	-1.61	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica Spectrum name: 4_20140521001_QCAsLeft.An1

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

Spectrum Filename: C:\User\SPC\Det4\4_20140521001_QCAsLeft.An1

Acquisition information
Start time:	5/21/2014 12:21:36 AM
Live time:	1000
Real time:	1018
Dead time:	1.74 %
Detector ID:	4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_QC.Clb
4_QA-D_Rad11-0018_032612

Energy Calibration
Created:	2/28/2012 2:55:17 PM
Zero offset:	0.091 keV
Gain:	0.250 keV/channel
Quadratic:	-2.917E-08 keV/channel^2

Efficiency Calibration
Created:	3/27/2012 7:34:55 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

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

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (1999.44keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica Spectrum name: 4_20140521001_QCAsLeft.An1

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

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 5 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1216

***** 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. GPS	Nuc
59.59	29130.	0.66	0.77	4.398E-02	59.54	100.000	6.683E+02	QA60
88.10	3574.	2.06	0.78	6.283E-02	88.03	100.000	9.451E+02	QA88
661.37	8444.	1.16	1.34	1.502E-02	661.66	100.000	6.341E+02	QA662
1173.02	5582.	1.44	1.64	8.792E-03	1173.23	100.000	1.248E+03	QA1173
1332.25	4822.	1.45	1.83	7.839E-03	1332.51	100.000	1.209E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	237.85	59.59	1814.	29130.	29.129	0.66	0.765
QA-88	351.83	88.10	476.	3574.	3.574	2.06	0.780
QA-662	2644.32	661.37	225.	8444.	8.444	1.16	1.338
QA-1173	4691.43	1173.02	145.	5582.	5.582	1.44	1.641
QA-1332	5328.72	1332.25	6.	4822.	4.822	1.45	1.826

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 GPS	Peak Energy keV	Peak Activity GPS	Peak Code	MDA Value GPS			COMMENTS
QA-60		6.6829E+02				1.58E+05			
			59.54	6.683E+02	(	4.616E+00	6.58E-01	1.00E+02	G
QA-88		9.4515E+02				4.63E+02			
			88.03	9.451E+02	(	2.760E+01	2.06E+00	1.00E+02	G
QA-662		6.3414E+02				1.10E+04			
			661.66	6.341E+02	(	5.453E+00	1.16E+00	1.00E+02	G
QA-1173		1.2476E+03				1.92E+03			
			1173.23	1.248E+03	(	1.315E+01	1.44E+00	1.00E+02	G
QA-1332		1.2088E+03				1.92E+03			
			1332.51	1.209E+03	(	3.620E+00	1.45E+00	1.00E+02	G

(- This peak used in the nuclide activity average.

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

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

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

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

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

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

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60		6.6281E+02	6.6829E+02	6.576E-01%	4.62E+00
QA-88		5.6890E+01	9.4515E+02	2.056E+00%	2.76E+01
QA-122	<	1.8529E+00	2.2138E+02		
QA-166		>12 Halflives			
QA-279		>12 Halflives			
QA-392		>12 Halflives			
QA-514		>12 Halflives			
QA-662		5.6335E+02	6.3414E+02	1.161E+00%	5.45E+00
QA-898		>12 Halflives			
QA-1173		6.3498E+02	1.2476E+03	1.436E+00%	1.31E+01
QA-1332		6.1524E+02	1.2088E+03	1.447E+00%	3.62E+00
QA-1836		>12 Halflives			

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

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

Total Activity (37.6 to 1999.4 keV) 2.533E+03 GPS
Total Decayed Activity (37.6 to 1999.4 keV) 4.7040205E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 4_20140521002_BG
Acquired: 5/21/2014 12:40:33 AM
Detector: Ge 4 SN/181
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	1.32	1.20	1.24	1.35	1.39	1.43	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica Spectrum name: 4_20140521002_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det4\4_20140521002_BG.An1

Acquisition information
Start time:	5/21/2014 12:40:33 AM
Live time:	1800
Real time:	1802
Dead time:	0.10 %
Detector ID:	4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_QC.Clb
4_QA-D_Rad11-0018_032612

Energy Calibration
Created:	2/28/2012 2:55:17 PM
Zero offset:	0.091 keV
Gain:	0.250 keV/channel
Quadratic:	-2.917E-08 keV/channel^2

Efficiency Calibration
Created:	3/27/2012 7:34:55 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 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (1999.44keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

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

Corrections	Status	Comments
Decay correct to date:	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. 2 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1777

***** 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
46.40	21.	27.36	0.36	3.524E-02	46.54	4.250	7.769E+00	PB210
238.21	24.	28.67	0.51	5.337E-02	238.63	43.300	5.769E-01	PB212

No unknown peaks passed sensitivity test.

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	185.11	46.40	3.	21.	0.012	27.36	0.356s
PB-212	952.00	238.21	7.	24.	0.013	28.67	0.512s

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
PB-210	N	7.7687E+00				8.14E+03	
			46.54	7.769E+00	(	3.988E+00	2.74E+01 4.25E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N 5.7695E-01					6.98E+02	
		238.63	5.769E-01 ?(		3.615E-01	2.87E+01	4.33E+01 G
		300.03	0.000E+00 %		2.602E+00	1.00E+03	3.28E+00 GA

(- This peak used in the nuclide activity average.

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

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

- -

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

Nuclide	Centroid 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	<	1.2163E+00		
NA-22	<	5.0059E-01		
K-40	<	4.8985E+00		
Sc-46	<	3.9205E-01		
CR-51	<	1.3036E+00		
MN-54	<	3.5513E-01		
FE-59	<	7.8867E-01		
Co-56	<	3.6277E-01		
CO-57	<	1.0800E-01		
CO-58	<	3.4270E-01		
CO-60	<	5.2255E-01		
ZN-65	<	8.8910E-01		
NB-94	<	3.7242E-01		
ZR-95	<	5.7430E-01		
NB-95	<	6.8524E-01		
RU-103	<	2.6571E-01		
RH-106	<	3.2322E+00		
AG-108M	<	1.2558E-01		
AG-110M	<	5.3464E-01		
SN-113	<	2.8537E-01		
SB-124	<	2.0391E-01		
SB-125	<	4.7699E-01		
I-131	<	1.1840E-01		
BA-133	<	1.5320E-01		
CS-134	<	2.0710E-01		
CS-137	<	3.2058E-01		
CE-139	<	1.8489E-01		
Ba-140	<	9.2721E-01		
La-140	<	5.4812E-01		
CE-141	<	2.0010E-01		
CE-144	<	7.3405E-01		
PM-144	<	5.9048E-01		
EU-152	<	5.1253E-01		
EU-154	<	3.0996E+00		
EU-155	<	6.5248E-01		
HF-181	<	1.6099E-01		
Ta-182	<	1.2935E+00		
Hg-203	<	1.0091E-01		
TL-208	<	3.1848E-01		
pm-146	<	9.0667E-01		
y-88	<	4.2545E-01		
PB-210		7.7687E+00	2.7355E+01%	3.988E+00
PB-212	#	5.7695E-01	2.8666E+01%	3.615E-01

PB-214	<	3.1642E-01
BI-207	<	2.6091E-01
BI-212	<	3.9639E+00
BI-214	<	4.4806E-01
BI-210M	<	2.8614E-01
RA-224	<	3.3464E+00
AC-228	<	1.3842E+00
TH-227	<	6.2098E-01
TH-229	<	1.6231E+00
TH-234	<	8.3132E+00
PA-231	<	6.4190E+00
PA-233	<	2.4234E-01
PA-234	<	7.2838E-01
PA-234M	<	5.0342E+01
Ra-226	<	5.5063E+00
U-235	<	1.4782E+00
AM-241	<	3.2750E-01
Np-237	<	9.0098E-01

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

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

Total Activity (37.6 to 1999.4 keV) 8.346E+00 DPS

Test America
St. Louis
Quality Control Check

Spectrum: 5_20140521001_QCAsLeft
Acquired: 5/21/2014 12:21:41 AM
Detector: Ge 5 SN/157
  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	59.60	59.79	60.04	PASS
FWHM	0.74	0.00	0.00	0.72	1.84	1.94	PASS
ActivityDiff	636.60	-5.00	-4.00	-1.60	4.00	5.00	PASS
QA-662							
FWHM	1.36	0.00	0.00	1.35	3.06	3.16	PASS
ActivityDiff	596.80	-5.00	-4.00	-2.52	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.30	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.37	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.99	4.10	4.20	PASS
ActivityDiff	1164.20	-5.00	-4.00	-2.83	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica Spectrum name: 5_20140521001_QCAsLeft.An1

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

Spectrum Filename: C:\User\SPC\Det5\5_20140521001_QCAsLeft.An1

Acquisition information
Start time:	5/21/2014 12:21:41 AM
Live time:	1000
Real time:	1011
Dead time:	1.12 %
Detector ID:	5

Detector system
Ge 5 SN/157

Calibration
Filename:	5_QC.Clb

Ge5_QC

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

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

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

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.62keV)
Stop channel:	8000 (2000.81keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica Spectrum name: 5_20140521001_QCAsLeft.An1

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

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0652

***** 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. GPS	Nuc
59.60	47599.	0.50	0.72	7.429E-02	59.54	100.000	6.468E+02	QA60
87.97	6204.	1.49	0.79	1.124E-01	88.03	100.000	9.167E+02	QA88
121.93	556.	9.66	0.91	1.160E-01	122.06	100.000	5.723E+02	QA122
661.63	15547.	0.88	1.35	2.861E-02	661.66	100.000	6.118E+02	QA662
1173.09	9312.	1.13	1.75	1.552E-02	1173.23	100.000	1.179E+03	QA1173
1332.37	8420.	1.11	1.99	1.382E-02	1332.51	100.000	1.197E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	238.00	59.60	2505.	47599.	47.599	0.50	0.724
QA-88	351.56	87.97	672.	6204.	6.205	1.49	0.785
QA-122	487.52	121.93	606.	556.	0.556	9.66	0.915s
QA-662	2647.23	661.63	522.	15547.	15.547	0.88	1.352
QA-1173	4692.64	1173.09	280.	9312.	9.312	1.13	1.748
QA-1332	5329.34	1332.37	48.	8420.	8.420	1.11	1.986

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 GPS	Peak Energy keV	Peak Activity GPS	Peak Code	MDA Value GPS		COMMENTS
QA-60		6.4678E+02				1.58E+05		
			59.54	6.468E+02	(	3.206E+00	5.02E-01	1.00E+02 G
QA-88		9.1674E+02				4.63E+02		
			88.03	9.167E+02	(	1.826E+01	1.49E+00	1.00E+02 G
QA-122		5.7228E+02				2.72E+02		
			122.06	5.723E+02	@(	1.210E+02	9.66E+00	1.00E+02 G
QA-662		6.1184E+02				1.10E+04		
			661.66	6.118E+02	(	4.296E+00	8.81E-01	1.00E+02 G
QA-1173		1.1793E+03				1.92E+03		
			1173.23	1.179E+03	(	1.023E+01	1.13E+00	1.00E+02 G
QA-1332		1.1971E+03				1.92E+03		
			1332.51	1.197E+03	(	4.975E+00	1.11E+00	1.00E+02 G

(- This peak used in the nuclide activity average.

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

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

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

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

- -

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

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

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60	6.4147E+02	6.4678E+02	5.025E-01%	3.21E+00
QA-88	5.5180E+01	9.1674E+02	1.491E+00%	1.83E+01
QA-122 #	4.7898E+00	5.7228E+02	9.658E+00%	1.21E+02
QA-166		>12 Halflives		
QA-279		>12 Halflives		
QA-392		>12 Halflives		
QA-514		>12 Halflives		
QA-662	5.4354E+02	6.1184E+02	8.811E-01%	4.30E+00
QA-898		>12 Halflives		
QA-1173	6.0022E+02	1.1793E+03	1.133E+00%	1.02E+01
QA-1332	6.0926E+02	1.1971E+03	1.111E+00%	4.98E+00
QA-1836		>12 Halflives		

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

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

Total Activity (37.6 to 2000.8 keV) 2.454E+03 GPS
Total Decayed Activity (37.6 to 2000.8 keV) 5.1240186E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 5_20140521002_BG
Acquired: 5/21/2014 12:40:20 AM
Detector: Ge 5 SN/157
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.45	1.30	1.35	1.41	1.55	1.60	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica Spectrum name: 5_20140521002_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det5\5_20140521002_BG.An1

Acquisition information
Start time:	5/21/2014 12:40:20 AM
Live time:	1800
Real time:	1805
Dead time:	0.26 %
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 G53W4.25
Start channel:	150 (37.62keV)
Stop channel:	8000 (2000.81keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

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

Corrections	Status	Comments
Decay correct to date:	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. 2 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1595

***** 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

No unknown peaks passed sensitivity test.

This section based on library: DET_Long Background PBC.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.19	46.66	3.	21.	0.012	25.42	0.877
TH-234	252.76	63.29	1.	14.	0.008	29.97	0.552s

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
PB-210	N	4.8368E+00				8.14E+03	
			46.54	4.837E+00	(	2.483E+00	2.54E+01 4.25E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234 N	2.5151E+00					1.63E+12	
		63.29	2.515E+00	?(	1.489E+00	3.00E+01	3.81E+00 G
		92.59	0.000E+00	%	1.590E+00	3.16E+01	5.58E+00 G

(- This peak used in the nuclide activity average.

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

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

- -

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

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

P - Peakbackground subtraction

TestAmerica Spectrum name: 5_20140521002_BG.An1

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

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	1.8408E+00		
NA-22	<	2.8378E-01		
K-40	<	3.7255E+00		
Sc-46	<	1.9738E-01		
CR-51	<	1.2439E+00		
MN-54	<	1.8100E-01		
FE-59	<	4.3032E-01		
Co-56	<	1.8443E-01		
CO-57	<	6.7302E-02		
CO-58	<	1.7550E-01		
CO-60	<	2.9632E-01		
ZN-65	<	4.8897E-01		
NB-94	<	1.5382E-01		
ZR-95	<	2.9690E-01		
NB-95	<	2.4000E-01		
RU-103	<	1.1472E-01		
RH-106	<	1.3225E+00		
AG-108M	<	1.0439E-01		
AG-110M	<	2.6947E-01		
SN-113	<	1.3882E-01		
SB-124	<	1.2853E-01		
SB-125	<	3.1623E-01		
I-131	<	1.2003E-01		
BA-133	<	1.7632E-01		
CS-134	<	1.6391E-01		
CS-137	<	1.6799E-01		
CE-139	<	9.7338E-02		
Ba-140	<	5.7787E-01		
La-140	<	3.5380E-01		
CE-141	<	1.5082E-01		
CE-144	<	3.2950E-01		
PM-144	<	1.5094E-01		
EU-152	<	5.4747E-01		
EU-154	<	1.5666E+00		
EU-155	<	1.6904E-01		
HF-181	<	1.2641E-01		
Ta-182	<	7.1338E-01		
Hg-203	<	8.6430E-02		
TL-208	<	1.4380E-01		
pm-146	<	4.6944E-01		
y-88	<	2.1373E-01		
PB-210		4.8368E+00	2.5422E+01%	2.483E+00
PB-212	<	2.8002E-01		

PB-214	<	5.3409E-01			
BI-207	<	1.5297E-01			
BI-212	<	2.0587E+00			
BI-214	<	4.5324E-01			
BI-210M	<	1.0686E-01			
RA-224	<	1.7673E+00			
AC-228	<	6.9860E-01			
TH-227	<	1.2105E+00			
TH-229	<	2.1303E+00			
TH-234	#	2.5151E+00	2.9971E+01%		1.489E+00
PA-231	<	2.1001E+00			
PA-233	<	3.5475E-01			
PA-234	<	2.5442E-01			
PA-234M	<	2.6299E+01			
Ra-226	<	4.2455E+00			
U-235	<	8.8067E-01			
AM-241	<	4.2017E-01			
Np-237	<	6.1056E-01			

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

S U M M A R Y

Total Activity (37.6 to 2000.8 keV) 7.352E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 7_20140520002_BG
Acquired: 5/20/2014 12:43:47 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.25	1.40	1.45	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

TestAmerica Spectrum name: 7_20140520002_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det7\7_20140520002_BG.An1

Acquisition information

Start time:	5/20/2014 12:43:47 AM
Live time:	1800
Real time:	1824
Dead time:	1.33 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_QC.Clb
Ge7_QC

Energy Calibration

Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration

Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files

Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

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

 Corrections                          Status          Comments
       Decay correct to date:          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.    2 cutoff: 5.00E+01%

 *****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
  Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
  Energy                             Factor    Energy   Ratio    DPS
 ____________________________________________________________________________
 No unknown peaks passed sensitivity test.

 ------------------------------------------------------------
 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    Centroid  Background  Net Area   Intensity   Uncert  FWHM
          Channel Energy    Counts      Counts     Cts/Sec  1 Sigma %  keV
 ____________________________________________________________________________

 *****   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
             DPS           keV     DPS           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	

- - - -

SB-124	<	1.4822E-01
SB-125	<	1.8482E-01
I-131	<	8.1195E-02
BA-133	<	7.0380E-02
CS-134	<	7.8190E-02
CS-137	<	1.0264E-01
CE-139	<	4.3730E-02
Ba-140	<	2.7196E-01
La-140	<	2.3065E-01
CE-141	<	1.0009E-01
CE-144	<	2.4555E-01
PM-144	<	9.2839E-02
EU-152	<	1.5679E-01
EU-154	<	1.0091E+00
EU-155	<	1.4834E-01
HF-181	<	7.4411E-02
Ta-182	<	4.6290E-01
Hg-203	<	4.0170E-02
TL-208	<	8.6154E-02
pm-146	<	2.9187E-01
y-88	<	1.3891E-01
PB-210	<	3.8779E+00
PB-212	<	1.8242E-01
PB-214	<	2.0332E-01
BI-207	<	1.0595E-01
BI-212	<	2.2702E+00
BI-214	<	2.1115E-01
BI-210M	<	1.3521E-01
RA-224	<	1.0380E+00
AC-228	<	4.5399E-01
TH-227	<	5.0266E-01
TH-229	<	1.3160E+00
TH-234	<	3.4012E+00
PA-231	<	1.2304E+00
PA-233	<	1.0180E-01
PA-234	<	1.1909E-01
PA-234M	<	1.7081E+01
Ra-226	<	1.9566E+00
U-235	<	3.6185E-01
AM-241	<	2.1665E-01
Np-237	<	3.0822E-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

TestAmerica Spectrum name: 7_20140520002_BG.An1

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

Total Activity (37.6 to 2000.1 keV)	0.000E+00	DPS

Test America
St. Louis
Quality Control Check

Spectrum: 7_20140520003_QCAsLeft
Acquired: 5/20/2014 1:44:54 AM
Detector: Ge 7 SN/154
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.59	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	0.86	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	0.81	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.46	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	-0.30	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.40	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.69	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.07	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	0.19	4.00	5.00	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

TestAmerica Spectrum name: 7_20140520003_QCAsLeft.An1

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

Spectrum Filename: C:\User\SPC\Det7\7_20140520003_QCAsLeft.An1

Acquisition information
Start time:	5/20/2014 1:44:54 AM
Live time:	1000
Real time:	1028
Dead time:	2.74 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_QC.Clb
Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

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

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica Spectrum name: 7_20140520003_QCAsLeft.An1

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

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0639

***** 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. GPS	Nuc
59.59	72251.	0.40	0.86	1.136E-01	59.54	100.000	6.418E+02	QA60
88.04	10132.	1.28	0.89	1.845E-01	88.03	100.000	9.111E+02	QA88
122.02	816.	8.71	0.76	1.962E-01	122.06	100.000	4.959E+02	QA122
661.76	25301.	0.70	1.45	4.681E-02	661.66	100.000	6.083E+02	QA662
1173.44	14488.	0.92	1.87	2.392E-02	1173.23	100.000	1.190E+03	QA1173
1332.69	12777.	0.94	2.07	2.125E-02	1332.51	100.000	1.181E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	237.91	59.59	3360.	72251.	72.251	0.40	0.860
QA-88	351.72	88.04	1466.	10132.	10.132	1.28	0.894
QA-122	487.65	122.02	1016.	816.	0.817	8.71	0.758
QA-662	2646.76	661.76	924.	25301.	25.301	0.70	1.455
QA-1173	4693.49	1173.44	492.	14488.	14.488	0.92	1.868
QA-1332	5330.47	1332.69	172.	12777.	12.777	0.94	2.069

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 GPS	Peak Energy keV	Peak Activity GPS		Peak Code	MDA Value GPS			COMMENTS
QA-60		6.4175E+02					1.58E+05			
			59.54	6.418E+02	(	2.423E+00	4.04E-01	1.00E+02	G	
QA-88		9.1111E+02					4.63E+02			
			88.03	9.111E+02	(	1.629E+01	1.28E+00	1.00E+02	G	
QA-122		4.9592E+02					2.72E+02			
			122.06	4.959E+02	(	9.189E+01	8.71E+00	1.00E+02	G	
QA-662		6.0834E+02					1.10E+04			
			661.66	6.083E+02	(	3.470E+00	7.01E-01	1.00E+02	G	
QA-1173		1.1895E+03					1.92E+03			
			1173.23	1.190E+03	(	8.709E+00	9.24E-01	1.00E+02	G	
QA-1332		1.1807E+03					1.92E+03			
			1332.51	1.181E+03	(	5.904E+00	9.36E-01	1.00E+02	G	

(- This peak used in the nuclide activity average.

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

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

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

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

- -

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

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

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60	6.3649E+02	6.4175E+02	4.038E-01%	2.42E+00
QA-88	5.4919E+01	9.1111E+02	1.277E+00%	1.63E+01
QA-122	4.1607E+00	4.9592E+02	8.705E+00%	9.19E+01
QA-166		>12 Halflives		
QA-279		>12 Halflives		
QA-392		>12 Halflives		
QA-514		>12 Halflives		
QA-662	5.4046E+02	6.0834E+02	7.010E-01%	3.47E+00
QA-898		>12 Halflives		
QA-1173	6.0562E+02	1.1895E+03	9.243E-01%	8.71E+00
QA-1332	6.0115E+02	1.1807E+03	9.359E-01%	5.90E+00
QA-1836		>12 Halflives		

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

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

Total Activity (37.6 to 2000.1 keV) 2.443E+03 GPS
Total Decayed Activity (37.6 to 2000.1 keV) 5.0273896E+03 GPS

Test America
St. Louis
Quality Control Check

Spectrum: 7_20140521001_QCAsLeft
Acquired: 5/21/2014 12:22:34 AM
Detector: Ge 7 SN/154
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	237.70	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.56	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	0.85	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	0.83	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.44	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	0.39	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.90	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.57	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	1.93	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	0.25	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica Spectrum name: 7_20140521001_QCAsLeft.An1

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

Spectrum Filename: C:\User\SPC\Det7\7_20140521001_QCAsLeft.An1

Acquisition information
Start time:	5/21/2014 12:22:34 AM
Live time:	1000
Real time:	1028
Dead time:	2.76 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename:	7_QC.Clb

Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

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

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+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	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0312

***** 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. GPS	Nuc
59.56	72236.	0.40	0.85	1.136E-01	59.54	100.000	6.416E+02	QA60
88.00	10206.	1.20	0.93	1.844E-01	88.03	100.000	9.190E+02	QA88
122.01	909.	7.27	1.05	1.962E-01	122.06	100.000	5.535E+02	QA122
661.69	25124.	0.68	1.44	4.681E-02	661.66	100.000	6.041E+02	QA662
1173.30	14511.	0.93	1.88	2.392E-02	1173.23	100.000	1.192E+03	QA1173
1332.57	12764.	0.92	1.93	2.125E-02	1332.51	100.000	1.180E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	237.78	59.56	3256.	72236.	72.235	0.40	0.849
QA-88	351.59	88.00	1221.	10206.	10.206	1.20	0.926
QA-122	487.61	122.01	904.	909.	0.909	7.27	1.050
QA-662	2646.47	661.69	735.	25124.	25.124	0.68	1.442
QA-1173	4692.92	1173.30	518.	14511.	14.511	0.93	1.876
QA-1332	5329.98	1332.57	147.	12764.	12.764	0.92	1.930

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 GPS	Peak Energy keV	Peak Activity GPS	Peak Code	MDA Value GPS		COMMENTS
QA-60		6.4162E+02				1.58E+05		
			59.54	6.416E+02	(	2.386E+00	4.03E-01 1.00E+02 G	
QA-88		9.1900E+02				4.63E+02		
			88.03	9.190E+02	(	1.491E+01	1.20E+00 1.00E+02 G	
QA-122		5.5353E+02				2.72E+02		
			122.06	5.535E+02	(	8.695E+01	7.27E+00 1.00E+02 G	
QA-662		6.0412E+02				1.10E+04		
			661.66	6.041E+02	(	3.102E+00	6.83E-01 1.00E+02 G	
QA-1173		1.1918E+03				1.92E+03		
			1173.23	1.192E+03	(	8.934E+00	9.30E-01 1.00E+02 G	
QA-1332		1.1800E+03				1.92E+03		
			1332.51	1.180E+03	(	5.468E+00	9.23E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

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

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

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

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

- -

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

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

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60	6.3636E+02	6.4162E+02	4.029E-01%	2.39E+00
QA-88	5.5316E+01	9.1900E+02	1.196E+00%	1.49E+01
QA-122	4.6329E+00	5.5353E+02	7.274E+00%	8.69E+01
QA-166		>12 Halflives		
QA-279		>12 Halflives		
QA-392		>12 Halflives		
QA-514		>12 Halflives		
QA-662	5.3668E+02	6.0412E+02	6.826E-01%	3.10E+00
QA-898		>12 Halflives		
QA-1173	6.0659E+02	1.1918E+03	9.303E-01%	8.93E+00
QA-1332	6.0057E+02	1.1800E+03	9.233E-01%	5.47E+00
QA-1836		>12 Halflives		

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

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

Total Activity (37.6 to 2000.1 keV) 2.440E+03 GPS
Total Decayed Activity (37.6 to 2000.1 keV) 5.0900952E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 7_20140521002_BG
Acquired: 5/21/2014 12:40:50 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.28	1.40	1.45	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica Spectrum name: 7_20140521002_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det7\7_20140521002_BG.An1

Acquisition information
Start time:	5/21/2014 12:40:50 AM
Live time:	1800
Real time:	1826
Dead time:	1.43 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_QC.Clb
Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica Spectrum name: 7_20140521002_BG.An1

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. 1 cutoff: 5.00E+01%

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc

No unknown peaks passed sensitivity test.

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

***** 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

(- 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	

- - - -

SB-124	<	7.7339E-02
SB-125	<	1.8482E-01
I-131	<	1.1967E-01
BA-133	<	1.0296E-01
CS-134	<	1.3930E-01
CS-137	<	1.0264E-01
CE-139	<	8.6598E-02
Ba-140	<	2.7196E-01
La-140	<	2.3065E-01
CE-141	<	7.5773E-02
CE-144	<	4.7961E-01
PM-144	<	9.2839E-02
EU-152	<	1.5679E-01
EU-154	<	1.0091E+00
EU-155	<	2.5939E-01
HF-181	<	7.4411E-02
Ta-182	<	4.6290E-01
Hg-203	<	9.0968E-02
TL-208	<	8.6154E-02
pm-146	<	2.9187E-01
y-88	<	1.3891E-01
PB-210	<	4.7504E+00
PB-212	<	6.6734E-02
PB-214	<	2.5844E-01
BI-207	<	7.2427E-02
BI-212	<	2.2702E+00
BI-214	<	2.1115E-01
BI-210M	<	1.3521E-01
RA-224	<	1.7490E+00
AC-228	<	4.5399E-01
TH-227	<	5.9637E-01
TH-229	<	1.5385E+00
TH-234	<	3.2484E+00
PA-231	<	1.2304E+00
PA-233	<	1.6617E-01
PA-234	<	1.5028E-01
PA-234M	<	1.7081E+01
Ra-226	<	1.8853E+00
U-235	<	2.9713E-01
AM-241	<	2.1665E-01
Np-237	<	3.0822E-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

TestAmerica Spectrum name: 7_20140521002_BG.An1

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

Total Activity (37.6 to 2000.1 keV)	0.000E+00	DPS

Test America
St. Louis
Quality Control Check

Spectrum: 9_20140521001_QCAsLeft
Acquired: 5/21/2014 12:24:24 AM
Detector: Ge9 S/N100228730
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.59	59.79	60.04	PASS
FWHM	1.08	0.00	0.00	0.95	2.18	2.28	PASS
ActivityDiff	649.44	-5.00	-4.00	-0.50	4.00	5.00	PASS
QA-662							
FWHM	1.62	0.00	0.00	1.51	3.32	3.42	PASS
ActivityDiff	607.56	-5.00	-4.00	-0.45	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.10	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.19	1333.01	1333.26	PASS
FWHM	2.12	0.00	0.00	2.03	4.32	4.42	PASS
ActivityDiff	1191.31	-5.00	-4.00	-0.57	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica, Inc Spectrum name: 9_20140521001_QCAsLeft.An1

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

Spectrum Filename: C:\User\SPC\Det9\9_20140521001_QCAsLeft.An1

Acquisition information
Start time:	5/21/2014 12:24:24 AM
Live time:	1000
Real time:	1014
Dead time:	1.39 %
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_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.59keV)
Stop channel:	8000 (1999.34keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica, Inc Spectrum name: 9_20140521001_QCAsLeft.An1

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

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0854

***** 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. GPS	Nuc
59.59	64208.	0.43	0.94	9.930E-02	59.54	100.000	6.527E+02	QA60
88.07	8655.	1.30	1.00	1.545E-01	88.03	100.000	9.308E+02	QA88
122.09	786.	7.94	0.94	1.634E-01	122.06	100.000	5.745E+02	QA122
661.51	25765.	0.67	1.51	4.754E-02	661.66	100.000	6.103E+02	QA662
1172.96	16391.	0.87	1.98	2.680E-02	1173.23	100.000	1.202E+03	QA1173
1332.19	14727.	0.86	2.03	2.416E-02	1332.51	100.000	1.198E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	238.00	59.59	3020.	64208.	64.208	0.43	0.945
QA-88	351.87	88.07	953.	8655.	8.655	1.30	1.003
QA-122	487.90	122.09	777.	786.	0.786	7.94	0.943
QA-662	2645.44	661.51	730.	25765.	25.765	0.67	1.513
QA-1173	4691.85	1172.96	480.	16391.	16.391	0.87	1.981
QA-1332	5329.11	1332.19	136.	14727.	14.727	0.86	2.032

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 GPS	Peak Energy keV	Peak Activity GPS		Peak Code	MDA Value GPS			COMMENTS
QA-60		6.5266E+02					1.58E+05			
			59.54	6.527E+02	(	2.631E+00	4.33E-01	1.00E+02	G	
QA-88		9.3080E+02					4.63E+02			
			88.03	9.308E+02	(	1.576E+01	1.30E+00	1.00E+02	G	
QA-122		5.7452E+02					2.72E+02			
			122.06	5.745E+02	(	9.693E+01	7.94E+00	1.00E+02	G	
QA-662		6.1031E+02					1.10E+04			
			661.66	6.103E+02	(	3.047E+00	6.74E-01	1.00E+02	G	
QA-1173		1.2019E+03					1.92E+03			
			1173.23	1.202E+03	(	7.685E+00	8.73E-01	1.00E+02	G	
QA-1332		1.1981E+03					1.92E+03			
			1332.51	1.198E+03	(	4.641E+00	8.58E-01	1.00E+02	G	

(- This peak used in the nuclide activity average.

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

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

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

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

- -

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

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

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60	6.4731E+02	6.5266E+02	4.330E-01%	2.63E+00
QA-88	5.6026E+01	9.3080E+02	1.298E+00%	1.58E+01
QA-122	4.8085E+00	5.7452E+02	7.939E+00%	9.69E+01
QA-166		>12 Halflives		
QA-279		>12 Halflives		
QA-392		>12 Halflives		
QA-514		>12 Halflives		
QA-662	5.4218E+02	6.1031E+02	6.739E-01%	3.05E+00
QA-898		>12 Halflives		
QA-1173	6.1173E+02	1.2019E+03	8.729E-01%	7.69E+00
QA-1332	6.0976E+02	1.1981E+03	8.576E-01%	4.64E+00
QA-1836		>12 Halflives		

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

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

Total Activity (37.6 to 1999.3 keV) 2.472E+03 GPS
Total Decayed Activity (37.6 to 1999.3 keV) 5.1682822E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 9_20140521002_BG
Acquired: 5/21/2014 12:45:15 AM
Detector: Ge9 S/N100228730
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	1.76	2.14	2.26	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica, Inc Spectrum name: 9_20140521002_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det9\9_20140521002_BG.An1

Acquisition information
Start time: 5/21/2014 12:45:15 AM
Live time: 1800
Real time: 1802
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 G53W4.25
Start channel: 150 (37.59keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

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

 Corrections                          Status          Comments
       Decay correct to date:          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.    0 cutoff: 5.00E+01%

 *****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
  Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
  Energy                             Factor    Energy   Ratio    DPS
 ____________________________________________________________________________
 No unknown peaks passed sensitivity test.

------------------------------------------------------------
 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    Centroid  Background  Net Area   Intensity   Uncert  FWHM
          Channel Energy    Counts      Counts     Cts/Sec  1 Sigma %  keV
 ____________________________________________________________________________

 *****   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
             DPS           keV     DPS           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	

- - - -

SB-124	<	9.8810E-02
SB-125	<	2.8860E-01
I-131	<	7.6783E-02
BA-133	<	1.8357E-01
CS-134	<	1.6141E-01
CS-137	<	1.0111E-01
CE-139	<	9.5773E-02
Ba-140	<	2.8194E-01
La-140	<	1.8998E-01
CE-141	<	8.0547E-02
CE-144	<	4.4515E-01
PM-144	<	9.1722E-02
EU-152	<	1.7388E-01
EU-154	<	1.0180E+00
EU-155	<	4.7901E-01
HF-181	<	7.8390E-02
Ta-182	<	4.2511E-01
Hg-203	<	9.3414E-02
TL-208	<	2.4030E-01
pm-146	<	2.8974E-01
y-88	<	1.4073E-01
PB-210	<	2.3205E+00
PB-212	<	1.6596E-01
PB-214	<	3.4452E-01
BI-207	<	7.4264E-02
BI-212	<	1.5931E+00
BI-214	<	4.4730E-01
BI-210M	<	1.8359E-01
RA-224	<	1.6691E+00
AC-228	<	4.5769E-01
TH-227	<	5.4911E-01
TH-229	<	1.6036E+00
TH-234	<	2.0598E+00
PA-231	<	1.7545E+00
PA-233	<	2.1964E-01
PA-234	<	3.8903E-01
PA-234M	<	1.6606E+01
Ra-226	<	2.3643E+00
U-235	<	3.9360E-01
AM-241	<	3.8331E-01
Np-237	<	2.0632E-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

TestAmerica, Inc Spectrum name: 9_20140521002_BG.An1

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

Total Activity (37.6 to 1999.3 keV)	0.000E+00	DPS

Test America
St. Louis
Quality Control Check

Spectrum: 11_20140520001_QCAsLeft
Acquired: 5/20/2014 12:25:04 AM
Detector: Ge11 S/N09363993
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	627.52	-5.00	-4.00	-0.24	4.00	5.00	PASS
QA-662							
FWHM	1.48	0.00	0.00	1.38	3.18	3.28	PASS
ActivityDiff	604.82	-5.00	-4.00	-0.03	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.80	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.55	1333.01	1333.26	PASS
FWHM	2.05	0.00	0.00	1.98	4.25	4.35	PASS
ActivityDiff	1163.60	-5.00	-4.00	-0.79	4.00	5.00	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

TestAmerica, Inc Spectrum name: 11_20140520001_QCAsLeft.An1

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

Spectrum Filename: C:\User\SPC\Det11\11_20140520001_QCAsLeft.An1

Acquisition information
Start time:	5/20/2014 12:25:04 AM
Live time:	1000
Real time:	1015
Dead time:	1.46 %
Detector ID:	11

Detector system
Ge11 S/N09363993

Calibration
Filename: 11_QC.Clb
11_QC-G_092511

Energy Calibration
Created:	2/28/2012 1:09:34 PM
Zero offset:	0.055 keV
Gain:	0.250 keV/channel
Quadratic:	-2.946E-08 keV/channel^2

Efficiency Calibration
Created:	10/4/2011 1:15:19 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_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.58keV)
Stop channel:	8000 (1999.47keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica, Inc Spectrum name: 11_20140520001_QCAsLeft.An1

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:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0225

***** 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. GPS	Nuc
59.56	50899.	0.50	0.86	8.138E-02	59.54	100.000	6.290E+02	QA60
88.04	17586.	0.89	0.87	1.193E-01	88.03	100.000	9.370E+02	QA88
122.08	2710.	2.97	0.92	1.236E-01	122.06	100.000	5.109E+02	QA122
661.71	20104.	0.76	1.38	3.592E-02	661.66	100.000	6.050E+02	QA662
1173.28	15175.	0.88	1.85	2.018E-02	1173.23	100.000	1.173E+03	QA1173
1332.55	13642.	0.88	1.98	1.814E-02	1332.51	100.000	1.173E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	237.88	59.56	3179.	50899.	50.899	0.50	0.856
QA-88	351.73	88.04	1529.	17586.	17.586	0.89	0.874
QA-122	487.81	122.08	836.	2710.	2.711	2.97	0.916
QA-662	2645.72	661.71	608.	20104.	20.104	0.76	1.384
QA-1173	4692.43	1173.28	390.	15175.	15.175	0.88	1.851
QA-1332	5329.88	1332.55	79.	13642.	13.642	0.88	1.978

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 GPS	Peak Energy keV	Peak Activity GPS		Peak Code	MDA Value GPS			COMMENTS
QA-60		6.2903E+02					1.58E+05			
			59.54	6.290E+02	(	3.281E+00	4.98E-01	1.00E+02	G	
QA-88		9.3700E+02					4.63E+02			
			88.03	9.370E+02	(	9.853E+00	8.94E-01	1.00E+02	G	
QA-122		5.1088E+02					2.72E+02			
			122.06	5.109E+02	(	2.591E+01	2.97E+00	1.00E+02	G	
QA-662		6.0500E+02					1.10E+04			
			661.66	6.050E+02	(	3.538E+00	7.62E-01	1.00E+02	G	
QA-1173		1.1729E+03					1.92E+03			
			1173.23	1.173E+03	(	7.322E+00	8.82E-01	1.00E+02	G	
QA-1332		1.1728E+03					1.92E+03			
			1332.51	1.173E+03	(	3.790E+00	8.76E-01	1.00E+02	G	

(- This peak used in the nuclide activity average.

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

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

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

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

- -

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

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

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60		6.2563E+02	6.2903E+02	4.976E-01%	3.28E+00
QA-88		1.4736E+02	9.3700E+02	8.941E-01%	9.85E+00
QA-122		2.1925E+01	5.1088E+02	2.969E+00%	2.59E+01
QA-166	<	1.1615E+00	5.8328E+02		
QA-279		>12 Halflives			
QA-392	<	2.3146E+00	3.9202E+03		
QA-514		>12 Halflives			
QA-662		5.5965E+02	6.0500E+02	7.616E-01%	3.54E+00
QA-898	<	5.5619E+00	1.7042E+04		
QA-1173		7.5195E+02	1.1729E+03	8.818E-01%	7.32E+00
QA-1332		7.5187E+02	1.1728E+03	8.761E-01%	3.79E+00
QA-1836	<	2.4598E+00	7.5369E+03		

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

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

Total Activity (37.6 to 1999.5 keV) 2.858E+03 GPS
Total Decayed Activity (37.6 to 1999.5 keV) 5.0276162E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 11_20140520002_BG
Acquired: 5/20/2014 12:45:08 AM
Detector: Ge11 S/N09363993
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	2.13	2.00	2.04	2.09	2.21	2.25	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

TestAmerica, Inc Spectrum name: 11_20140520002_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det11\11_20140520002_BG.An1

Acquisition information
Start time:	5/20/2014 12:45:08 AM
Live time:	1800
Real time:	1807
Dead time:	0.39 %
Detector ID:	11

Detector system
Ge11 S/N09363993

Calibration
Filename: 11_QC.Clb
11_QC-G_092511

Energy Calibration
Created:	2/28/2012 1:09:34 PM
Zero offset:	0.055 keV
Gain:	0.250 keV/channel
Quadratic:	-2.946E-08 keV/channel^2

Efficiency Calibration
Created:	10/4/2011 1:15:19 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 G53W4.25
Start channel:	150 (37.58keV)
Stop channel:	8000 (1999.47keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

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

 Corrections                          Status          Comments
       Decay correct to date:          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.    6 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.2163

 *****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
  Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
  Energy                             Factor    Energy   Ratio    DPS
 ____________________________________________________________________________
 No unknown peaks passed sensitivity test.

 ------------------------------------------------------------
 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    Centroid  Background  Net Area   Intensity   Uncert  FWHM
          Channel Energy    Counts      Counts     Cts/Sec  1 Sigma %  keV
 ____________________________________________________________________________
 PB-210    185.04    46.34         9.        51.     0.028    18.29   0.914
 Ra-226    742.36   185.75         6.        47.     0.026    17.93   1.112s

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


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

PB-210   N   1.0413E+01                                        8.14E+03
                          46.54 1.041E+01  (  3.408E+00 1.83E+01 4.25E+00 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ra-226	7.5534E+00					5.84E+05	
		185.99	7.553E+00	*(	2.270E+00	1.79E+01	3.28E+00 G

(- This peak used in the nuclide activity average.

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

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

- -

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

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

P - Peakbackground subtraction

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

Nuclide	Activity DPS	Time of Count Uncertainty 1 Sigma Counting	MDA
BE-7	< 7.9123E-01		
NA-22	< 2.1693E-01		
K-40	< 4.8353E+00		
Sc-46	< 1.5948E-01		

CR-51	<	1.4982E+00		
MN-54	<	1.8373E-01		
FE-59	<	5.4883E-01		
Co-56	<	1.4849E-01		
CO-57	<	1.1802E-01		
CO-58	<	1.4093E-01		
CO-60	<	2.2570E-01		
ZN-65	<	3.8078E-01		
NB-94	<	1.2273E-01		
ZR-95	<	2.3759E-01		
NB-95	<	1.3136E-01		
RU-103	<	1.5386E-01		
RH-106	<	1.0631E+00		
AG-108M	<	8.6463E-02		
AG-110M	<	4.1709E-01		
SN-113	<	1.1552E-01		
SB-124	<	2.5568E-01		
SB-125	<	4.6696E-01		
I-131	<	1.6495E-01		
BA-133	<	1.0301E-01		
CS-134	<	2.1383E-01		
CS-137	<	1.3377E-01		
CE-139	<	4.6464E-02		
Ba-140	<	5.4708E-01		
La-140	<	2.6790E-01		
CE-141	<	2.2777E-01		
CE-144	<	8.9032E-01		
PM-144	<	1.2040E-01		
EU-152	<	5.4665E-01		
EU-154	<	1.2640E+00		
EU-155	<	2.8315E-01		
HF-181	<	1.0407E-01		
Ta-182	<	5.5486E-01		
Hg-203	<	6.0755E-02		
TL-208	<	1.1651E-01		
pm-146	<	3.7546E-01		
y-88	<	1.7282E-01		
PB-210		1.0413E+01	1.8289E+01%	3.408E+00
PB-212	<	3.4723E-01		
PB-214	<	4.9798E-01		
BI-207	<	2.7729E-01		
BI-212	<	2.6846E+00		
BI-214	<	6.6573E-01		
BI-210M	<	1.5546E-01		
RA-224	<	2.7760E+00		
AC-228	<	1.0045E+00		
TH-227	<	4.5051E-01		
TH-229	<	1.1339E+00		
TH-234	<	6.5018E+00		

PA-231	<	1.8456E+00			
PA-233	<	2.7106E-01			
PA-234	<	3.0733E-01			
PA-234M	<	2.6408E+01			
Ra-226	#	7.5534E+00	1.7928E+01%		2.270E+00
U-235	<	4.8597E-01			
AM-241	<	5.0356E-01			
Np-237	<	4.7475E-01			

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

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

Total Activity (37.6 to 1999.5 keV) 1.797E+01 DPS

Test America
St. Louis
Quality Control Check

Spectrum: 12_20140520001_QCAsLeft
Acquired: 5/20/2014 12:25:57 AM
Detector: Ge12 S/N10034336
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	59.62	59.79	60.04	PASS
FWHM	0.90	0.00	0.00	1.12	2.00	2.10	PASS
ActivityDiff	691.00	-5.00	-4.00	1.28	4.00	5.00	PASS
QA-662							
FWHM	1.48	0.00	0.00	1.66	3.18	3.28	PASS
ActivityDiff	659.00	-5.00	-4.00	-0.65	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.54	1333.01	1333.26	PASS
FWHM	2.00	0.00	0.00	2.06	4.20	4.30	PASS
ActivityDiff	1274.00	-5.00	-4.00	-1.81	4.00	5.00	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

TestAmerica, Inc Spectrum name: 12_20140520001_QCAsLeft.An1

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

Spectrum Filename: C:\User\SPC\Det12\12_20140520001_QCAsLeft.An1

Acquisition information
Start time:	5/20/2014 12:25:57 AM
Live time:	1000
Real time:	1015
Dead time:	1.50 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_QC.Clb
12_QC-H_83725-334_060211

Energy Calibration
Created:	2/28/2012 1:26:42 PM
Zero offset:	0.049 keV
Gain:	0.250 keV/channel
Quadratic:	-3.945E-08 keV/channel^2

Efficiency Calibration
Created:	6/3/2011 6:41:14 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

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

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.58keV)
Stop channel:	8000 (1999.36keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+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:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0485

***** 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. GPS	Nuc
59.62	54685.	0.49	1.12	8.070E-02	59.54	100.000	6.822E+02	QA60
88.12	18871.	0.85	1.18	1.192E-01	88.03	100.000	1.007E+03	QA88
122.16	2711.	3.02	1.11	1.237E-01	122.06	100.000	5.104E+02	QA122
661.73	22845.	0.76	1.66	3.723E-02	661.66	100.000	6.633E+02	QA662
1173.28	17038.	0.88	1.99	2.088E-02	1173.23	100.000	1.273E+03	QA1173
1332.54	15561.	0.85	2.06	1.871E-02	1332.51	100.000	1.297E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	238.06	59.62	3740.	54685.	54.685	0.49	1.122s
QA-88	351.99	88.12	1587.	18871.	18.871	0.85	1.182s
QA-122	488.03	122.16	963.	2711.	2.711	3.02	1.107
QA-662	2645.40	661.73	1056.	22845.	22.845	0.76	1.657
QA-1173	4692.10	1173.28	687.	17038.	17.038	0.88	1.992
QA-1332	5329.54	1332.54	227.	15561.	15.561	0.85	2.064

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 GPS	Peak Energy keV	Peak Activity GPS		Peak Code	MDA Value GPS			COMMENTS
QA-60		6.8218E+02					1.58E+05			
			59.54	6.822E+02	*(	3.589E+00	4.87E-01	1.00E+02	G	
QA-88		1.0066E+03					4.63E+02			
			88.03	1.007E+03	*(	1.005E+01	8.50E-01	1.00E+02	G	
QA-122		5.1041E+02					2.72E+02			
			122.06	5.104E+02	(	2.773E+01	3.02E+00	1.00E+02	G	
QA-662		6.6329E+02					1.10E+04			
			661.66	6.633E+02	(	4.475E+00	7.59E-01	1.00E+02	G	
QA-1173		1.2728E+03					1.92E+03			
			1173.23	1.273E+03	(	9.324E+00	8.77E-01	1.00E+02	G	
QA-1332		1.2970E+03					1.92E+03			
			1332.51	1.297E+03	(	6.073E+00	8.45E-01	1.00E+02	G	

(- This peak used in the nuclide activity average.

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

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

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

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

- -

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

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

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60	#	6.7850E+02	6.8218E+02	4.869E-01%	3.59E+00
QA-88	#	1.5829E+02	1.0066E+03	8.503E-01%	1.00E+01
QA-122		2.1905E+01	5.1041E+02	3.024E+00%	2.77E+01
QA-166	<	1.1629E+00	5.8399E+02		
QA-279			>12 Halflives		
QA-392	<	2.8188E+00	4.7742E+03		
QA-514			>12 Halflives		
QA-662		6.1357E+02	6.6329E+02	7.589E-01%	4.48E+00
QA-898	<	5.8450E+00	1.7909E+04		
QA-1173		8.1598E+02	1.2728E+03	8.765E-01%	9.32E+00
QA-1332		8.3151E+02	1.2970E+03	8.452E-01%	6.07E+00
QA-1836	<	1.4180E+00	4.3448E+03		

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

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

Total Activity (37.6 to 1999.4 keV) 3.120E+03 GPS
Total Decayed Activity (37.6 to 1999.4 keV) 5.4322490E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 12_20140520002_BG
Acquired: 5/20/2014 12:44:44 AM
Detector: Ge12 S/N10034336
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	2.16	1.95	2.02	2.16	2.29	2.36	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

TestAmerica, Inc Spectrum name: 12_20140520002_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det12\12_20140520002_BG.An1

Acquisition information
Start time:	5/20/2014 12:44:44 AM
Live time:	1800
Real time:	1804
Dead time:	0.23 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_QC.Clb
12_QC-H_83725-334_060211

Energy Calibration
Created:	2/28/2012 1:26:42 PM
Zero offset:	0.049 keV
Gain:	0.250 keV/channel
Quadratic:	-3.945E-08 keV/channel^2

Efficiency Calibration
Created:	6/3/2011 6:41:14 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.58keV)
Stop channel:	8000 (1999.36keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

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

 Corrections                          Status          Comments
       Decay correct to date:          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.    4 cutoff: 5.00E+01%

 *****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
  Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
  Energy                             Factor    Energy   Ratio    DPS
 ____________________________________________________________________________
 No unknown peaks passed sensitivity test.

------------------------------------------------------------
 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    Centroid  Background  Net Area   Intensity   Uncert  FWHM
          Channel Energy    Counts      Counts     Cts/Sec  1 Sigma %  keV
 ____________________________________________________________________________

 *****   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
             DPS           keV     DPS           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	

- - - -

SB-124	<	1.2664E-01
SB-125	<	5.2035E-01
I-131	<	1.8692E-01
BA-133	<	1.4733E-01
CS-134	<	3.4465E-01
CS-137	<	1.2905E-01
CE-139	<	9.3733E-02
Ba-140	<	6.9509E-01
La-140	<	2.5886E-01
CE-141	<	2.7332E-01
CE-144	<	5.8683E-01
PM-144	<	1.8983E-01
EU-152	<	4.6124E-01
EU-154	<	1.2313E+00
EU-155	<	1.5892E-01
HF-181	<	2.4920E-01
Ta-182	<	5.3741E-01
Hg-203	<	1.3532E-01
TL-208	<	3.1771E-01
pm-146	<	3.6340E-01
y-88	<	1.6863E-01
PB-210	<	7.5378E+00
PB-212	<	3.6155E-01
PB-214	<	5.4581E-01
BI-207	<	9.5370E-02
BI-212	<	2.3268E+00
BI-214	<	4.4168E-01
BI-210M	<	1.3714E-01
RA-224	<	3.0125E+00
AC-228	<	1.4559E+00
TH-227	<	9.0029E-01
TH-229	<	1.7007E+00
TH-234	<	6.5012E+00
PA-231	<	3.6986E+00
PA-233	<	1.8842E-01
PA-234	<	4.4427E-01
PA-234M	<	2.0357E+01
Ra-226	<	3.9784E+00
U-235	<	4.0047E-01
AM-241	<	3.3500E-01
Np-237	<	4.7540E-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

TestAmerica, Inc Spectrum name: 12_20140520002_BG.An1

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

Total Activity (37.6 to 1999.4 keV)	0.000E+00	DPS

Test America
St. Louis
Quality Control Check

Spectrum: 12_20140521001_QCAsLeft
Acquired: 5/21/2014 12:25:36 AM
Detector: Ge12 S/N10034336
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.57	59.79	60.04	PASS
FWHM	0.90	0.00	0.00	1.14	2.00	2.10	PASS
ActivityDiff	691.00	-5.00	-4.00	0.69	4.00	5.00	PASS
QA-662							
FWHM	1.48	0.00	0.00	1.63	3.18	3.28	PASS
ActivityDiff	659.00	-5.00	-4.00	-0.19	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.10	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.45	1333.01	1333.26	PASS
FWHM	2.00	0.00	0.00	2.03	4.20	4.30	PASS
ActivityDiff	1274.00	-5.00	-4.00	-0.90	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica, Inc Spectrum name: 12_20140521001_QCAsLeft.An1

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

Spectrum Filename: C:\User\SPC\Det12\12_20140521001_QCAsLeft.An1

Acquisition information
Start time:	5/21/2014 12:25:36 AM
Live time:	1000
Real time:	1016
Dead time:	1.54 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration
Filename:	12_QC.Clb

12_QC-H_83725-334_060211

Energy Calibration
Created:	2/28/2012 1:26:42 PM
Zero offset:	0.049 keV
Gain:	0.250 keV/channel
Quadratic:	-3.945E-08 keV/channel^2

Efficiency Calibration
Created:	6/3/2011 6:41:14 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

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

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.58keV)
Stop channel:	8000 (1999.36keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+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:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.    6 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0191

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    GPS
_____________________________________________________________________________
   59.57    55012.   0.48   1.14  8.063E-02    59.54 100.000  6.863E+02 QA60
   88.07    18643.   0.86   1.14  1.192E-01    88.03 100.000  9.959E+02 QA88
  122.12     2419.   2.69   0.96  1.238E-01   122.06 100.000  4.565E+02 QA122
  661.66    22739.   0.74   1.63  3.723E-02   661.66 100.000  6.602E+02 QA662
 1173.18    17160.   0.86   1.96  2.088E-02  1173.23 100.000  1.282E+03 QA1173
 1332.45    15418.   0.86   2.03  1.872E-02  1332.51 100.000  1.286E+03 QA1332
No unknown peaks passed sensitivity test.

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


************** I D E N T I F I E D   P E A K    S U M M A R Y **************
Nuclide  Peak    Centroid  Background  Net Area   Intensity   Uncert  FWHM
         Channel Energy    Counts      Counts     Cts/Sec  1 Sigma %  keV
_____________________________________________________________________________
QA-60     237.87    59.57      3562.     55012.    55.012     0.48   1.140s
QA-88     351.77    88.07      1624.     18643.    18.643     0.86   1.136s
QA-122    487.93   122.13      1123.      2769.     2.769     3.27   1.220s
QA-662   2645.11   661.66       900.     22739.    22.739     0.74   1.631
QA-1173  4691.70  1173.18       630.     17160.    17.160     0.86   1.958
QA-1332  5329.18  1332.45       240.     15418.    15.418     0.86   2.027

  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 GPS	Peak Energy keV	Peak Activity GPS		Peak Code	MDA Value GPS		COMMENTS
QA-60		6.8626E+02					1.58E+05		
			59.54	6.863E+02	*(	3.504E+00	4.80E-01	1.00E+02	G
QA-88		9.9587E+02					4.63E+02		
			88.03	9.959E+02	*(	1.018E+01	8.64E-01	1.00E+02	G
QA-122		5.2256E+02					2.72E+02		
			122.06	5.226E+02	*(	2.999E+01	3.27E+00	1.00E+02	G
QA-662		6.6025E+02					1.10E+04		
			661.66	6.602E+02	(	4.138E+00	7.38E-01	1.00E+02	G
QA-1173		1.2823E+03					1.92E+03		
			1173.23	1.282E+03	(	8.943E+00	8.56E-01	1.00E+02	G
QA-1332		1.2855E+03					1.92E+03		
			1332.51	1.286E+03	(	6.245E+00	8.57E-01	1.00E+02	G

(- This peak used in the nuclide activity average.

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

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

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

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

- -

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

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

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60	#	6.8255E+02	6.8626E+02	4.804E-01%	3.50E+00
QA-88	#	1.5638E+02	9.9587E+02	8.641E-01%	1.02E+01
QA-122	#	2.2369E+01	5.2256E+02	3.270E+00%	3.00E+01
QA-166	<	1.4210E+00	7.1719E+02		
QA-279			>12 Halflives		
QA-392	<	2.5822E+00	4.3999E+03		
QA-514			>12 Halflives		
QA-662		6.1072E+02	6.6025E+02	7.377E-01%	4.14E+00
QA-898	<	5.1237E+00	1.5802E+04		
QA-1173		8.2181E+02	1.2823E+03	8.559E-01%	8.94E+00
QA-1332		8.2385E+02	1.2855E+03	8.570E-01%	6.25E+00
QA-1836	<	2.6916E+00	8.3011E+03		

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

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

Total Activity (37.6 to 1999.4 keV) 3.118E+03 GPS
Total Decayed Activity (37.6 to 1999.4 keV) 5.4328174E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 12_20140521002_BG
Acquired: 5/21/2014 12:47:14 AM
Detector: Ge12 S/N10034336
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	2.16	1.95	2.02	2.11	2.29	2.36	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica, Inc Spectrum name: 12_20140521002_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det12\12_20140521002_BG.An1

Acquisition information
Start time:	5/21/2014 12:47:14 AM
Live time:	1800
Real time:	1805
Dead time:	0.25 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_QC.Clb
12_QC-H_83725-334_060211

Energy Calibration
Created:	2/28/2012 1:26:42 PM
Zero offset:	0.049 keV
Gain:	0.250 keV/channel
Quadratic:	-3.945E-08 keV/channel^2

Efficiency Calibration
Created:	6/3/2011 6:41:14 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.58keV)
Stop channel:	8000 (1999.36keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

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

Corrections	Status	Comments
Decay correct to date:	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. 4 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0063

***** 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

No unknown peaks passed sensitivity test.

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	185.77	46.53	16.	31.	0.017	28.67	0.872

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
PB-210	N	6.4348E+00				8.14E+03	
			46.54	6.435E+00	(	4.432E+00	2.87E+01 4.25E+00 G

(- This peak used in the nuclide activity average.

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

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

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

- -

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

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

P - Peakbackground subtraction

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

Nuclide	Activity	Time of Count Uncertainty 1 Sigma Counting DPS	MDA
BE-7	<	1.1246E+00	
NA-22	<	2.1006E-01	
K-40	<	2.1709E+00	
Sc-46	<	2.5385E-01	
CR-51	<	8.1192E-01	
MN-54	<	3.6199E-01	
FE-59	<	3.2594E-01	
Co-56	<	2.3575E-01	
CO-57	<	1.2882E-01	
CO-58	<	3.0980E-01	
CO-60	<	2.1883E-01	
ZN-65	<	3.6889E-01	

NB-94	<	1.9355E-01			
ZR-95	<	2.3005E-01			
NB-95	<	1.2724E-01			
RU-103	<	9.1530E-02			
RH-106	<	1.0276E+00			
AG-108M	<	1.8134E-01			
AG-110M	<	2.1217E-01			
SN-113	<	2.1556E-01			
SB-124	<	1.2664E-01			
SB-125	<	5.2035E-01			
I-131	<	2.2875E-01			
BA-133	<	1.0071E-01			
CS-134	<	2.0685E-01			
CS-137	<	1.2905E-01			
CE-139	<	1.1750E-01			
Ba-140	<	5.3057E-01			
La-140	<	2.5886E-01			
CE-141	<	2.0405E-01			
CE-144	<	3.8639E-01			
PM-144	<	1.1630E-01			
EU-152	<	4.0269E-01			
EU-154	<	1.2313E+00			
EU-155	<	3.5988E-01			
HF-181	<	1.0110E-01			
Ta-182	<	5.3741E-01			
Hg-203	<	7.5405E-02			
TL-208	<	2.9864E-01			
pm-146	<	3.6340E-01			
y-88	<	1.6863E-01			
PB-210		6.4348E+00	2.8672E+01%		4.432E+00
PB-212	<	2.4811E-01			
PB-214	<	2.9171E-01			
BI-207	<	1.6991E-01			
BI-212	<	3.6019E+00			
BI-214	<	2.1645E-01			
BI-210M	<	9.3745E-02			
RA-224	<	3.1817E+00			
AC-228	<	8.9766E-01			
TH-227	<	5.1485E-01			
TH-229	<	2.7068E+00			
TH-234	<	4.9476E+00			
PA-231	<	2.2872E+00			
PA-233	<	1.4931E-01			
PA-234	<	3.5969E-01			
PA-234M	<	4.3891E+01			
Ra-226	<	5.2249E+00			
U-235	<	1.0790E+00			
AM-241	<	2.7122E-01			
Np-237	<	8.1396E-01			

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

S U M M A R Y

Total Activity	37.6 to 1999.4 keV)	6.435E+00	DPS

Test America
St. Louis
Background Check

Spectrum: 15_20140521001_BG
Acquired: 5/21/2014 12:02:40 AM
Detector: Ge15 SN/11012216
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	1.72	1.60	1.64	1.71	1.80	1.84	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica, Inc. Spectrum name: 15_20140521001_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det15\15_20140521001_BG.An1

Acquisition information
Start time: 5/21/2014 12:02:40 AM
Live time: 1800
Real time: 1801
Dead time: 0.06 %
Detector ID: 15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_20140521001_BG.An1
15_QC_83725-334_SOURCE F_2011

Energy Calibration
Created: 2/28/2012 4:29:17 PM
Zero offset: 0.044 keV
Gain: 0.250 keV/channel
Quadratic: -3.267E-08 keV/channel^2

Efficiency Calibration
Created: 8/2/2011 8:55:45 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 G53W4.25
Start channel: 150 (37.57keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

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

 Corrections                          Status          Comments
       Decay correct to date:          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.    3 cutoff: 5.00E+01%

 *****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
  Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
  Energy                             Factor    Energy   Ratio    DPS
 ____________________________________________________________________________
 No unknown peaks passed sensitivity test.

------------------------------------------------------------
 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    Centroid  Background  Net Area   Intensity   Uncert  FWHM
          Channel Energy    Counts      Counts     Cts/Sec  1 Sigma %  keV
 ____________________________________________________________________________

 *****   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
             DPS           keV     DPS           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	

- - - -

SB-124	<	1.6092E-01
SB-125	<	5.4309E-01
I-131	<	1.1586E-01
BA-133	<	2.0757E-01
CS-134	<	2.6308E-01
CS-137	<	2.4753E-01
CE-139	<	7.3057E-02
Ba-140	<	1.0156E+00
La-140	<	3.5136E-01
CE-141	<	1.7580E-01
CE-144	<	1.0404E+00
PM-144	<	1.5177E-01
EU-152	<	6.1505E-01
EU-154	<	3.1763E+00
EU-155	<	2.4465E-01
HF-181	<	1.7952E-01
Ta-182	<	6.9359E-01
Hg-203	<	1.5136E-01
TL-208	<	3.0630E-01
pm-146	<	5.9396E-01
y-88	<	2.1189E-01
PB-210	<	6.9475E+00
PB-212	<	4.1964E-01
PB-214	<	3.6221E-01
BI-207	<	2.5750E-01
BI-212	<	2.0665E+00
BI-214	<	2.7589E-01
BI-210M	<	1.3175E-01
RA-224	<	2.7995E+00
AC-228	<	6.9194E-01
TH-227	<	3.8862E-01
TH-229	<	2.3911E+00
TH-234	<	6.7929E+00
PA-231	<	4.1722E+00
PA-233	<	2.4733E-01
PA-234	<	4.2966E-01
PA-234M	<	2.5865E+01
Ra-226	<	4.8183E+00
U-235	<	8.3726E-01
AM-241	<	2.4116E-01
Np-237	<	1.1192E+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

TestAmerica, Inc. Spectrum name: 15_20140521001_BG.An1

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

Total Activity (	37.6 to	1999.5 keV)	0.000E+00 DPS

Test America
St. Louis
Quality Control Check

Spectrum: 15_20140521002_QCAsLeft
Acquired: 5/21/2014 1:07:05 AM
Detector: Ge15 SN/11012216
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	0.95	0.00	0.00	1.06	2.05	2.15	PASS
ActivityDiff	670.56	-5.00	-4.00	1.63	4.00	5.00	PASS
QA-662							
FWHM	1.51	0.00	0.00	1.55	3.21	3.31	PASS
ActivityDiff	668.76	-5.00	-4.00	1.40	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.70	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.61	1333.01	1333.26	PASS
FWHM	1.99	0.00	0.00	2.00	4.19	4.29	PASS
ActivityDiff	1277.79	-5.00	-4.00	0.89	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica, Inc. Spectrum name: 15_20140521002_QCAsLeft.An1

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

Spectrum Filename: C:\User\SPC\Det15\15_20140521002_QCAsLeft.An1

Acquisition information
Start time:	5/21/2014 1:07:05 AM
Live time:	1000
Real time:	1012
Dead time:	1.17 %
Detector ID:	15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_20140521002_QCAsLeft.An1
15_QC_83725-334_SOURCE F_2011

Energy Calibration
Created:	2/28/2012 4:29:17 PM
Zero offset:	0.044 keV
Gain:	0.250 keV/channel
Quadratic:	-3.267E-08 keV/channel^2

Efficiency Calibration
Created:	8/2/2011 8:55:45 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

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

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.57keV)
Stop channel:	8000 (1999.52keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica, Inc. Spectrum name: 15_20140521002_QCAsLeft.An1

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:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0321

***** 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. GPS	Nuc
59.56	50645.	0.50	1.06	7.722E-02	59.54	100.000	6.596E+02	QA60
88.05	16863.	0.91	1.11	1.137E-01	88.03	100.000	9.447E+02	QA88
122.08	2350.	2.56	1.02	1.172E-01	122.06	100.000	4.682E+02	QA122
661.69	17321.	0.84	1.55	2.840E-02	661.66	100.000	6.594E+02	QA662
1173.33	12727.	0.98	1.86	1.605E-02	1173.23	100.000	1.237E+03	QA1173
1332.61	11374.	0.95	2.00	1.401E-02	1332.51	100.000	1.266E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	237.87	59.56	3007.	50645.	50.645	0.50	1.063
QA-88	351.77	88.05	1485.	16863.	16.863	0.91	1.105
QA-122	487.71	122.06	640.	2349.	2.349	2.56	1.016D
QA-662	2645.41	661.69	644.	17321.	17.321	0.84	1.552
QA-1173	4692.35	1173.33	414.	12727.	12.727	0.98	1.861
QA-1332	5329.79	1332.61	50.	11374.	11.374	0.95	2.000

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 GPS	Peak Energy keV	Peak Activity GPS		Peak Code	MDA Value GPS			COMMENTS
QA-60		6.5960E+02					1.58E+05			
			59.54	6.596E+02	(	3.363E+00	5.02E-01	1.00E+02	G	
QA-88		9.4469E+02					4.63E+02			
			88.03	9.447E+02	(	1.021E+01	9.15E-01	1.00E+02	G	
QA-122		4.6822E+02					2.72E+02			
			122.06	4.682E+02	(	2.403E+01	2.56E+00	1.00E+02	G	
QA-662		6.5942E+02					1.10E+04			
			661.66	6.594E+02	(	4.605E+00	8.36E-01	1.00E+02	G	
QA-1173		1.2371E+03					1.92E+03			
			1173.23	1.237E+03	(	9.480E+00	9.82E-01	1.00E+02	G	
QA-1332		1.2664E+03					1.92E+03			
			1332.51	1.266E+03	(	3.977E+00	9.54E-01	1.00E+02	G	

(- This peak used in the nuclide activity average.

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

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

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

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

- -

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

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

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60		6.5603E+02	6.5960E+02	5.022E-01%	3.36E+00
QA-88		1.4834E+02	9.4469E+02	9.147E-01%	1.02E+01
QA-122		2.0042E+01	4.6822E+02	2.564E+00%	2.40E+01
QA-166	<	1.4173E+00	7.1545E+02		
QA-279		>12 Halflives			
QA-392	<	2.2097E+00	3.7659E+03		
QA-514		>12 Halflives			
QA-662		6.0996E+02	6.5942E+02	8.360E-01%	4.61E+00
QA-898	<	3.8990E+00	1.2027E+04		
QA-1173		7.9283E+02	1.2371E+03	9.822E-01%	9.48E+00
QA-1332		8.1157E+02	1.2664E+03	9.544E-01%	3.98E+00
QA-1836	<	1.7172E+00	5.2969E+03		

< - 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 (136.4 to 1999.5 keV) 3.039E+03 GPS
Total Decayed Activity (136.4 to 1999.5 keV) 5.2354600E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 17_20140521001_BG
Acquired: 5/21/2014 12:03:13 AM
Detector: Ge17 SN/11080671
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	2.47	2.30	2.35	2.39	2.58	2.63	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica, Inc. Spectrum name: 17_20140521001_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det17\17_20140521001_BG.An1

Acquisition information
Start time: 5/21/2014 12:03:13 AM
Live time: 1800
Real time: 1806
Dead time: 0.33 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_QC.Clb
17_QC_83725-334_SOURCE H_042211

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

Efficiency Calibration
Created: 5/1/2011 11:17:56 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.63keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

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

Corrections	Status	Comments
Decay correct to date:	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. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0303

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.56	42.	24.05	1.04	5.941E-02	46.54	4.250	9.242E+00	PB210
62.93	40.	24.24	0.68	8.036E-02	63.29	3.810	7.258E+00	TH234
92.49	48.	25.24	0.93	1.119E-01	92.59	5.584	4.224E+00	TH234
					93.35	5.561	4.238E+00	AC228
351.56	25.	20.00	0.40	6.080E-02	351.93	37.600	6.075E-01	PB214

No unknown peaks passed sensitivity test.

This section based on library: DET_Long Background PBC.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.72	46.56	20.	42.	0.023	24.05	1.037s
TH-234	251.14	62.93	18.	40.	0.022	24.24	0.680s
TH-234	369.33	92.49	28.	48.	0.026	25.24	0.925s
PB-214	1405.24	351.56	0.	25.	0.014	20.00	0.400s

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
PB-210	N	9.2419E+00				8.14E+03		
			46.54	9.242E+00	(	5.182E+00	2.40E+01 4.25E+00	G
PB-214	N	6.0751E-01				5.84E+05		
			351.93	6.075E-01	(	1.791E-01	2.00E+01 3.76E+01	G
			295.09	0.000E+00	%	5.515E-01	4.28E+01 1.93E+01	G
			242.00	0.000E+00	%	6.424E-01	1.00E+03 7.43E+00	GA
TH-234	N	7.2577E+00				1.63E+12		
			63.29	7.258E+00	*(	4.079E+00	2.42E+01 3.81E+00	G
			92.59	4.224E+00	-	2.414E+00	2.52E+01 5.58E+00	G

(- This peak used in the nuclide activity average.

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

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

- -

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

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

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	< 8.4647E-01		
NA-22	< 2.3087E-01		
K-40	< 2.3857E+00		
Sc-46	< 1.6963E-01		
CR-51	< 1.2354E+00		
MN-54	< 1.9578E-01		
FE-59	< 3.5771E-01		
Co-56	< 1.5818E-01		
CO-57	< 7.3781E-02		
CO-58	< 1.8964E-01		
CO-60	< 2.4023E-01		
ZN-65	< 4.0512E-01		
NB-94	< 1.3122E-01		
ZR-95	< 2.5373E-01		
NB-95	< 3.3199E-01		
RU-103	< 1.0084E-01		
RH-106	< 1.1375E+00		
AG-108M	< 9.2497E-02		
AG-110M	< 2.9217E-01		
SN-113	< 3.3779E-01		
SB-124	< 2.2649E-01		
SB-125	< 4.1019E-01		
I-131	< 1.0913E-01		
BA-133	< 2.1120E-01		
CS-134	< 1.1212E-01		
CS-137	< 1.4314E-01		
CE-139	< 7.2728E-02		
Ba-140	< 5.0490E-01		
La-140	< 2.8480E-01		
CE-141	< 1.9960E-01		
CE-144	< 1.3157E+00		
PM-144	< 1.2874E-01		
EU-152	< 5.8482E-01		
EU-154	< 1.3452E+00		
EU-155	< 4.1961E-01		
HF-181	< 1.4050E-01		

Ta-182	<	8.6360E-01			
Hg-203	<	9.5089E-02			
TL-208	<	3.0725E-01			
pm-146	<	7.1449E-01			
y-88	<	1.8377E-01			
PB-210		9.2419E+00	2.4046E+01%		5.182E+00
PB-212	<	3.9917E-01			
PB-214	#	6.0751E-01	2.0000E+01%		1.791E-01
BI-207	<	1.3292E-01			
BI-212	<	2.2179E+00			
BI-214	<	6.7445E-01			
BI-210M	<	2.9519E-01			
RA-224	<	1.4652E+00			
AC-228	<	7.5657E-01			
TH-227	<	8.2359E-01			
TH-229	<	2.6280E+00			
TH-234	#	7.2577E+00	2.4238E+01%		4.079E+00
PA-231	<	4.4716E+00			
PA-233	<	2.0541E-01			
PA-234	<	3.5901E-01			
PA-234M	<	2.2258E+01			
Ra-226	<	4.9275E+00			
U-235	<	1.1617E+00			
AM-241	<	3.4132E-01			
Np-237	<	6.1599E-01			

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

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

Total Activity (37.6 to 1999.5 keV) 1.711E+01 DPS

Test America
St. Louis
Quality Control Check

Spectrum: 17_20140521002_QCAsLeft
Acquired: 5/21/2014 1:08:03 AM
Detector: Ge17 SN/11080671
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	59.62	59.79	60.04	PASS
FWHM	0.77	0.00	0.00	0.77	1.87	1.97	PASS
ActivityDiff	691.00	-5.00	-4.00	0.52	4.00	5.00	PASS
QA-662							
FWHM	1.37	0.00	0.00	1.34	3.07	3.17	PASS
ActivityDiff	659.00	-5.00	-4.00	1.06	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.60	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.50	1333.01	1333.26	PASS
FWHM	1.88	0.00	0.00	1.82	4.08	4.18	PASS
ActivityDiff	1274.00	-5.00	-4.00	0.16	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica, Inc. Spectrum name: 17_20140521002_QCAsLeft.An1

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

Spectrum Filename: C:\User\SPC\Det17\17_20140521002_QCAsLeft.An1

Acquisition information
Start time: 5/21/2014 1:08:03 AM
Live time: 1000
Real time: 1015
Dead time: 1.52 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_QC.Clb
17_QC_83725-334_SOURCE H_042211

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

Efficiency Calibration
Created: 5/1/2011 11:17:56 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

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

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.63keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+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 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0452

***** 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. GPS	Nuc
59.62	51736.	0.48	0.77	7.577E-02	59.54	100.000	6.874E+02	QA60
88.09	17566.	0.82	0.81	1.113E-01	88.03	100.000	1.005E+03	QA88
121.99	2599.	2.92	0.88	1.155E-01	122.06	100.000	5.257E+02	QA122
661.66	20246.	0.75	1.34	3.357E-02	661.66	100.000	6.520E+02	QA662
1173.29	15153.	0.83	1.76	1.896E-02	1173.23	100.000	1.247E+03	QA1173
1332.50	13897.	0.88	1.82	1.705E-02	1332.51	100.000	1.272E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	237.91	59.62	2832.	51736.	51.736	0.48	0.767
QA-88	351.74	88.09	966.	17566.	17.566	0.82	0.812
QA-122	487.30	121.99	795.	2599.	2.599	2.92	0.883
QA-662	2645.48	661.66	598.	20246.	20.246	0.75	1.344
QA-1173	4692.32	1173.26	485.	15361.	15.361	0.90	1.796
QA-1332	5329.60	1332.50	112.	13897.	13.897	0.88	1.815

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 GPS	Peak Energy keV	Peak Activity GPS		Code	MDA Value GPS			COMMENTS
QA-60		6.8738E+02					1.58E+05			
			59.54	6.874E+02	(	3.331E+00	4.82E-01	1.00E+02	G	
QA-88		1.0048E+03					4.63E+02			
			88.03	1.005E+03	(	8.441E+00	8.18E-01	1.00E+02	G	
QA-122		5.2565E+02					2.72E+02			
			122.06	5.257E+02	(	2.712E+01	2.92E+00	1.00E+02	G	
QA-662		6.5203E+02					1.10E+04			
			661.66	6.520E+02	(	3.757E+00	7.51E-01	1.00E+02	G	
QA-1173		1.2639E+03					1.92E+03			
			1173.23	1.264E+03	(	8.668E+00	9.01E-01	1.00E+02	G	
QA-1332		1.2720E+03					1.92E+03			
			1332.51	1.272E+03	(	4.762E+00	8.75E-01	1.00E+02	G	

(- This peak used in the nuclide activity average.

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

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

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

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

- -

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

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

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60		6.8366E+02	6.8738E+02	4.818E-01%	3.33E+00
QA-88		1.5778E+02	1.0048E+03	8.176E-01%	8.44E+00
QA-122		2.2502E+01	5.2565E+02	2.925E+00%	2.71E+01
QA-166	<	1.1789E+00	5.9499E+02		
QA-279		>12 Halflives			
QA-392	<	2.1652E+00	3.6892E+03		
QA-514		>12 Halflives			
QA-662		6.0311E+02	6.5203E+02	7.513E-01%	3.76E+00
QA-898	<	4.6511E+00	1.4343E+04		
QA-1173		8.0997E+02	1.2639E+03	9.012E-01%	8.67E+00
QA-1332		8.1520E+02	1.2720E+03	8.752E-01%	4.76E+00
QA-1836	<	2.5067E+00	7.7303E+03		

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

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

Total Activity (37.6 to 1999.5 keV) 3.092E+03 GPS
Total Decayed Activity (37.6 to 1999.5 keV) 5.4057617E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 18_20140520001_BG
Acquired: 5/20/2014 12:03:31 AM
Detector: Ge18 SN/11164036
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	2.58	2.45	2.50	2.52	2.66	2.71	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

Test America Spectrum name: 18_20140520001_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det18\18_20140520001_BG.An1

Acquisition information
Start time:	5/20/2014 12:03:31 AM
Live time:	1800
Real time:	1809
Dead time:	0.49 %
Detector ID:	18

Detector system
Ge18 SN/11164036

Calibration
Filename: 18_QC.Clb
Ge18_QA Source E

Energy Calibration
Created:	3/1/2012 1:27:55 PM
Zero offset:	0.007 keV
Gain:	0.250 keV/channel
Quadratic:	-3.202E-08 keV/channel^2

Efficiency Calibration
Created:	6/23/2011 2:02:37 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 G53W4.25
Start channel:	150 (37.54keV)
Stop channel:	8000 (1999.55keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

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

Corrections	Status	Comments
Decay correct to date:	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. 5 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0350

***** 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

No unknown peaks passed sensitivity test.

This section based on library: DET_Long Background PBC.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.12	46.57	27.	41.	0.023	28.54	1.004
PB-212	951.97	238.16	18.	42.	0.023	26.42	0.798s

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
PB-210	N	8.9074E+00				8.14E+03	
			46.54	8.907E+00	(	5.770E+00	2.85E+01 4.25E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N 5.7996E-01					6.98E+02	
		238.63	5.800E-01 ?(		3.103E-01	2.64E+01	4.33E+01 G
		300.03	0.000E+00 %		2.194E+00	4.12E+02	3.28E+00 GA

(- This peak used in the nuclide activity average.

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

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

- -

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

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

P - Peakbackground subtraction

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

Nuclide		Activity DPS	Time of Count Uncertainty 1 Sigma Counting	MDA
BE-7	<	7.8173E-01		
NA-22	<	2.1869E-01		
K-40	<	2.2445E+00		
Sc-46	<	2.8069E-01		
CR-51	<	1.6294E+00		
MN-54	<	1.4606E-01		
FE-59	<	3.3693E-01		
Co-56	<	1.4850E-01		
CO-57	<	8.4782E-02		
CO-58	<	1.4224E-01		
CO-60	<	2.2725E-01		
ZN-65	<	3.8219E-01		
NB-94	<	2.7320E-01		
ZR-95	<	2.4273E-01		
NB-95	<	2.3863E-01		
RU-103	<	2.9876E-01		
RH-106	<	1.5941E+00		
AG-108M	<	2.0886E-01		
AG-110M	<	2.1531E-01		
SN-113	<	2.6615E-01		
SB-124	<	1.7252E-01		
SB-125	<	2.5661E-01		
I-131	<	7.9415E-02		
BA-133	<	2.0702E-01		
CS-134	<	1.0683E-01		
CS-137	<	2.8383E-01		
CE-139	<	1.2092E-01		
Ba-140	<	3.7432E-01		
La-140	<	2.6622E-01		
CE-141	<	3.2742E-01		
CE-144	<	5.0996E-01		
PM-144	<	1.5703E-01		
EU-152	<	2.2818E-01		
EU-154	<	1.2547E+00		
EU-155	<	6.8439E-01		
HF-181	<	1.2987E-01		
Ta-182	<	5.5725E-01		
Hg-203	<	7.6828E-02		
TL-208	<	2.5445E-01		
pm-146	<	7.3658E-01		
y-88	<	1.7028E-01		
PB-210		8.9074E+00	2.8535E+01%	5.770E+00
PB-212	#	5.7996E-01	2.6424E+01%	3.103E-01

PB-214	<	4.5122E-01
BI-207	<	2.2501E-01
BI-212	<	2.1329E+00
BI-214	<	5.4086E-01
BI-210M	<	1.8333E-01
RA-224	<	3.1695E+00
AC-228	<	1.0656E+00
TH-227	<	1.0434E+00
TH-229	<	3.0988E+00
TH-234	<	6.4333E+00
PA-231	<	6.2607E+00
PA-233	<	3.2664E-01
PA-234	<	7.9645E-01
PA-234M	<	3.3925E+01
Ra-226	<	5.1288E+00
U-235	<	5.2989E-01
AM-241	<	5.9267E-01
Np-237	<	1.3504E+00

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

S U M M A R Y

Total Activity (37.5 to 1999.5 keV)   9.487E+00 DPS

Test America
St. Louis
Quality Control Check

Spectrum: 18_20140520002_QCAsLeft
Acquired: 5/20/2014 1:45:47 AM
Detector: Ge18 SN/11164036
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	0.94	0.00	0.00	0.94	2.04	2.14	PASS
ActivityDiff	669.75	-5.00	-4.00	-1.47	4.00	5.00	PASS
QA-662							
FWHM	1.54	0.00	0.00	1.55	3.24	3.34	PASS
ActivityDiff	630.92	-5.00	-4.00	-0.76	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.90	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.65	1333.01	1333.26	PASS
FWHM	2.03	0.00	0.00	1.98	4.23	4.33	PASS
ActivityDiff	1228.08	-5.00	-4.00	-2.52	4.00	5.00	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

Test America Spectrum name: 18_20140520002_QCAsLeft.An1

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

Spectrum Filename: C:\User\SPC\Det18\18_20140520002_QCAsLeft.An1

Acquisition information
Start time:	5/20/2014 1:45:47 AM
Live time:	1000
Real time:	1015
Dead time:	1.51 %
Detector ID:	18

Detector system
Ge18 SN/11164036

Calibration
Filename: 18_QC.Clb
Ge18_QA Source E

Energy Calibration
Created:	3/1/2012 1:27:55 PM
Zero offset:	0.007 keV
Gain:	0.250 keV/channel
Quadratic:	-3.202E-08 keV/channel^2

Efficiency Calibration
Created:	6/23/2011 2:02:37 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_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.54keV)
Stop channel:	8000 (1999.55keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Test America Spectrum name: 18_20140520002_QCAsLeft.An1

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

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0479

***** 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. GPS	Nuc
59.56	52591.	0.49	0.94	7.806E-02	59.54	100.000	6.796E+02	QA60
88.05	6709.	1.59	0.95	1.161E-01	88.03	100.000	9.587E+02	QA88
661.75	19512.	0.83	1.55	3.454E-02	661.66	100.000	6.357E+02	QA662
1173.36	12930.	0.98	1.91	1.998E-02	1173.23	100.000	1.271E+03	QA1173
1332.65	11552.	0.98	1.98	1.802E-02	1332.51	100.000	1.259E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	238.03	59.56	3037.	52591.	52.591	0.49	0.938
QA-88	351.90	88.05	1070.	6709.	6.709	1.59	0.952
QA-662	2645.78	661.75	948.	19512.	19.512	0.83	1.551
QA-1173	4692.52	1173.36	413.	12930.	12.930	0.98	1.915
QA-1332	5329.95	1332.65	150.	11552.	11.552	0.98	1.983

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 GPS	Peak Energy keV	Peak Activity GPS		Peak Code	MDA Value GPS			COMMENTS
QA-60		6.7957E+02					1.58E+05			
			59.54	6.796E+02	(	3.353E+00	4.88E-01	1.00E+02	G	
QA-88		9.5871E+02					4.63E+02			
			88.03	9.587E+02	(	2.217E+01	1.59E+00	1.00E+02	G	
QA-662		6.3574E+02					1.10E+04			
			661.66	6.357E+02	(	4.763E+00	8.29E-01	1.00E+02	G	
QA-1173		1.2710E+03					1.92E+03			
			1173.23	1.271E+03	(	9.579E+00	9.81E-01	1.00E+02	G	
QA-1332		1.2590E+03					1.92E+03			
			1332.51	1.259E+03	(	6.526E+00	9.79E-01	1.00E+02	G	

(- This peak used in the nuclide activity average.

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

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

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

Test America Spectrum name: 18_20140520002_QCAsLeft.An1

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

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

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

P - Peakbackground subtraction

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

Nuclide		Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60		6.7399E+02	6.7957E+02	4.876E-01%	3.35E+00
QA-88		5.7788E+01	9.5871E+02	1.588E+00%	2.22E+01
QA-122	<	1.1299E+00	1.3468E+02		
QA-166		>12 Halflives			
QA-279		>12 Halflives			
QA-392		>12 Halflives			
QA-514		>12 Halflives			
QA-662		5.6480E+02	6.3574E+02	8.287E-01%	4.76E+00
QA-898		>12 Halflives			
QA-1173		6.4710E+02	1.2710E+03	9.813E-01%	9.58E+00
QA-1332		6.4101E+02	1.2590E+03	9.787E-01%	6.53E+00
QA-1836		>12 Halflives			

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

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

Total Activity (37.5 to 1999.5 keV) 2.585E+03 GPS
Total Decayed Activity (37.5 to 1999.5 keV) 4.8040430E+03 GPS

Initial Calibrations

Gamma Verification per Geometry

Detector:	Ge4
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	14534	97.4
Am-241	2037	418	0.3590	1163	1211.4	104.1
Cd-109	2881	591	0.0361	16363	16123	98.5
Co-57	1511	310	0.8560	362	353.51	97.7
Ce-139	2139	439	0.7990	549	541.9	98.7
Hg-203	4651	954	0.8146	1171	1197.5	102.3
Sn-113	3015	618	0.6400	966	965.83	100.0
Cs-137	1938	397	0.8510	467	464.8	99.5
Y-88	7264	1489	0.9370	1589	1568.4	98.7
Co-60	3580	734	0.9997	734	732.09	99.7
Co-60	3581	734	0.9999	734	730.52	99.5
Y-88	7690	1577	0.9920	1589	1608.9	101.2

Reviewed By: Jody Watson

Date: 4/2/2012

Calibration Data from file: 4_Soil_TunaCan.Clb
Energy Calibration Date: 4/2/2012 Time: 1:19:28 PM
Efficiency Calibration Date: 4/2/2012 Time: 1:19:41 PM

Calibration Description:
4_Soil_TunaCan_90099_033012

Energy Calibration Fit
Energy = 0.0841 +0.250111*Channel -2.82165e-008*Channel**2
FWHM (ch) = 2.9699 +0.000905*Channel -1.12861e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta	
185.86	46.54	46.57	-0.06%	0.77	0.78	-2.05%	*
237.99	59.54	59.61	-0.11%	0.77	0.80	-2.87%	*
352.07	88.03	88.14	-0.12%	0.80	0.82	-3.00%	*
487.89	122.06	122.10	-0.04%	0.85	0.85	-0.79%	
662.68	165.85	165.81	0.02%	0.92	0.89	2.85%	
1115.49	279.17	279.05	0.04%	1.04	0.99	4.71%	*
1565.30	391.69	391.51	0.04%	1.10	1.09	0.87%	
2645.59	661.66	661.58	0.01%	1.34	1.32	1.45%	
3591.88	898.02	898.09	-0.01%	1.50	1.52	-1.26%	*
4693.38	1173.24	1173.33	-0.01%	1.74	1.74	0.11%	
5330.90	1332.50	1332.60	-0.01%	1.83	1.87	-2.11%	*
7346.21	1836.01	1835.93	0.00%	2.27	2.25	0.88%	*

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.7786 %
Ln(Eff) = -0.3984 -0.574628*Ln(Eng) -0.0204644*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.8003 %
Ln(Eff) = -25.4679 +9.285295*Ln(Eng) -0.990443*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.1765E-002	1.2076E-002	-2.64%
59.54	1.7788E-002	1.7193E-002	3.35%
88.03	2.3178E-002	2.3534E-002	-1.53%
122.06	2.3675E-002	2.4250E-002	-2.43%
165.85	========== Knee ==========		
165.85	2.0578E-002	2.0860E-002	-1.37%
279.17	1.4119E-002	1.3792E-002	2.32%
391.69	1.0481E-002	1.0476E-002	0.05%
661.66	6.7648E-003	6.7809E-003	-0.24%
898.02	5.1688E-003	5.2356E-003	-1.29%
1173.24	4.1471E-003	4.1620E-003	-0.36%
1332.50	3.7091E-003	3.7274E-003	-0.49%
1836.01	2.8499E-003	2.8152E-003	1.22%

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 4/2/2012 2:16:12 PM
TestAmerica Spectrum name: 4_TunaCan_20120147.An1

Sample description
4_TunaCan_90099_033012

Spectrum Filename: C:\User\Cal\Spectra\Det4\4_TunaCan_20120147.An1

Acquisition information
Start time: 3/30/2012 1:58:17 PM
Live time: 7200
Real time: 7338
Dead time: 1.88 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Soil_TunaCan.Clb
4_Soil_TunaCan_90099_033012

Energy Calibration
Created: 4/2/2012 1:19:28 PM
Zero offset: 0.084 keV
Gain: 0.250 keV/channel
Quadratic: -2.822E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 1:19:41 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.78 %
Log(Eff): -3.983609E-01 + (-5.746278E-01*Log(E)) +
(-2.046438E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.80 %
Log(Eff): -2.546791E+01 + (9.285295E+00*Log(E)) +
(-9.904428E-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 (1999.16keV)
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 2:16:12 PM
TestAmerica Spectrum name: 4_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:	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: 0.0727

***** 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	53301.	0.71	0.77	1.209E-02	46.54	4.250	1.453E+04	Pb210
59.61	53514.	0.70	0.77	1.722E-02	59.54	35.700	1.211E+03	AM241
72.99	2672.	6.56	0.81	2.103E-02				
88.14	86292.	0.46	0.80	2.355E-02	88.03	3.610	1.612E+04	CD109
122.10	42094.	0.74	0.85	2.425E-02	122.06	85.600	3.535E+02	CO57
136.52	5015.	4.27	0.87	2.334E-02				
165.81	41514.	0.70	0.92	2.058E-02	165.85	79.900	5.419E+02	Ce139
254.94	1501.	9.38	0.88	1.484E-02				
279.05	25767.	0.82	1.04	1.380E-02	279.17	81.500	1.198E+03	Hg203
391.51	27259.	0.80	1.10	1.048E-02	391.69	64.000	9.658E+02	SN113
661.58	19228.	1.08	1.34	6.782E-03	661.66	85.210	4.648E+02	CS137
898.08	31032.	0.70	1.50	5.235E-03	898.02	93.700	1.568E+03	Y898
1173.32	21224.	0.86	1.74	4.162E-03	1173.24	99.900	7.321E+02	Co1173
1332.60	18983.	0.84	1.83	3.727E-03	1332.50	99.982	7.305E+02	Co1332
1835.92	18122.	0.77	2.27	2.815E-03	1836.01	99.200	1.609E+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	
291.55	73.00	15410.	2435.	1.158E+05	9.06	0.811	-	D
545.54	136.52	10631.	5015.	2.149E+05	4.27	0.869	-	
1019.10	254.94	4774.	1501.	1.012E+05	9.38	0.884	-	

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	185.86	46.57	22518.	53301.	7.403	0.71	0.769
AM-241	237.99	59.61	21765.	53514.	7.432	0.70	0.774
CD-109	352.07	88.14	19168.	86292.	11.985	0.46	0.798
CO-57	487.89	122.10	12939.	42094.	5.846	0.74	0.846
Ce-139	662.68	165.81	9873.	41514.	5.766	0.70	0.918
Hg-203	1115.49	279.05	4611.	25767.	3.579	0.82	1.041
SN-113	1565.30	391.51	4016.	27259.	3.786	0.80	1.099
CS-137	2645.59	661.58	4040.	19228.	2.671	1.08	1.341
Y-898	3591.86	898.08	2594.	31032.	4.310	0.70	1.500
Co-1173	4693.36	1173.32	1627.	21224.	2.948	0.86	1.745
Co-1332	5330.90	1332.60	968.	18983.	2.636	0.84	1.828
Y-1836	7346.17	1835.92	184.	18122.	2.517	0.77	2.271

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	1.4534E+04				8.15E+03		
			46.54	1.453E+04	(	1.914E+02	7.10E-01	4.25E+00 G
AM-241		1.2114E+03				1.58E+05		
			59.54	1.211E+03	(	1.562E+01	7.01E-01	3.57E+01 G
CD-109		1.6123E+04				4.63E+02		
			88.03	1.612E+04	(	1.210E+02	4.63E-01	3.61E+00 G
CO-57		3.5351E+02				2.72E+02		
			122.06	3.535E+02	(	4.474E+00	7.36E-01	8.56E+01 G

ORTEC g v - i (1087) Env32 G53W4.25 4/2/2012 2:16:12 PM
TestAmerica Spectrum name: 4_TunaCan_20120147.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.4190E+02					1.38E+02	
		165.85	5.419E+02	(	6.080E+00	6.99E-01	7.99E+01 G
Hg-203	1.1975E+03					4.66E+01	
		279.17	1.198E+03	(	1.483E+01	8.16E-01	8.15E+01 G
SN-113	9.6583E+02					1.15E+02	
		391.69	9.658E+02	(	1.056E+01	7.98E-01	6.40E+01 G
CS-137	4.6480E+02					1.10E+04	
		661.66	4.648E+02	(	7.225E+00	1.08E+00	8.52E+01 G
Y-898	1.5684E+03					1.07E+02	
		898.02	1.568E+03	(	1.213E+01	6.99E-01	9.37E+01 G
Co-1173	7.3209E+02					1.93E+03	
		1173.24	7.321E+02	(	6.576E+00	8.65E-01	9.99E+01 G
Co-1332	7.3052E+02					1.93E+03	
		1332.50	7.305E+02	(	5.685E+00	8.43E-01	1.00E+02 G
Y-1836	1.6089E+03					1.07E+02	
		1836.01	1.609E+03	(	5.860E+00	7.72E-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 4/2/2012 2:16:12 PM
TestAmerica Spectrum name: 4_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	1.4424E+04	1.4534E+04	7.104E-01%	1.91E+02
AM-241	1.2109E+03	1.2114E+03	7.006E-01%	1.56E+01
CD-109	1.4107E+04	1.6123E+04	4.632E-01%	1.21E+02
CO-57	2.8164E+02	3.5351E+02	7.361E-01%	4.47E+00
Ce-139	3.4594E+02	5.4190E+02	6.994E-01%	6.08E+00
Hg-203	3.1837E+02	1.1975E+03	8.160E-01%	1.48E+01
SN-113	5.6466E+02	9.6583E+02	7.982E-01%	1.06E+01
CS-137	4.6220E+02	4.6480E+02	1.084E+00%	7.23E+00
Y-898	8.7856E+02	1.5684E+03	6.988E-01%	1.21E+01
Co-1173	7.0897E+02	7.3209E+02	8.649E-01%	6.58E+00
Co-1332	7.0745E+02	7.3052E+02	8.429E-01%	5.68E+00
Y-1836	9.0125E+02	1.6089E+03	7.719E-01%	5.86E+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 1999.2 keV) 3.491E+04 Bq
Total Decayed Activity (37.6 to 1999.2 keV) 4.0031488E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector:	Ge5
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

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

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

Sample description
5_TunaCan_90099_032612

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

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

Detector system
Ge 5 SN/157

Calibration
Filename: 5_Soil_TunaCan.Clb
5_Soil_TunaCan_90099_032612

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

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

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

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

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

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

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

total peaks alloc. 12 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0527

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

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

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

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

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

This section based on library: DET_EnergyStandardMix & Pb.Lib

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

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

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

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

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

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

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

(- This peak used in the nuclide activity average.

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

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

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

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

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

- -

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

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

P - Peakbackground subtraction

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

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

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

S U M M A R Y

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

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector: Ge7

Geometry: 1L Marn

Reference date 1/1/2012

Calibration Standard: 90062

Standard volume g / vial 1

Standard volume transferred in g / geometry 1

lab ID# of cal standard 6707

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	Abundance	Activity Bq/L	Count Results	%recovery
Am-241	1821	1821	0.359	**5072.4**	5093.3	100.4
Cd-109	2602	2602	0.0361	**72077.6**	69699	96.7
Co-57	1364	1364	0.856	**1593.5**	1580.4	99.2
Ce-139	1932	1932	0.799	**2418.0**	2383.5	98.6
Hg-203	4200	4200	0.8146	**5155.9**	5281.6	102.4
Sn-113	2722	2722	0.64	**4253.1**	4257.7	100.1
Cs-137	1750	1750	0.851	**2056.4**	2033.3	98.9
Mn-54	3114	3114	0.9998	**3114.6**	3150.2	101.1
Y-88	6559	6559	0.937	**7000.0**	6734.2	96.2
Zn-65	3134	3134	0.506	**6193.7**	6490.5	104.8
Co-60	3233	3233	0.99974	**3233.8**	3132.2	96.9
Co-60	3233	3233	0.99986	**3233.5**	3149.5	97.4
Y-88	6944	6944	0.992	**7000.0**	7117.9	101.7

Reviewed By: Megan McAfee

Date: 3/26/2012

Calibration Data from file: 7_Liquid_Marinelli 1L.Clb
Energy Calibration Date: 3/28/2012 Time: 9:18:12 AM
Efficiency Calibration Date: 3/28/2012 Time: 9:18:24 AM

Calibration Description:
7_1Lmarn_90062_032612

Energy Calibration Fit
Energy = 0.1874 +0.249932*Channel +7.03104e-009*Channel**2
FWHM (ch) = 3.4322 +0.000971*Channel -1.53808e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
237.59	59.54	59.57	-0.05%	0.88	0.92	-3.43%
351.44	88.03	88.03	0.01%	0.94	0.94	0.22%
487.37	122.06	122.00	0.05%	0.98	0.98	0.43%
662.51	165.85	165.77	0.05%	1.02	1.02	-0.14%
1116.55	279.17	279.26	-0.03%	1.14	1.12	1.21%
1566.60	391.69	391.75	-0.02%	1.24	1.23	0.70%
2646.39	661.66	661.65	0.00%	1.51	1.47	2.26%
3339.20	834.85	834.84	0.00%	1.63	1.63	0.15%
3592.04	898.02	898.04	-0.00%	1.68	1.68	0.00%
4462.03	1115.55	1115.53	0.00%	1.85	1.86	-0.81%
4692.79	1173.24	1173.22	0.00%	1.89	1.91	-0.96%
5329.78	1332.50	1332.47	0.00%	2.03	2.04	-0.79%
7343.85	1836.01	1836.03	-0.00%	2.45	2.43	0.65%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.4210 %
Ln(Eff) = -0.7055 -0.284825*Ln(Eng) -0.04424*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.4307 %
Ln(Eff) = -14.8444 +5.183775*Ln(Eng) -0.573052*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
59.54	3.9481E-002	3.9540E-002	-0.15%
88.03	4.4466E-002	4.4045E-002	0.95%
122.06	4.1797E-002	4.2138E-002	-0.82%
165.85	========== Knee ==========		
165.85	3.5751E-002	3.6265E-002	-1.44%
279.17	2.5027E-002	2.4411E-002	2.46%
391.69	1.8652E-002	1.8630E-002	0.12%
661.66	1.1897E-002	1.2017E-002	-1.00%
834.85	9.9346E-003	9.8167E-003	1.19%
898.02	8.8561E-003	9.2042E-003	-3.93%
1115.55	7.9420E-003	7.5782E-003	4.58%
1173.24	7.0066E-003	7.2392E-003	-3.32%
1332.50	6.2752E-003	6.4426E-003	-2.67%
1836.01	4.8544E-003	4.7733E-003	1.67%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Am-241	59.54	35.70	1.58E+005	5100.80	1821.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	72078.00	2602.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	1593.50	1364.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	2418.00	1932.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	5153.40	4200.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	4253.10	2722.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	2053.70	1750.00	4.00%	1/1/2012 11:00:00 AM
Mn-54	834.85	99.98	3.12E+002	3114.60	3114.00	3.30%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	7000.00	6559.00	3.90%	1/1/2012 11:00:00 AM
Zn-65	1115.55	50.60	2.44E+002	6193.70	3134.00	3.50%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	3236.20	3233.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	3233.60	3233.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	7000.00	6944.00	4.00%	1/1/2012 11:00:00 AM

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

Sample description
7_1Lmarn_90062_032612

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

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

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Liquid_Marinelli 1L.Clb
7_1Lmarn_90062_032612

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

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

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

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

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 9:26:09 AM Page 2
TestAmerica Spectrum name: 7_1Lmarn_20120463.An1
Page 1

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

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

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

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

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

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

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

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

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

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
291.11	72.93	68727.	14085.	3.295E+05	2.76	0.928	- D
329.40	82.50	63478.	7182.	8.098E+04	5.10	0.937	- lD
339.04	84.91	63224.	9567.	2.997E+04	3.85	0.940	- lD
544.97	136.39	49365.	20328.	5.036E+05	2.30	0.951	-
1020.02	255.13	23704.	5677.	2.168E+05	5.36	1.096	- s
2044.04	511.09	18658.	7966.	5.325E+05	4.06	2.416	- s
3255.49	813.91	8727.	2256.	2.248E+05	8.87	1.494	-
5298.91	1324.75	3552.	2192.	3.385E+05	6.90	2.967	- sM

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

This section based on library: DET_EnergyStandardMix & Mn, Zn.L

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.59	59.57	108036.	258725.	71.868	0.32	0.885
CD-109	351.44	88.03	94147.	351348.	97.597	0.25	0.945
CO-57	487.37	122.00	62912.	165308.	45.919	0.41	0.979
Ce-139	662.50	165.77	52768.	162197.	45.055	0.40	1.015
Hg-203	1116.55	279.26	29908.	107214.	29.782	0.47	1.138
SN-113	1566.60	391.75	21940.	109651.	30.459	0.43	1.237
CS-137	2646.39	661.65	16600.	74553.	20.709	0.54	1.507
Mn-54	3339.24	834.85	10174.	92207.	25.613	0.36	1.626D
Y-898	3592.02	898.04	15389.	120447.	33.458	0.39	1.681
Zn-65	4462.01	1115.53	9956.	70435.	19.565	0.55	1.851
Co-1173	4692.77	1173.22	7268.	79095.	21.971	0.48	1.895
Co-1332	5329.78	1332.47	4608.	70838.	19.677	0.46	2.027
Y-1836	7343.76	1836.01	1125.	69898.	19.416	0.41	2.456

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

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

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq	COMMENTS
AM-241		5.0933E+03				1.58E+05	
			59.54	5.093E+03	(	3.021E+01	3.21E-01 3.57E+01 G

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

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments

CD-109		6.9699E+04						4.63E+02	
			88.03	6.970E+04	(	2.842E+02	2.48E-01	3.61E+00	G
CO-57		1.5804E+03						2.72E+02	
			122.06	1.580E+03	(	1.120E+01	4.05E-01	8.56E+01	G
Ce-139		2.3835E+03						1.38E+02	
			165.85	2.383E+03	(	1.577E+01	4.02E-01	7.99E+01	G
Hg-203		5.2816E+03						4.66E+01	
			279.17	5.282E+03	(	3.983E+01	4.73E-01	8.15E+01	G
SN-113		4.2577E+03						1.15E+02	
			391.69	4.258E+03	(	2.691E+01	4.34E-01	6.40E+01	G
CS-137		2.0333E+03						1.10E+04	
			661.66	2.033E+03	(	1.645E+01	5.37E-01	8.52E+01	G
Mn-54		3.1502E+03						3.12E+02	
			834.85	3.150E+03	(	1.615E+01	3.64E-01	1.00E+02	G
Y-898		6.7342E+03						1.07E+02	
			898.02	6.734E+03	(	3.247E+01	3.90E-01	9.37E+01	G
Zn-65	F	6.4905E+03						2.44E+02	
			1115.55	6.491E+03	(	4.310E+01	5.47E-01	5.06E+01	G
Co-1173		3.1322E+03						1.93E+03	
			1173.24	3.132E+03	(	1.584E+01	4.77E-01	9.99E+01	G
Co-1332		3.1495E+03						1.93E+03	
			1332.50	3.150E+03	(	1.419E+01	4.58E-01	1.00E+02	G
Y-1836		7.1179E+03						1.07E+02	
			1836.01	7.118E+03	(	1.619E+01	4.08E-01	9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
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? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
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$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
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- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
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R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

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

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

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
AM-241	5.0914E+03	5.0933E+03	3.213E-01%	3.02E+01
CD-109	6.1380E+04	6.9699E+04	2.480E-01%	2.84E+02
CO-57	1.2730E+03	1.5804E+03	4.051E-01%	1.12E+01
Ce-139	1.5549E+03	2.3835E+03	4.024E-01%	1.58E+01
Hg-203	1.4969E+03	5.2816E+03	4.726E-01%	3.98E+01
SN-113	2.5546E+03	4.2577E+03	4.342E-01%	2.69E+01
CS-137	2.0225E+03	2.0333E+03	5.371E-01%	1.64E+01
Mn-54	2.6097E+03	3.1502E+03	3.638E-01%	1.62E+01
Y-898	3.8795E+03	6.7342E+03	3.898E-01%	3.25E+01
Zn-65	5.1023E+03	6.4905E+03	5.470E-01%	4.31E+01
Co-1173	3.0380E+03	3.1322E+03	4.766E-01%	1.58E+01
Co-1332	3.0548E+03	3.1495E+03	4.583E-01%	1.42E+01
Y-1836	4.1005E+03	7.1179E+03	4.075E-01%	1.62E+01

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

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 9:26:09 AM Page 6
TestAmerica Spectrum name: 7_1Lmarn_20120463.An1

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

Total Activity (877.5 to 2000.1 keV) 9.716E+04 Bq
Total Decayed Activity (877.5 to 2000.1 keV) 1.2010304E+05 Bq

Gamma Verification per Geometry

Detector: Ge7

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14726	98.7
Am-241	2037	418	0.3590	1163	1241.6	106.7
Cd-109	2881	591	0.0361	16363	15976	97.6
Co-57	1511	310	0.8560	362	346.77	95.8
Ce-139	2139	439	0.7990	549	539.48	98.3
Hg-203	4651	954	0.8146	1171	1199.2	102.4
Sn-113	3015	618	0.6400	966	976.76	101.1
Cs-137	1938	397	0.8510	467	467.66	100.2
Y-88	7264	1489	0.9370	1589	1567.3	98.6
Co-60	3580	734	0.9997	734	726.23	98.9
Co-60	3581	734	0.9999	734	719.64	98.0
Y-88	7690	1577	0.9920	1589	1635.7	102.9

Reviewed By: Jody Watson

Date: 3/16/2012

Calibration Data from file: 7_Soil_TunaCan.Clb
Energy Calibration Date: 3/16/2012 Time: 11:44:50 AM
Efficiency Calibration Date: 3/16/2012 Time: 11:45:14 AM

Calibration Description:
7_TunaCan_90099_030512

Energy Calibration Fit
Energy = 0.1533 +0.249954*Channel +6.71576e-009*Channel**2
FWHM (ch) = 3.2969 +0.001030*Channel -2.25091e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.73	46.54	46.58	-0.08%	0.86	0.87	-1.80%
237.72	59.54	59.57	-0.06%	0.86	0.88	-3.29%
351.56	88.03	88.03	0.00%	0.91	0.91	-0.17%
487.42	122.06	121.99	0.06%	0.97	0.95	2.36%
662.55	165.85	165.76	0.05%	1.00	0.99	1.26%
1116.52	279.17	279.24	-0.03%	1.13	1.10	1.85%
1566.54	391.69	391.73	-0.01%	1.21	1.21	-0.23%
2646.25	661.66	661.64	0.00%	1.47	1.47	0.54%
3591.85	898.02	898.04	-0.00%	1.66	1.68	-1.15%
4692.53	1173.24	1173.22	0.00%	1.92	1.91	0.69%
5329.58	1332.50	1332.49	0.00%	2.02	2.04	-0.87%
7343.37	1836.01	1836.02	-0.00%	2.42	2.41	0.28%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.8690 %
Ln(Eff) = 0.6717 -0.616654*Ln(Eng) -0.0206592*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.4845 %
Ln(Eff) = -26.8969 +10.195443*Ln(Eng) -1.08167*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.3732E-002	2.4829E-002	-4.62%
59.54	3.9252E-002	3.7016E-002	5.70%
88.03	5.1999E-002	5.3285E-002	-2.47%
122.06	5.3679E-002	5.6057E-002	-4.43%
165.85	========== Knee ==========		
165.85	4.7932E-002	4.8811E-002	-1.83%
279.17	3.2322E-002	3.1541E-002	2.42%
391.69	2.3837E-002	2.3601E-002	0.99%
661.66	1.4947E-002	1.4924E-002	0.15%
898.02	1.1205E-002	1.1367E-002	-1.45%
1173.24	8.8255E-003	8.9287E-003	-1.17%
1332.50	7.7833E-003	7.9508E-003	-2.15%
1836.01	6.0876E-003	5.9192E-003	2.77%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14941.00	635.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	967.19	619.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	467.08	398.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1590.20	1490.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	735.15	735.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1590.70	1578.00	4.00%	1/1/2012 11:00:00 AM

ORTEC g v - i (1087) Env32 G53W4.25 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

Sample description
7_TunaCan_90099_030512

Spectrum Filename: C:\User\SPC\Det7\7_TunaCan_20120388.An1

Acquisition information
Start time: 3/5/2012 2:07:36 PM
Live time: 3600
Real time: 3721
Dead time: 3.25 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration
Created: 3/16/2012 11:44:50 AM
Zero offset: 0.153 keV
Gain: 0.250 keV/channel
Quadratic: 6.716E-09 keV/channel^2

Efficiency Calibration
Created: 3/16/2012 11:45:14 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.716580E-01 + (-6.166540E-01*Log(E)) +
(-2.065917E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): -2.689695E+01 + (1.019544E+01*Log(E)) +
(-1.081671E+00*Log(E)^2)

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

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.65keV)
Stop channel: 8000 (2000.21keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

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

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

total peaks alloc. 12 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0324

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.63	53946.	0.53	0.87	2.487E-02	46.54	4.250	1.428E+04	Pb210
59.57	59050.	0.65	0.86	3.704E-02	59.54	35.700	1.242E+03	AM241
70.74	2770.	6.58	0.90	4.527E-02				
72.95	4536.	4.27	0.90	4.661E-02				
88.03	100494.	0.43	0.91	5.328E-02	88.03	3.610	1.598E+04	CD109
121.99	50865.	0.71	0.97	5.606E-02	122.06	85.600	3.468E+02	CO57
136.41	6524.	3.77	0.93	5.411E-02				
165.76	54838.	0.57	1.00	4.767E-02	165.85	79.900	5.395E+02	Ce139
255.13	1772.	7.37	1.21	3.404E-02				
279.24	42776.	0.59	1.13	3.153E-02	279.17	81.500	1.199E+03	Hg203
391.73	36096.	0.66	1.21	2.360E-02	391.69	64.000	9.768E+02	SN113
661.68	21323.	0.77	1.47	1.492E-02	661.66	85.210	4.677E+02	CS137
898.03	39603.	0.63	1.66	1.137E-02	898.02	93.700	1.567E+03	Y898
1173.21	22788.	0.85	1.92	8.929E-03	1173.24	99.900	7.262E+02	Co1173
1332.49	20124.	0.85	2.02	7.951E-03	1332.50	99.982	7.196E+02	Co1332
1836.00	22787.	0.70	2.43	5.919E-03	1836.01	99.200	1.636E+03	Y1836

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

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
282.41	70.73	15146.	2828.	6.248E+04	6.43	0.896	-	D
291.25	72.94	16305.	4682.	1.005E+05	4.12	0.899	-	D
545.11	136.41	12980.	6524.	1.206E+05	3.77	0.932	-	
1020.07	255.13	4580.	1772.	5.204E+04	7.37	1.209	-	

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

This section based on library: DET_EnergyStandardMix & Pb.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.73	46.58	19825.	55636.	15.454	0.65	0.856
AM-241	237.72	59.57	21942.	59050.	16.403	0.65	0.857
CD-109	351.56	88.03	21396.	100494.	27.915	0.43	0.912
CO-57	487.42	121.99	16859.	50865.	14.129	0.71	0.971
Ce-139	662.55	165.76	9893.	54838.	15.233	0.57	1.005
Hg-203	1116.52	279.24	5111.	42776.	11.882	0.59	1.126
SN-113	1566.54	391.73	4106.	36096.	10.027	0.66	1.211
CS-137	2646.33	661.66	2922.	21323.	5.923	0.77	1.466D
Y-898	3591.84	898.03	3210.	39603.	11.001	0.63	1.659
Co-1173	4692.50	1173.21	1804.	22788.	6.330	0.85	1.924
Co-1332	5329.58	1332.49	1286.	20124.	5.590	0.85	2.020
Y-1836	7343.30	1836.00	283.	22787.	6.330	0.70	2.426

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

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

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq		Peak MDA Value Bq			COMMENTS
Pb-210	N	1.4726E+04						8.15E+03	
			46.54	1.473E+04	(	1.744E+02	6.52E-01	4.25E+00	G
AM-241		1.2416E+03						1.58E+05	
			59.54	1.242E+03	(	1.457E+01	6.49E-01	3.57E+01	G
CD-109		1.5976E+04						4.63E+02	
			88.03	1.598E+04	(	1.088E+02	4.29E-01	3.61E+00	G
CO-57		3.4677E+02						2.72E+02	
			122.06	3.468E+02	(	4.144E+00	7.08E-01	8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Ce-139	5.3948E+02				1.38E+02	
		165.85	5.395E+02	(	4.586E+00 5.65E-01 7.99E+01	G
Hg-203	1.1992E+03				4.66E+01	
		279.17	1.199E+03	(	9.415E+00 5.92E-01 8.15E+01	G
SN-113	9.7676E+02				1.15E+02	
		391.69	9.768E+02	(	8.153E+00 6.55E-01 6.40E+01	G
CS-137	4.6766E+02				1.10E+04	
		661.66	4.677E+02	(	5.584E+00 7.73E-01 8.52E+01	G
Y-898	1.5673E+03				1.07E+02	
		898.02	1.567E+03	(	1.056E+01 6.29E-01 9.37E+01	G
Co-1173	7.2623E+02				1.93E+03	
		1173.24	7.262E+02	(	6.394E+00 8.53E-01 9.99E+01	G
Co-1332	7.1964E+02				1.93E+03	
		1332.50	7.196E+02	(	6.072E+00 8.54E-01 1.00E+02	G
Y-1836	1.6357E+03				1.07E+02	
		1836.01	1.636E+03	(	5.819E+00 7.02E-01 9.92E+01	G

(- This peak used in the nuclide activity average.

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

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

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

ORTEC g v - i (1087) Env32 G53W4.25 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

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

- - - -

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
```

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	-

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: Ge 11

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 Rad11-0032

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	Abundance	Activity Bq/L	Count Results	%recovery
Am-241	1830	1830	0.359	**5097.5**	5128.6	100.6
Cd-109	2609	2609	0.0361	**72271.5**	70492	97.5
Co-57	1339	1339	0.856	**1564.3**	1568.3	100.3
Ce-139	1917	1917	0.799	**2399.2**	2350.2	98.0
Hg-203	4232	4232	0.8146	**5195.2**	5319.7	102.4
Sn-113	2719	2719	0.64	**4248.4**	4283.1	100.8
Cs-137	1705	1705	0.851	**2003.5**	1997.7	99.7
Mn-54	3083	3083	0.9998	**3083.6**	3059.4	99.2
Y-88	6493	6493	0.937	**6929.6**	6602.2	95.3
Zn-65	3181	3181	0.506	**6286.6**	6620.4	105.3
Co-60	3293	3293	0.99974	**3293.9**	3187.2	96.8
Co-60	3294	3294	0.99986	**3294.5**	3225	97.9
Y-88	6874	6874	0.992	**6929.4**	7070.4	102.0

Reviewed By: Jody Watson

Date: 10/31/2011

Calibration Data from file: 11_Liquid_Marinelli 1L.Clb
Energy Calibration Date: 11/1/2011 Time: 11:26:50 AM
Efficiency Calibration Date: 11/1/2011 Time: 11:27:06 AM

Calibration Description:
Ge11_1Lmarn_83924_334_101210 ✓

Energy Calibration Fit
Energy = 0.0977 +0.250130*Channel -2.6695e-008*Channel**2
FWHM (ch) = 3.4252 +0.000986*Channel -2.86452e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
237.71	59.54	59.55	-0.02%	0.90	0.91	-1.80%
351.58	88.03	88.03	-0.01%	0.96	0.94	1.36%
487.74	122.06	122.09	-0.02%	0.98	0.98	0.68%
662.93	165.85	165.90	-0.03%	1.00	1.02	-1.35%
1115.42	279.17	279.06	0.04%	1.14	1.12	1.10%
1565.62	391.69	391.64	0.01%	1.23	1.22	0.51%
2645.74	661.66	661.69	-0.00%	1.44	1.46	-0.98%
3338.49	834.85	834.86	-0.00%	1.60	1.60	0.00%
3591.24	898.02	898.03	-0.00%	1.65	1.65	0.36%
4461.62	1115.55	1115.55	-0.00%	1.81	1.81	-0.17%
4692.51	1173.24	1173.25	-0.00%	1.86	1.85	0.49%
5329.92	1332.50	1332.51	-0.00%	1.96	1.97	-0.42%
7345.54	1836.01	1836.00	0.00%	2.28	2.28	0.07%

✓ ✓ ✓

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.6925 %
Ln(Eff) = -1.7287 +0.059982*Ln(Eng) -0.0639924*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.1511 %
Ln(Eff) = -13.4091 +4.619770*Ln(Eng) -0.50897*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
59.54	4.8346E-002	4.8322E-002	0.05%
88.03	5.3328E-002	5.3510E-002	-0.34%
122.06	5.1850E-002	5.1711E-002	0.27%
165.85	========== Knee ==========		
165.85	4.4411E-002	4.5327E-002	-2.06%
279.17	3.3580E-002	3.2693E-002	2.64%
391.69	2.6161E-002	2.5946E-002	0.82%
661.66	1.7595E-002	1.7624E-002	-0.16%
834.85	1.4573E-002	1.4680E-002	-0.74%
898.02	1.3192E-002	1.3842E-002	-4.93%
1115.55	1.2201E-002	1.1576E-002	5.12%
1173.24	1.0728E-002	1.1095E-002	-3.42%
1332.50	9.7442E-003	9.9541E-003	-2.15%
1836.01	7.6592E-003	7.5043E-003	2.02%

✓ ✓

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Am-241	59.54	35.90	1.58E+005	5097.50	1830.00	3.50%	1/1/2011 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	72271.00	2609.00	4.90%	1/1/2011 11:00:00 AM
Co-57	122.07	85.59	2.72E+002	1564.40	1339.00	4.10%	1/1/2011 11:00:00 AM
Ce-139	165.85	80.00	1.38E+002	2396.30	1917.00	3.90%	1/1/2011 11:00:00 AM
Hg-203	279.19	81.50	4.66E+001	5192.60	4232.00	3.90%	1/1/2011 11:00:00 AM
Sn-113	391.71	64.00	1.15E+002	4248.40	2719.00	2.50%	1/1/2011 11:00:00 AM
Cs-137	661.66	85.10	1.10E+004	2003.50	1705.00	4.00%	1/1/2011 11:00:00 AM
Mn-54	834.83	99.98	3.12E+002	3083.60	3083.00	3.30%	1/1/2011 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	6929.60	6493.00	3.90%	1/1/2011 11:00:00 AM
Zn-65	1115.52	50.75	2.44E+002	6268.00	3181.00	3.50%	1/1/2011 11:00:00 AM
Co-60	1173.24	99.97	1.93E+003	3293.90	3293.00	4.00%	1/1/2011 11:00:00 AM
Co-60	1332.50	99.99	1.93E+003	3294.50	3294.00	4.00%	1/1/2011 11:00:00 AM

Y-88	1836.01	99.20	1.07E+002	6929.40	6874.00	3.90%	1/1/2011 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  11/4/2011 9:30:44 AM
TestAmerica, Inc                Spectrum name: 11_Liquid_20110906.An1

Sample description
     11_Liquid_Marn83924


Spectrum Filename: C:\User\SPC\Det11\11_Liquid_20110906.An1

Acquisition information
       Start time:                 10/31/2011 1:03:19 PM
       Live time:                7200
       Real time:                7874
       Dead time:                   8.55 %
       Detector ID:                   11

Detector system
     Ge11 SN/09363993


Calibration
       Filename:                   11_Liquid_Marinelli 1L.Clb
     Ge11_1Lmarn_83924_334_101210


       Energy Calibration
            Created:               11/1/2011 11:26:50 AM
            Zero offset:           0.098 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.669E-08 keV/channel^2

       Efficiency Calibration
            Created:               11/1/2011 11:27:06 AM
            Knee Energy:          165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.69 %
            Log(Eff):             -1.728738E+00 + ( 5.998209E-02*Log(E) ) +
                                   ( -6.399241E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   0.15 %
            Log(Eff):             -1.340909E+01 + ( 4.619770E+00*Log(E) ) +
                                   ( -5.089701E-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 (    37.62keV )
       Stop channel:            8000 (  1999.43keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:   3
       Sample Size:               1.0000E+00
       Activity scaling factor:   1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                  1.0000E+00
       Detection limit method:    Reg. Guide 4.16 Method
```

Random error:	1.0000000E+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:	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: 0.0219

***** 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
36.40	4803.	7.38	0.89	3.403E-02				
37.91	13900.	2.80	0.89	3.536E-02				
49.56	27222.	2.92	1.86	4.366E-02				
59.55	636154.	0.18	0.90	4.833E-02	59.54	35.700	5.129E+03	AM241
84.72	8804.	4.81	0.94	5.334E-02				
88.05	635801.	0.14	0.94	5.351E-02	88.03	3.610	7.199E+04	CD109
122.09	230744.	0.30	0.98	5.171E-02	122.06	85.600	1.568E+03	CO57
136.51	28230.	1.43	1.01	4.985E-02				
165.90	133190.	0.42	1.00	4.532E-02	165.85	79.900	2.350E+03	Ce139
199.08	4380.	8.87	1.41	4.058E-02				
255.07	3570.	8.99	1.11	3.468E-02				
279.06	11277.	3.22	1.14	3.270E-02	279.17	81.500	5.320E+03	Hg203
391.64	82527.	0.56	1.23	2.595E-02	391.69	64.000	4.283E+03	SN113
510.98	12173.	3.16	2.44	2.142E-02				
661.69	211908.	0.28	1.44	1.762E-02	661.66	85.210	1.998E+03	CS137
834.86	164992.	0.34	1.60	1.468E-02	834.85	99.980	3.059E+03	Mn54
898.03	85918.	0.65	1.66	1.384E-02	898.02	93.700	6.602E+03	Y898
1115.55	118160.	0.42	1.81	1.158E-02	1115.55	50.600	6.620E+03	Zn65
1173.25	228064.	0.25	1.86	1.110E-02	1173.24	99.900	3.187E+03	Co1173
1324.90	1722.	9.54	2.17	1.000E-02				
1332.51	207205.	0.24	1.96	9.954E-03	1332.50	99.982	3.225E+03	Co1332
1835.99	52809.	0.48	2.28	7.504E-03	1836.01	99.200	7.070E+03	Y1836

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

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
145.12	36.36	60498.	4803.	1.412E+05	7.38	0.892	-	D
151.17	37.87	69051.	13900.	3.931E+05	2.80	0.894	-	D
197.75	49.56	172998.	27222.	6.235E+05	2.92	1.859	-	s

ORTEC g v - i (1087) Env32 G53W4.25 11/4/2011 9:30:44 AM
TestAmerica, Inc Spectrum name: 11_Liquid_20110906.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
338.33	84.71	85213.	8804.	4.543E+04	4.81	0.939	- lD
545.40	136.51	38738.	28230.	5.663E+05	1.43	1.007	-
795.60	199.08	38224.	4380.	1.079E+05	8.87	1.414	- s
1019.49	255.07	28430.	3570.	1.029E+05	8.99	1.106	-
2042.93	510.98	26229.	12173.	5.683E+05	3.16	2.436	- s
5299.47	1324.90	3888.	1722.	1.722E+05	9.54	2.166	- sM

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

This section based on library: DET_EnergyStandardMix & Mn, Zn.L

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.71	59.55	163443.	636154.	88.355	0.18	0.899
CD-109	351.58	88.03	115340.	622562.	86.467	0.17	0.955
CO-57	487.74	122.09	58659.	230744.	32.048	0.30	0.982
Ce-139	662.93	165.90	42937.	133190.	18.499	0.42	1.003
Hg-203	1115.42	279.06	30048.	11277.	1.566	3.22	1.135
SN-113	1565.62	391.64	27516.	82527.	11.462	0.56	1.231
CS-137	2645.74	661.69	24411.	211908.	29.432	0.28	1.444
Mn-54	3338.49	834.86	23287.	164992.	22.916	0.34	1.599
Y-898	3591.25	898.03	30463.	85918.	11.933	0.65	1.655
Zn-65	4461.62	1115.55	17466.	118160.	16.411	0.42	1.809
Co-1173	4692.50	1173.25	12008.	228064.	31.676	0.25	1.864
Co-1332	5329.92	1332.51	4290.	207205.	28.778	0.24	1.957
Y-1836	7345.52	1835.99	1272.	52809.	7.335	0.48	2.281

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

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

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Peak Code	Peak MDA Value Bq	COMMENTS
AM-241		5.1286E+03				1.58E+05	
			59.54	5.129E+03	(	1.521E+01 1.79E-01 3.57E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 11/4/2011 9:30:44 AM
TestAmerica, Inc Spectrum name: 11_Liquid_20110906.An1

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109		7.0492E+04					4.63E+02	
			88.03	7.049E+04	(	1.795E+02	1.70E-01	3.61E+00 G
CO-57		1.5683E+03					2.72E+02	
			122.06	1.568E+03	(	7.689E+00	2.99E-01	8.56E+01 G
Ce-139		2.3502E+03					1.38E+02	
			165.85	2.350E+03	(	1.709E+01	4.19E-01	7.99E+01 G
Hg-203		5.3197E+03					4.66E+01	
			279.17	5.320E+03	(	3.823E+02	3.22E+00	8.15E+01 G
SN-113		4.2831E+03					1.15E+02	
			391.69	4.283E+03	(	4.026E+01	5.63E-01	6.40E+01 G
CS-137		1.9977E+03					1.10E+04	
			661.66	1.998E+03	(	6.889E+00	2.79E-01	8.52E+01 G
Mn-54		3.0594E+03					3.12E+02	
			834.85	3.059E+03	(	1.324E+01	3.41E-01	1.00E+02 G
Y-898		6.6022E+03					1.07E+02	
			898.02	6.602E+03	(	6.271E+01	6.47E-01	9.37E+01 G
Zn-65	F	6.6204E+03					2.44E+02	
			1115.55	6.620E+03	(	3.466E+01	4.22E-01	5.06E+01 G
Co-1173		3.1872E+03					1.93E+03	
			1173.24	3.187E+03	(	7.174E+00	2.52E-01	9.99E+01 G
Co-1332		3.2250E+03					1.93E+03	
			1332.50	3.225E+03	(	4.793E+00	2.36E-01	1.00E+02 G
Y-1836		7.0704E+03					1.07E+02	
			1836.01	7.070E+03	(	2.261E+01	4.84E-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.

ORTEC g v - i (1087) Env32 G53W4.25 11/4/2011 9:30:44 AM
TestAmerica, Inc Spectrum name: 11_Liquid_20110906.An1

- - 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	

- - - -

ORTEC g v - i (1087) Env32 G53W4.25 11/4/2011 9:30:44 AM
TestAmerica, Inc Spectrum name: 11_Liquid_20110906.An1

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

Total Activity (42.9 to 1999.4 keV) 6.585E+04 Bq
Total Decayed Activity (42.9 to 1999.4 keV) 1.2090427E+05 Bq

Analyzed by: _____
admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc

Gamma Verification per Geometry

Detector: Ge12

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**	5105.3	100.6
Cd-109	2602	2602	0.0361	**72077.6**	69937	97.0
Co-57	1364	1364	0.856	**1593.5**	1601	100.5
Ce-139	1932	1932	0.799	**2418.0**	2419.8	100.1
Hg-203	4200	4200	0.8146	**5155.9**	5250	101.8
Sn-113	2722	2722	0.64	**4253.1**	4232.6	99.5
Cs-137	1750	1750	0.851	**2056.4**	2043.2	99.4
Mn-54	3114	3114	0.9998	**3114.6**	3226.9	103.6
Y-88	6559	6559	0.937	**7000.0**	6535.5	93.4
Zn-65	3134	3134	0.506	**6193.7**	6567.8	106.0
Co-60	3233	3233	0.99974	**3233.8**	3114.7	96.3
Co-60	3233	3233	0.99986	**3233.5**	3112.9	96.3
Y-88	6944	6944	0.992	**7000.0**	7133.6	101.9

Reviewed By: Megan McAfee

Date: 4/10/2012

Calibration Data from file: 12_Liquid_Marinelli 1L.Clb
Energy Calibration Date: 4/2/2012 Time: 5:16:59 PM
Efficiency Calibration Date: 4/2/2012 Time: 5:17:10 PM

Calibration Description:
Ge12_Marn1LCal_90062_032612

Energy Calibration Fit
Energy = 0.1071 +0.250201*Channel -3.54049e-008*Channel**2
FWHM (ch) = 3.6433 +0.000897*Channel -1.85195e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
237.63	59.54	59.56	-0.03%	0.95	0.96	-1.95%
351.51	88.03	88.05	-0.02%	1.00	0.99	1.12%
487.56	122.06	122.09	-0.02%	1.02	1.02	0.27%
662.76	165.85	165.91	-0.04%	1.05	1.06	-0.48%
1115.13	279.17	279.07	0.04%	1.16	1.16	0.39%
1565.05	391.69	391.60	0.02%	1.26	1.25	0.73%
2645.14	661.66	661.67	-0.00%	1.47	1.47	-0.15%
3337.89	834.85	834.86	-0.00%	1.61	1.61	0.30%
3590.66	898.02	898.04	-0.00%	1.66	1.66	0.21%
4461.02	1115.55	1115.55	-0.00%	1.82	1.82	-0.08%
4691.91	1173.24	1173.25	-0.00%	1.85	1.86	-0.28%
5329.51	1332.50	1332.55	-0.00%	1.96	1.97	-0.48%
7345.24	1836.01	1835.98	0.00%	2.31	2.31	0.24%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.1819 %
Ln(Eff) = -2.7712 +0.400977*Ln(Eng) -0.0891117*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.2531 %
Ln(Eff) = -13.2459 +4.570937*Ln(Eng) -0.503944*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
59.54	5.0722E-002	5.0677E-002	0.09%
88.03	5.5677E-002	5.5991E-002	-0.56%
122.06	5.4332E-002	5.4071E-002	0.48%
165.85	========== Knee ==========		
165.85	4.6910E-002	4.7377E-002	-1.00%
279.17	3.6139E-002	3.5461E-002	1.88%
391.69	2.8486E-002	2.8620E-002	-0.47%
661.66	1.9624E-002	1.9726E-002	-0.52%
834.85	1.7060E-002	1.6465E-002	3.49%
898.02	1.4498E-002	1.5526E-002	-7.09%
1115.55	1.3752E-002	1.2968E-002	5.70%
1173.24	1.1955E-002	1.2421E-002	-3.90%
1332.50	1.0704E-002	1.1119E-002	-3.88%
1836.01	8.4660E-003	8.3061E-003	1.89%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Am-241	59.54	35.70	1.58E+005	5100.80	1821.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	72078.00	2602.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	1593.50	1364.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	2418.00	1932.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	5153.40	4200.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	4253.10	2722.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	2053.70	1750.00	4.00%	1/1/2012 11:00:00 AM
Mn-54	834.85	99.98	3.12E+002	3114.60	3114.00	3.30%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	7000.00	6559.00	3.90%	1/1/2012 11:00:00 AM
Zn-65	1115.55	50.60	2.44E+002	6193.70	3134.00	3.50%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	3236.20	3233.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	3233.60	3233.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	7000.00	6944.00	4.00%	1/1/2012 11:00:00 AM

ORTEC g v - i (1087) Env32 G53W4.25 4/2/2012 5:17:37 PM
TestAmerica, Inc Spectrum name: 12_1LMarn_20120731.An1

Sample description
12_1LMarn_90062_032612

Spectrum Filename: C:\User\SPC\Det12\12_1LMarn_20120731.An1

Acquisition information
Start time: 3/26/2012 11:38:29 AM
Live time: 3600
Real time: 4205
Dead time: 14.40 %
Detector ID: 12

Detector system
Ge12 SN/10034336

Calibration
Filename: 12_Liquid_Marinelli 1L.Clb
Ge12_Marn1LCal_90062_032612

Energy Calibration
Created: 4/2/2012 5:16:59 PM
Zero offset: 0.107 keV
Gain: 0.250 keV/channel
Quadratic: -3.540E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 5:17:10 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.18 %
Log(Eff): -2.771167E+00 + (4.009767E-01*Log(E)) +
(-8.911171E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.25 %
Log(Eff): -1.324587E+01 + (4.570937E+00*Log(E)) +
(-5.039442E-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 (37.64keV)
Stop channel: 8000 (1999.45keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

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

Corrections	Status	Comments
Decay correct to date:	YES	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: 0.0272

***** 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
37.94	28085.	2.05	1.02	3.732E-02				
49.79	13754.	4.70	2.04	4.600E-02				
59.56	332388.	0.30	0.95	5.068E-02	59.54	35.700	5.105E+03	AM241
66.67	7205.	8.69	2.85	5.299E-02				
70.79	10394.	4.12	0.97	5.398E-02				
72.94	16670.	2.56	0.98	5.440E-02				
82.51	9156.	4.53	0.98	5.566E-02				
84.95	13122.	3.07	0.99	5.584E-02				
88.07	457312.	0.17	0.99	5.599E-02	88.03	3.610	7.139E+04	CD109
122.08	214769.	0.38	1.02	5.407E-02	122.06	85.600	1.601E+03	CO57
136.51	26655.	1.93	1.03	5.212E-02				
165.93	212593.	0.25	1.06	4.737E-02	165.85	79.900	2.394E+03	Ce139
199.16	6079.	6.77	1.22	4.303E-02				
255.00	7424.	5.34	1.11	3.742E-02				
279.07	154333.	0.41	1.16	3.547E-02	279.17	81.500	5.250E+03	Hg203
391.60	167246.	0.36	1.26	2.862E-02	391.69	64.000	4.233E+03	SN113
510.99	14530.	2.70	2.58	2.384E-02				
661.67	122972.	0.46	1.47	1.973E-02	661.66	85.210	2.043E+03	CS137
813.80	2410.	9.44	1.64	1.680E-02				
834.85	158346.	0.36	1.61	1.646E-02	834.85	99.980	3.227E+03	Mn54
898.03	196917.	0.32	1.66	1.553E-02	898.02	93.700	6.535E+03	Y898
1115.54	121888.	0.40	1.82	1.297E-02	1115.55	50.600	6.568E+03	Zn65
1173.24	134942.	0.34	1.86	1.242E-02	1173.24	99.900	3.115E+03	Co1173
1324.88	3374.	5.94	2.79	1.118E-02				
1332.55	120824.	0.36	1.96	1.112E-02	1332.50	99.982	3.113E+03	Co1332
1835.96	121734.	0.32	2.32	8.306E-03	1836.01	99.200	7.134E+03	Y1836

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

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
151.23	37.94	78730.	28085.	7.525E+05	2.05	1.015	- s
198.58	49.79	115542.	13754.	2.990E+05	4.70	2.040	- s
266.05	66.67	104952.	7205.	1.360E+05	8.69	2.853	- s

ORTEC g v - i (1087) Env32 G53W4.25 4/2/2012 5:17:37 PM
TestAmerica, Inc Spectrum name: 12_1LMarn_20120731.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
282.52	70.79	86523.	10394.	1.926E+05	4.12	0.975 -	D
291.09	72.93	82453.	16670.	3.064E+05	2.56	0.976 -	D
329.38	82.50	81479.	9156.	7.561E+04	4.53	0.985 -	lD
339.11	84.93	74517.	13122.	2.766E+04	3.07	0.987 -	lD
545.20	136.51	59598.	26655.	5.114E+05	1.93	1.034 -	
795.67	199.16	42585.	6079.	1.413E+05	6.77	1.221 -	
1018.90	255.00	36005.	7424.	1.984E+05	5.34	1.112 -	
2042.47	510.99	25384.	14530.	6.094E+05	2.70	2.579 -	s
3253.66	813.80	11387.	2410.	1.434E+05	9.44	1.639 -	
5298.83	1324.88	6125.	3374.	3.019E+05	5.94	2.787 -	sM

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

This section based on library: DET_EnergyStandardMix & Mn, Zn.L

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.63	59.56	146464.	332388.	92.330	0.30	0.946
CD-109	351.51	88.05	113553.	448029.	124.452	0.22	1.001
CO-57	487.55	122.08	87100.	214769.	59.658	0.38	1.023
Ce-139	662.76	165.91	57396.	214900.	59.694	0.32	1.053
Hg-203	1115.13	279.07	44199.	154333.	42.870	0.41	1.160
SN-113	1565.05	391.60	32591.	167246.	46.457	0.36	1.260
CS-137	2645.12	661.67	30520.	122972.	34.159	0.46	1.470
Mn-54	3337.88	834.85	23845.	158346.	43.985	0.36	1.613
Y-898	3590.64	898.03	26904.	196917.	54.699	0.32	1.661
Zn-65	4460.98	1115.54	14600.	121888.	33.858	0.40	1.819
Co-1173	4691.89	1173.24	10127.	134942.	37.484	0.34	1.856
Co-1332	5329.51	1332.55	8323.	120824.	33.562	0.36	1.964
Y-1836	7345.16	1835.96	3494.	121734.	33.815	0.32	2.315

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

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

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq		COMMENTS
AM-241		5.1053E+03				1.58E+05		
			59.54	5.105E+03	(	2.743E+01	3.00E-01 3.57E+01	G
CD-109		6.9937E+04				4.63E+02		
			88.03	6.994E+04	(	2.455E+02	2.16E-01 3.61E+00	G
CO-57		1.6010E+03				2.72E+02		
			122.06	1.601E+03	(	1.027E+01	3.75E-01 8.56E+01	G
Ce-139		2.4198E+03				1.38E+02		
			165.85	2.420E+03	(	1.260E+01	3.20E-01 7.99E+01	G
Hg-203		5.2500E+03				4.66E+01		
			279.17	5.250E+03	(	3.342E+01	4.08E-01 8.15E+01	G
SN-113		4.2326E+03				1.15E+02		
			391.69	4.233E+03	(	2.136E+01	3.57E-01 6.40E+01	G
CS-137		2.0432E+03				1.10E+04		
			661.66	2.043E+03	(	1.357E+01	4.61E-01 8.52E+01	G
Mn-54		3.2269E+03				3.12E+02		
			834.85	3.227E+03	(	1.472E+01	3.65E-01 1.00E+02	G
Y-898		6.5355E+03				1.07E+02		
			898.02	6.535E+03	(	2.546E+01	3.19E-01 9.37E+01	G
Zn-65	F	6.5678E+03				2.44E+02		
			1115.55	6.568E+03	(	3.049E+01	3.97E-01 5.06E+01	G
Co-1173		3.1147E+03				1.93E+03		
			1173.24	3.115E+03	(	1.089E+01	3.42E-01 9.99E+01	G
Co-1332		3.1129E+03				1.93E+03		
			1332.50	3.113E+03	(	1.102E+01	3.57E-01 1.00E+02	G
Y-1836		7.1336E+03				1.07E+02		
			1836.01	7.134E+03	(	1.630E+01	3.23E-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	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
AM-241	5.1034E+03	5.1053E+03	2.996E-01%	2.74E+01
CD-109	6.1571E+04	6.9937E+04	2.164E-01%	2.46E+02
CO-57	1.2889E+03	1.6010E+03	3.755E-01%	1.03E+01
Ce-139	1.5770E+03	2.4198E+03	3.201E-01%	1.26E+01
Hg-203	1.4834E+03	5.2500E+03	4.085E-01%	3.34E+01
SN-113	2.5364E+03	4.2326E+03	3.574E-01%	2.14E+01
CS-137	2.0322E+03	2.0432E+03	4.610E-01%	1.36E+01
Mn-54	2.6720E+03	3.2269E+03	3.645E-01%	1.47E+01
Y-898	3.7598E+03	6.5355E+03	3.188E-01%	2.55E+01
Zn-65	5.1600E+03	6.5678E+03	3.967E-01%	3.05E+01
Co-1173	3.0208E+03	3.1147E+03	3.417E-01%	1.09E+01
Co-1332	3.0190E+03	3.1129E+03	3.570E-01%	1.10E+01

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Y-1836	4.1039E+03	7.1336E+03	3.233E-01%	1.63E+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 (77.7 to 1999.4 keV) 9.733E+04 Bq
Total Decayed Activity (77.7 to 1999.4 keV) 1.2028057E+05 Bq

Analyzed by: _____
admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc

Gamma Verification per Geometry

Detector: Ge12

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14446	96.8
Am-241	2037	418	0.3590	1163	1221.2	105.0
Cd-109	2881	591	0.0361	16363	16047	98.1
Co-57	1511	310	0.8560	362	351.89	97.2
Ce-139	2139	439	0.7990	549	541.18	98.6
Hg-203	4651	954	0.8146	1171	1185.4	101.3
Sn-113	3015	618	0.6400	966	985.86	102.1
Cs-137	1938	397	0.8510	467	464.95	99.6
Y-88	7264	1489	0.9370	1589	1567.8	98.6
Co-60	3580	734	0.9997	734	723.38	98.5
Co-60	3581	734	0.9999	734	722.83	98.4
Y-88	7690	1577	0.9920	1589	1631.1	102.6

Reviewed By: Jody Watson

Date: 10/4/2012

ORTEC g v - i (1087) Env32 G53W4.25 10/4/2012 9:11:35 AM
TestAmerica, Inc Spectrum name: 12_TunaCan_20122189.An1

Sample description
12_TunaCan_90099

Spectrum Filename: C:\User\SPC\Det12\12_TunaCan_20122189.An1

Acquisition information
Start time: 10/2/2012 10:17:00 AM
Live time: 7200
Real time: 7302
Dead time: 1.40 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCanCal_90099_100212

Energy Calibration
Created: 10/4/2012 8:58:25 AM
Zero offset: 0.009 keV
Gain: 0.250 keV/channel
Quadratic: -3.662E-08 keV/channel^2

Efficiency Calibration
Created: 10/4/2012 9:05:44 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.70 %
Log(Eff): -7.827468E-01 + (-3.001271E-01*Log(E)) +
(-3.369562E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.96 %
Log(Eff): -2.288409E+01 + (8.352717E+00*Log(E)) +
(-8.812368E-01*Log(E)^2)

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

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.54keV)
Stop channel: 8000 (1999.46keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (1087) Env32 G53W4.25 10/4/2012 9:11:35 AM
TestAmerica, Inc Spectrum name: 12_TunaCan_20122189.An1

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

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

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0301

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.56	96262.	0.47	0.90	2.231E-02	46.54	4.250	1.445E+04	Pb210
59.55	97880.	0.49	0.89	3.122E-02	59.54	35.700	1.221E+03	AM241
88.04	118171.	0.40	0.93	4.278E-02	88.03	3.610	1.605E+04	CD109
122.08	48689.	0.66	0.97	4.526E-02	122.06	85.600	3.519E+02	CO57
136.52	6070.	3.34	0.99	4.419E-02				
165.91	31873.	0.80	1.00	4.088E-02	165.85	79.900	5.412E+02	Ce139
279.09	3381.	4.68	1.15	2.897E-02	279.17	81.500	1.185E+03	Hg203
391.58	19876.	1.11	1.21	2.292E-02	391.69	64.000	9.859E+02	SN113
661.67	44047.	0.60	1.46	1.571E-02	661.66	85.210	4.649E+02	CS137
898.03	22124.	1.09	1.65	1.250E-02	898.02	93.700	1.568E+03	Y898
1173.25	47992.	0.54	1.80	1.018E-02	1173.24	99.900	7.234E+02	Co1173
1332.54	43454.	0.53	1.94	9.220E-03	1332.50	99.982	7.228E+02	Co1332
1835.96	13783.	0.98	2.29	7.144E-03	1836.01	99.200	1.614E+03	Y1836

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
545.60	136.52	8754.	6070.	1.374E+05	3.34	0.989	-

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

This section based on library: DET_EnergyStandardMix & Pb.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.06	46.56	27968.	96262.	13.370	0.47	0.903
AM-241	237.95	59.55	29903.	97880.	13.594	0.49	0.891
CD-109	351.83	88.04	24170.	118171.	16.413	0.40	0.926
CO-57	487.89	122.08	12523.	48689.	6.762	0.66	0.972
Ce-139	663.08	165.91	7948.	31873.	4.427	0.80	1.002
Hg-203	1115.49	279.09	5203.	3381.	0.470	4.68	1.152
SN-113	1565.25	391.58	5206.	19876.	2.760	1.11	1.214
CS-137	2645.31	661.67	4245.	44047.	6.118	0.60	1.464
Y-898	3590.75	898.03	4771.	22124.	3.073	1.09	1.649
Co-1173	4691.96	1173.25	2353.	47992.	6.666	0.54	1.802
Co-1332	5329.49	1332.54	1369.	43454.	6.035	0.53	1.941
Y-1836	7345.05	1835.95	424.	13925.	1.934	0.97	2.293

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

✓

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

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq		COMMENTS
Pb-210	N	1.4446E+04				8.15E+03		
			46.54	1.445E+04	(	1.174E+02	4.69E-01	4.25E+00 G
AM-241		1.2212E+03				1.58E+05		
			59.54	1.221E+03	(	1.009E+01	4.87E-01	3.57E+01 G
CD-109		1.6047E+04				4.63E+02		
			88.03	1.605E+04	(	9.875E+01	4.00E-01	3.61E+00 G
CO-57		3.5189E+02				2.72E+02		
			122.06	3.519E+02	(	3.789E+00	6.59E-01	8.56E+01 G

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TestAmerica, Inc Spectrum name: 12_TunaCan_20122189.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA		Comments
Ce-139	5.4118E+02						1.38E+02	
		165.85	5.412E+02	(	7.100E+00	8.00E-01	7.99E+01	G
Hg-203	1.1854E+03						4.66E+01	
		279.17	1.185E+03	(	1.188E+02	4.68E+00	8.15E+01	G
SN-113	9.8586E+02						1.15E+02	
		391.69	9.859E+02	(	1.681E+01	1.11E+00	6.40E+01	G
CS-137	4.6495E+02						1.10E+04	
		661.66	4.649E+02	(	3.233E+00	5.99E-01	8.52E+01	G
Y-898	1.5678E+03						1.07E+02	
		898.02	1.568E+03	(	2.300E+01	1.09E+00	9.37E+01	G
Co-1173	7.2338E+02						1.93E+03	
		1173.24	7.234E+02	(	3.448E+00	5.35E-01	9.99E+01	G
Co-1332	7.2283E+02						1.93E+03	
		1332.50	7.228E+02	(	2.913E+00	5.31E-01	1.00E+02	G
Y-1836	1.6311E+03						1.07E+02	
		1836.01	1.631E+03	(	1.156E+01	9.66E-01	9.92E+01	G

(- This peak used in the nuclide activity average.

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

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

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

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TestAmerica, Inc Spectrum name: 12_TunaCan_20122189.An1

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

- -

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

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

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4112E+04	1.4446E+04	4.686E-01%	1.17E+02
AM-241	1.2198E+03	1.2212E+03	4.873E-01%	1.01E+01
CD-109	1.0628E+04	1.6047E+04	3.995E-01%	9.87E+01
CO-57	1.7453E+02	3.5189E+02	6.590E-01%	3.79E+00
Ce-139	1.3551E+02	5.4118E+02	7.998E-01%	7.10E+00
Hg-203	1.9895E+01	1.1854E+03	4.682E+00%	1.19E+02
SN-113	1.8819E+02	9.8586E+02	1.108E+00%	1.68E+01
CS-137	4.5695E+02	4.6495E+02	5.986E-01%	3.23E+00
Y-898	2.6230E+02	1.5678E+03	1.088E+00%	2.30E+01
Co-1173	6.5520E+02	7.2338E+02	5.354E-01%	3.45E+00
Co-1332	6.5470E+02	7.2283E+02	5.311E-01%	2.91E+00
Y-1836	2.7290E+02	1.6311E+03	9.660E-01%	1.16E+01

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

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

Total Activity (37.5 to 1999.5 keV) 2.878E+04 Bq
Total Decayed Activity (37.5 to 1999.5 keV) 3.9888684E+04 Bq

Analyzed by: _____
admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc

Gamma Verification per Geometry

Detector: Ge15

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	14410	96.5
Am-241	2037	418	0.3590	1163	1206.9	103.7
Cd-109	2881	591	0.0361	16363	16069	98.2
Co-57	1511	310	0.8560	362	356.06	98.4
Ce-139	2139	439	0.7990	549	538.81	98.2
Hg-203	4651	954	0.8146	1171	1202.4	102.7
Sn-113	3015	618	0.6400	966	974.62	100.9
Cs-137	1938	397	0.8510	467	465.43	99.7
Y-88	7264	1489	0.9370	1589	1573.7	99.0
Co-60	3580	734	0.9997	734	716.44	97.6
Co-60	3581	734	0.9999	734	726.55	98.9
Y-88	7690	1577	0.9920	1589	1633.2	102.8

Reviewed By: Jody Watson

Date: 3/22/2012

Calibration Data from file: 15_Soil_TunaCan.Clb
Energy Calibration Date: 3/22/2012 Time: 1:02:46 PM
Efficiency Calibration Date: 3/22/2012 Time: 1:03:01 PM

Calibration Description:
15_TunaCan_90099_032212

Energy Calibration Fit
Energy = 0.0042 +0.250192*Channel -3.10425e-008*Channel**2
FWHM (ch) = 3.5032 +0.001000*Channel -3.73783e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.91	46.54	46.52	0.05%	0.90	0.92	-2.54%
237.99	59.54	59.55	-0.01%	0.91	0.94	-2.43%
352.01	88.03	88.07	-0.05%	0.95	0.96	-1.92%
487.92	122.06	122.07	-0.01%	1.00	1.00	0.30%
663.08	165.85	165.89	-0.02%	1.05	1.04	1.34%
1115.99	279.17	279.18	-0.00%	1.18	1.14	3.23%
1565.41	391.69	391.58	0.03%	1.26	1.24	1.14%
2645.35	661.66	661.63	0.00%	1.50	1.47	2.11%
3590.98	898.02	898.04	-0.00%	1.67	1.65	0.79%
4692.06	1173.24	1173.24	-0.00%	1.80	1.84	-2.06%
5329.66	1332.50	1332.56	-0.00%	1.90	1.94	-2.28%
7344.95	1836.01	1835.98	0.00%	2.23	2.21	1.30%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.9975 %
Ln(Eff) = -0.6895 -0.329061*Ln(Eng) -0.0387563*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.1273 %
Ln(Eff) = -23.6268 +8.666669*Ln(Eng) -0.921464*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.8904E-002	1.9569E-002	-3.52%
59.54	2.8630E-002	2.7372E-002	4.39%
88.03	3.6378E-002	3.7061E-002	-1.88%
122.06	3.7201E-002	3.8461E-002	-3.39%
165.85	========== Knee ==========		
165.85	3.3266E-002	3.3919E-002	-1.96%
279.17	2.3641E-002	2.3007E-002	2.68%
391.69	1.7841E-002	1.7674E-002	0.94%
661.66	1.1534E-002	1.1545E-002	-0.10%
898.02	8.8355E-003	8.9209E-003	-0.97%
1173.24	6.9001E-003	7.0763E-003	-2.55%
1332.50	6.2597E-003	6.3249E-003	-1.04%
1836.01	4.8716E-003	4.7412E-003	2.68%

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 3/22/2012 1:04:51 PM Page 1
TestAmerica, Inc. Spectrum name: 15_TunaCan_20120283.An1

Sample description
15_TunaCan_90099_032212

Spectrum Filename: C:\User\SPC\Det15\15_TunaCan_20120283.An1

Acquisition information
Start time: 3/22/2012 11:06:02 AM
Live time: 3600
Real time: 3653
Dead time: 1.44 %
Detector ID: 15

Detector system
Ge15 SN/1102216

Calibration
Filename: 15_TunaCan.Clb
15_TunaCan_90099_032212

Energy Calibration
Created: 3/22/2012 1:02:46 PM
Zero offset: 0.004 keV
Gain: 0.250 keV/channel
Quadratic: -3.104E-08 keV/channel^2

Efficiency Calibration
Created: 3/22/2012 1:03:01 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-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 (37.53keV)
Stop channel: 8000 (1999.56keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

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

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

Corrections	Status	Comments
Decay correct to date:	YES	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: 0.0249

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.52	42849.	0.75	0.90	1.955E-02	46.54	4.250	1.441E+04	Pb210
59.55	42443.	0.72	0.91	2.738E-02	59.54	35.700	1.207E+03	AM241
72.95	2606.	6.34	0.95	3.318E-02				
88.07	68550.	0.54	0.95	3.707E-02	88.03	3.610	1.607E+04	CD109
122.10	33756.	0.64	1.00	3.846E-02	122.06	85.600	3.502E+02	CO57
136.52	4295.	2.96	1.01	3.724E-02				
165.89	34959.	0.78	1.05	3.391E-02	165.85	79.900	5.388E+02	Ce139
279.18	24347.	0.88	1.18	2.301E-02	279.17	81.500	1.202E+03	Hg203
391.58	24366.	0.82	1.26	1.768E-02	391.69	64.000	9.746E+02	SN113
661.63	16400.	1.16	1.50	1.155E-02	661.66	85.210	4.654E+02	CS137
898.03	27965.	0.74	1.67	8.921E-03	898.02	93.700	1.574E+03	Y898
1173.23	17709.	0.94	1.81	7.076E-03	1173.24	99.900	7.164E+02	Co1173
1332.55	16065.	0.98	1.90	6.325E-03	1332.50	99.982	7.266E+02	Co1332
1835.95	16330.	0.85	2.24	4.741E-03	1836.01	99.200	1.633E+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	
291.58	72.93	12341.	2606.	7.854E+04	6.34	0.949	-	D
545.42	136.45	8010.	4524.	1.215E+05	4.23	1.054	-	s

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

This section based on library: DET_EnergyStandardMix & Pb.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.91	46.52	15447.	42849.	11.903	0.75	0.900
AM-241	237.99	59.55	14029.	42443.	11.790	0.72	0.913
CD-109	352.01	88.07	16260.	68550.	19.042	0.54	0.945
CO-57	487.92	122.07	9130.	34324.	9.535	0.78	0.999
Ce-139	663.08	165.89	8215.	34959.	9.711	0.78	1.052
Hg-203	1115.99	279.18	4252.	24347.	6.763	0.88	1.182
SN-113	1565.41	391.58	3012.	24366.	6.768	0.82	1.259
CS-137	2645.35	661.63	3077.	16400.	4.555	1.16	1.503
Y-898	3590.94	898.03	2252.	27965.	7.768	0.74	1.667
Co-1173	4692.02	1173.23	1355.	17709.	4.919	0.94	1.807
Co-1332	5329.60	1332.55	1160.	16065.	4.463	0.98	1.900
Y-1836	7344.81	1835.95	345.	16330.	4.536	0.85	2.240

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	1.4410E+04				8.15E+03	
			46.54	1.441E+04	(	1.957E+02 7.55E-01 4.25E+00	G
AM-241		1.2069E+03				1.58E+05	
			59.54	1.207E+03	(	1.577E+01 7.22E-01 3.57E+01	G
CD-109		1.6069E+04				4.63E+02	
			88.03	1.607E+04	(	1.399E+02 5.44E-01 3.61E+00	G
CO-57		3.5606E+02				2.72E+02	
			122.06	3.561E+02	(	4.647E+00 7.84E-01 8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/22/2012 1:04:51 PM Page 4
TestAmerica, Inc. Spectrum name: 15_TunaCan_20120283.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Ce-139	5.3881E+02				1.38E+02	
		165.85	5.388E+02	(	6.551E+00 7.82E-01 7.99E+01	G
Hg-203	1.2024E+03				4.66E+01	
		279.17	1.202E+03	(	1.514E+01 8.77E-01 8.15E+01	G
SN-113	9.7462E+02				1.15E+02	
		391.69	9.746E+02	(	1.034E+01 8.20E-01 6.40E+01	G
CS-137	4.6543E+02				1.10E+04	
		661.66	4.654E+02	(	7.413E+00 1.16E+00 8.52E+01	G
Y-898	1.5737E+03				1.07E+02	

898.02 1.574E+03 (1.260E+01 7.45E-01 9.37E+01 G

Co-1173 7.1644E+02 1.93E+03
1173.24 7.164E+02 (7.050E+00 9.39E-01 9.99E+01 G

Co-1332 7.2655E+02 1.93E+03
1332.50 7.266E+02 (7.301E+00 9.83E-01 1.00E+02 G

Y-1836 1.6332E+03 1.07E+02
1836.01 1.633E+03 (8.923E+00 8.49E-01 9.92E+01 G

(- This peak used in the nuclide activity average.

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

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

P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4311E+04	1.4410E+04	7.549E-01%	1.96E+02
AM-241	1.2065E+03	1.2069E+03	7.219E-01%	1.58E+01
CD-109	1.4233E+04	1.6069E+04	5.439E-01%	1.40E+02

CO-57	2.8961E+02	3.5606E+02	7.837E-01%	4.65E+00
Ce-139	3.5832E+02	5.3881E+02	7.816E-01%	6.55E+00
Hg-203	3.6068E+02	1.2024E+03	8.771E-01%	1.51E+01
SN-113	5.9836E+02	9.7462E+02	8.201E-01%	1.03E+01
CS-137	4.6306E+02	4.6543E+02	1.155E+00%	7.41E+00
Y-898	9.2933E+02	1.5737E+03	7.445E-01%	1.26E+01
Co-1173	6.9585E+02	7.1644E+02	9.390E-01%	7.05E+00
Co-1332	7.0567E+02	7.2655E+02	9.834E-01%	7.30E+00
Y-1836	9.6449E+02	1.6332E+03	8.486E-01%	8.92E+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 1999.6 keV) 3.512E+04 Bq
Total Decayed Activity (82.3 to 1999.6 keV) 3.9873703E+04 Bq

Gamma Verification per Geometry

Detector: Ge17

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	14476	97.0
Am-241	2037	418	0.3590	1163	1217.3	104.6
Cd-109	2881	591	0.0361	16363	16121	98.5
Co-57	1511	310	0.8560	362	351.58	97.1
Ce-139	2139	439	0.7990	549	540.43	98.5
Hg-203	4651	954	0.8146	1171	1200.7	102.6
Sn-113	3015	618	0.6400	966	969.38	100.4
Cs-137	1938	397	0.8510	467	466.08	99.8
Y-88	7264	1489	0.9370	1589	1562.4	98.3
Co-60	3580	734	0.9997	734	724.88	98.7
Co-60	3581	734	0.9999	734	733.12	99.8
Y-88	7690	1577	0.9920	1589	1616.3	101.7

Reviewed By: Megan McAfee

Date: 4/13/2012

Calibration Data from file: 17_Soil_TunaCan.Clb
Energy Calibration Date: 4/12/2012 Time: 9:28:30 AM
Efficiency Calibration Date: 4/12/2012 Time: 9:28:42 AM

Calibration Description:
17_TunaCan_90099_032612

Energy Calibration Fit
Energy = 0.1178 +0.250077*Channel -2.37566e-008*Channel**2
FWHM (ch) = 2.9772 +0.000994*Channel -3.22638e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.96	46.54	46.62	-0.17%	0.77	0.79	-3.16%
237.92	59.54	59.61	-0.12%	0.78	0.80	-3.33%
351.79	88.03	88.09	-0.07%	0.82	0.83	-1.16%
487.44	122.06	122.01	0.04%	0.89	0.86	3.09%
662.32	165.85	165.74	0.07%	0.93	0.91	2.22%
1115.65	279.17	279.09	0.03%	1.03	1.01	2.15%
1565.90	391.69	391.66	0.01%	1.10	1.11	-0.78%
2646.02	661.66	661.66	-0.00%	1.37	1.35	1.74%
3591.93	898.02	898.07	-0.01%	1.52	1.53	-0.67%
4693.19	1173.24	1173.25	-0.00%	1.72	1.73	-0.81%
5330.69	1332.50	1332.53	-0.00%	1.82	1.84	-0.74%
7346.32	1836.01	1835.98	0.00%	2.14	2.13	0.55%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.9072 %
Ln(Eff) = -0.5264 -0.402416*Ln(Eng) -0.0260446*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.0020 %
Ln(Eff) = -23.4389 +8.582715*Ln(Eng) -0.907543*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.0383E-002	2.1004E-002	-3.05%
59.54	3.0743E-002	2.9571E-002	3.81%
88.03	3.9976E-002	4.0594E-002	-1.55%
122.06	4.1510E-002	4.2756E-002	-3.00%
165.85	========== Knee ==========		
165.85	3.7629E-002	3.8252E-002	-1.65%
279.17	2.7514E-002	2.6814E-002	2.54%
391.69	2.1207E-002	2.1122E-002	0.40%
661.66	1.4433E-002	1.4427E-002	0.04%
898.02	1.1287E-002	1.1478E-002	-1.69%
1173.24	9.2333E-003	9.3589E-003	-1.36%
1332.50	8.4692E-003	8.4809E-003	-0.14%
1836.01	6.7041E-003	6.5931E-003	1.66%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

ORTEC g v - i (1087) Env32 G53W4.25 7/6/2012 10:31:21 AM Page 1
TestAmerica, Inc. Spectrum name: 17_TunaCan_20120263.An1

Sample description
17_TunaCan_90099_032612

Spectrum Filename: C:\User\SPC\Det17\17_TunaCan_20120263.An1

Acquisition information
Start time: 3/26/2012 6:29:58 AM
Live time: 3600
Real time: 3672
Dead time: 1.95 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Soil_TunaCan.Clb
17_TunaCan_90099_032612

Energy Calibration
Created: 4/12/2012 9:28:30 AM
Zero offset: 0.118 keV
Gain: 0.250 keV/channel
Quadratic: -2.376E-08 keV/channel^2

Efficiency Calibration
Created: 4/12/2012 9:28:42 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.91 %
Log(Eff): -5.264190E-01 + (-4.024164E-01*Log(E)) +
(-2.604461E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -2.343889E+01 + (8.582715E+00*Log(E)) +
(-9.075430E-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 (37.63keV)
Stop channel: 8000 (1999.21keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (1087) Env32 G53W4.25 7/6/2012 10:31:21 AM Page 2
TestAmerica, Inc. Spectrum name: 17_TunaCan_20120263.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0522

***** 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
46.62	46187.	0.69	0.77	2.106E-02	46.54	4.250	1.448E+04	Pb210
59.61	46245.	0.74	0.78	2.961E-02	59.54	35.700	1.217E+03	AM241
72.97	2852.	5.64	0.82	3.610E-02				
88.09	74900.	0.46	0.82	4.061E-02	88.03	3.610	1.612E+04	CD109
122.01	37313.	0.73	0.89	4.276E-02	122.06	85.600	3.516E+02	CO57
136.40	4536.	4.09	0.81	4.164E-02				
165.74	38793.	0.66	0.93	3.765E-02	165.85	79.900	5.404E+02	Ce139
255.04	1259.	9.59	1.07	2.855E-02				
279.09	26776.	0.82	1.03	2.682E-02	279.17	81.500	1.201E+03	Hg203
391.66	28306.	0.76	1.11	2.112E-02	391.69	64.000	9.694E+02	SN113
661.66	20517.	0.91	1.37	1.443E-02	661.66	85.210	4.661E+02	CS137
898.07	34851.	0.63	1.52	1.148E-02	898.02	93.700	1.562E+03	Y898
1173.25	23664.	0.80	1.72	9.359E-03	1173.24	99.900	7.249E+02	Co1173
1332.52	21706.	0.78	1.83	8.481E-03	1332.50	99.982	7.331E+02	Co1332
1835.97	21924.	0.70	2.15	6.593E-03	1836.01	99.200	1.616E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
291.30	72.97	10374.	2884.	7.989E+04	5.33	0.816	-	D
544.98	136.40	8136.	4536.	1.089E+05	4.09	0.813	-	
1019.46	255.04	3805.	1259.	4.410E+04	9.59	1.072	-	

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	185.96	46.62	15035.	46187.	12.830	0.69	0.766
AM-241	237.92	59.61	17361.	46245.	12.846	0.74	0.777
CD-109	351.79	88.09	12661.	74900.	20.806	0.46	0.821
CO-57	487.44	122.01	9755.	37313.	10.365	0.73	0.891
Ce-139	662.32	165.74	6828.	38793.	10.776	0.66	0.926
Hg-203	1115.65	279.09	4528.	26776.	7.438	0.82	1.034
SN-113	1565.90	391.66	3496.	28306.	7.863	0.76	1.105
CS-137	2646.02	661.66	2816.	20517.	5.699	0.91	1.369
Y-898	3591.91	898.07	2257.	34851.	9.681	0.63	1.523
Co-1173	4693.17	1173.25	1531.	23664.	6.573	0.80	1.720
Co-1332	5330.69	1332.52	1002.	21706.	6.029	0.78	1.825
Y-1836	7346.26	1835.97	205.	21924.	6.090	0.70	2.146

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	1.4476E+04				8.15E+03		
			46.54	1.448E+04	(	1.799E+02	6.89E-01 4.25E+00 G	
AM-241		1.2173E+03				1.58E+05		
			59.54	1.217E+03	(	1.623E+01	7.35E-01 3.57E+01 G	
CD-109		1.6121E+04				4.63E+02		
			88.03	1.612E+04	(	1.134E+02	4.57E-01 3.61E+00 G	
CO-57		3.5158E+02				2.72E+02		
			122.06	3.516E+02	(	4.362E+00	7.33E-01 8.56E+01 G	

□

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Ce-139	5.4043E+02				1.38E+02	
		165.85	5.404E+02	(	5.402E+00	6.57E-01 7.99E+01 G
Hg-203	1.2007E+03				4.66E+01	
		279.17	1.201E+03	(	1.418E+01	8.17E-01 8.15E+01 G
SN-113	9.6938E+02				1.15E+02	
		391.69	9.694E+02	(	9.529E+00	7.56E-01 6.40E+01 G
CS-137	4.6608E+02				1.10E+04	
		661.66	4.661E+02	(	5.679E+00	9.07E-01 8.52E+01 G

```
Y-898        1.5624E+03                                          1.07E+02
                          898.02 1.562E+03  (  1.005E+01 6.29E-01 9.37E+01 G

Co-1173      7.2488E+02                                          1.93E+03
                         1173.24 7.249E+02  (  5.668E+00 7.98E-01 9.99E+01 G

Co-1332      7.3312E+02                                          1.93E+03
                         1332.50 7.331E+02  (  5.074E+00 7.81E-01 1.00E+02 G

Y-1836       1.6163E+03                                          1.07E+02
                         1836.01 1.616E+03  (  5.123E+00 7.01E-01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
```



```
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count  Time Corrected  Uncertainty  1 Sigma
 Nuclide     Activity       Activity       Counting                    MDA
                Bq             Bq

 ____________________________________________________________________________
 Pb-210       1.4372E+04    1.4476E+04    6.891E-01%                 1.80E+02
```

AM-241	1.2168E+03	1.2173E+03	7.355E-01%	1.62E+01
CD-109	1.4197E+04	1.6121E+04	4.569E-01%	1.13E+02
CO-57	2.8320E+02	3.5158E+02	7.325E-01%	4.36E+00
Ce-139	3.5257E+02	5.4043E+02	6.571E-01%	5.40E+00
Hg-203	3.4034E+02	1.2007E+03	8.175E-01%	1.42E+01
SN-113	5.8164E+02	9.6938E+02	7.559E-01%	9.53E+00
CS-137	4.6359E+02	4.6608E+02	9.066E-01%	5.68E+00
Y-898	9.0011E+02	1.5624E+03	6.288E-01%	1.00E+01
Co-1173	7.0308E+02	7.2488E+02	7.979E-01%	5.67E+00
Co-1332	7.1107E+02	7.3312E+02	7.808E-01%	5.07E+00
Y-1836	9.3113E+02	1.6163E+03	7.012E-01%	5.12E+00

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (77.1 to 1999.2 keV) 3.505E+04 Bq
Total Decayed Activity (77.1 to 1999.2 keV) 3.9979633E+04 Bq

Gamma Verification per Geometry

Detector: Ge 18

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 Rad11-0032

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	Abundance	Activity Bq/L	Count Results	%recovery
Am-241	1830	1830	0.359	**5097.5**	5141	100.9
Cd-109	2609	2609	0.0361	**72271.5**	70815	98.0
Co-57	1339	1339	0.856	**1564.3**	1589.4	101.6
Ce-139	1917	1917	0.799	**2399.2**	2389.3	99.6
Sn-113	2719	2719	0.64	**4248.4**	4277.8	100.7
Cs-137	1705	1705	0.851	**2003.5**	1991.7	99.4
Mn-54	3083	3083	0.9998	**3083.6**	3065.8	99.4
Y-88	6493	6493	0.937	**6929.6**	6642.5	95.9
Zn-65	3181	3181	0.506	**6286.6**	6776	107.8
Co-60	3293	3293	0.99974	**3293.9**	3181.2	96.6
Co-60	3294	3294	0.99986	**3294.5**	3215.2	97.6
Y-88	6874	6874	0.992	**6929.4**	6956.5	100.4

Reviewed By: Michaela Korrinhizer

Date: 12/9/2011

Calibration Data from file: 18_1LMarinelli.Clb
Energy Calibration Date: 12/8/2011 Time: 10:13:49 AM
Efficiency Calibration Date: 12/8/2011 Time: 10:14:04 AM

Calibration Description:
18_1Lmarn_83924-334_120711

Energy Calibration Fit
Energy = 0.0388 +0.250152*Channel -2.73379e-008*Channel**2
FWHM (ch) = 3.6883 +0.000929*Channel -2.53975e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
237.84	59.54	59.53	0.01%	0.95	0.98	-2.43%
351.71	88.03	88.02	0.02%	1.00	1.00	-0.56%
487.88	122.06	122.08	-0.01%	1.05	1.03	1.66%
663.14	165.85	165.91	-0.04%	1.09	1.07	1.13%
1565.58	391.69	391.60	0.02%	1.28	1.27	0.68%
2645.64	661.66	661.66	0.00%	1.48	1.49	-0.98%
3338.49	834.85	834.86	-0.00%	1.62	1.63	-0.14%
3591.15	898.02	898.02	-0.00%	1.70	1.67	1.39%
4461.52	1115.55	1115.55	-0.00%	1.80	1.83	-1.46%
4692.31	1173.24	1173.23	0.00%	1.87	1.87	-0.14%
5329.82	1332.50	1332.53	-0.00%	1.99	1.98	0.58%
7345.25	1836.01	1836.00	0.00%	2.28	2.28	0.04%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.5547 %
Ln(Eff) = -1.6459 +0.032277*Ln(Eng) -0.0618758*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.9000 %
Ln(Eff) = -13.1819 +4.538566*Ln(Eng) -0.501748*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
59.54	4.9245E-002	4.9101E-002	0.29%
88.03	5.2877E-002	5.3963E-002	-2.05%
122.06	5.2746E-002	5.1908E-002	1.59%
165.85	========== Knee ==========		
165.85	4.4987E-002	4.5168E-002	-0.40%
391.69	2.5938E-002	2.5761E-002	0.68%
661.66	1.7406E-002	1.7486E-002	-0.46%
834.85	1.4490E-002	1.4566E-002	-0.53%
898.02	1.3169E-002	1.3736E-002	-4.31%
1115.55	1.2396E-002	1.1491E-002	7.30%
1173.24	1.0630E-002	1.1015E-002	-3.62%
1332.50	9.6470E-003	9.8851E-003	-2.47%
1836.01	7.4907E-003	7.4605E-003	0.40%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Am-241	59.54	35.90	1.58E+005	5097.50	1830.00	3.50%	1/1/2011 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	72271.00	2609.00	4.90%	1/1/2011 11:00:00 AM
Co-57	122.07	85.59	2.72E+002	1564.40	1339.00	4.10%	1/1/2011 11:00:00 AM
Ce-139	165.85	80.00	1.38E+002	2396.30	1917.00	3.90%	1/1/2011 11:00:00 AM
Hg-203	279.19	81.50	4.66E+001	5192.60	4232.00	3.90%	1/1/2011 11:00:00 AM
Sn-113	391.71	64.00	1.15E+002	4248.40	2719.00	2.50%	1/1/2011 11:00:00 AM
Cs-137	661.66	85.10	1.10E+004	2003.50	1705.00	4.00%	1/1/2011 11:00:00 AM
Mn-54	834.83	99.98	3.12E+002	3083.60	3083.00	3.30%	1/1/2011 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	6929.60	6493.00	3.90%	1/1/2011 11:00:00 AM
Zn-65	1115.52	50.75	2.44E+002	6268.00	3181.00	3.50%	1/1/2011 11:00:00 AM
Co-60	1173.24	99.97	1.93E+003	3293.90	3293.00	4.00%	1/1/2011 11:00:00 AM
Co-60	1332.50	99.99	1.93E+003	3294.50	3294.00	4.00%	1/1/2011 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	6929.40	6874.00	3.90%	1/1/2011 11:00:00 AM

ORTEC g v - i (1087) Env32 G53W4.25 12/8/2011 10:14:50 AM
Test America Spectrum name: 18_1LMarnCal_20111552.An1

Sample description
18_1LMarnCal_83924

Spectrum Filename: C:\User\SPC\Det18\18_1LMarnCal_20111552.An1

Acquisition information
Start time: 12/7/2011 1:13:41 PM
Live time: 3600
Real time: 3927
Dead time: 8.32 %
Detector ID: 18

Detector system
Ge18 SN/11164036

Calibration
Filename: 18_1LMarinelli.Clb
18_1Lmarn_83924-334_120711

Energy Calibration
Created: 12/8/2011 10:13:49 AM
Zero offset: 0.039 keV
Gain: 0.250 keV/channel
Quadratic: -2.734E-08 keV/channel^2

Efficiency Calibration
Created: 12/8/2011 10:14:04 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.55 %
Log(Eff): -1.645931E+00 + (3.227669E-02*Log(E)) +
(-6.187585E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.90 %
Log(Eff): -1.318185E+01 + (4.538566E+00*Log(E)) +
(-5.017483E-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 (37.56keV)
Stop channel: 8000 (1999.51keV)
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 12/8/2011 10:14:50 AM
Test America Spectrum name: 18_1LMarnCal_20111552.An1

Random error:	1.0000000E+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:	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: 0.0207

***** 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
36.42	2624.	9.34	0.96	3.504E-02				
37.86	6289.	4.27	0.96	3.630E-02				
49.57	16197.	3.79	2.05	4.456E-02				
59.53	323940.	0.26	0.95	4.910E-02	59.54	35.700	5.141E+03	AM241
88.02	298345.	0.26	1.00	5.396E-02	88.03	3.610	7.082E+04	CD109
122.08	106802.	0.50	1.05	5.191E-02	122.06	85.600	1.589E+03	CO57
136.52	13056.	2.75	1.04	4.998E-02				
165.91	55995.	0.77	1.09	4.516E-02	165.85	79.900	2.389E+03	Ce139
279.20	3341.	7.68	1.23	3.249E-02	279.17	81.500	5.497E+03	Hg203
391.60	32743.	1.03	1.28	2.577E-02	391.69	64.000	4.278E+03	SN113
511.00	5243.	5.07	2.49	2.126E-02				
661.66	104567.	0.42	1.48	1.749E-02	661.66	85.210	1.992E+03	CS137
834.85	75386.	0.57	1.63	1.457E-02	834.85	99.980	3.059E+03	Mn54
898.00	33716.	1.08	1.70	1.374E-02	898.02	93.700	6.643E+03	Y898
1115.52	54040.	0.66	1.81	1.149E-02	1115.55	50.600	6.776E+03	Zn65
1173.21	111495.	0.35	1.87	1.102E-02	1173.24	99.900	3.181E+03	Co1173
1332.51	101212.	0.35	1.99	9.885E-03	1332.50	99.982	3.215E+03	Co1332
1835.93	20304.	0.84	2.30	7.461E-03	1836.01	99.200	6.956E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
145.44	36.37	28698.	2624.	7.488E+04	9.34	0.956	-	D
151.19	37.81	32970.	6289.	1.732E+05	4.27	0.958	-	D
198.01	49.57	94234.	16197.	3.635E+05	3.79	2.046	-	s

ORTEC g v - i (1087) Env32 G53W4.25 12/8/2011 10:14:50 AM
Test America Spectrum name: 18_1LMarnCal_20111552.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
545.62	136.52	25792.	13056.	2.613E+05	2.75	1.036	-	
2043.07	511.00	12642.	5243.	2.467E+05	5.07	2.485	-	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	237.84	59.53	90927.	323940.	89.983	0.26	0.954
CD-109	351.71	88.02	63078.	298345.	82.874	0.26	0.998
CO-57	487.88	122.08	35088.	106802.	29.667	0.50	1.052
Ce-139	663.14	165.91	26192.	55995.	15.554	0.77	1.086
Hg-203	1116.12	279.20	15016.	3341.	0.928	7.68	1.233
SN-113	1565.55	391.60	15310.	32743.	9.095	1.03	1.280
CS-137	2645.63	661.66	14213.	104567.	29.046	0.42	1.478
Mn-54	3338.41	834.85	12382.	75560.	20.989	0.53	1.627
Y-898	3591.07	898.00	14232.	33716.	9.366	1.08	1.701
Zn-65	4461.37	1115.52	9246.	54040.	15.011	0.66	1.812
Co-1173	4692.23	1173.21	5402.	111495.	30.971	0.35	1.871
Co-1332	5329.73	1332.51	3198.	101212.	28.114	0.35	1.993
Y-1836	7345.00	1835.93	883.	20304.	5.640	0.84	2.296s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq		COMMENTS
AM-241		5.1410E+03				1.58E+05		
			59.54	5.141E+03	(	2.234E+01	2.62E-01 3.57E+01 G	
CD-109		7.0815E+04				4.63E+02		
			88.03	7.082E+04	(	2.784E+02	2.58E-01 3.61E+00 G	
CO-57		1.5894E+03				2.72E+02		
			122.06	1.589E+03	(	1.303E+01	4.97E-01 8.56E+01 G	

ORTEC g v - i (1087) Env32 G53W4.25 12/8/2011 10:14:50 AM
Test America Spectrum name: 18_1LMarnCal_20111552.An1

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139		2.3893E+03					1.38E+02	
			165.85	2.389E+03	(	3.230E+01	7.72E-01	7.99E+01 G
Hg-203		5.4968E+03					4.66E+01	
			279.17	5.497E+03	(	9.441E+02	7.68E+00	8.15E+01 G
SN-113		4.2778E+03					1.15E+02	
			391.69	4.278E+03	(	7.568E+01	1.03E+00	6.40E+01 G
CS-137		1.9917E+03					1.10E+04	
			661.66	1.992E+03	(	1.063E+01	4.22E-01	8.52E+01 G
Mn-54		3.0658E+03					3.12E+02	
			834.85	3.066E+03	(	2.115E+01	5.26E-01	1.00E+02 G
Y-898		6.6425E+03					1.07E+02	
			898.02	6.643E+03	(	1.101E+02	1.08E+00	9.37E+01 G
Zn-65	F	6.7760E+03					2.44E+02	
			1115.55	6.776E+03	(	5.652E+01	6.58E-01	5.06E+01 G
Co-1173		3.1812E+03					1.93E+03	
			1173.24	3.181E+03	(	9.850E+00	3.48E-01	9.99E+01 G
Co-1332		3.2152E+03					1.93E+03	
			1332.50	3.215E+03	(	8.458E+00	3.49E-01	1.00E+02 G
Y-1836		6.9565E+03					1.07E+02	
			1836.01	6.956E+03	@(	4.838E+01	8.39E-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	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
AM-241	5.1334E+03	5.1410E+03	2.616E-01%	2.23E+01
CD-109	4.2542E+04	7.0815E+04	2.580E-01%	2.78E+02
CO-57	6.6768E+02	1.5894E+03	4.974E-01%	1.30E+01
Ce-139	4.3099E+02	2.3893E+03	7.722E-01%	3.23E+01
Hg-203	3.5040E+01	5.4968E+03	7.685E+00%	9.44E+02
SN-113	5.5166E+02	4.2778E+03	1.033E+00%	7.57E+01
CS-137	1.9494E+03	1.9917E+03	4.219E-01%	1.06E+01
Mn-54	1.4412E+03	3.0658E+03	5.262E-01%	2.11E+01
Y-898	7.2768E+02	6.6425E+03	1.083E+00%	1.10E+02
Zn-65	2.5817E+03	6.7760E+03	6.581E-01%	5.65E+01
Co-1173	2.8145E+03	3.1812E+03	3.476E-01%	9.85E+00
Co-1332	2.8446E+03	3.2152E+03	3.489E-01%	8.46E+00
Y-1836 #	7.6207E+02	6.9565E+03	8.386E-01%	4.84E+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

ORTEC g v - i (1087) Env32 G53W4.25 12/8/2011 10:14:50 AM
Test America Spectrum name: 18_1LMarnCal_20111552.An1

---------- S U M M A R Y ----------

Total Activity (49.6 to 1999.5 keV) 6.248E+04 Bq
Total Decayed Activity (49.6 to 1999.5 keV) 1.2153873E+05 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: Test America

Initial Calibration Verifications

2nd Source Verification

Detector: Ge4

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 Tuna Can_00002

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1179.4	101.3
Cs-137	1926	396	0.851	465	435.81	93.7
Co-60	3611	742	0.99974	742	706.01	95.1
Co-60	3612	742	0.999856	742	707.18	95.3

Reviewed By: Megan McAfee

Date: 4/5/2012

ORTEC g v - i (3263) Env32 G53W4.25 4/3/2012 8:08:30 AM Page 1
TestAmerica Spectrum name: 4_TunaCan2nd_20120155.An1

Sample description
4_TunaCan2nd_Rad11_040212

Spectrum Filename: C:\User\SPC\Det4\4_TunaCan2nd_20120155.An1

Acquisition information
Start time: 4/2/2012 4:50:30 PM
Live time: 7200
Real time: 7269
Dead time: 0.95 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Soil_TunaCan.Clb
4_Soil_TunaCan_90099_033012

Energy Calibration
Created: 4/2/2012 1:19:28 PM
Zero offset: 0.084 keV
Gain: 0.250 keV/channel
Quadratic: -2.822E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 1:19:41 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.78 %
Log(Eff): -3.983609E-01 + (-5.746278E-01*Log(E)) +
(-2.046438E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.80 %
Log(Eff): -2.546791E+01 + (9.285295E+00*Log(E)) +
(-9.904428E-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 (1999.16keV)
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

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	4_2012-04-01_0505.PBC 4/1/2012 5:05:33 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0600

***** 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
36.42	806.	13.21	0.80	7.538E-03				
46.54	50484.	0.61	0.75	1.208E-02	46.54	4.250	1.463E+04	Pb210
49.71	736.	21.48	1.02	1.343E-02				
59.58	51934.	0.60	0.77	1.721E-02	59.54	35.700	1.179E+03	AM241
63.49	155.	63.51	0.54	1.848E-02				
88.11	27333.	0.79	0.79	2.354E-02	88.03	3.610	1.532E+04	CD109
122.09	6277.	1.96	0.86	2.425E-02	122.06	85.600	3.419E+02	CO57
134.27	52.	97.34	0.86	2.351E-02				
136.47	659.	9.66	0.87	2.334E-02				
148.82	69.	86.21	0.36	2.228E-02				
158.85	43.	92.59	0.33	2.130E-02				
165.81	1043.	6.61	0.81	2.058E-02	165.85	79.900	5.464E+02	Ce139
238.49	236.	22.32	0.96	1.565E-02				
241.88	116.	42.88	0.96	1.547E-02				
313.38	122.	47.39	0.75	1.256E-02				
344.70	47.	65.34	0.49	1.163E-02				
351.68	160.	27.20	0.66	1.144E-02				
391.67	434.	16.95	1.10	1.048E-02	391.69	64.000	1.272E+03	SN113
419.11	117.	48.70	0.60	9.911E-03				
473.76	122.	50.01	0.45	8.958E-03				
537.00	45.	87.01	0.37	8.074E-03				
592.99	36.	69.91	0.40	7.433E-03				
620.80	59.	58.25	0.37	7.153E-03				
661.57	17213.	0.84	1.29	6.782E-03	661.66	85.210	4.358E+02	CS137
860.29	61.	44.90	0.75	5.431E-03				
898.19	323.	17.33	1.63	5.236E-03	898.02	93.700	1.920E+03	Y898
935.59	77.	51.48	0.57	5.056E-03				
1173.33	15720.	0.87	1.73	4.162E-03	1173.24	99.900	7.060E+02	Co1173
1332.63	14113.	0.86	1.81	3.727E-03	1332.50	99.982	7.072E+02	Co1332
1835.84	135.	10.17	1.24	2.815E-03	1836.01	99.200	1.406E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
145.26	36.42	3510.	806.	1.069E+05	13.21	0.797 -	s
198.40	49.71	8086.	736.	5.481E+04	21.48	1.022 -	s
253.51	63.49	3351.	155.	8.368E+03	63.51	0.538 -	s
536.51	134.26	898.	64.	2.722E+03	67.39	0.281 -	sc

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
545.30	136.46	2079.	727.	3.115E+04	12.04	0.949 -	s
594.74	148.82	1288.	69.	3.082E+03	86.21	0.363 -	sc
634.84	158.85	771.	43.	2.019E+03	92.59	0.329 -	sc
953.28	238.48	1188.	206.	1.316E+04	29.01	1.147 -	
966.87	241.88	864.	60.	3.878E+03	75.94	0.463 -	c
1252.81	313.38	1023.	122.	9.737E+03	47.39	0.746 -	s
1378.05	344.70	448.	47.	4.042E+03	65.34	0.489 -	sc
1405.98	351.68	650.	160.	1.399E+04	27.20	0.659 -	s
1675.68	419.11	933.	117.	1.177E+04	48.70	0.600 -	s
1894.25	473.76	1038.	122.	1.367E+04	50.01	0.454 -	s
2147.23	537.00	496.	45.	5.573E+03	87.01	0.368 -	sc
2371.22	592.99	256.	36.	4.843E+03	69.91	0.402 -	sc
2482.47	620.80	374.	59.	8.248E+03	58.25	0.372 -	s
3440.64	860.29	299.	61.	1.129E+04	44.90	0.752 -	s
3741.93	935.59	530.	77.	1.526E+04	51.48	0.570 -	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	185.75	46.54	12490.	50416.	7.002	0.61	0.755
AM-241	237.88	59.58	11109.	51934.	7.213	0.60	0.767
CD-109	351.97	88.11	5395.	27333.	3.796	0.79	0.790
CO-57	487.82	122.09	2530.	6277.	0.872	1.96	0.855
Ce-139	662.66	165.81	1311.	1043.	0.145	6.61	0.812
SN-113	1565.91	391.67	1245.	434.	0.060	16.95	1.102s
CS-137	2645.56	661.57	829.	17213.	2.391	0.84	1.295
Y-898	3592.29	898.19	734.	323.	0.045	17.33	1.625
Co-1173	4693.38	1173.33	470.	15720.	2.183	0.87	1.726
Co-1332	5331.03	1332.63	76.	14113.	1.960	0.86	1.814
Y-1836	7345.88	1835.84	9.	135.	0.019	10.17	1.237s

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	1.4632E+04				8.15E+03		
			46.54	1.463E+04	(P	1.519E+02	6.07E-01 4.25E+00	G
AM-241		1.1794E+03				1.58E+05		
			59.54	1.179E+03	(	1.122E+01	5.98E-01 3.57E+01	G
CD-109		1.5319E+04				4.63E+02		
			88.03	1.532E+04	(	1.933E+02	7.94E-01 3.61E+00	G
CO-57		3.4190E+02				2.72E+02		
			122.06	3.419E+02	(	1.291E+01	1.96E+00 8.56E+01	G
Ce-139		5.4636E+02				1.38E+02		
			165.85	5.464E+02	(	8.978E+01	6.61E+00 7.99E+01	G
Hg-203		-4.3324E-04				4.66E+01		
			279.17	-4.332E-04	%(	2.541E+00	1.76E+05 8.15E+01	G
SN-113		1.2718E+03				1.15E+02		
			391.69	1.272E+03	(	4.898E+02	1.70E+01 6.40E+01	G
CS-137		4.3581E+02				1.10E+04		
			661.66	4.358E+02	(	3.465E+00	8.43E-01 8.52E+01	G
Y-898		1.9202E+03				1.07E+02		
			898.02	1.920E+03	(	7.662E+02	1.73E+01 9.37E+01	G
Co-1173		7.0601E+02				1.93E+03		
			1173.24	7.060E+02	(	4.661E+00	8.74E-01 9.99E+01	G
Co-1332		7.0718E+02				1.93E+03		
			1332.50	7.072E+02	(	2.171E+00	8.58E-01 1.00E+02	G
Y-1836		1.4056E+03				1.07E+02		
			1836.01	1.406E+03	(	1.769E+02	1.02E+01 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the

library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

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	1.3643E+04	1.4632E+04	6.080E-01%		1.52E+02
AM-241	1.1752E+03	1.1794E+03	5.977E-01%		1.12E+01
CD-109	4.4685E+03	1.5319E+04	7.941E-01%		1.93E+02
CO-57	4.1998E+01	3.4190E+02	1.960E+00%		1.29E+01
Ce-139	8.6929E+00	5.4636E+02	6.612E+00%		8.98E+01
Hg-203 #A	-4.3324E-04	>12 Halflives	1.7564E+05%	2.5409E+00	
SN-113 #	8.9902E+00	1.2718E+03	1.695E+01%		4.90E+02
CS-137	4.1377E+02	4.3581E+02	8.435E-01%		3.46E+00
Y-898	9.1492E+00	1.9202E+03	1.733E+01%		7.66E+02
Co-1173	5.2510E+02	7.0601E+02	8.735E-01%		4.66E+00
Co-1332	5.2597E+02	7.0718E+02	8.582E-01%		2.17E+00
Y-1836	6.6974E+00	1.4056E+03	1.017E+01%		1.77E+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 1999.2 keV) 2.083E+04 Bq/Sample
Total Decayed Activity (37.6 to 1999.2 keV) 3.8465293E+04 Bq/Sample

2nd Source Verification

Detector: Ge5

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard 6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1160.9	99.7
Cs-137	1926	396	0.851	465	442.36	95.1
Co-60	3611	742	0.99974	742	700.21	94.3
Co-60	3612	742	0.999856	742	701.86	94.6

Reviewed By: Jody Watson

Date: 3/27/2012

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 7:35:49 AM Page 1
TestAmerica Spectrum name: 5_TunaCan2nd_20120813.An1

Sample description
5_TunaCan2nd_Rad10_032712

Spectrum Filename: C:\User\SPC\Det5\5_TunaCan2nd_20120813.An1

Acquisition information
Start time: 3/27/2012 10:12:05 AM
Live time: 7200
Real time: 7250
Dead time: 0.69 %
Detector ID: 5

Detector system
Ge 5 SN/157

Calibration
Filename: 5_Soil_TunaCan.Clb
5_Soil_TunaCan_90099_032612

Energy Calibration
Created: 3/27/2012 5:20:02 PM
Zero offset: 0.135 keV
Gain: 0.250 keV/channel
Quadratic: 2.720E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 5:20:37 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.466115E-01 + (-7.830454E-01*Log(E)) +
(-4.117504E-03*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.43 %
Log(Eff): -2.462251E+01 + (9.075211E+00*Log(E)) +
(-9.664422E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.53keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 7:35:49 AM Page 2
TestAmerica Spectrum name: 5_TunaCan2nd_20120813.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2012-02-26_0305.PBC 2/26/2012 3:05:30 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 33.1557

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.81	1005.	12.08	0.62	1.151E-02				
46.61	72616.	0.49	0.73	1.792E-02	46.54	4.250	1.421E+04	Pb210
49.73	1326.	15.18	0.68	1.987E-02				
59.57	75329.	0.49	0.74	2.535E-02	59.54	35.700	1.161E+03	AM241
87.94	40851.	0.68	0.80	3.460E-02	88.03	3.610	1.542E+04	CD109
96.44	148.	47.31	0.80	3.568E-02				
99.01	160.	48.52	0.81	3.589E-02				
105.59	109.	69.79	0.52	3.619E-02				
121.94	9225.	1.66	0.84	3.583E-02	122.06	85.600	3.348E+02	CO57
129.89	126.	62.97	0.30	3.522E-02				
136.43	1263.	7.42	0.90	3.457E-02				
165.86	1574.	6.14	0.84	3.133E-02	165.85	79.900	5.319E+02	Ce139
238.72	327.	27.04	0.86	2.319E-02				
247.25	57.	84.47	0.31	2.252E-02				
259.02	93.	60.17	0.97	2.167E-02				
260.46	98.	58.62	0.97	2.157E-02				
322.65	45.	91.14	0.46	1.806E-02				
351.63	256.	27.79	1.06	1.681E-02				
391.95	494.	16.33	1.15	1.536E-02	391.69	64.000	9.501E+02	SN113
407.02	43.	90.43	0.56	1.489E-02				
412.80	202.	35.90	0.77	1.471E-02				
420.83	123.	52.91	0.72	1.448E-02				
510.72	188.	44.32	0.50	1.232E-02				
542.81	148.	28.69	0.36	1.171E-02				
583.30	161.	33.50	0.69	1.103E-02				
661.70	25605.	0.71	1.39	9.924E-03	661.66	85.210	4.424E+02	CS137
762.61	129.	36.06	0.79	8.812E-03				
796.90	151.	38.71	0.30	8.493E-03				
886.67	129.	46.77	0.30	7.766E-03				
897.77	428.	19.21	1.38	7.686E-03	898.02	93.700	1.665E+03	Y898
932.49	230.	35.52	0.82	7.445E-03				

1008.65	104.	56.29	0.28	6.970E-03				
1173.15	23044.	0.73	1.79	6.138E-03	1173.24	99.900	7.002E+02	Co1173
1332.39	20769.	0.71	1.87	5.515E-03	1332.50	99.982	7.019E+02	Co1332
1836.05	245.	7.47	1.56	4.208E-03	1836.01	99.200	1.642E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.78	36.81	4847.	1005.	8.731E+04	12.08	0.625	-	
198.52	49.73	12365.	1326.	6.673E+04	15.18	0.681	-	s
385.40	96.42	1874.	90.	2.532E+03	71.31	0.588	-	sc
395.68	98.99	2103.	121.	3.381E+03	58.44	0.394	-	s

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 1 Sigma Counting		MDA Bq/Sample
Pb-210	1.3259E+04	1.4212E+04	4.918E-01%		1.18E+02
AM-241	1.1568E+03	1.1609E+03	4.867E-01%		8.96E+00
CD-109	4.5403E+03	1.5419E+04	6.810E-01%		1.66E+02
CO-57	4.1787E+01	3.3478E+02	1.660E+00%		1.06E+01
Ce-139	8.7347E+00	5.3191E+02	6.138E+00%		7.69E+01
Hg-203 #A	-6.5193E-03	>12 Halflives	8.2197E+03%	1.7882E+00	
SN-113	6.9747E+00	9.5011E+02	1.633E+01%		3.68E+02
CS-137	4.2015E+02	4.4236E+02	7.122E-01%		3.02E+00
Y-898	8.2662E+00	1.6655E+03	1.921E+01%		6.91E+02
Co-1173	5.2196E+02	7.0021E+02	7.316E-01%		4.06E+00
Co-1332	5.2320E+02	7.0186E+02	7.069E-01%		1.65E+00
Y-1836	8.1520E+00	1.6424E+03	7.471E+00%		1.39E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity (  279.0 to  2000.5 keV)     2.050E+04  Bq/Sample
Total Decayed Activity (  279.0 to  2000.5 keV) 3.7761527E+04  Bq/Sample
```

2nd Source Verification

Detector: Ge7

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard 6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1150.4	98.8
Cs-137	1926	396	0.851	465	440.47	94.7
Co-60	3611	742	0.99974	742	681.72	91.9
Co-60	3612	742	0.999856	742	692.1	93.2

Reviewed By: Jody Watson

Date: 3/27/2012

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

Sample description
7_TunaCan2ndSource_81427-334_032712

Spectrum Filename: C:\User\SPC\Det7\7_TunaCan2ndSource_20120479.An1

Acquisition information

Start time:	3/27/2012 3:25:25 PM
Live time:	3600
Real time:	3684
Dead time:	2.28 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration

Created:	3/16/2012 11:44:50 AM
Zero offset:	0.153 keV
Gain:	0.250 keV/channel
Quadratic:	6.716E-09 keV/channel^2

Efficiency Calibration

Created:	3/16/2012 11:45:14 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 0.87 %
Log(Eff):	6.716580E-01 + (-6.166540E-01*Log(E)) + (-2.065917E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.48 %
Log(Eff):	-2.689695E+01 + (1.019544E+01*Log(E)) + (-1.081671E+00*Log(E)^2)

Library Files

Main analysis library:	DET_EnergyStandardMix & Pb.Lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.65keV)
Stop channel:	8000 (2000.21keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2012-02-26_0327.PBC 2/26/2012 3:27:47 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0270

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.65	788.	12.78	0.82	1.487E-02				
40.49	109.	96.90	0.59	1.869E-02				
46.62	49142.	0.63	0.84	2.491E-02	46.54	4.250	1.386E+04	Pb210
49.64	876.	18.72	0.86	2.792E-02				
59.61	54530.	0.58	0.87	3.707E-02	59.54	35.700	1.150E+03	AM241
76.99	260.	38.90	1.03	4.881E-02				
88.06	31019.	0.77	0.89	5.329E-02	88.03	3.610	1.522E+04	CD109
122.04	6834.	2.04	0.94	5.606E-02	122.06	85.600	3.171E+02	CO57
136.41	810.	9.51	1.00	5.411E-02				
165.84	1193.	6.45	0.96	4.765E-02	165.85	79.900	5.180E+02	Ce139
185.66	92.	57.01	0.73	4.445E-02				
213.19	122.	50.56	0.75	3.960E-02				
272.80	146.	47.29	0.28	3.217E-02				
391.67	372.	19.60	1.11	2.360E-02	391.69	64.000	9.332E+02	SN113
442.91	47.	93.72	0.45	2.122E-02				
483.77	95.	38.10	0.62	1.965E-02				
524.63	67.	65.12	0.73	1.831E-02				
604.78	31.	59.37	0.27	1.616E-02				
628.99	32.	94.37	0.58	1.561E-02				
661.67	19152.	0.86	1.47	1.492E-02	661.66	85.210	4.405E+02	CS137
898.03	322.	23.53	1.90	1.137E-02	898.02	93.700	1.694E+03	Y898
910.18	180.	33.99	0.85	1.123E-02				
963.79	49.	71.39	0.69	1.067E-02				
1173.23	16317.	0.86	1.89	8.929E-03	1173.24	99.900	6.817E+02	Co1173
1332.49	14763.	0.85	2.04	7.951E-03	1332.50	99.982	6.921E+02	Co1332
1836.09	186.	9.19	1.40	5.919E-03	1836.01	99.200	1.780E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.00	36.65	3116.	788.	5.300E+04	12.78	0.819	-	
161.37	40.49	4419.	109.	5.831E+03	96.90	0.587	-	c
197.99	49.64	8222.	876.	3.138E+04	18.72	0.855	-	sM

307.39	76.99	3728.	260.	5.319E+03	38.90	1.033	-

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
545.11	136.41	1706.	810.	1.497E+04	9.51	1.002	-	
742.15	185.66	1076.	92.	2.081E+03	57.01	0.725	-	s
852.30	213.19	1296.	122.	3.077E+03	50.56	0.748	-	s
1090.74	272.80	1320.	146.	4.539E+03	47.29	0.283	-	s
1771.26	442.91	710.	47.	2.215E+03	93.72	0.453	-	sc
1934.71	483.77	486.	95.	4.835E+03	38.10	0.616	-	s
2098.18	524.63	583.	67.	3.669E+03	65.12	0.732	-	s
2418.80	604.78	172.	31.	1.939E+03	59.37	0.268	-	s
2515.62	628.99	330.	32.	2.050E+03	94.37	0.581	-	sc
3640.41	910.18	855.	180.	1.603E+04	33.99	0.852	-	s
3854.87	963.79	447.	49.	4.625E+03	71.39	0.695	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.90	46.62	12530.	49107.	13.641	0.63	0.840
AM-241	237.87	59.61	10985.	54530.	15.147	0.58	0.871
CD-109	351.70	88.06	6100.	31019.	8.616	0.77	0.892
CO-57	487.62	122.04	3040.	6834.	1.898	2.04	0.937
Ce-139	662.88	165.84	1495.	1193.	0.331	6.45	0.956
Hg-203	1114.79	278.81	2119.	-42.	-0.012	155.58	1.105s
SN-113	1566.31	391.67	1236.	372.	0.103	19.60	1.107
CS-137	2646.35	661.67	1156.	19152.	5.320	0.86	1.474
Y-898	3591.81	898.03	1084.	322.	0.089	23.53	1.897
Co-1173	4692.59	1173.23	493.	16317.	4.532	0.86	1.893
Co-1332	5329.55	1332.49	127.	14763.	4.101	0.85	2.038
Y-1836	7343.66	1836.09	16.	186.	0.052	9.19	1.399s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** 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	Peak MDA Value Bq/Sample		COMMENTS
Pb-210	N	1.3857E+04				8.15E+03		
			46.54	1.386E+04	(P	1.480E+02	6.34E-01	4.25E+00 G
AM-241		1.1504E+03				1.58E+05		
			59.54	1.150E+03	(	1.036E+01	5.81E-01	3.57E+01 G
CD-109		1.5217E+04				4.63E+02		
			88.03	1.522E+04	(	1.799E+02	7.73E-01	3.61E+00 G
CO-57		3.1712E+02				2.72E+02		
			122.06	3.171E+02	(	1.205E+01	2.04E+00	8.56E+01 G
Ce-139		5.1801E+02				1.38E+02		
			165.85	5.180E+02	(	7.941E+01	6.45E+00	7.99E+01 G
Hg-203		-4.5441E-01				4.66E+01		
			279.17	-4.544E-01	?(	2.347E+00	1.56E+02	8.15E+01 G
SN-113		9.3315E+02				1.15E+02		
			391.69	9.332E+02	(	4.178E+02	1.96E+01	6.40E+01 G
CS-137		4.4047E+02				1.10E+04		
			661.66	4.405E+02	(	3.706E+00	8.56E-01	8.52E+01 G
Y-898		1.6944E+03				1.07E+02		
			898.02	1.694E+03	(	8.216E+02	2.35E+01	9.37E+01 G
Co-1173		6.8172E+02				1.93E+03		
			1173.24	6.817E+02	(	4.436E+00	8.58E-01	9.99E+01 G
Co-1332		6.9210E+02				1.93E+03		
			1332.50	6.921E+02	(	2.586E+00	8.49E-01	1.00E+02 G
Y-1836		1.7801E+03				1.07E+02		
			1836.01	1.780E+03	(	2.065E+02	9.19E+00	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	278.81	2119.	-42.	-0.012	155.58	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.2927E+04	1.3857E+04	6.344E-01%		1.48E+02
AM-241	1.1462E+03	1.1504E+03	5.808E-01%		1.04E+01
CD-109	4.4794E+03	1.5217E+04	7.727E-01%		1.80E+02
CO-57	3.9561E+01	3.1712E+02	2.043E+00%		1.20E+01
Ce-139	8.4971E+00	5.1801E+02	6.453E+00%		7.94E+01
Hg-203 #A	-4.5441E-01	>12 Halflives	1.5558E+02%	2.3474E+00	
SN-113	6.8413E+00	9.3315E+02	1.960E+01%		4.18E+02
CS-137	4.1835E+02	4.4047E+02	8.557E-01%		3.71E+00
Y-898	8.3979E+00	1.6944E+03	2.353E+01%		8.22E+02
Co-1173	5.0814E+02	6.8172E+02	8.581E-01%		4.44E+00
Co-1332	5.1588E+02	6.9210E+02	8.485E-01%		2.59E+00
Y-1836	8.8227E+00	1.7801E+03	9.190E+00%		2.07E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.2 keV) 2.007E+04 Bq/Sample
Total Decayed Activity (37.6 to 2000.2 keV) 3.7281199E+04 Bq/Sample

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Second Source Verification

Detector: Ge7

Geometry: 1L Marn

Reference date 1/1/2011

Calibration Standard: 83924-334

Standard volume g / vial 1

Standard volume transferred in g / geometry 1

lab ID# of cal standard 6675

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	Abundance	Activity Bq/L	Count Results	%recovery
Am-241	1830	1830	0.359	**5097.5**	5064.7	99.4
Cs-137	1705	1705	0.851	**2003.5**	1974.8	98.6
Co-60	3293	3293	0.99974	**3293.9**	3224.4	97.9
Co-60	3294	3294	0.99986	**3294.5**	3228.8	98.0

Reviewed By: Megan McAfee

Date: 4/5/2012

ORTEC g v - i (3263) Env32 G53W4.25 4/3/2012 8:09:21 AM Page 1
TestAmerica Spectrum name: 7_1Lmarn2nd_20120523.An1

Sample description
7_1Lmarn2nd_83924-334_040212

Spectrum Filename: C:\User\SPC\Det7\7_1Lmarn2nd_20120523.An1

Acquisition information
Start time: 4/2/2012 2:43:08 PM
Live time: 7200
Real time: 7709
Dead time: 6.60 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Liquid_Marinelli 1L.Clb
7_1Lmarn_90062_032612

Energy Calibration
Created: 3/28/2012 9:18:12 AM
Zero offset: 0.187 keV
Gain: 0.250 keV/channel
Quadratic: 7.031E-09 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 9:18:24 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -7.054602E-01 + (-2.848254E-01*Log(E)) +
(-4.423998E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.43 %
Log(Eff): -1.484435E+01 + (5.183775E+00*Log(E)) +
(-5.730519E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Mn, Zn.L
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.68keV)
Stop channel: 8000 (2000.10keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G53W4.25 4/3/2012 8:09:21 AM Page 2
TestAmerica Spectrum name: 7_1Lmarn2nd_20120523.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2012-04-01_0533.PBC 4/1/2012 5:33:35 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0302

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.43	3528.	8.11	0.89	2.696E-02				
37.87	4819.	6.33	0.89	2.806E-02				
42.90	850.	39.80	0.39	3.156E-02				
49.61	22317.	3.24	1.78	3.541E-02				
59.56	513708.	0.20	0.87	3.954E-02	59.54	35.700	5.065E+03	AM241
66.30	486.	67.51	0.38	4.145E-02				
77.88	972.	42.49	0.64	4.339E-02				
88.01	406256.	0.22	0.93	4.404E-02	88.03	3.610	7.040E+04	CD109
122.00	128434.	0.44	0.98	4.215E-02	122.06	85.600	1.587E+03	CO57
136.37	15240.	2.23	0.97	4.037E-02				
165.78	49846.	0.96	1.00	3.618E-02	165.85	79.900	2.388E+03	Ce139
170.81	156.	93.30	0.31	3.548E-02				
198.91	1359.	20.81	1.11	3.167E-02				
216.38	511.	53.39	0.29	2.972E-02				
225.00	424.	43.72	0.57	2.884E-02				
235.83	344.	47.73	0.65	2.782E-02				
255.11	1122.	21.90	0.63	2.619E-02				
279.47	1059.	21.56	1.15	2.439E-02	279.17	81.500	6.606E+03	Hg203
310.33	357.	52.58	0.82	2.246E-02				
391.75	24138.	1.65	1.24	1.863E-02	391.69	64.000	4.413E+03	SN113
472.35	388.	47.11	0.40	1.597E-02				
477.47	212.	66.81	0.43	1.583E-02				
500.69	264.	57.74	0.61	1.522E-02				
511.06	4978.	5.72	2.29	1.496E-02				
558.51	102.	92.01	0.46	1.388E-02				
597.84	146.	71.13	0.52	1.311E-02				
661.68	141450.	0.32	1.47	1.202E-02	661.66	85.210	1.975E+03	CS137
724.87	115.	70.60	0.54	1.111E-02				
828.41	306.	39.09	0.49	9.884E-03				
834.88	77158.	0.59	1.63	9.816E-03	834.85	99.980	3.012E+03	Mn54
898.08	21460.	1.63	1.71	9.204E-03	898.02	93.700	6.754E+03	Y898

954.58	398.	42.37	0.34	8.718E-03				
1115.57	49573.	0.78	1.87	7.578E-03	1115.55	50.600	6.569E+03	Zn65
1173.26	142414.	0.30	1.91	7.239E-03	1173.24	99.900	3.224E+03	Co1173
1189.08	147.	45.22	0.46	7.151E-03				
1199.08	67.	61.19	0.67	7.097E-03				
1246.07	162.	33.31	1.97	6.853E-03				
1251.95	100.	45.66	1.98	6.823E-03				
1320.19	83.	48.25	2.03	6.498E-03				
1324.82	263.	22.63	2.04	6.477E-03				
1332.52	127020.	0.30	2.01	6.442E-03	1332.50	99.982	3.229E+03	Co1332
1522.24	110.	39.93	0.31	5.694E-03				
1836.08	12210.	1.03	2.43	4.773E-03	1836.01	99.200	6.999E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.03	36.46	39179.	3528.	1.309E+05	8.11	0.893	-	D
150.78	37.90	44171.	4819.	1.717E+05	6.33	0.894	-	D

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
170.90	42.90	45388.	850.	2.692E+04	39.80	0.388	-	s
197.73	49.61	142965.	22317.	6.303E+05	3.24	1.783	-	s
264.52	66.30	42956.	486.	1.174E+04	67.51	0.375	-	s
310.85	77.88	56534.	972.	2.240E+04	42.49	0.642	-	s
544.89	136.37	27355.	15240.	3.775E+05	2.23	0.970	-	
682.65	170.81	9642.	156.	4.382E+03	93.30	0.315	-	C
795.10	198.91	22460.	1359.	4.291E+04	20.81	1.113	-	
864.99	216.38	22202.	511.	1.721E+04	53.39	0.287	-	s
899.46	225.00	13540.	424.	1.468E+04	43.72	0.573	-	s
942.81	235.83	11431.	344.	1.238E+04	47.73	0.647	-	s
1019.95	255.11	17792.	1122.	4.286E+04	21.90	0.629	-	s
1240.85	310.33	11626.	357.	1.590E+04	52.58	0.816	-	s
1889.05	472.35	10437.	388.	2.430E+04	47.11	0.400	-	s
1909.56	477.47	7467.	212.	1.341E+04	66.81	0.432	-	s
2002.45	500.69	7658.	264.	1.735E+04	57.74	0.606	-	s
2043.92	511.06	15755.	4978.	3.328E+05	5.72	2.285	-	s
2233.76	558.51	4005.	102.	7.335E+03	92.01	0.456	-	sC
2391.11	597.84	4560.	146.	1.114E+04	71.13	0.523	-	sC
2899.28	724.87	2989.	115.	1.035E+04	70.60	0.541	-	sC
3313.47	828.41	4937.	306.	3.094E+04	39.09	0.489	-	sM
3818.18	954.58	7992.	398.	4.560E+04	42.37	0.339	-	s
4756.20	1189.08	1424.	147.	2.056E+04	45.22	0.459	-	s
4796.24	1199.08	737.	67.	9.394E+03	61.19	0.666	-	s
4983.38	1245.87	1280.	201.	2.938E+04	39.02	0.270	-	s
5006.88	1251.75	1011.	134.	1.964E+04	48.24	0.468	-	s
5280.66	1320.19	769.	83.	1.284E+04	48.25	2.033	-	D
5299.17	1324.82	1646.	263.	4.068E+04	22.63	2.036	-	D
6088.83	1522.24	473.	110.	1.929E+04	39.93	0.307	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Mn, Zn.L

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.54	59.56	133662.	513708.	71.348	0.20	0.869
CD-109	351.37	88.01	88190.	406256.	56.424	0.22	0.933
CO-57	487.38	122.00	42014.	128434.	17.838	0.44	0.979
Ce-139	662.53	165.78	35420.	49846.	6.923	0.96	0.997
Hg-203	1117.41	279.47	15318.	1059.	0.147	21.56	1.154s
SN-113	1566.61	391.75	23045.	24138.	3.352	1.65	1.236

ORTEC g v - i (3263) Env32 G53W4.25 4/3/2012 8:09:21 AM Page 4
TestAmerica Spectrum name: 7_1Lmarn2nd_20120523.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	2646.50	661.68	12931.	141450.	19.646	0.32	1.470
Mn-54	3339.35	834.88	17455.	77158.	10.716	0.59	1.627
Y-898	3592.18	898.08	16384.	21460.	2.980	1.63	1.714
Zn-65	4462.19	1115.57	12614.	49573.	6.885	0.78	1.871
Co-1173	4692.95	1173.26	5998.	142414.	19.780	0.30	1.906
Co-1332	5329.99	1332.52	2348.	127020.	17.642	0.30	2.013
Y-1836	7344.06	1836.08	428.	12210.	1.696	1.03	2.425

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
AM-241		5.0647E+03				1.58E+05	
			59.54	5.065E+03	(	1.682E+01 2.01E-01 3.57E+01	G
CD-109		7.0396E+04				4.63E+02	
			88.03	7.040E+04	(	2.403E+02 2.25E-01 3.61E+00	G
CO-57		1.5868E+03				2.72E+02	
			122.06	1.587E+03	(	1.183E+01 4.39E-01 8.56E+01	G
Ce-139		2.3884E+03				1.38E+02	
			165.85	2.388E+03	(	4.215E+01 9.56E-01 7.99E+01	G
Hg-203		6.6061E+03				4.66E+01	
			279.17	6.606E+03	*(	3.616E+03 2.16E+01 8.15E+01	G
SN-113		4.4128E+03				1.15E+02	
			391.69	4.413E+03	(	1.298E+02 1.65E+00 6.40E+01	G
CS-137		1.9748E+03				1.10E+04	
			661.66	1.975E+03	(	7.436E+00 3.24E-01 8.52E+01	G
Mn-54		3.0118E+03				3.12E+02	
			834.85	3.012E+03	(	2.414E+01 5.87E-01 1.00E+02	G
Y-898		6.7536E+03				1.07E+02	
			898.02	6.754E+03	(	1.886E+02 1.63E+00 9.37E+01	G

Zn-65 F 6.5691E+03 2.44E+02
1115.55 6.569E+03 (6.971E+01 7.83E-01 5.06E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-1173	3.2244E+03					1.93E+03	
		1173.24	3.224E+03	(	8.232E+00	3.03E-01	9.99E+01 G
Co-1332	3.2288E+03					1.93E+03	
		1332.50	3.229E+03	(	5.808E+00	3.02E-01	1.00E+02 G
Y-1836	6.9991E+03					1.07E+02	
		1836.01	6.999E+03	(	5.678E+01	1.03E+00	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid 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 *****

7_1Lmarn2nd_20120523

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
AM-241	5.0546E+03	5.0647E+03	2.014E-01%	1.68E+01
CD-109	3.5486E+04	7.0396E+04	2.246E-01%	2.40E+02
CO-57	4.9453E+02	1.5868E+03	4.387E-01%	1.18E+01
Ce-139	2.3893E+02	2.3884E+03	9.557E-01%	4.22E+01
Hg-203 #	7.3907E+00	6.6061E+03	2.156E+01%	3.62E+03
SN-113	2.8118E+02	4.4128E+03	1.650E+00%	1.30E+02
CS-137	1.9186E+03	1.9748E+03	3.243E-01%	7.44E+00
Mn-54	1.0919E+03	3.0118E+03	5.870E-01%	2.41E+01
Y-898	3.4559E+02	6.7536E+03	1.631E+00%	1.89E+02
Zn-65	1.7955E+03	6.5691E+03	7.825E-01%	6.97E+01
Co-1173	2.7351E+03	3.2244E+03	3.032E-01%	8.23E+00
Co-1332	2.7388E+03	3.2288E+03	3.018E-01%	5.81E+00
Y-1836	3.5815E+02	6.9991E+03	1.031E+00%	5.68E+01

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (1332.3 to 2000.1 keV) 5.255E+04 Bq/Sample
Total Decayed Activity (1332.3 to 2000.1 keV) 1.2221653E+05 Bq/Sample

2nd Source Verification

Detector: Ge9

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard 6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1169.4	100.4
Cs-137	1926	396	0.851	465	444.52	95.6
Co-60	3611	742	0.99974	742	687.72	92.7
Co-60	3612	742	0.999856	742	692.56	93.3

Reviewed By: Jody Watson

Date: 6/14/2012

ORTEC g v - i (3263) Env32 G53W4.25 6/14/2012 1:20:45 PM Page 1
TestAmerica, Inc Spectrum name: 9_TunaCan_20120371.An1

Sample description
9_TunaCan_90099_061412

Spectrum Filename: C:\User\SPC\Det9\9_TunaCan_20120371.An1

Acquisition information
Start time: 6/14/2012 10:54:15 AM
Live time: 3600
Real time: 3629
Dead time: 0.81 %
Detector ID: 9

Detector system
Ge 9 SN/100113

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

Energy Calibration
Created: 6/14/2012 10:19:40 AM
Zero offset: 0.088 keV
Gain: 0.250 keV/channel
Quadratic: -2.039E-08 keV/channel^2

Efficiency Calibration
Created: 6/14/2012 10:19:51 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.30 %
Log(Eff): -8.079856E-01 + (-2.367265E-01*Log(E)) + (-3.950640E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -2.387916E+01 + (8.875647E+00*Log(E)) + (-9.401100E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.60keV)
Stop channel: 8000 (1999.66keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G53W4.25 6/14/2012 1:20:45 PM Page 2
TestAmerica, Inc Spectrum name: 9_TunaCan_20120371.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2012-05-27_0502.PBC 5/27/2012 5:02:59 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0390

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.54	860.	12.66	1.34	1.634E-02				
46.62	48876.	0.54	1.09	2.580E-02	46.54	4.250	1.338E+04	Pb210
50.03	116.	122.12	1.09	2.886E-02				
59.57	54776.	0.62	1.11	3.661E-02	59.54	35.700	1.169E+03	AM241
63.90	47.	193.18	0.35	3.962E-02				
88.09	26880.	0.87	1.14	5.052E-02	88.03	3.610	1.566E+04	CD109
122.10	5522.	2.86	1.15	5.303E-02	122.06	85.600	3.312E+02	CO57
136.38	729.	11.64	1.25	5.151E-02				
165.67	814.	10.74	1.30	4.629E-02	165.85	79.900	5.417E+02	Ce139
295.46	252.	33.13	0.56	3.229E-02				
316.16	66.	75.82	0.25	3.082E-02				
356.41	45.	97.50	1.36	2.835E-02				
358.68	42.	110.02	1.37	2.822E-02				
379.76	37.	75.05	0.46	2.711E-02				
391.75	310.	24.80	1.08	2.652E-02	391.69	64.000	1.113E+03	SN113
454.98	83.	53.05	0.37	2.383E-02				
568.66	103.	37.41	0.47	2.026E-02				
626.42	84.	49.00	0.45	1.885E-02				
661.66	23324.	0.76	1.61	1.810E-02	661.66	85.210	4.445E+02	CS137
821.54	239.	27.43	0.39	1.536E-02				
876.16	66.	52.19	0.61	1.462E-02				
898.25	346.	23.61	1.52	1.434E-02	898.02	93.700	2.406E+03	Y898
937.90	34.	79.64	0.44	1.387E-02				
1071.41	38.	61.01	0.57	1.249E-02				
1085.31	68.	35.74	1.00	1.237E-02				
1098.64	14.	140.33	0.47	1.225E-02				
1173.23	20836.	0.81	2.05	1.163E-02	1173.24	99.900	6.877E+02	Co1173
1332.49	18966.	0.75	2.11	1.050E-02	1332.50	99.982	6.926E+02	Co1332
1835.90	150.	10.23	1.72	8.080E-03	1836.01	99.200	1.745E+03	Y1836

********** 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	-

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.

***** 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	1.3971E+04				8.15E+03		
			46.54	1.397E+04	(	1.478E+02	6.46E-01 4.25E+00	G
AM-241		1.1694E+03				1.58E+05		
			59.54	1.169E+03	(	1.086E+01	6.16E-01 3.57E+01	G
CD-109		1.5657E+04				4.63E+02		
			88.03	1.566E+04	(	2.117E+02	8.71E-01 3.61E+00	G
CO-57		3.3118E+02				2.72E+02		
			122.06	3.312E+02	(	1.731E+01	2.86E+00 8.56E+01	G
Ce-139		5.4173E+02				1.38E+02		
			165.85	5.417E+02	(	1.357E+02	1.07E+01 7.99E+01	G
Hg-203		-5.2429E-01				4.66E+01		
			279.17	-5.243E-01	?(	2.327E+00	1.34E+02 8.15E+01	G
SN-113		9.5260E+02				1.15E+02		
			391.69	9.526E+02	?(	7.503E+02	2.44E+01 6.40E+01	G
CS-137		4.4452E+02				1.10E+04		
			661.66	4.445E+02	(	3.202E+00	7.63E-01 8.52E+01	G
Y-898		2.4057E+03				1.07E+02		
			898.02	2.406E+03	@(	1.118E+03	2.36E+01 9.37E+01	G
Co-1173		6.8772E+02				1.93E+03		
			1173.24	6.877E+02	(	4.547E+00	8.09E-01 9.99E+01	G
Co-1332		6.9256E+02				1.93E+03		
			1332.50	6.926E+02	(	2.044E+00	7.49E-01 1.00E+02	G
Y-1836		1.7452E+03				1.07E+02		
			1836.01	1.745E+03	(	2.388E+02	1.02E+01 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the

library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	280.29	2362.	-52.	-0.014	133.84	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
Pb-210	1.2947E+04	1.3971E+04	6.459E-01%		1.48E+02
AM-241	1.1648E+03	1.1694E+03	6.156E-01%		1.09E+01
CD-109	4.0954E+03	1.5657E+04	8.713E-01%		2.12E+02
CO-57	3.3792E+01	3.3118E+02	2.862E+00%		1.73E+01
Ce-139	5.9752E+00	5.4173E+02	1.074E+01%		1.36E+02
Hg-203 #A	-5.2429E-01	>12 Halflives	1.3384E+02%	2.3272E+00	
SN-113 #	4.3447E+00	9.5260E+02	2.438E+01%		7.50E+02
CS-137	4.2011E+02	4.4452E+02	7.635E-01%		3.20E+00
Y-898 #	7.1422E+00	2.4057E+03	2.361E+01%		1.12E+03
Co-1173	4.9827E+02	6.8772E+02	8.087E-01%		4.55E+00
Co-1332	5.0178E+02	6.9256E+02	7.487E-01%		2.04E+00
Y-1836	5.1813E+00	1.7452E+03	1.023E+01%		2.39E+02

ORTEC g v - i (3263) Env32 G53W4.25 6/14/2012 1:20:45 PM Page 6
TestAmerica, Inc Spectrum name: 9_TunaCan_20120371.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (379.7 to 1999.7 keV)	1.968E+04	Bq/Sample
Total Decayed Activity (379.7 to 1999.7 keV)	3.8598309E+04	Bq/Sample

Second Source Verification

Detecter: Ge 11

Geometry: 1L Marn

Reference date 1/1/2010

Calibration Standard: 81592-334

Standard volume g / vial 1

Standard volume transferred in g / geometry 1

lab ID# of cal standard Rad 10-0030

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	Abundance*	Activity Bq/L	Count Results	%recovery
Am-241	1929	1929	0.359	**5373.3**	5254.3	97.8
Cs-137	1826	1826	0.851	**2145.7**	2118.8	98.7
Co-60	3424	3424	0.99974	**3424.9**	3249.3	94.9
Co-60	3426	3426	0.99986	**3426.5**	3300.3	96.3

Reviewed By: Jody Watson

Date: 9/2/2011

ORTEC g v - i (3263) Env32 G53W4.25 11/23/2011 8:51:25 AM
TestAmerica, Inc Spectrum name: 11_marn1L_20110937.An1

Sample description
11_marn1L_2ndsource_111011

Spectrum Filename: C:\User\SPC\Det11\11_marn1L_20110937.An1

Acquisition information
Start time: 11/10/2011 2:13:51 AM
Live time: 7200
Real time: 7613
Dead time: 5.42 %
Detector ID: 11

Detector system
Ge11 SN/09363993

Calibration
Filename: 11_Liquid_Marinelli 1L.Clb
Ge11_1Lmarn_83924_334_101210

Energy Calibration
Created: 11/1/2011 11:26:50 AM
Zero offset: 0.098 keV
Gain: 0.250 keV/channel
Quadratic: -2.669E-08 keV/channel^2

Efficiency Calibration
Created: 11/1/2011 11:27:06 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.69 %
Log(Eff): -1.728738E+00 + (5.998209E-02*Log(E)) +
(-6.399241E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.15 %
Log(Eff): -1.340909E+01 + (4.619770E+00*Log(E)) +
(-5.089701E-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 (37.62keV)
Stop channel: 8000 (1999.43keV)
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 11/23/2011 8:51:25 AM
TestAmerica, Inc Spectrum name: 11_marn1L_20110937.An1

Random error:	1.0000000E+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:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	11_2011-10-29_1022.PBC 10/29/2011 10:22:41 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0277

***** 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
36.50	4518.	6.39	0.89	3.408E-02				
37.97	2037.	14.55	0.89	3.538E-02				
42.39	422.	79.51	0.35	3.897E-02				
49.58	28212.	2.68	1.80	4.367E-02				
59.56	652750.	0.17	0.89	4.833E-02	59.54	35.700	5.271E+03	AM241
66.17	2473.	12.86	0.92	5.042E-02				
67.20	2984.	11.16	0.92	5.069E-02				
74.97	1326.	26.91	0.93	5.229E-02				
88.04	361346.	0.22	0.94	5.351E-02	88.03	3.610	7.172E+04	CD109
103.13	614.	46.51	0.69	5.335E-02				
122.08	91666.	0.51	0.97	5.171E-02	122.06	85.600	1.619E+03	CO57
136.50	11480.	3.07	1.00	4.985E-02				
165.92	21866.	1.59	1.01	4.532E-02	165.85	79.900	2.544E+03	Ce139
198.80	643.	37.03	0.42	4.062E-02				
215.88	289.	57.37	0.91	3.858E-02				
228.14	331.	63.22	0.46	3.726E-02				
279.33	101.	220.86	1.12	3.269E-02	279.17	81.500	HL>Cutoff	Hg203
370.00	248.	74.51	0.40	2.700E-02				
379.97	225.	76.51	0.32	2.651E-02				
391.60	8985.	3.15	1.18	2.595E-02	391.69	64.000	4.450E+03	SN113
496.10	111.	90.09	0.66	2.189E-02				
503.03	134.	73.41	0.48	2.167E-02				
510.83	2730.	10.10	1.79	2.142E-02				
530.79	573.	37.26	0.73	2.082E-02				
566.47	77.	103.81	0.56	1.984E-02				
661.67	218136.	0.26	1.45	1.762E-02	661.66	85.210	2.106E+03	CS137
703.72	347.	44.49	0.56	1.680E-02				
819.03	269.	51.05	1.59	1.490E-02				
821.78	583.	23.01	1.59	1.486E-02				
834.83	72294.	0.57	1.59	1.468E-02	834.85	99.980	3.078E+03	Mn54
897.95	7974.	3.79	1.57	1.384E-02	898.02	93.700	6.998E+03	Y898
920.50	375.	55.07	0.34	1.357E-02				
935.61	478.	46.46	0.35	1.339E-02				
998.23	417.	33.41	0.48	1.270E-02				
1022.42	402.	33.34	1.74	1.245E-02				

1026.05	228.	48.12	1.75	1.241E-02				
1115.53	26774.	1.22	1.78	1.158E-02	1115.55	50.600	4.342E+03	Zn65
1126.42	75.	103.86	0.44	1.148E-02				
1173.21	204379.	0.25	1.87	1.110E-02	1173.24	99.900	3.269E+03	Co1173
1212.84	166.	49.95	1.09	1.079E-02				
1332.47	185866.	0.24	1.97	9.954E-03	1332.50	99.982	3.311E+03	Co1332
1549.65	146.	27.79	0.75	8.728E-03				
1835.92	4968.	1.95	2.19	7.505E-03	1836.01	99.200	7.596E+03	Y1836
1959.08	87.	46.83	0.65	7.076E-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	
145.53	36.42	39453.	4518.	1.326E+05	6.39	0.892	-	D
151.42	37.89	42893.	2037.	5.757E+04	14.55	0.894	-	D

ORTEC g v - i (3263) Env32 G53W4.25 11/23/2011 8:51:25 AM
TestAmerica, Inc Spectrum name: 11_marn1L_20110937.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
169.07	42.39	44968.	422.	1.084E+04	79.51	0.351	- c
197.83	49.58	155190.	28212.	6.460E+05	2.68	1.798	- s
264.17	66.10	49331.	2473.	4.904E+04	12.86	0.921	- D
268.28	67.13	53935.	2984.	5.887E+04	11.16	0.922	- D
299.34	74.97	44486.	1326.	2.536E+04	26.91	0.930	-
411.93	103.13	24283.	614.	1.151E+04	46.51	0.692	- s
545.34	136.50	26974.	11480.	2.303E+05	3.07	1.003	-
794.46	198.80	17695.	643.	1.583E+04	37.03	0.419	- s
862.75	215.88	11629.	289.	7.482E+03	57.37	0.905	- s
911.79	228.14	15308.	331.	8.874E+03	63.22	0.458	- s
1479.08	370.00	10734.	248.	9.197E+03	74.51	0.400	- s
1518.94	379.97	9802.	225.	8.489E+03	76.51	0.318	- sc
1983.39	496.10	4564.	111.	5.071E+03	90.09	0.665	- sc
2011.10	503.03	4416.	134.	6.192E+03	73.41	0.484	- sc
2042.31	510.83	15161.	2730.	1.274E+05	10.10	1.793	- s
2122.14	530.79	10795.	573.	2.751E+04	37.26	0.728	- s
2264.84	566.47	3156.	77.	3.882E+03	103.81	0.562	- sc
2813.85	703.72	6419.	347.	2.067E+04	44.49	0.556	- s
3275.18	819.24	9265.	269.	1.802E+04	51.05	1.586	- D
3286.16	821.98	8714.	583.	3.923E+04	23.01	1.588	- D
3681.15	920.50	10146.	375.	2.764E+04	55.07	0.345	- s
3741.59	935.61	11253.	478.	3.568E+04	46.46	0.352	- s
3992.16	998.23	5698.	417.	3.284E+04	33.41	0.479	- s
4088.94	1022.20	8777.	402.	3.228E+04	33.34	1.744	- D
4103.46	1025.83	5905.	228.	1.837E+04	48.12	1.746	- D
4505.11	1126.42	2397.	75.	6.532E+03	103.86	0.443	- c
4850.96	1212.84	1677.	166.	1.539E+04	49.95	1.086	- s
6199.08	1549.65	375.	146.	1.673E+04	27.79	0.747	- s
7838.42	1959.08	275.	87.	1.225E+04	46.83	0.646	- 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	237.73	59.56	135134.	652750.	90.660	0.17	0.891
CD-109	351.59	88.04	61150.	361346.	50.187	0.22	0.943
CO-57	487.69	122.08	30435.	91666.	12.731	0.51	0.972
Ce-139	662.99	165.92	23769.	21866.	3.037	1.59	1.006
Hg-203	1116.48	279.33	24665.	101.	0.014	220.86	1.123s
SN-113	1565.47	391.60	16353.	8985.	1.248	3.15	1.179

ORTEC g v - i (3263) Env32 G53W4.25 11/23/2011 8:51:25 AM
TestAmerica, Inc Spectrum name: 11_marn1L_20110937.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	2645.66	661.67	15752.	218136.	30.297	0.26	1.450
Mn-54	3338.37	834.83	15290.	72294.	10.041	0.57	1.592
Y-898	3590.93	897.95	14742.	7974.	1.107	3.79	1.572
Zn-65	4461.52	1115.53	11807.	26774.	3.719	1.22	1.777
Co-1173	4692.35	1173.21	7749.	204379.	28.386	0.25	1.871
Co-1332	5329.74	1332.47	2143.	185866.	25.815	0.24	1.966
Y-1836	7345.27	1835.93	506.	4954.	0.688	1.95	2.189

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
AM-241		5.2710E+03				1.58E+05	
			59.54	5.271E+03	(	1.385E+01 1.69E-01 3.57E+01	G
CD-109		7.1716E+04				4.63E+02	
			88.03	7.172E+04	(	2.292E+02 2.19E-01 3.61E+00	G
CO-57		1.6193E+03				2.72E+02	
			122.06	1.619E+03	(	1.441E+01 5.10E-01 8.56E+01	G
Ce-139		2.5443E+03				1.38E+02	
			165.85	2.544E+03	(	8.391E+01 1.59E+00 7.99E+01	G
Hg-203		5.2474E-01				4.66E+01	
			279.17	5.247E-01	?(	3.829E+00 2.21E+02 8.15E+01	G
SN-113		4.4498E+03				1.15E+02	
			391.69	4.450E+03	(	2.965E+02 3.15E+00 6.40E+01	G
CS-137		2.1056E+03				1.10E+04	
			661.66	2.106E+03	(	5.672E+00 2.60E-01 8.52E+01	G
Mn-54		3.0783E+03				3.12E+02	
			834.85	3.078E+03	(	2.465E+01 5.73E-01 1.00E+02	G
Y-898		6.9981E+03				1.07E+02	
			898.02	6.998E+03	(	4.989E+02 3.79E+00 9.37E+01	G
Zn-65	F	4.3417E+03				2.44E+02	
			1115.55	4.342E+03	(	8.255E+01 1.22E+00 5.06E+01	G

ORTEC g v - i (3263) Env32 G53W4.25 11/23/2011 8:51:25 AM
TestAmerica, Inc Spectrum name: 11_marn1L_20110937.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-1173	3.2685E+03					1.93E+03	
		1173.24	3.269E+03	(	6.604E+00	2.53E-01	9.99E+01 G
Co-1332	3.3105E+03					1.93E+03	
		1332.50	3.311E+03	(	3.890E+00	2.43E-01	1.00E+02 G
Y-1836	7.5751E+03					1.07E+02	
		1836.01	7.575E+03	(	1.644E+02	1.95E+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	

- - - -

ORTEC g v - i (3263) Env32 G53W4.25 11/23/2011 8:51:25 AM
TestAmerica, Inc Spectrum name: 11_marn1L_20110937.An1

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
AM-241	5.2554E+03	5.2710E+03	1.689E-01%		1.39E+01
CD-109	2.5981E+04	7.1716E+04	2.190E-01%		2.29E+02
CO-57	2.8762E+02	1.6193E+03	5.099E-01%		1.44E+01
Ce-139	8.3856E+01	2.5443E+03	1.590E+00%		8.39E+01
Hg-203 #A	5.2474E-01	>12 Halflives	2.2086E+02%	3.8291E+00	
SN-113	7.5147E+01	4.4498E+03	3.145E+00%		2.96E+02
CS-137	2.0174E+03	2.1056E+03	2.595E-01%		5.67E+00
Mn-54	6.8411E+02	3.0783E+03	5.731E-01%		2.47E+01
Y-898	8.5388E+01	6.9981E+03	3.794E+00%		4.99E+02
Zn-65	6.3485E+02	4.3417E+03	1.224E+00%		8.25E+01
Co-1173	2.5609E+03	3.2685E+03	2.525E-01%		6.60E+00
Co-1332	2.5938E+03	3.3105E+03	2.426E-01%		3.89E+00
Y-1836	9.2427E+01	7.5751E+03	1.951E+00%		1.64E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (1115.4 to 1999.4 keV) 4.035E+04 Bq/Sample
Total Decayed Activity (1115.4 to 1999.4 keV) 1.1627776E+05 Bq/Sample

Analyzed by: _____
admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc

Second Source Verification

Detector:	Ge12
Geometry:	1L Marn
Reference date	1/1/2011
Calibration Standard:	83924-334
Standard volume g / vial	1
Standard volume transferred in g / geometry	1
lab ID# of cal standard	6675

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	Abundance	Activity Bq/L	Count Results	%recovery
Am-241	1830	1830	0.359	**5097.5**	4962.7	97.4
Cs-137	1705	1705	0.851	**2003.5**	1940	96.8
Co-60	3293	3293	0.99974	**3293.9**	3113.9	94.5
Co-60	3294	3294	0.99986	**3294.5**	3167.4	96.1

Reviewed By: Megan McAfee

Date: 4/17/2012

ORTEC g v - i (3263) Env32 G53W4.25 4/17/2012 11:19:58 AM
TestAmerica, Inc Spectrum name: 12_Marn1L2ND_20120863.An1

Sample description
12_Marn1L_83924-334_2nd_041112

Spectrum Filename: C:\User\SPC\Det12\12_Marn1L2ND_20120863.An1

Acquisition information
Start time: 4/11/2012 10:47:52 PM
Live time: 3600
Real time: 3890
Dead time: 7.45 %
Detector ID: 12

Detector system
Ge12 SN/10034336

Calibration
Filename: 12_Liquid_Marinelli 1L.Clb
Ge12_Marn1LCal_90062_032612

Energy Calibration
Created: 4/2/2012 5:16:59 PM
Zero offset: 0.107 keV
Gain: 0.250 keV/channel
Quadratic: -3.540E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 5:17:10 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.18 %
Log(Eff): -2.771167E+00 + (4.009767E-01*Log(E)) +
(-8.911171E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.25 %
Log(Eff): -1.324587E+01 + (4.570937E+00*Log(E)) +
(-5.039442E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.45keV)
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 11:19:58 AM
TestAmerica, Inc Spectrum name: 12_Marn1L2ND_20120863.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	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2012-04-01_0338.PBC 4/1/2012 3:38:18 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0659

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.51	2472.	8.84	0.94	3.597E-02				
37.92	3328.	7.28	0.95	3.726E-02				
49.75	12975.	4.28	1.82	4.597E-02				
59.60	322562.	0.27	0.91	5.070E-02	59.54	35.700	4.963E+03	AM241
66.88	777.	36.05	0.66	5.305E-02				
77.86	900.	39.37	0.64	5.517E-02				
88.09	254212.	0.26	0.96	5.599E-02	88.03	3.610	7.028E+04	CD109
97.15	234.	59.20	0.48	5.604E-02				
122.14	80010.	0.53	0.99	5.406E-02	122.06	85.600	1.578E+03	CO57
136.55	10228.	2.96	1.02	5.212E-02				
165.96	30780.	0.99	1.00	4.736E-02	165.85	79.900	2.367E+03	Ce139
199.44	1045.	22.16	1.33	4.299E-02				
223.94	177.	68.09	0.45	4.033E-02				
235.23	325.	54.92	0.60	3.921E-02				
255.16	1069.	20.88	1.11	3.741E-02				
265.07	172.	54.33	0.60	3.658E-02				
277.37	94.	131.56	1.15	3.561E-02				
279.33	518.	27.97	1.16	3.545E-02	279.17	81.500	5.115E+03	Hg203
296.19	287.	48.39	0.46	3.421E-02				
312.62	144.	79.60	0.41	3.308E-02				
332.92	164.	74.20	0.42	3.180E-02				
353.05	364.	45.88	0.57	3.063E-02				
361.18	122.	87.66	1.23	3.019E-02				
363.73	171.	65.12	1.23	3.005E-02				
391.65	16610.	1.43	1.23	2.862E-02	391.69	64.000	4.182E+03	SN113
427.01	250.	64.66	0.54	2.701E-02				
511.01	4277.	5.46	2.54	2.384E-02				
661.75	113984.	0.39	1.45	1.972E-02	661.66	85.210	1.940E+03	CS137
734.88	198.	49.36	0.41	1.820E-02				
754.71	47.	120.45	0.32	1.783E-02				
834.95	62740.	0.57	1.60	1.646E-02				
898.12	16564.	1.64	1.62	1.553E-02	898.02	93.700	6.567E+03	Y898
936.14	84.	103.31	0.27	1.501E-02				
1019.42	297.	41.34	0.38	1.399E-02				
1036.99	170.	45.98	0.45	1.379E-02				

1108.75	93.	100.45	0.57	1.304E-02				
1115.65	40641.	0.83	1.83	1.297E-02				
1173.35	117595.	0.35	1.86	1.242E-02	1173.24	99.900	3.114E+03	Co1173
1316.33	102.	48.57	0.54	1.124E-02				
1332.65	107164.	0.34	1.97	1.112E-02	1332.50	99.982	3.167E+03	Co1332
1416.40	113.	44.71	0.55	1.053E-02				
1601.07	37.	81.44	2.16	9.430E-03				
1607.55	76.	48.86	2.16	9.395E-03				
1836.12	10106.	1.23	2.37	8.306E-03	1836.01	99.200	7.075E+03	Y1836
1880.57	60.	48.25	0.36	8.121E-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	
145.51	36.46	22627.	2472.	6.874E+04	8.84	0.944	-	D
151.14	37.87	27659.	3328.	8.932E+04	7.28	0.945	-	D
198.42	49.75	84350.	12975.	2.822E+05	4.28	1.816	-	s
266.91	66.88	29162.	777.	1.465E+04	36.05	0.662	-	s

ORTEC g v - i (3263) Env32 G53W4.25 4/17/2012 11:19:58 AM
TestAmerica, Inc Spectrum name: 12_Marn1L2ND_20120863.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
310.79	77.86	37394.	900.	1.631E+04	39.37	0.644	- s
387.87	97.15	8724.	234.	4.170E+03	59.20	0.481	- s
545.39	136.55	18737.	10228.	1.963E+05	2.96	1.019	- s
796.79	199.44	14347.	1045.	2.431E+04	22.16	1.331	- s
894.71	223.94	6635.	177.	4.393E+03	68.09	0.453	- sc
939.86	235.23	10510.	325.	8.288E+03	54.92	0.602	- s
1019.54	255.16	12722.	1069.	2.858E+04	20.88	1.114	-
1059.15	265.07	4280.	172.	4.702E+03	54.33	0.598	- s
1108.62	277.29	7589.	83.	2.328E+03	149.01	1.154	- sc
1183.58	296.19	6697.	287.	8.385E+03	48.39	0.458	- s
1249.26	312.62	5162.	144.	4.337E+03	79.60	0.408	- sc
1330.44	332.92	5468.	164.	5.146E+03	74.20	0.423	- sc
1410.92	353.05	7842.	364.	1.187E+04	45.88	0.569	- s
1443.42	361.14	5648.	122.	4.038E+03	87.66	1.225	- sc
1453.62	363.69	6129.	171.	5.697E+03	65.12	1.228	- sc
1706.66	427.01	7395.	250.	9.256E+03	64.66	0.539	- s
2042.57	511.01	10064.	4277.	1.794E+05	5.46	2.541	- s
2937.97	734.88	3118.	198.	1.088E+04	49.36	0.406	- s
3017.29	754.71	1579.	47.	2.636E+03	120.45	0.315	- sc
3338.29	834.95	10224.	62740.	3.811E+06	0.57	1.598	-
3743.11	936.14	2979.	84.	5.596E+03	103.31	0.270	- c
4076.33	1019.42	3865.	297.	2.125E+04	41.34	0.375	- s
4146.65	1036.99	2218.	170.	1.230E+04	45.98	0.447	- s
4433.80	1108.75	2878.	93.	7.135E+03	100.45	0.568	- sc
4461.39	1115.65	9191.	40641.	3.134E+06	0.83	1.832	-
5264.61	1316.33	618.	102.	9.105E+03	48.57	0.544	- s
5665.17	1416.40	488.	113.	1.073E+04	44.71	0.550	- s
6404.28	1601.01	176.	36.	3.818E+03	58.71	0.336	- s
6430.25	1607.50	396.	95.	1.011E+04	43.13	0.401	- s
7523.83	1880.57	161.	60.	7.388E+03	48.25	0.362	- 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.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	237.77	59.60	93392.	322562.	89.601	0.27	0.914
CD-109	351.66	88.09	42424.	254212.	70.614	0.26	0.959
CO-57	487.77	122.14	23227.	80010.	22.225	0.53	0.985
Ce-139	662.95	165.96	15411.	30780.	8.550	0.99	0.998
Hg-203	1115.53	279.17	10243.	518.	0.144	27.99	1.156D

ORTEC g v - i (3263) Env32 G53W4.25 4/17/2012 11:19:58 AM
TestAmerica, Inc Spectrum name: 12_Marn1L2ND_20120863.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SN-113	1565.27	391.65	9513.	16610.	4.614	1.43	1.234
CS-137	2645.43	661.75	12139.	113984.	31.662	0.39	1.453
Y-898	3591.02	898.12	9797.	16564.	4.601	1.64	1.618
Co-1173	4692.34	1173.35	6277.	117595.	32.665	0.35	1.864
Co-1332	5329.92	1332.65	2845.	107164.	29.768	0.34	1.966
Y-1836	7345.79	1836.12	556.	10106.	2.807	1.23	2.365

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
AM-241		4.9627E+03				1.58E+05		
			59.54	4.963E+03	(	2.195E+01	2.73E-01 3.57E+01	G
CD-109		7.0280E+04				4.63E+02		
			88.03	7.028E+04	(	2.661E+02	2.58E-01 3.61E+00	G
CO-57		1.5779E+03				2.72E+02		
			122.06	1.578E+03	(	1.406E+01	5.31E-01 8.56E+01	G
Ce-139		2.3665E+03				1.38E+02		
			165.85	2.367E+03	(	4.469E+01	9.88E-01 7.99E+01	G
Hg-203		5.1112E+03				4.66E+01		
			279.17	5.111E+03	(	4.682E+03	2.80E+01 8.15E+01	G
SN-113		4.1821E+03				1.15E+02		
			391.69	4.182E+03	(	1.151E+02	1.43E+00 6.40E+01	G
CS-137		1.9400E+03				1.10E+04		
			661.66	1.940E+03	(	8.785E+00	3.89E-01 8.52E+01	G
Y-898		6.5672E+03				1.07E+02		
			898.02	6.567E+03	(	1.840E+02	1.64E+00 9.37E+01	G
Co-1173		3.1139E+03				1.93E+03		
			1173.24	3.114E+03	(	9.849E+00	3.51E-01 9.99E+01	G
Co-1332		3.1674E+03				1.93E+03		
			1332.50	3.167E+03	(	7.427E+00	3.38E-01 1.00E+02	G

ORTEC g v - i (3263) Env32 G53W4.25 4/17/2012 11:19:58 AM
TestAmerica, Inc Spectrum name: 12_Marn1L2ND_20120863.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Y-1836	7.0749E+03					1.07E+02	
		1836.01	7.075E+03	(	7.885E+01	1.23E+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	

- - - -

ORTEC g v - i (3263) Env32 G53W4.25 4/17/2012 11:19:58 AM
TestAmerica, Inc Spectrum name: 12_Marn1L2ND_20120863.An1

Hg-203	4.9772E+00	5.1112E+03	2.799E+01%	4.68E+03
SN-113	2.5190E+02	4.1821E+03	1.428E+00%	1.15E+02
CS-137	1.8837E+03	1.9400E+03	3.893E-01%	8.78E+00
Y-898	3.1626E+02	6.5672E+03	1.639E+00%	1.84E+02
Co-1173	2.6325E+03	3.1139E+03	3.505E-01%	9.85E+00
Co-1332	2.6777E+03	3.1674E+03	3.376E-01%	7.43E+00
Y-1836	3.4071E+02	7.0749E+03	1.235E+00%	7.89E+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 (391.6 to 1999.4 keV) 4.870E+04 Bq/Sample
Total Decayed Activity (391.6 to 1999.4 keV) 1.1034369E+05 Bq/Sample

Analyzed by: _____
admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc

2nd Source Verification

Detector:	Ge12
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1143.6	98.2
Cs-137	1926	396	0.851	465	442.3	95.1
Co-60	3611	742	0.99974	742	688.36	92.7
Co-60	3612	742	0.999856	742	696.49	93.8

Reviewed By: Jody Watson

Date: 10/4/2012

ORTEC g v - i (3263) Env32 G53W4.25 10/4/2012 1:47:56 PM Page 1
TestAmerica, Inc Spectrum name: 12_TunaCan2nd_20122201.An1

Sample description
12_TunaCan2nd_81427_104012

Spectrum Filename: C:\User\SPC\Det12\12_TunaCan2nd_20122201.An1

Acquisition information
Start time: 10/4/2012 9:10:35 AM
Live time: 7200
Real time: 7274
Dead time: 1.02 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCanCal_90099_100212

Energy Calibration
Created: 10/4/2012 8:58:25 AM
Zero offset: 0.009 keV
Gain: 0.250 keV/channel
Quadratic: -3.662E-08 keV/channel^2

Efficiency Calibration
Created: 10/4/2012 9:05:44 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.70 %
Log(Eff): -7.827468E-01 + (-3.001271E-01*Log(E)) + (-3.369562E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.96 %
Log(Eff): -2.288409E+01 + (8.352717E+00*Log(E)) + (-8.812368E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.54keV)
Stop channel: 8000 (1999.46keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G53W4.25 10/4/2012 1:47:56 PM Page 2
TestAmerica, Inc Spectrum name: 12_TunaCan2nd_20122201.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	12_2012-09-01_2017.PBC 9/1/2012 8:17:39 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0602

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.51	1416.	10.10	0.96	1.441E-02				
46.55	84361.	0.42	0.90	2.227E-02	46.54	4.250	1.345E+04	Pb210
49.64	1661.	13.12	1.17	2.460E-02				
59.51	91361.	0.43	0.89	3.120E-02	59.54	35.700	1.144E+03	AM241
74.70	192.	60.04	0.37	3.873E-02				
87.98	38152.	0.76	0.95	4.277E-02	88.03	3.610	1.551E+04	CD109
122.02	7369.	2.14	0.99	4.527E-02	122.06	85.600	3.444E+02	CO57
136.48	773.	12.58	1.02	4.420E-02				
165.75	856.	13.18	0.97	4.024E-02	165.85	79.900	5.800E+02	Ce139
238.46	426.	21.37	0.80	3.221E-02				
270.42	104.	53.05	0.50	2.960E-02				
277.12	37.	187.22	1.11	2.896E-02	279.17	81.500	HL>Cutoff	Hg203
294.88	216.	34.45	0.89	2.790E-02				
351.76	281.	28.30	0.91	2.471E-02				
385.62	79.	49.11	0.42	2.317E-02				
391.36	361.	28.92	0.71	2.293E-02	391.69	64.000	1.472E+03	SN113
469.80	98.	76.63	0.28	2.015E-02				
506.86	66.	63.64	1.31	1.908E-02				
510.13	151.	39.24	1.32	1.899E-02				
517.01	68.	58.29	0.42	1.881E-02				
661.58	40010.	0.58	1.44	1.571E-02	661.66	85.210	4.423E+02	CS137
897.91	201.	34.47	0.69	1.250E-02	898.02	93.700	1.665E+03	Y898
1072.91	53.	57.37	0.45	1.091E-02				
1090.45	58.	68.49	0.42	1.078E-02				
1173.14	35088.	0.63	1.82	1.018E-02	1173.24	99.900	6.884E+02	Co1173
1332.41	32170.	0.59	1.94	9.221E-03	1332.50	99.982	6.965E+02	Co1332
1835.69	150.	11.35	3.27	7.144E-03	1836.01	99.200	2.050E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid	Background	Net Area	Efficiency	Uncert	FWHM	Suspected

12_TunaCan2nd_20122201

Channel	Energy	Counts	Counts	* Area	1 Sigma %	keV	Nuclide
145.90	36.51	6010.	1416.	9.823E+04	10.10	0.958	- s
198.34	49.64	14478.	1661.	6.754E+04	13.12	1.174	- sM
298.51	74.70	5238.	192.	4.958E+03	60.04	0.372	- s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
545.45	136.48	2894.	773.	1.749E+04	12.58	1.017	-
953.09	238.46	2483.	426.	1.323E+04	21.37	0.799	- s
1080.86	270.42	1260.	104.	3.514E+03	53.05	0.496	- s
1178.62	294.88	1774.	216.	7.741E+03	34.45	0.889	- s
1406.03	351.76	1808.	281.	1.136E+04	28.30	0.914	- s
1541.40	385.62	713.	79.	3.409E+03	49.11	0.419	- s
1877.98	469.80	1744.	98.	4.856E+03	76.63	0.281	- s
2026.19	506.79	849.	66.	3.459E+03	63.64	1.314	- sc
2039.28	510.06	1671.	151.	7.930E+03	39.24	1.317	- D
2066.76	517.01	651.	68.	3.633E+03	58.29	0.422	- s
4290.46	1072.91	405.	53.	4.872E+03	57.37	0.452	- s
4360.63	1090.45	570.	58.	5.382E+03	68.49	0.425	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.85	46.51	23444.	86492.	12.013	0.48	0.868
AM-241	237.80	59.51	16320.	91361.	12.689	0.43	0.894
CD-109	351.60	87.98	9992.	38152.	5.299	0.76	0.948
CO-57	487.64	122.02	4562.	7369.	1.024	2.14	0.992
Ce-139	662.45	165.75	3243.	856.	0.119	13.18	0.970
Hg-203	1107.62	277.12	2320.	37.	0.005	187.22	1.114s
SN-113	1565.46	391.64	1973.	296.	0.041	29.35	0.690s
CS-137	2644.92	661.58	2210.	40010.	5.557	0.58	1.443
Y-898	3590.25	897.91	1259.	201.	0.028	34.47	0.688s
Co-1173	4691.52	1173.14	1694.	35088.	4.873	0.63	1.818
Co-1332	5328.99	1332.41	521.	32170.	4.468	0.59	1.937
Y-1836	7344.02	1835.69	28.	150.	0.021	11.35	3.274s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** 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

12_TunaCan2nd_20122201

Name	Code	Activity Bq/Sample	Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
Pb-210	N	1.3814E+04				8.15E+03		
			46.54	1.381E+04	(P	1.144E+02	4.84E-01	4.25E+00 G
AM-241		1.1436E+03				1.58E+05		
			59.54	1.144E+03	(	7.486E+00	4.26E-01	3.57E+01 G
CD-109		1.5513E+04				4.63E+02		
			88.03	1.551E+04	(	1.905E+02	7.56E-01	3.61E+00 G
CO-57		3.4441E+02				2.72E+02		
			122.06	3.444E+02	(	1.484E+01	2.14E+00	8.56E+01 G
Ce-139		5.7998E+02				1.38E+02		
			165.85	5.800E+02	(	1.816E+02	1.32E+01	7.99E+01 G
Hg-203		2.1493E-01				4.66E+01		
			279.17	2.149E-01	?(	1.337E+00	1.87E+02	8.15E+01 G
SN-113		1.2045E+03				1.15E+02		
			391.69	1.204E+03	(	8.544E+02	2.94E+01	6.40E+01 G
CS-137		4.4230E+02				1.10E+04		
			661.66	4.423E+02	(	2.452E+00	5.77E-01	8.52E+01 G
Y-898		1.6647E+03				1.07E+02		
			898.02	1.665E+03	(	1.389E+03	3.45E+01	9.37E+01 G
Co-1173		6.8836E+02				1.93E+03		
			1173.24	6.884E+02	(	3.816E+00	6.32E-01	9.99E+01 G
Co-1332		6.9649E+02				1.93E+03		
			1332.50	6.965E+02	(	2.361E+00	5.94E-01	1.00E+02 G
Y-1836		2.0501E+03				1.07E+02		
			1836.01	2.050E+03	(	3.740E+02	1.14E+01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	277.12	2320.	37.	0.005	187.22	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
Pb-210	1.2680E+04	1.3814E+04	4.851E-01%		1.14E+02
AM-241	1.1385E+03	1.1436E+03	4.256E-01%		7.49E+00
CD-109	3.4313E+03	1.5513E+04	7.557E-01%		1.91E+02
CO-57	2.6416E+01	3.4441E+02	2.139E+00%		1.48E+01
Ce-139	3.6407E+00	5.7998E+02	1.318E+01%		1.82E+02
Hg-203 #A	2.1493E-01	>12 Halflives	1.8722E+02%	1.3367E+00	
SN-113	2.7995E+00	1.2045E+03	2.935E+01%		8.54E+02
CS-137	4.1507E+02	4.4230E+02	5.769E-01%		2.45E+00
Y-898	2.3870E+00	1.6647E+03	3.447E+01%		1.39E+03
Co-1173	4.7903E+02	6.8836E+02	6.322E-01%		3.82E+00
Co-1332	4.8469E+02	6.9649E+02	5.939E-01%		2.36E+00
Y-1836	2.9396E+00	2.0501E+03	1.135E+01%		3.74E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (516.8 to 1999.5 keV) 1.867E+04 Bq/Sample
Total Decayed Activity (516.8 to 1999.5 keV) 3.8141477E+04 Bq/Sample

```
     ORTEC g v - i (3263) Env32  G53W4.25  10/4/2012 1:47:48 PM
TestAmerica, Inc                Spectrum name: 12_TunaCan2nd_20122201.An1

Sample description
     12_TunaCan2nd_81427_104012


Spectrum Filename: C:\User\SPC\Det12\12_TunaCan2nd_20122201.An1

Acquisition information
       Start time:                 10/4/2012 9:10:35 AM
       Live time:                7200
       Real time:                7274
       Dead time:                  1.02 %
       Detector ID:                   12

Detector system
     Ge12 S/N10034336


Calibration
       Filename:                   12_Soil_TunaCan.Clb
     12_TunaCanCal_90099_100212


       Energy Calibration
            Created:               10/4/2012 8:58:25 AM
            Zero offset:           0.009 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -3.662E-08 keV/channel^2

       Efficiency Calibration
            Created:               10/4/2012 9:05:44 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.70 %
            Log(Eff):             -7.827468E-01 + (-3.001271E-01*Log(E) ) +
                                   ( -3.369562E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   0.96 %
            Log(Eff):             -2.288409E+01 + ( 8.352717E+00*Log(E) ) +
                                   ( -8.812368E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.54keV )
       Stop channel:            8000 (  1999.46keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (3263) Env32 G53W4.25 10/4/2012 1:47:48 PM
TestAmerica, Inc Spectrum name: 12_TunaCan2nd_20122201.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2012-09-01_2017.PBC 9/1/2012 8:17:39 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0602

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.51	1416.	10.10	0.96	1.441E-02				
46.55	84361.	0.42	0.90	2.227E-02	46.54	4.250	1.345E+04	Pb210
49.64	1661.	13.12	1.17	2.460E-02				
59.51	91361.	0.43	0.89	3.120E-02	59.54	35.700	1.144E+03	AM241
74.70	192.	60.04	0.37	3.873E-02				
87.98	38152.	0.76	0.95	4.277E-02	88.03	3.610	1.551E+04	CD109
122.02	7369.	2.14	0.99	4.527E-02	122.06	85.600	3.444E+02	CO57
136.48	773.	12.58	1.02	4.420E-02				
165.75	856.	13.18	0.97	4.024E-02	165.85	79.900	5.800E+02	Ce139
238.46	426.	21.37	0.80	3.221E-02				
270.42	104.	53.05	0.50	2.960E-02				
277.12	37.	187.22	1.11	2.896E-02	279.17	81.500	HL>Cutoff	Hg203
294.88	216.	34.45	0.89	2.790E-02				
351.76	281.	28.30	0.91	2.471E-02				
385.62	79.	49.11	0.42	2.317E-02				
391.36	361.	28.92	0.71	2.293E-02	391.69	64.000	1.472E+03	SN113
469.80	98.	76.63	0.28	2.015E-02				
506.86	66.	63.64	1.31	1.908E-02				
510.13	151.	39.24	1.32	1.899E-02				
517.01	68.	58.29	0.42	1.881E-02				
661.58	40010.	0.58	1.44	1.571E-02	661.66	85.210	4.423E+02	CS137
897.91	201.	34.47	0.69	1.250E-02	898.02	93.700	1.665E+03	Y898
1072.91	53.	57.37	0.45	1.091E-02				
1090.45	58.	68.49	0.42	1.078E-02				
1173.14	35088.	0.63	1.82	1.018E-02	1173.24	99.900	6.884E+02	Co1173
1332.41	32170.	0.59	1.94	9.221E-03	1332.50	99.982	6.965E+02	Co1332
1835.69	150.	11.35	3.27	7.144E-03	1836.01	99.200	2.050E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.90	36.51	6010.	1416.	9.823E+04	10.10	0.958	-	s
198.34	49.64	14478.	1661.	6.754E+04	13.12	1.174	-	sM

298.51	74.70	5238.	192.	4.958E+03	60.04	0.372	- s

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TestAmerica, Inc Spectrum name: 12_TunaCan2nd_20122201.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
545.45	136.48	2894.	773.	1.749E+04	12.58	1.017	-	
953.09	238.46	2483.	426.	1.323E+04	21.37	0.799	-	s
1080.86	270.42	1260.	104.	3.514E+03	53.05	0.496	-	s
1178.62	294.88	1774.	216.	7.741E+03	34.45	0.889	-	s
1406.03	351.76	1808.	281.	1.136E+04	28.30	0.914	-	s
1541.40	385.62	713.	79.	3.409E+03	49.11	0.419	-	s
1877.98	469.80	1744.	98.	4.856E+03	76.63	0.281	-	s
2026.19	506.79	849.	66.	3.459E+03	63.64	1.314	-	sc
2039.28	510.06	1671.	151.	7.930E+03	39.24	1.317	-	D
2066.76	517.01	651.	68.	3.633E+03	58.29	0.422	-	s
4290.46	1072.91	405.	53.	4.872E+03	57.37	0.452	-	s
4360.63	1090.45	570.	58.	5.382E+03	68.49	0.425	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	
Pb-210	185.85	46.51	23444.	86492.	12.013	0.48	0.868	
AM-241	237.80	59.51	16320.	91361.	12.689	0.43	0.894	
CD-109	351.60	87.98	9992.	38152.	5.299	0.76	0.948	
CO-57	487.64	122.02	4562.	7369.	1.024	2.14	0.992	
Ce-139	662.45	165.75	3243.	856.	0.119	13.18	0.970	
Hg-203	1107.62	277.12	2320.	37.	0.005	187.22	1.114s	
SN-113	1565.46	391.64	1973.	296.	0.041	29.35	0.690s	
CS-137	2644.92	661.58	2210.	40010.	5.557	0.58	1.443	
Y-898	3590.25	897.91	1259.	201.	0.028	34.47	0.688s	
Co-1173	4691.52	1173.14	1694.	35088.	4.873	0.63	1.818	
Co-1332	5328.99	1332.41	521.	32170.	4.468	0.59	1.937	
Y-1836	7344.02	1835.69	28.	150.	0.021	11.35	3.274s	

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample			COMMENTS
Pb-210	N	1.3814E+04				8.15E+03			
			46.54	1.381E+04	(P	1.144E+02	4.84E-01	4.25E+00	G
AM-241		1.1436E+03				1.58E+05			
			59.54	1.144E+03	(	7.486E+00	4.26E-01	3.57E+01	G
CD-109		1.5513E+04				4.63E+02			
			88.03	1.551E+04	(	1.905E+02	7.56E-01	3.61E+00	G
CO-57		3.4441E+02				2.72E+02			
			122.06	3.444E+02	(	1.484E+01	2.14E+00	8.56E+01	G
Ce-139		5.7998E+02				1.38E+02			
			165.85	5.800E+02	(	1.816E+02	1.32E+01	7.99E+01	G
Hg-203		2.1493E-01				4.66E+01			
			279.17	2.149E-01	?(	1.337E+00	1.87E+02	8.15E+01	G
SN-113		1.2045E+03				1.15E+02			
			391.69	1.204E+03	(	8.544E+02	2.94E+01	6.40E+01	G
CS-137		4.4230E+02				1.10E+04			
			661.66	4.423E+02	(	2.452E+00	5.77E-01	8.52E+01	G
Y-898		1.6647E+03				1.07E+02			
			898.02	1.665E+03	(	1.389E+03	3.45E+01	9.37E+01	G
Co-1173		6.8836E+02				1.93E+03			
			1173.24	6.884E+02	(	3.816E+00	6.32E-01	9.99E+01	G
Co-1332		6.9649E+02				1.93E+03			
			1332.50	6.965E+02	(	2.361E+00	5.94E-01	1.00E+02	G
Y-1836		2.0501E+03				1.07E+02			
			1836.01	2.050E+03	(	3.740E+02	1.14E+01	9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

ORTEC g v - i (3263) Env32 G53W4.25 10/4/2012 1:47:48 PM
TestAmerica, Inc Spectrum name: 12_TunaCan2nd_20122201.An1

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	277.12	2320.	37.	0.005	187.22	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
Pb-210	1.2680E+04	1.3814E+04	4.851E-01%		1.14E+02
AM-241	1.1385E+03	1.1436E+03	4.256E-01%		7.49E+00
CD-109	3.4313E+03	1.5513E+04	7.557E-01%		1.91E+02
CO-57	2.6416E+01	3.4441E+02	2.139E+00%		1.48E+01
Ce-139	3.6407E+00	5.7998E+02	1.318E+01%		1.82E+02
Hg-203 #A	2.1493E-01	>12 Halflives	1.8722E+02%	1.3367E+00	
SN-113	2.7995E+00	1.2045E+03	2.935E+01%		8.54E+02
CS-137	4.1507E+02	4.4230E+02	5.769E-01%		2.45E+00
Y-898	2.3870E+00	1.6647E+03	3.447E+01%		1.39E+03
Co-1173	4.7903E+02	6.8836E+02	6.322E-01%		3.82E+00
Co-1332	4.8469E+02	6.9649E+02	5.939E-01%		2.36E+00
Y-1836	2.9396E+00	2.0501E+03	1.135E+01%		3.74E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (516.8 to 1999.5 keV) 1.867E+04 Bq/Sample
Total Decayed Activity (516.8 to 1999.5 keV) 3.8141477E+04 Bq/Sample

Analyzed by: _____
admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc

2nd Source Verification

Detector: Ge 15

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	1151	98.9
Cs-137	1926	396	0.851	465	435.18	93.6
Co-60	3611	742	0.99974	742	687.16	92.6
Co-60	3612	742	0.999856	742	696.46	93.8

Reviewed By: Jody Watson

Date: 3/23/2012

ORTEC g v - i (3263) Env32 G53W4.25 7/5/2012 1:14:04 PM Page 1
TestAmerica, Inc. Spectrum name: 15_TunaCan2nd_20120288.An1

Sample description
15_TunaCan2nd_rad10_032312

Spectrum Filename: C:\User\SPC\Det15\15_TunaCan2nd_20120288.An1

Acquisition information
Start time: 3/23/2012 6:10:28 AM
Live time: 7200
Real time: 7248
Dead time: 0.66 %
Detector ID: 15

Detector system
Ge15 SN/1102216

Calibration
Filename: 15_Soil_TunaCan.Clb
15_TunaCan_90099_032212

Energy Calibration
Created: 3/22/2012 1:02:46 PM
Zero offset: 0.004 keV
Gain: 0.250 keV/channel
Quadratic: -3.104E-08 keV/channel^2

Efficiency Calibration
Created: 3/22/2012 1:03:01 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-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 (37.53keV)
Stop channel: 8000 (1999.56keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G53W4.25 7/5/2012 1:14:04 PM Page 2
TestAmerica, Inc. Spectrum name: 15_TunaCan2nd_20120288.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	15_2012-02-26_0425.PBC 2/26/2012 4:25:10 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 26.5953

***** 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
36.48	1231.	11.17	1.20	1.258E-02				
46.44	76440.	0.51	0.91	1.950E-02	46.54	4.250	1.366E+04	Pb210
49.65	1514.	14.37	1.25	2.160E-02				
59.44	80694.	0.48	0.94	2.732E-02	59.54	35.700	1.151E+03	AM241
87.99	43578.	0.68	0.97	3.705E-02	88.03	3.610	1.527E+04	CD109
92.63	219.	44.56	0.42	3.776E-02				
122.00	10133.	1.58	1.01	3.846E-02	122.06	85.600	3.389E+02	CO57
136.33	1390.	8.77	1.13	3.725E-02				
165.85	1699.	7.29	1.05	3.392E-02	165.85	79.900	5.192E+02	Ce139
238.39	480.	20.10	1.42	2.594E-02				
260.67	81.	57.86	0.33	2.424E-02				
279.32	56.	141.32	1.14	2.301E-02	279.17	81.500	HL>Cutoff	Hg203
352.13	110.	54.66	0.68	1.922E-02				
368.26	125.	49.84	0.46	1.856E-02				
391.56	581.	13.59	1.28	1.768E-02	391.69	64.000	9.477E+02	SN113
400.57	73.	61.58	0.54	1.736E-02				
661.57	29285.	0.71	1.46	1.155E-02	661.66	85.210	4.352E+02	CS137
754.74	100.	52.53	0.39	1.034E-02				
898.10	516.	14.74	1.96	8.921E-03	898.02	93.700	1.681E+03	Y898
904.89	86.	54.53	0.36	8.863E-03				
1000.75	82.	43.22	0.58	8.127E-03				
1096.51	181.	26.16	0.80	7.507E-03				
1173.15	26111.	0.71	1.80	7.077E-03	1173.24	99.900	6.872E+02	Co1173
1226.66	98.	36.87	0.74	6.805E-03				
1332.45	23674.	0.68	1.95	6.325E-03	1332.50	99.982	6.965E+02	Co1332
1835.96	284.	9.76	1.20	4.741E-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

145.78	36.48	5577.	1231.	9.786E+04	11.17	1.202	-	s
198.43	49.65	13746.	1514.	7.010E+04	14.37	1.248	-	sM
370.24	92.63	3274.	219.	5.791E+03	44.56	0.421	-	s

ORTEC g v - i (3263) Env32 G53W4.25 7/5/2012 1:14:04 PM Page 3
TestAmerica, Inc. Spectrum name: 15_TunaCan2nd_20120288.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
544.93	136.33	3516.	1390.	3.731E+04	8.77	1.130	- s
952.92	238.39	2518.	480.	1.849E+04	20.10	1.422	- sM
1042.01	260.67	968.	81.	3.328E+03	57.86	0.332	- sM
1407.66	352.13	1248.	110.	5.749E+03	54.66	0.679	- s
1472.16	368.26	1252.	125.	6.736E+03	49.84	0.459	- s
1601.36	400.57	843.	73.	4.224E+03	61.58	0.543	- s
3017.75	754.74	768.	100.	9.719E+03	52.53	0.393	- s
3618.39	904.89	752.	86.	9.741E+03	54.53	0.363	- s
4001.87	1000.75	476.	82.	1.015E+04	43.22	0.582	- s
4385.05	1096.51	621.	181.	2.415E+04	26.16	0.796	- s
4905.82	1226.66	215.	98.	1.445E+04	36.87	0.740	- 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	185.62	46.44	19930.	76355.	10.605	0.51	0.907
AM-241	237.58	59.44	16824.	80694.	11.208	0.48	0.935
CD-109	351.67	87.99	9695.	43578.	6.052	0.68	0.972
CO-57	487.63	122.00	4069.	10133.	1.407	1.58	1.014
Ce-139	662.95	165.85	3411.	1699.	0.236	7.29	1.054
Hg-203	1116.56	279.32	3139.	56.	0.008	141.32	1.144
SN-113	1565.32	391.56	1615.	581.	0.081	13.59	1.282
CS-137	2645.11	661.57	2071.	29285.	4.067	0.71	1.459
Y-898	3591.24	898.10	1317.	516.	0.072	14.74	1.959
Co-1173	4691.69	1173.15	1159.	26111.	3.627	0.71	1.803
Co-1332	5329.20	1332.45	323.	23674.	3.288	0.68	1.945
Y-1836	7345.58	1836.14	48.	260.	0.036	8.96	1.181s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 7/5/2012 1:14:04 PM Page 4
TestAmerica, Inc. Spectrum name: 15_TunaCan2nd_20120288.An1

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS

Pb-210	N	1.3663E+04						8.15E+03	
			46.54	1.366E+04	(P	1.182E+02	5.11E-01	4.25E+00	G
AM-241		1.1510E+03						1.58E+05	
			59.54	1.151E+03	(	8.660E+00	4.81E-01	3.57E+01	G
CD-109		1.5268E+04						4.63E+02	
			88.03	1.527E+04	(	1.617E+02	6.78E-01	3.61E+00	G
CO-57		3.3887E+02						2.72E+02	
			122.06	3.389E+02	(	1.003E+01	1.58E+00	8.56E+01	G
Ce-139		5.1921E+02						1.38E+02	
			165.85	5.192E+02	(	8.400E+01	7.29E+00	7.99E+01	G
Hg-203		4.1717E-01						4.66E+01	
			279.17	4.172E-01	(	1.954E+00	1.41E+02	8.15E+01	G
SN-113		9.4771E+02						1.15E+02	
			391.69	9.477E+02	(	3.099E+02	1.36E+01	6.40E+01	G
CS-137		4.3518E+02						1.10E+04	
			661.66	4.352E+02	(	3.191E+00	7.12E-01	8.52E+01	G
Y-898		1.6812E+03						1.07E+02	
			898.02	1.681E+03	(	5.598E+02	1.47E+01	9.37E+01	G
Co-1173		6.8716E+02						1.93E+03	
			1173.24	6.872E+02	(	4.246E+00	7.12E-01	9.99E+01	G
Co-1332		6.9646E+02						1.93E+03	
			1332.50	6.965E+02	(	2.544E+00	6.82E-01	1.00E+02	G
Y-1836		1.5036E+03						1.07E+02	
			1836.01	1.504E+03	(	2.033E+02	8.96E+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:
T - Thermal Neutron Activation

Peak Codes:
G - Gamma Ray

F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
P - Peakbackground subtraction						

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity Bq/Sample	Time of Count Activity Bq/Sample	Time Corrected Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210		1.2751E+04	1.3663E+04	5.115E-01%		1.18E+02
AM-241		1.1469E+03	1.1510E+03	4.812E-01%		8.66E+00
CD-109		4.5239E+03	1.5268E+04	6.776E-01%		1.62E+02
CO-57		4.2749E+01	3.3887E+02	1.583E+00%		1.00E+01
Ce-139		8.7071E+00	5.1921E+02	7.291E+00%		8.40E+01
Hg-203	A	4.1717E-01	>12 Halflives	1.4132E+02%	1.9540E+00	
SN-113		7.1340E+00	9.4771E+02	1.359E+01%		3.10E+02
CS-137		4.1344E+02	4.3518E+02	7.117E-01%		3.19E+00
Y-898		8.5738E+00	1.6812E+03	1.474E+01%		5.60E+02
Co-1173		5.1301E+02	6.8716E+02	7.125E-01%		4.25E+00
Co-1332		5.1995E+02	6.9646E+02	6.817E-01%		2.54E+00
Y-1836		7.6681E+00	1.5036E+03	8.962E+00%		2.03E+02

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 1999.6 keV) 1.994E+04 Bq/Sample
Total Decayed Activity (37.5 to 1999.6 keV) 3.6891324E+04 Bq/Sample

2nd Source Verification

Detector: Ge17

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard 6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1140.2	97.9
Cs-137	1926	396	0.851	465	440.98	94.8
Co-60	3611	742	0.99974	742	682.05	91.9
Co-60	3612	742	0.999856	742	689.63	92.9

Reviewed By: Megan McAfee

Date: 4/13/2012

ORTEC g v - i (3263) Env32 G53W4.25 7/6/2012 9:25:36 AM Page 1
TestAmerica, Inc. Spectrum name: 17_Tuna2nd_20120265.An1

Sample description
17_Tuna2nd_81427_032612

Spectrum Filename: C:\User\SPC\Det17\17_Tuna2nd_20120265.An1

Acquisition information
Start time: 3/26/2012 9:29:21 AM
Live time: 3600
Real time: 3637
Dead time: 1.02 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Soil_TunaCan.Clb
17_TunaCan_90099_032612

Energy Calibration
Created: 4/12/2012 9:28:30 AM
Zero offset: 0.118 keV
Gain: 0.250 keV/channel
Quadratic: -2.376E-08 keV/channel^2

Efficiency Calibration
Created: 4/12/2012 9:28:42 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.91 %
Log(Eff): -5.264190E-01 + (-4.024164E-01*Log(E)) +
(-2.604461E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -2.343889E+01 + (8.582715E+00*Log(E)) +
(-9.075430E-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 (37.63keV)
Stop channel: 8000 (1999.21keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

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	17_2012-02-26_0520.PBC 2/26/2012 5:20:29 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0590

***** 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
36.64	681.	13.12	0.69	1.356E-02				
40.87	116.	86.09	0.16	1.677E-02				
46.62	41004.	0.69	0.76	2.106E-02	46.54	4.250	1.365E+04	Pb210
49.59	775.	17.97	0.63	2.318E-02				
59.61	43179.	0.65	0.77	2.961E-02	59.54	35.700	1.140E+03	AM241
77.20	214.	40.60	1.02	3.765E-02				
88.08	23344.	0.86	0.81	4.060E-02	88.03	3.610	1.500E+04	CD109
121.99	5536.	2.31	0.89	4.276E-02	122.06	85.600	3.357E+02	CO57
136.39	771.	11.84	0.71	4.164E-02				
162.22	87.	50.79	0.72	3.820E-02				
165.73	964.	7.35	1.09	3.765E-02	165.85	79.900	5.310E+02	Ce139
216.43	116.	39.82	0.95	3.196E-02				
217.94	83.	57.15	0.95	3.181E-02				
238.21	247.	27.84	0.94	2.992E-02				
265.99	94.	61.67	0.61	2.773E-02				
301.12	44.	67.34	0.41	2.544E-02				
340.53	91.	61.26	0.55	2.333E-02				
351.73	148.	32.96	0.62	2.280E-02				
391.54	336.	18.56	0.91	2.113E-02	391.69	64.000	9.356E+02	SN113
464.58	72.	65.99	1.18	1.868E-02				
466.04	44.	93.25	1.18	1.864E-02				
582.96	167.	29.62	0.45	1.584E-02				
661.66	18538.	0.82	1.37	1.443E-02	661.66	85.210	4.410E+02	CS137
738.88	57.	57.41	0.44	1.329E-02				
833.91	110.	41.26	0.51	1.214E-02				
856.69	111.	46.51	0.75	1.189E-02				
898.10	352.	17.10	1.23	1.148E-02	898.02	93.700	1.818E+03	Y898
1026.09	89.	47.19	0.52	1.037E-02				
1173.27	17119.	0.83	1.74	9.359E-03	1173.24	99.900	6.820E+02	Co1173
1332.53	15698.	0.82	1.79	8.481E-03	1332.50	99.982	6.896E+02	Co1332
1835.81	220.	7.55	1.96	6.593E-03	1836.01	99.200	1.873E+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
146.04	36.64	2578.	681.	5.025E+04	13.12	0.695	-
162.95	40.87	4224.	116.	6.916E+03	86.09	0.161	- c
197.82	49.59	6204.	775.	3.343E+04	17.97	0.635	- sM
308.25	77.20	2934.	214.	5.685E+03	40.60	1.020	- s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
544.96	136.39	1975.	771.	1.852E+04	11.84	0.713	-
648.26	162.22	793.	87.	2.269E+03	50.79	0.719	- s
865.04	216.40	1003.	116.	3.620E+03	39.82	0.953	- D
871.09	217.91	1078.	83.	2.603E+03	57.15	0.955	- D
952.16	238.21	1349.	247.	8.265E+03	27.84	0.937	- s
1063.26	265.99	1020.	94.	3.372E+03	61.67	0.615	- s
1203.77	301.12	417.	44.	1.730E+03	67.34	0.412	- sc
1361.41	340.53	898.	91.	3.887E+03	61.26	0.553	- s
1406.20	351.73	744.	148.	6.491E+03	32.96	0.618	- s
1857.60	464.69	1086.	72.	3.842E+03	65.99	1.178	- sc
1863.46	466.15	839.	44.	2.387E+03	93.25	1.179	- sc
2331.15	582.96	570.	167.	1.054E+04	29.62	0.448	- s
2954.96	738.88	338.	57.	4.289E+03	57.41	0.442	- s
3335.20	833.91	507.	110.	9.049E+03	41.26	0.506	- s
3426.35	856.69	611.	111.	9.318E+03	46.51	0.755	- s
4104.24	1026.09	453.	89.	8.549E+03	47.19	0.517	- 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	185.95	46.62	10512.	40927.	11.369	0.69	0.761
AM-241	237.89	59.61	9192.	43179.	11.994	0.65	0.771
CD-109	351.75	88.08	4394.	23344.	6.484	0.86	0.812
CO-57	487.38	121.99	2606.	5536.	1.538	2.31	0.891
Ce-139	662.30	165.73	1283.	964.	0.268	7.35	1.085
Hg-203	1119.82	280.13	1632.	-52.	-0.015	109.81	1.012s
SN-113	1565.42	391.54	971.	336.	0.093	18.56	0.910s
CS-137	2646.04	661.66	840.	18538.	5.149	0.82	1.373
Y-898	3592.05	898.10	753.	352.	0.098	17.10	1.228
Co-1173	4693.24	1173.27	496.	17119.	4.755	0.83	1.743
Co-1332	5330.69	1332.53	136.	15698.	4.361	0.82	1.789
Y-1836	7345.64	1835.81	10.	220.	0.061	7.55	1.956s

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	1.365OE+04				8.15E+03		
			46.54	1.365E+04	(P	1.603E+02	6.87E-01 4.25E+00	G
AM-241		1.1402E+03				1.58E+05		
			59.54	1.140E+03	(	1.187E+01	6.55E-01 3.57E+01	G
CD-109		1.5004E+04				4.63E+02		
			88.03	1.500E+04	(	2.003E+02	8.59E-01 3.61E+00	G
CO-57		3.3573E+02				2.72E+02		
			122.06	3.357E+02	(	1.459E+01	2.31E+00 8.56E+01	G
Ce-139		5.3096E+02				1.38E+02		
			165.85	5.310E+02	(	9.338E+01	7.35E+00 7.99E+01	G
Hg-203		-6.6653E-01				4.66E+01		
			279.17	-6.665E-01	?(	2.427E+00	1.10E+02 8.15E+01	G
SN-113		9.3563E+02				1.15E+02		
			391.69	9.356E+02	@(	4.114E+02	1.86E+01 6.40E+01	G
CS-137		4.4098E+02				1.10E+04		
			661.66	4.410E+02	(	3.277E+00	8.23E-01 8.52E+01	G
Y-898		1.8177E+03				1.07E+02		
			898.02	1.818E+03	(	6.751E+02	1.71E+01 9.37E+01	G
Co-1173		6.8205E+02				1.93E+03		
			1173.24	6.820E+02	(	4.243E+00	8.31E-01 9.99E+01	G
Co-1332		6.8963E+02				1.93E+03		
			1332.50	6.896E+02	(	2.503E+00	8.22E-01 1.00E+02	G
Y-1836		1.8728E+03				1.07E+02		
			1836.01	1.873E+03	(	1.462E+02	7.55E+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
Hg-203	280.13	1632.	-52.	-0.015	109.81	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	1.2735E+04	1.3650E+04	6.879E-01%		1.60E+02
AM-241	1.1361E+03	1.1402E+03	6.548E-01%		1.19E+01
CD-109	4.4248E+03	1.5004E+04	8.588E-01%		2.00E+02
CO-57	4.2016E+01	3.3573E+02	2.313E+00%		1.46E+01
Ce-139	8.7645E+00	5.3096E+02	7.352E+00%		9.34E+01
Hg-203 #A	-6.6653E-01	>12 Halflives	1.0981E+02%	2.4271E+00	
SN-113 #	6.9111E+00	9.3563E+02	1.856E+01%		4.11E+02
CS-137	4.1887E+02	4.4098E+02	8.234E-01%		3.28E+00
Y-898	9.0827E+00	1.8177E+03	1.710E+01%		6.75E+02
Co-1173	5.0861E+02	6.8205E+02	8.315E-01%		4.24E+00
Co-1332	5.1427E+02	6.8963E+02	8.225E-01%		2.50E+00
Y-1836 #	9.3579E+00	1.8728E+03	7.550E+00%		1.46E+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

17_Tuna2nd_20120265

---------- S U M M A R Y ----------

Total Activity (582.9 to 1999.2 keV)   1.981E+04 Bq/Sample
Total Decayed Activity (582.9 to 1999.2 keV) 3.7099195E+04 Bq/Sample

Second Source Verification

Detecter: Ge 18

Geometry: 1L Marn

Reference date 1/1/2010

Calibration Standard: 81592-334

Standard volume g / vial 1

Standard volume transferred in g / geometry 1

lab ID# of cal standard Rad 10-0030

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	Abundance*	Activity Bq/L	Count Results	%recovery
Am-241	1929	1929	0.359	**5373.3**	5347.2	99.5
Cs-137	1826	1826	0.851	**2145.7**	2103.2	98.0
Co-60	3424	3424	0.99974	**3424.9**	3258.8	95.2
Co-60	3426	3426	0.99986	**3426.5**	3296.2	96.2

Reviewed By: Michaela Korrinhizer

Date: 12/9/2011

Test America Spectrum name: 18_1Lmarn2nd_20111560.An1

Sample description
18_1Lmarn2nd_rad10_120911

Spectrum Filename: C:\User\SPC\Det18\18_1Lmarn2nd_20111560.An1

Acquisition information
Start time: 12/9/2011 12:09:00 PM
Live time: 7200
Real time: 7623
Dead time: 5.55 %
Detector ID: 18

Detector system
Ge18 SN/11164036

Calibration
Filename: 18_1LMarinelli.Clb
18_1Lmarn_83924-334_120711

Energy Calibration
Created: 6/23/2011 2:01:18 PM
Zero offset: -0.041 keV
Gain: 0.250 keV/channel
Quadratic: -3.236E-08 keV/channel^2

Efficiency Calibration
Created: 12/8/2011 10:14:04 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.55 %
Log(Eff): -1.645931E+00 + (3.227669E-02*Log(E)) + (-6.187585E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.90 %
Log(Eff): -1.318185E+01 + (4.538566E+00*Log(E)) + (-5.017483E-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 (37.49keV)
Stop channel: 8000 (1999.48keV)
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

Test America Spectrum name: 18_1Lmarn2nd_20111560.An1

Random error:	1.0000000E+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	18_2011-11-25_1217.PBC 11/25/2011 12:17:57 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0419

***** 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
36.47	2471.	13.33	0.78	3.512E-02				
42.98	689.	51.74	0.22	4.037E-02				
49.62	26270.	2.92	1.78	4.459E-02				
59.50	672785.	0.17	0.96	4.909E-02	59.54	35.700	5.347E+03	AM241
88.00	352095.	0.23	0.97	5.396E-02	88.03	3.610	7.242E+04	CD109
115.50	158.	90.55	0.50	5.264E-02				
122.07	86542.	0.58	1.03	5.191E-02	122.06	85.600	1.642E+03	CO57
136.52	10521.	3.05	1.07	4.998E-02				
165.91	18601.	1.94	1.11	4.516E-02	165.85	79.900	2.519E+03	Ce139
172.02	253.	77.50	0.42	4.419E-02				
187.30	365.	64.85	0.54	4.195E-02				
229.65	548.	32.44	0.85	3.691E-02				
270.35	138.	82.55	0.39	3.319E-02				
281.66	64.	286.79	1.19	3.249E-02	279.17	81.500	HL>Cutoff	Hg203
391.64	7813.	3.58	1.37	2.576E-02	391.69	64.000	4.652E+03	SN113
511.05	2722.	10.06	2.30	2.125E-02				
518.72	52.	164.67	0.43	2.102E-02				
648.97	156.	86.22	0.54	1.775E-02				
661.72	215786.	0.27	1.50	1.749E-02	661.66	85.210	2.103E+03	CS137
732.78	108.	72.27	0.48	1.615E-02				
750.28	485.	45.36	0.29	1.585E-02				
790.10	158.	69.06	1.65	1.522E-02				
795.66	261.	51.74	1.65	1.514E-02				
815.61	111.	73.71	0.41	1.484E-02				
834.93	67637.	0.62	1.60	1.457E-02	834.85	99.980	3.098E+03	Mn54
869.66	308.	49.02	0.32	1.410E-02				
898.19	6530.	3.91	1.68	1.373E-02	898.02	93.700	6.993E+03	Y898
906.05	282.	49.24	0.32	1.364E-02				

941.41	610.	35.08	0.35	1.322E-02				
962.20	354.	58.25	0.45	1.299E-02				
1115.60	24756.	1.53	1.85	1.149E-02	1115.55	50.600	4.396E+03	Zn65
1129.90	232.	50.18	0.34	1.137E-02				
1142.59	109.	50.29	0.41	1.126E-02				
1166.81	691.	17.22	1.94	1.107E-02				
1173.43	195575.	0.24	1.94	1.101E-02	1173.24	99.900	3.184E+03	Co1173
1242.14	105.	67.99	0.49	1.050E-02				
1270.92	61.	53.36	0.54	1.029E-02				
1305.62	31.	86.01	0.37	1.006E-02				
1318.50	46.	71.02	0.54	9.975E-03				
1332.60	181838.	0.25	1.96	9.884E-03	1332.50	99.982	3.296E+03	Co1332
1343.88	102.	66.80	0.27	9.813E-03				
1405.08	76.	48.56	0.63	9.444E-03				
1502.39	79.	45.32	0.54	8.910E-03				
1836.03	4054.	2.42	2.42	7.460E-03	1836.01	99.200	7.550E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.93	36.47	37413.	2471.	7.036E+04	13.33	0.781	-	s
171.97	42.98	50556.	689.	1.707E+04	51.74	0.219	-	s

Test America Spectrum name: 18_1Lmarn2nd_20111560.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
198.49	49.62	161060.	26270.	5.892E+05	2.92	1.776	-	s
461.81	115.50	10156.	158.	3.001E+03	90.55	0.500	-	sc
545.84	136.52	24055.	10521.	2.105E+05	3.05	1.074	-	
687.74	172.02	13499.	253.	5.730E+03	77.50	0.415	-	c
748.82	187.30	17611.	365.	8.709E+03	64.85	0.540	-	s
918.13	229.65	12446.	548.	1.486E+04	32.44	0.848	-	s
1080.87	270.35	6419.	138.	4.158E+03	82.55	0.387	-	sc
2043.28	511.05	14950.	2722.	1.281E+05	10.06	2.299	-	s
2073.97	518.72	3640.	52.	2.474E+03	164.67	0.427	-	sc
2594.87	648.97	5978.	156.	8.789E+03	86.22	0.545	-	sc
2930.07	732.78	2771.	108.	6.697E+03	72.27	0.483	-	sc
3000.06	750.28	9584.	485.	3.059E+04	45.36	0.292	-	s
3159.15	790.05	3241.	132.	8.651E+03	66.62	0.882	-	sc
3181.41	795.62	7044.	352.	2.328E+04	46.94	0.827	-	s
3261.39	815.61	3038.	111.	7.480E+03	73.71	0.415	-	sc
3477.62	869.66	6760.	308.	2.187E+04	49.02	0.325	-	s
3623.20	906.05	6334.	282.	2.068E+04	49.24	0.318	-	s
3764.64	941.41	10858.	610.	4.618E+04	35.08	0.353	-	s
3847.84	962.20	10140.	354.	2.729E+04	58.25	0.451	-	s
4518.81	1129.90	3822.	232.	2.045E+04	50.18	0.341	-	s
4569.61	1142.59	1448.	109.	9.678E+03	50.29	0.405	-	s
4666.52	1166.68	6726.	691.	5.723E+02	17.22	1.939	-	lD
4967.97	1242.14	1248.	105.	1.000E+04	67.99	0.492	-	s
5083.16	1270.92	428.	61.	5.926E+03	53.36	0.535	-	s
5222.01	1305.62	340.	31.	3.082E+03	86.01	0.369	-	sc
5273.57	1318.50	464.	46.	4.578E+03	71.02	0.537	-	sc
5375.15	1343.88	888.	102.	1.045E+04	66.80	0.273	-	s
5620.10	1405.08	362.	76.	7.995E+03	48.56	0.626	-	s
6009.62	1502.39	328.	79.	8.867E+03	45.32	0.538	-	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	237.99	59.50	143333.	672785.	93.442	0.17	0.964
CD-109	351.90	88.00	68534.	352095.	48.902	0.23	0.974
CO-57	488.07	122.07	35677.	86542.	12.020	0.58	1.029
Ce-139	663.35	165.91	25840.	18601.	2.583	1.94	1.107
Hg-203	1126.08	281.66	16892.	64.	0.009	286.79	1.186
SN-113	1565.81	391.64	16283.	7813.	1.085	3.58	1.368

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	2645.83	661.72	18918.	215786.	29.970	0.27	1.498
Mn-54	3338.67	834.93	16218.	67637.	9.394	0.62	1.603
Y-898	3591.76	898.19	12144.	6530.	0.907	3.91	1.683
Zn-65	4461.60	1115.60	14840.	24756.	3.438	1.53	1.848
Co-1173	4692.49	1173.30	9533.	200159.	27.800	0.26	1.861
Co-1332	5330.00	1332.60	4053.	181838.	25.255	0.25	1.962
Y-1836	7345.43	1836.03	627.	4054.	0.563	2.42	2.416s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
AM-241		5.3472E+03				1.58E+05		
			59.54	5.347E+03	(	1.404E+01	1.69E-01 3.57E+01 G	
CD-109		7.2415E+04				4.63E+02		
			88.03	7.242E+04	(	2.515E+02	2.33E-01 3.61E+00 G	
CO-57		1.6416E+03				2.72E+02		
			122.06	1.642E+03	(	1.675E+01	5.81E-01 8.56E+01 G	
Ce-139		2.5188E+03				1.38E+02		
			165.85	2.519E+03	(	1.018E+02	1.94E+00 7.99E+01 G	
Hg-203		3.3644E-01				4.66E+01		
			279.17	3.364E-01	(	3.191E+00	2.87E+02 8.15E+01 G	
SN-113		4.6524E+03				1.15E+02		
			391.69	4.652E+03	(	3.557E+02	3.58E+00 6.40E+01 G	
CS-137		2.1032E+03				1.10E+04		
			661.66	2.103E+03	(	6.274E+00	2.73E-01 8.52E+01 G	
Mn-54		3.0983E+03				3.12E+02		
			834.85	3.098E+03	(	2.731E+01	6.20E-01 1.00E+02 G	
Y-898		6.9925E+03				1.07E+02		
			898.02	6.993E+03	(	5.528E+02	3.91E+00 9.37E+01 G	
Zn-65	F	4.3962E+03				2.44E+02		
			1115.55	4.396E+03	(	1.013E+02	1.53E+00 5.06E+01 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-1173	3.2588E+03					1.93E+03	
		1173.24	3.259E+03	(	7.452E+00	2.61E-01	9.99E+01 G
Co-1332	3.2962E+03					1.93E+03	
		1332.50	3.296E+03	(	5.427E+00	2.55E-01	1.00E+02 G
Y-1836	7.5502E+03					1.07E+02	
		1836.01	7.550E+03	@(	2.223E+02	2.42E+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:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	281.66	16892.	64.	0.009	286.79	0.000E+00

P - Peakbackground subtraction

Test America Spectrum name: 18_1Lmarn2nd_20111560.An1

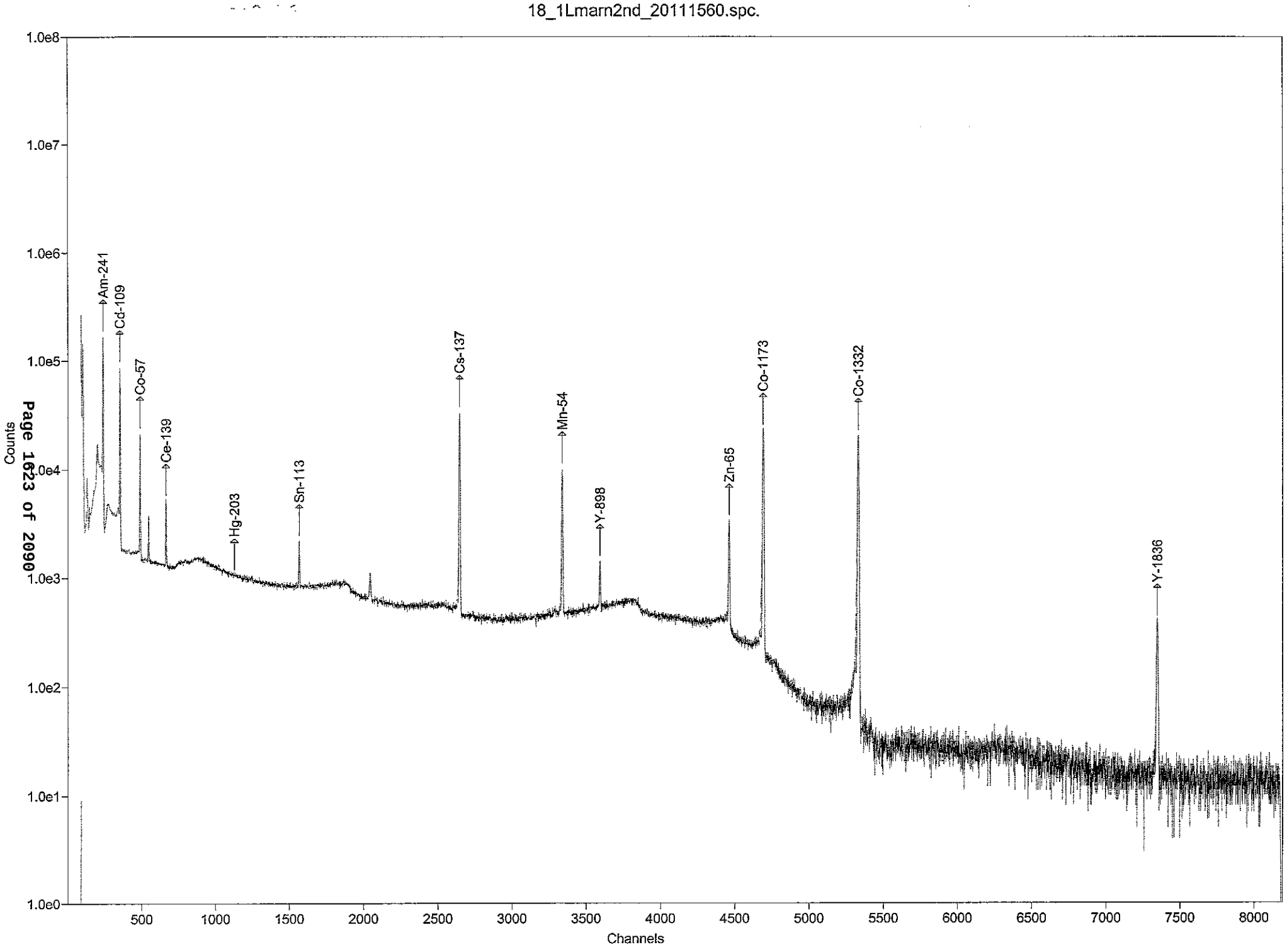
***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
AM-241	5.3307E+03	5.3472E+03	1.691E-01%		1.40E+01
CD-109	2.5103E+04	7.2415E+04	2.328E-01%		2.51E+02
CO-57	2.7051E+02	1.6416E+03	5.812E-01%		1.67E+01
Ce-139	7.1585E+01	2.5188E+03	1.943E+00%		1.02E+02
Hg-203 #A	3.3644E-01	>12 Halflives	2.8679E+02%	3.1906E+00	
SN-113	6.5814E+01	4.6524E+03	3.583E+00%		3.56E+02
CS-137	2.0114E+03	2.1032E+03	2.735E-01%		6.27E+00
Mn-54	6.4505E+02	3.0983E+03	6.198E-01%		2.73E+01
Y-898	7.0467E+01	6.9925E+03	3.911E+00%		5.53E+02
Zn-65	5.9134E+02	4.3962E+03	1.530E+00%		1.01E+02
Co-1173	2.5264E+03	3.2588E+03	2.612E-01%		7.45E+00
Co-1332	2.5554E+03	3.2962E+03	2.546E-01%		5.43E+00
Y-1836 #	7.6087E+01	7.5502E+03	2.415E+00%		2.22E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 1999.5 keV) 3.932E+04 Bq/Sample
Total Decayed Activity (37.5 to 1999.5 keV) 1.1727047E+05 Bq/Sample


18_1Lmarn2nd_20111560.spc.
Counts
Channels
1.0e8
1.0e7
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
Am-241
Cd-109
Co-57
Ce-139
Hg-203
Sn-113
Cs-137
Mn-54
Y-898
Zn-65
Co-1173
Co-1332
Y-1836

Annual Calibration Verifications

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 4**
SpectrumID: 4_20130227011_EffVerif
Analysis Description: ACVTop-91774;Tuna Can 2006
Calibration: 4_Soil_TunaCan_90099_033012
Detector: Ge 4 SN/181

Verification Date: 2013-02-27 16:17
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.48E+02	0.3%
Cs-137	661.66	400	3.83E+02	4.3%
Co-1332	1332.5	777	7.45E+02	4.1%

Comments:

Perform ____KM 2/27/13_____ Reviev ___RM 2/27/13_____

C:\User\CRpt\4_20130227011_EffVerif.xls

Sample Description: ACVTop-91774;Tuna Can 2006
Detector: Ge 4 SN/181
Source Date: 10/1/2006 11:00
Acquired: 2/27/2013 16:17:24
Analyzed: 3/4/2013 09:45

Analyst: Jody Watson

Efficiency: 4_Soil_TunaCan_90099_033012
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.478E+02	0.56
CS-137	3.829E+02	0.86
Co-1332	7.452E+02	1.09
Total	1.576E+03	

TestAmerica Spectrum name: 4_20130227011_EffVerif.An1

Sample description
ACVTop-91774;Tuna Can 2006

Spectrum Filename: C:\User\SPC\Det4\4_20130227011_EffVerif.An1

Acquisition information
Start time: 2/27/2013 4:17:24 PM
Live time: 7200
Real time: 7253
Dead time: 0.72 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Soil_TunaCan.Clb
4_Soil_TunaCan_90099_033012

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 1:19:41 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.78 %
Log(Eff): -3.983609E-01 + (-5.746278E-01*Log(E)) + (-2.046438E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.80 %
Log(Eff): -2.546791E+01 + (9.285295E+00*Log(E)) + (-9.904428E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1108

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. uCi/Sour	Nuc
46.55	47124.	0.63	0.76	1.208E-02				
59.59	54866.	0.56	0.76	1.721E-02	59.54	100.000	4.478E+02	AM241
88.12	3315.	2.53	0.84	2.354E-02				
661.43	16127.	0.86	1.34	6.783E-03	661.66	100.000	3.829E+02	CS137
1173.07	9616.	1.14	1.61	4.163E-03				
1332.31	8608.	1.09	1.83	3.728E-03	1332.50	100.000	7.452E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
185.74	46.55	11672.	47124.	3.900E+06	0.63	0.759	-	
351.92	88.08	1814.	3335.	1.417E+05	2.50	0.839	-	D
4691.64	1173.07	330.	9616.	2.310E+06	1.14	1.611	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.85	59.59	10017.	54866.	7.620	0.56	0.763
CS-137	2644.55	661.43	602.	16127.	2.240	0.86	1.344
Co-1332	5328.94	1332.31	36.	8608.	1.196	1.09	1.834

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.4779E+02				1.58E+05	
			59.54	4.478E+02	(	3.829E+00 5.62E-01 1.00E+02	G
CS-137		3.8291E+02				1.10E+04	
			661.66	3.829E+02	(	2.780E+00 8.62E-01 1.00E+02	G
Co-1332		7.4516E+02				1.93E+03	
			1332.50	7.452E+02	(	2.655E+00 1.09E+00 1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.4322E+02	4.4779E+02	5.616E-01%	3.83E+00
CS-137	3.3031E+02	3.8291E+02	8.623E-01%	2.78E+00
Co-1332	3.2075E+02	7.4516E+02	1.093E+00%	2.65E+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 (92.9 to 1999.4 keV) 1.094E+03 uCi/Source
Total Decayed Activity (92.9 to 1999.4 keV) 1.5758633E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 5**
SpectrumID: 5_20140128003_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 5_Soil_TunaCan_90099_032612
Detector: Ge 5 SN/157

Verification Date: 2014-01-28 09:57
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.49E+02	0.1%
Cs-137	661.66	400	3.94E+02	1.5%
Co-1332	1332.5	777	7.64E+02	1.7%

Comments:

Perform Justin D Lockhart Reviev 1/28/2014

C:\User\CRpt\5_20140128003_EffVerif.xls

Sample Description: ACVTop-259586;TunaCan2006
Detector: Ge 5 SN/157
Source Date: 10/1/2006 11:00
Acquired: 1/28/2014 09:57:52
Analyzed: 1/28/2014 11:58

Analyst: JustinL

Efficiency: 5_Soil_TunaCan_90099_032612
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.487E+02	0.46
CS-137	3.938E+02	0.71
Co-1332	7.635E+02	0.96
Total	1.606E+03	

TestAmerica Spectrum name: 5_20140128003_EffVerif.An1

Sample description
ACVTop-259586;TunaCan2006

Spectrum Filename: C:\User\SPC\Det5\5_20140128003_EffVerif.An1

Acquisition information
Start time: 1/28/2014 9:57:52 AM
Live time: 7200
Real time: 7241
Dead time: 0.57 %
Detector ID: 5

Detector system
Ge 5 SN/157

Calibration
Filename: 5_Soil_TunaCan.Clb
5_Soil_TunaCan_90099_032612

Energy Calibration
Created: 2/28/2012 7:35:48 PM
Zero offset: 0.158 keV
Gain: 0.250 keV/channel
Quadratic: 3.911E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 5:20:37 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.466115E-01 + (-7.830454E-01*Log(E)) +
(-4.117504E-03*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.43 %
Log(Eff): -2.462251E+01 + (9.075211E+00*Log(E)) +
(-9.664422E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.62keV)
Stop channel: 8000 (2000.81keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1051

***** 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. GPS/Sour	Nuc
36.67	1204.	9.66	0.79	1.141E-02				
46.62	65354.	0.55	0.72	1.793E-02				
59.58	80895.	0.46	0.74	2.535E-02	59.54	100.000	4.487E+02	AM241
87.90	2852.	4.19	0.80	3.459E-02				
661.53	23767.	0.71	1.33	9.926E-03	661.66	100.000	3.938E+02	CS137
1172.91	12920.	0.96	1.68	6.139E-03				
1332.18	11567.	0.96	1.84	5.515E-03	1332.50	100.000	7.635E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.17	36.67	4104.	1204.	1.055E+05	9.66	0.791	-	s
186.01	46.62	17227.	65354.	3.644E+06	0.55	0.723	-	
351.27	87.90	3262.	2852.	8.245E+04	4.19	0.801	-	
4691.90	1172.91	391.	12920.	2.104E+06	0.96	1.683	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.90	59.58	14402.	80895.	11.235	0.46	0.736
CS-137	2646.84	661.53	875.	23767.	3.301	0.71	1.325
Co-1332	5328.59	1332.18	84.	11567.	1.607	0.96	1.844

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 GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Code	MDA Value GPS/Source	COMMENTS
AM-241		4.4871E+02				1.58E+05	
			59.54	4.487E+02	(	3.117E+00 4.64E-01 1.00E+02 G	
CS-137		3.9381E+02				1.10E+04	
			661.66	3.938E+02	(	2.329E+00 7.15E-01 1.00E+02 G	
Co-1332		7.6351E+02				1.93E+03	
			1332.50	7.635E+02	(	2.998E+00 9.56E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.4348E+02	4.4871E+02	4.640E-01%	3.12E+00
CS-137	3.3261E+02	3.9381E+02	7.149E-01%	2.33E+00
Co-1332	2.9133E+02	7.6351E+02	9.564E-01%	3.00E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.8 keV) 1.067E+03 GPS/Source
Total Decayed Activity (37.6 to 2000.8 keV) 1.6060363E+03 GPS/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 7**
SpectrumID: 7_20140127010_EffVerif
Analysis Description: ACVWrap-255911;1LMarn2011
Calibration: 7_1Lmarn_90062_032612
Detector: Ge 7 SN/154

Verification Date: 2014-01-27 15:16
Source Assay Date/Time: 2011-01-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	1830	1.78E+03	2.6%
Cs-137	661.66	1705	1.68E+03	1.7%
Co-1332	1332.5	3294	3.26E+03	1.2%

Comments:

Perform Jody Watson Reviev 1/28/2014

C:\User\CRpt\7_20140127010_EffVerif.xls

Sample Description: ACVWrap-255911;1LMarn2011
Detector: Ge 7 SN/154
Source Date: 1/1/2011 11:00
Acquired: 1/27/2014 15:16:52
Analyzed: 1/27/2014 17:22

Analyst: JustinL

Efficiency: 7_1Lmarn_90062_032612
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	1.783E+03	0.19
CS-137	1.676E+03	0.31
Co-1332	3.255E+03	0.33
Total	6.714E+03	

TestAmerica Spectrum name: 7_20140127010_EffVerif.An1

Sample description
ACVWrap-255911;1LMarn2011

Spectrum Filename: C:\User\SPC\Det7\7_20140127010_EffVerif.An1

Acquisition information
Start time: 1/27/2014 3:16:52 PM
Live time: 7200
Real time: 7497
Dead time: 3.96 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Liquid_Marinelli 1L.Clb
7_1Lmarn_90062_032612

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 9:18:24 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -7.054602E-01 + (-2.848254E-01*Log(E)) + (-4.423998E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.43 %
Log(Eff): -1.484435E+01 + (5.183775E+00*Log(E)) + (-5.730519E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.12keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0341

***** 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. GPS/Sour	Nuc
36.47	2984.	9.01	0.84	2.696E-02				
49.52	17484.	3.50	1.54	3.536E-02				
59.51	505009.	0.19	0.87	3.953E-02	59.54	100.000	1.783E+03	AM241
87.96	149842.	0.37	0.94	4.404E-02				
122.00	24722.	1.42	1.00	4.215E-02				
136.34	2875.	7.64	0.91	4.038E-02				
661.63	135072.	0.31	1.48	1.202E-02	661.66	100.000	1.676E+03	CS137
834.82	17602.	1.34	1.65	9.817E-03				
1115.54	7865.	2.99	1.78	7.578E-03				
1173.18	110828.	0.35	1.91	7.239E-03				
1332.42	100812.	0.33	1.99	6.443E-03	1332.50	100.000	3.255E+03	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.42	36.47	24446.	2984.	1.107E+05	9.01	0.835	-	
197.63	49.52	112790.	17484.	4.944E+05	3.50	1.541	-	s
351.41	87.96	33638.	149842.	3.402E+06	0.37	0.937	-	
487.58	122.00	21840.	24722.	5.866E+05	1.42	0.997	-	s
544.94	136.34	13594.	2875.	7.120E+04	7.64	0.905	-	
3339.02	834.82	7312.	17602.	1.793E+06	1.34	1.653	-	
4461.89	1115.54	7304.	7865.	1.038E+06	2.99	1.778	-	s
4692.45	1173.18	4893.	110828.	1.531E+07	0.35	1.910	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.58	59.51	96922.	505009.	70.140	0.19	0.873
CS-137	2646.23	661.63	7593.	135072.	18.760	0.31	1.478
Co-1332	5329.40	1332.42	1003.	100812.	14.002	0.33	1.993

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 GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Code	MDA Value GPS/Source	COMMENTS
AM-241		1.7827E+03				1.58E+05	
			59.54	1.783E+03	(	5.131E+00 1.89E-01 1.00E+02 G	
CS-137		1.6757E+03				1.10E+04	
			661.66	1.676E+03	(	5.071E+00 3.12E-01 1.00E+02 G	
Co-1332		3.2553E+03				1.93E+03	
			1332.50	3.255E+03	(	4.852E+00 3.28E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes: Peak 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
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 GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	1.7739E+03	1.7827E+03	1.888E-01%	5.13E+00
CS-137	1.5612E+03	1.6757E+03	3.124E-01%	5.07E+00
Co-1332	2.1733E+03	3.2553E+03	3.285E-01%	4.85E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 5.508E+03 GPS/Source
Total Decayed Activity (37.6 to 2000.1 keV) 6.7136885E+03 GPS/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 7**
SpectrumID: 7_20140128004_EffVerif
Analysis Description: ACVTOP-259586;TunaCan2006
Calibration: 7_TunaCan_90099_032712
Detector: Ge 7 SN/154

Verification Date: 2014-01-28 18:43
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.25E+02	5.2%
Cs-137	661.66	400	3.78E+02	5.6%
Co-1332	1332.5	777	7.28E+02	6.2%

Comments:

Perform Jody Watson Reviev 1/28/2014

C:\User\CRpt\7_20140128004_EffVerif.xls

Sample Description: ACVTOP-259586;TunaCan2006
Detector: Ge 7 SN/154
Source Date: 10/1/2006 11:00
Acquired: 1/28/2014 18:43:13
Analyzed: 1/28/2014 20:45

Analyst: Jody Watson

Efficiency: 7_TunaCan_90099_032712
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.255E+02	0.39
CS-137	3.777E+02	0.59
Co-1332	7.285E+02	0.82
Total	1.532E+03	

TestAmerica Spectrum name: 7_20140128004_EffVerif.An1

Sample description
ACVTOP-259586;TunaCan2006

Spectrum Filename: C:\User\SPC\Det7\7_20140128004_EffVerif.An1

Acquisition information
Start time: 1/28/2014 6:43:13 PM
Live time: 7200
Real time: 7330
Dead time: 1.77 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/16/2012 11:45:14 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.716580E-01 + (-6.166540E-01*Log(E)) +
(-2.065917E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): -2.689695E+01 + (1.019544E+01*Log(E)) +
(-1.081671E+00*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.12keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       10/1/2006 11:00:00 AM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0148
```

***** 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. GPS/Sour	Nuc
36.68	1330.	9.67	1.05	1.489E-02				
46.60	80032.	0.43	0.84	2.484E-02				
59.54	112070.	0.39	0.88	3.701E-02	59.54	100.000	4.255E+02	AM241
88.01	3908.	2.64	0.88	5.327E-02				
661.64	34273.	0.59	1.49	1.492E-02	661.66	100.000	3.777E+02	CS137
1173.20	17374.	0.85	1.92	8.929E-03				
1332.45	15910.	0.82	2.01	7.951E-03	1332.50	100.000	7.285E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.25	36.68	5068.	1330.	8.929E+04	9.67	1.047	-	s
185.76	46.55	21357.	85177.	3.429E+06	0.47	0.876	-	
351.61	87.98	3362.	3908.	7.336E+04	2.64	0.881	-	D
4692.54	1173.20	614.	17374.	1.946E+06	0.85	1.923	-	

```
  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  L - Peak written from unknown list.
  C - Area < Critical level.

------------------------------------------------------------
This section based on library: DET_EfficiencyVerification.lib
```

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.70	59.54	19241.	112070.	15.565	0.39	0.882
CS-137	2646.28	661.64	1145.	34273.	4.760	0.59	1.489
Co-1332	5329.51	1332.45	128.	15910.	2.210	0.82	2.010

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 GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Code	MDA Value GPS/Source	COMMENTS
AM-241		4.2547E+02				1.58E+05	
			59.54	4.255E+02	(	2.464E+00 3.91E-01 1.00E+02 G	
CS-137		3.7766E+02				1.10E+04	
			661.66	3.777E+02	(	1.767E+00 5.92E-01 1.00E+02 G	
Co-1332		7.2849E+02				1.93E+03	
			1332.50	7.285E+02	(	2.533E+00 8.19E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.2051E+02	4.2547E+02	3.912E-01%	2.46E+00
CS-137	3.1896E+02	3.7766E+02	5.918E-01%	1.77E+00
Co-1332	2.7793E+02	7.2849E+02	8.193E-01%	2.53E+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 (98.9 to 2000.1 keV) 1.017E+03 GPS/Source
Total Decayed Activity (98.9 to 2000.1 keV) 1.5316135E+03 GPS/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 9**
SpectrumID: 9_20140127006_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 9_Soil_TunaCan_90099_050312
Detector: Ge9 S/N100228730

Verification Date: 2014-01-27 09:57
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.36E+02	2.9%
Cs-137	661.66	400	3.87E+02	3.2%
Co-1332	1332.5	777	7.44E+02	4.3%

Comments:

Perform Justin D Lockhart / Jody Watson Revie 1/27/2014

C:\User\CRpt\9_20140127006_EffVerif.xls

Sample Description: ACVTop-259586;TunaCan2006
Detector: Ge9 S/N100228730
Source Date: 10/1/2006 11:00
Acquired: 1/27/2014 09:57:52
Analyzed: 1/27/2014 11:58

Analyst: Jody Watson

Efficiency: 9_Soil_TunaCan_90099_050312
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.359E+02	0.40
CS-137	3.870E+02	0.53
Co-1332	7.440E+02	0.70
Total	1.567E+03	

TestAmerica, Inc Spectrum name: 9_20140127006_EffVerif.An1

Sample description
ACVTop-259586;TunaCan2006

Spectrum Filename: C:\User\SPC\Det9\9_20140127006_EffVerif.An1

Acquisition information
Start time: 1/27/2014 9:57:52 AM
Live time: 7200
Real time: 7243
Dead time: 0.59 %
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: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.59keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0279

***** 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. GPS/Sour	Nuc
36.52	1513.	9.40	0.98	1.632E-02				
46.61	90228.	0.40	1.00	2.579E-02				
59.58	113489.	0.40	0.95	3.662E-02	59.54	100.000	4.359E+02	AM241
88.11	4431.	4.23	1.01	5.052E-02				
661.70	42601.	0.53	1.51	1.810E-02	661.66	100.000	3.870E+02	CS137
1173.28	23445.	0.73	1.93	1.163E-02				
1332.55	21471.	0.70	2.03	1.050E-02	1332.50	100.000	7.439E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
145.74	36.52	5612.	1513.	9.270E+04	9.40	0.982	-
185.90	46.56	22509.	90806.	3.521E+06	0.47	0.935	-
352.02	88.11	6367.	4431.	8.770E+04	4.23	1.012	-
4693.14	1173.28	793.	23445.	2.016E+06	0.73	1.926	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.93	59.58	20068.	113489.	15.762	0.40	0.945
CS-137	2646.19	661.70	1349.	42601.	5.917	0.53	1.513
Co-1332	5330.56	1332.55	140.	21471.	2.982	0.70	2.033

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 GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Code	MDA Value GPS/Source	COMMENTS
AM-241		4.3588E+02				1.58E+05	
			59.54	4.359E+02	(	2.546E+00 4.01E-01 1.00E+02 G	
CS-137		3.8704E+02				1.10E+04	
			661.66	3.870E+02	(	1.580E+00 5.31E-01 1.00E+02 G	
Co-1332		7.4395E+02				1.93E+03	
			1332.50	7.439E+02	(	2.004E+00 7.00E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.3079E+02	4.3588E+02	4.010E-01%	2.55E+00
CS-137	3.2692E+02	3.8704E+02	5.309E-01%	1.58E+00
Co-1332	2.8397E+02	7.4395E+02	7.000E-01%	2.00E+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 1999.3 keV) 1.042E+03 GPS/Source
Total Decayed Activity (37.6 to 1999.3 keV) 1.5668657E+03 GPS/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #11**
SpectrumID: 11_20140127006_EffVerif
Analysis Description: ACVWrap-255911;1LMarn2011
Calibration: Ge11_1Lmarn_83924_334_101210
Detector: Ge11 S/N09363993

Verification Date: 2014-01-27 09:59
Source Assay Date/Time: 2011-01-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	1830	1.81E+03	1.0%
Cs-137	661.66	1705	1.73E+03	-1.6%
Co-1332	1332.5	3294	3.29E+03	0.2%

Comments:

Perform Jody Watson Revie 1/28/2014

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Sample Description: ACVWrap-255911;1LMarn2011
Detector: Ge11 S/N09363993
Source Date: 1/1/2011 11:00
Acquired: 1/27/2014 09:59:44
Analyzed: 1/28/2014 07:30

Analyst: Jody Watson

Efficiency: Ge11_1Lmarn_83924_334_101210
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	1.812E+03	0.17
CS-137	1.733E+03	0.26
Co-1332	3.288E+03	0.26
Total	6.833E+03	

TestAmerica, Inc Spectrum name: 11_20140127006_EffVerif.An1

Sample description
ACVWrap-255911;1LMarn2011

Spectrum Filename: C:\User\SPC\Det11\11_20140127006_EffVerif.An1

Acquisition information
Start time: 1/27/2014 9:59:44 AM
Live time: 7200
Real time: 7497
Dead time: 3.97 %
Detector ID: 11

Detector system
Ge11 S/N09363993

Calibration
Filename: 11_Liquid_Marinelli 1L.Clb
Ge11_1Lmarn_83924_334_101210

Energy Calibration
Created: 2/28/2012 1:09:34 PM
Zero offset: 0.055 keV
Gain: 0.250 keV/channel
Quadratic: -2.946E-08 keV/channel^2

Efficiency Calibration
Created: 11/1/2011 11:27:06 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.69 %
Log(Eff): -1.728738E+00 + (5.998209E-02*Log(E)) + (-6.399241E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.15 %
Log(Eff): -1.340909E+01 + (4.619770E+00*Log(E)) + (-5.089701E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.47keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0159

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. uCi/Sour	Nuc
36.65	5458.	6.81	0.88	3.429E-02				
49.52	26410.	2.72	1.77	4.363E-02				
59.51	627249.	0.17	0.89	4.831E-02	59.54	100.000	1.812E+03	AM241
84.84	2386.	9.85	0.94	5.335E-02				
88.01	187057.	0.26	0.94	5.351E-02				
122.07	30844.	1.22	0.99	5.171E-02				
136.43	3517.	6.89	0.94	4.986E-02				
661.66	204877.	0.26	1.43	1.762E-02	661.66	100.000	1.733E+03	CS137
834.83	27671.	1.03	1.55	1.468E-02				
1115.50	12772.	2.50	1.80	1.158E-02				
1173.22	173138.	0.26	1.80	1.110E-02				
1332.48	157323.	0.26	1.90	9.954E-03	1332.50	100.000	3.288E+03	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	
146.27	36.65	37918.	5458.	1.592E+05	6.81	0.875	-	s
197.72	49.52	139925.	26410.	6.053E+05	2.72	1.773	-	s
338.91	84.81	26438.	2386.	8.910E+03	9.85	0.936	-	lD
351.48	87.98	38852.	181420.	3.391E+06	0.33	0.943	-	
487.78	122.07	23932.	30844.	5.965E+05	1.22	0.990	-	
545.16	136.43	15760.	3517.	7.054E+04	6.89	0.941	-	
3338.24	834.83	9539.	27671.	1.885E+06	1.03	1.552	-	
4461.24	1115.50	11378.	12772.	1.103E+06	2.50	1.802	-	
4692.19	1173.22	4971.	173138.	1.560E+07	0.26	1.801	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.66	59.51	109066.	627249.	87.118	0.17	0.888
CS-137	2645.55	661.66	11390.	204877.	28.455	0.26	1.430
Co-1332	5329.59	1332.48	1267.	157323.	21.850	0.26	1.903

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source		COMMENTS
AM-241		1.8118E+03				1.58E+05		
			59.54	1.812E+03	(	4.453E+00	1.66E-01	1.00E+02 G
CS-137		1.7330E+03				1.10E+04		
			661.66	1.733E+03	(	4.230E+00	2.59E-01	1.00E+02 G
Co-1332		3.2877E+03				1.93E+03		
			1332.50	3.288E+03	(	3.523E+00	2.60E-01	1.00E+02 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes: Peak 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
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 uCi/Source	Time Corrected Activity uCi/Source	Uncertainty Counting 1 Sigma	MDA
AM-241	1.8029E+03	1.8118E+03	1.658E-01%	4.45E+00
CS-137	1.6146E+03	1.7330E+03	2.587E-01%	4.23E+00
Co-1332	2.1951E+03	3.2877E+03	2.598E-01%	3.52E+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 1999.5 keV) 5.613E+03 uCi/Source
Total Decayed Activity (37.6 to 1999.5 keV) 6.8324727E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #12**
SpectrumID: 12_20140127003_EffVerif
Analysis Description: ACVWrap-255911;1LMarn2011
Calibration: Ge12_Marn1LCal_90062_032612
Detector: Ge12 S/N10034336

Verification Date: 2014-01-27 12:08
Source Assay Date/Time: 2011-01-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	1830	1.78E+03	2.8%
Cs-137	661.66	1705	1.67E+03	2.2%
Co-1332	1332.5	3294	3.17E+03	3.6%

Comments:

Perform Jody Watson Revie 1/28/2014

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Sample Description: ACVWrap-255911;1LMarn2011
Detector: Ge12 S/N10034336
Source Date: 1/1/2011 11:00
Acquired: 1/27/2014 12:08:56
Analyzed: 1/28/2014 13:33

Analyst: Jody Watson

Efficiency: Ge12_Marn1LCal_90062_032612
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	1.779E+03	0.17
CS-137	1.668E+03	0.25
Co-1332	3.174E+03	0.26
Total	6.622E+03	

TestAmerica, Inc Spectrum name: 12_20140127003_EffVerif.An1

Sample description
ACVWrap-255911;1LMarn2011

Spectrum Filename: C:\User\SPC\Det12\12_20140127003_EffVerif.An1

Acquisition information
Start time:	1/27/2014 12:08:56 PM
Live time:	7200
Real time:	7491
Dead time:	3.89 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Liquid_Marinelli 1L.Clb
Ge12_Marn1LCal_90062_032612

Energy Calibration
Created:	2/28/2012 1:26:42 PM
Zero offset:	0.049 keV
Gain:	0.250 keV/channel
Quadratic:	-3.945E-08 keV/channel^2

Efficiency Calibration
Created:	4/2/2012 5:17:10 PM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 2.18 %
Log(Eff):	-2.771167E+00 + (4.009767E-01*Log(E)) + (-8.911171E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 0.25 %
Log(Eff):	-1.324587E+01 + (4.570937E+00*Log(E)) + (-5.039442E-01*Log(E)^2)

Library Files
Main analysis library:	DET_EfficiencyVerification.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.58keV)
Stop channel:	8000 (1999.36keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0523

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. uCi/Sour	Nuc
36.53	4866.	7.29	1.24	3.604E-02				
49.58	26778.	2.72	1.92	4.587E-02				
59.52	645957.	0.17	1.13	5.067E-02	59.54	100.000	1.779E+03	AM241
88.03	188796.	0.32	1.14	5.599E-02				
122.12	31879.	1.26	1.21	5.406E-02				
136.52	4186.	6.57	1.22	5.212E-02				
661.61	220744.	0.25	1.58	1.973E-02	661.66	100.000	1.668E+03	CS137
834.78	29837.	1.10	1.73	1.647E-02				
1115.38	13865.	2.44	1.87	1.297E-02				
1173.10	187375.	0.26	1.95	1.242E-02				
1332.36	169671.	0.26	2.05	1.112E-02	1332.50	100.000	3.174E+03	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	* Area	Efficiency Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.81	36.53	36239.	4866.	1.350E+05	7.29	1.240	-	s
197.93	49.58	143815.	26778.	5.838E+05	2.72	1.924	-	s
351.62	88.03	39886.	188796.	3.372E+06	0.32	1.143	-	s
487.87	122.12	27010.	31879.	5.897E+05	1.26	1.214	-	s
545.42	136.52	18649.	4186.	8.031E+04	6.57	1.223	-	s
3337.61	834.78	12304.	29837.	1.812E+06	1.10	1.734	-	
4460.38	1115.38	12355.	13865.	1.069E+06	2.44	1.874	-	s
4691.37	1173.10	7815.	187375.	1.508E+07	0.26	1.947	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.69	59.52	121203.	645957.	89.716	0.17	1.128s
CS-137	2644.92	661.61	11970.	220744.	30.659	0.25	1.581
Co-1332	5328.84	1332.36	3327.	169671.	23.565	0.26	2.046

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		1.7791E+03				1.58E+05	
			59.54	1.779E+03	*(	4.476E+00 1.68E-01 1.00E+02 G	
CS-137		1.6683E+03				1.10E+04	
			661.66	1.668E+03	(	3.874E+00 2.45E-01 1.00E+02 G	
Co-1332		3.1744E+03				1.93E+03	
			1332.50	3.174E+03	(	5.080E+00 2.63E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes: Peak 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
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 uCi/Source	Time Corrected Activity uCi/Source	Uncertainty 1 Sigma Counting	MDA
AM-241 #	1.7703E+03	1.7791E+03	1.675E-01%	4.48E+00
CS-137	1.5542E+03	1.6683E+03	2.450E-01%	3.87E+00
Co-1332	2.1194E+03	3.1744E+03	2.626E-01%	5.08E+00

\# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.4 keV) 5.444E+03 uCi/Source
Total Decayed Activity (37.6 to 1999.4 keV) 6.6217651E+03 uCi/Source

TestAmerica
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ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #12**
SpectrumID: 12_20140128004_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 12_TunaCanCal_90099_100212
Detector: Ge12 S/N10034336

Verification Date: 2014-01-28 14:18
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.47E+02	0.4%
Cs-137	661.66	400	3.94E+02	1.6%
Co-1332	1332.5	777	7.55E+02	2.8%

Comments:

Perform Jody Watson Revie 1/28/2014

C:\User\CRpt\12_20140128004_EffVerif.xls

Sample Description: ACVTop-259586;TunaCan2006
Detector: Ge12 S/N10034336
Source Date: 10/1/2006 11:00
Acquired: 1/28/2014 14:18:05
Analyzed: 1/28/2014 16:18

Analyst: Jody Watson

Efficiency: 12_TunaCanCal_90099_100212
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.471E+02	0.42
CS-137	3.935E+02	0.58
Co-1332	7.554E+02	0.77
Total	1.596E+03	

TestAmerica, Inc Spectrum name: 12_20140128004_EffVerif.An1

Sample description
ACVTop-259586;TunaCan2006

Spectrum Filename: C:\User\SPC\Det12\12_20140128004_EffVerif.An1

Acquisition information
Start time: 1/28/2014 2:18:05 PM
Live time: 7200
Real time: 7246
Dead time: 0.63 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCanCal_90099_100212

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 10/4/2012 9:05:44 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.70 %
Log(Eff): -7.827468E-01 + (-3.001271E-01*Log(E)) + (-3.369562E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.96 %
Log(Eff): -2.288409E+01 + (8.352717E+00*Log(E)) + (-8.812368E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0087

***** 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. GPS/Sour	Nuc
36.55	1480.	9.57	0.89	1.444E-02				
46.52	77370.	0.54	1.12	2.228E-02				
59.52	99318.	0.42	1.11	3.121E-02	59.54	100.000	4.471E+02	AM241
87.99	3561.	4.10	1.18	4.277E-02				
661.67	37598.	0.58	1.62	1.571E-02	661.66	100.000	3.935E+02	CS137
1173.21	20770.	0.79	1.92	1.018E-02				
1332.49	19132.	0.77	2.06	9.220E-03	1332.50	100.000	7.554E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.89	36.55	5572.	1480.	1.025E+05	9.57	0.886	-	s
185.74	46.52	24066.	77370.	3.473E+06	0.54	1.118	-	s
351.46	87.99	4624.	3561.	8.326E+04	4.10	1.175	-	s
4691.80	1173.21	827.	20770.	2.040E+06	0.79	1.915	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.67	59.52	17591.	99318.	13.794	0.42	1.110s
CS-137	2645.17	661.67	1535.	37598.	5.222	0.58	1.616
Co-1332	5329.33	1332.49	294.	19132.	2.657	0.77	2.055

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 GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Code	MDA Value GPS/Source	COMMENTS
AM-241		4.4707E+02				1.58E+05	
			59.54	4.471E+02	*(	2.794E+00 4.18E-01 1.00E+02	G
CS-137		3.9351E+02				1.10E+04	
			661.66	3.935E+02	(	1.939E+00 5.75E-01 1.00E+02	G
Co-1332		7.5535E+02				1.93E+03	
			1332.50	7.554E+02	(	3.261E+00 7.65E-01 1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241 #	4.4186E+02	4.4707E+02	4.183E-01%	2.79E+00
CS-137	3.3236E+02	3.9351E+02	5.754E-01%	1.94E+00
Co-1332	2.8820E+02	7.5535E+02	7.652E-01%	3.26E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.4 keV) 1.062E+03 GPS/Source
Total Decayed Activity (37.6 to 1999.4 keV) 1.5959352E+03 GPS/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #15**
SpectrumID: 15_20140124007_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 15_TunaCan_90099_032212
Detector: Ge15 SN/11012216

Verification Date: 2014-01-24 15:13
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.42E+02	1.5%
Cs-137	661.66	400	3.86E+02	3.5%
Co-1332	1332.5	777	7.51E+02	3.3%

Comments:

Perforn ____Jody Watson_____ Revie 1/24/2014

C:\User\CRpt\15_20140124007_EffVerif.xls

Sample Description: ACVTop-259586;TunaCan2006
Detector: Ge15 SN/11012216
Source Date: 10/1/2006 11:00
Acquired: 1/24/2014 15:13:10
Analyzed: 1/24/2014 17:13

Analyst: Jody Watson

Efficiency: 15_TunaCan_90099_032212
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.423E+02	0.46
CS-137	3.861E+02	0.67
Co-1332	7.514E+02	0.92
Total	1.580E+03	

TestAmerica, Inc. Spectrum name: 15_20140124007_EffVerif.An1

Sample description
ACVTop-259586;TunaCan2006

Spectrum Filename: C:\User\SPC\Det15\15_20140124007_EffVerif.An1

Acquisition information
Start time: 1/24/2014 3:13:10 PM
Live time: 7200
Real time: 7227
Dead time: 0.37 %
Detector ID: 15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_Soil_TunaCan.Clb
15_TunaCan_90099_032212

Energy Calibration
Created: 2/28/2012 4:29:17 PM
Zero offset: 0.044 keV
Gain: 0.250 keV/channel
Quadratic: -3.267E-08 keV/channel^2

Efficiency Calibration
Created: 3/22/2012 1:03:01 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.57keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0029

***** 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. GPS/Sour	Nuc
46.55	63242.	0.50	0.95	1.954E-02				
59.54	86146.	0.46	1.02	2.737E-02	59.54	100.000	4.423E+02	AM241
88.03	3254.	4.88	1.09	3.706E-02				
661.65	27112.	0.67	1.55	1.155E-02	661.66	100.000	3.861E+02	CS137
1173.21	14966.	0.95	1.84	7.076E-03				
1332.50	13074.	0.92	1.94	6.325E-03	1332.50	100.000	7.514E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
185.66	46.49	20160.	68291.	3.495E+06	0.57	1.022	-
351.69	88.03	4872.	3254.	8.780E+04	4.88	1.089	-
4691.88	1173.21	622.	14966.	2.115E+06	0.95	1.839	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.80	59.54	15953.	86146.	11.965	0.46	1.023
CS-137	2645.26	661.65	1040.	27112.	3.766	0.67	1.551
Co-1332	5329.37	1332.50	161.	13074.	1.816	0.92	1.937

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 GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Code	MDA Value GPS/Source	COMMENTS
AM-241		4.4227E+02				1.58E+05	
			59.54	4.423E+02	(	3.036E+00 4.61E-01 1.00E+02 G	
CS-137		3.8607E+02				1.10E+04	
			661.66	3.861E+02	(	2.179E+00 6.74E-01 1.00E+02 G	
Co-1332		7.5135E+02				1.93E+03	
			1332.50	7.514E+02	(	3.557E+00 9.18E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.3711E+02	4.4227E+02	4.613E-01%	3.04E+00
CS-137	3.2615E+02	3.8607E+02	6.736E-01%	2.18E+00
Co-1332	2.8708E+02	7.5135E+02	9.185E-01%	3.56E+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 1999.5 keV) 1.050E+03 GPS/Source
Total Decayed Activity (37.6 to 1999.5 keV) 1.5796848E+03 GPS/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #17**
SpectrumID: 17_20140123005_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 17_TunaCan_90099_032612
Detector: Ge17 SN/11080671

Verification Date: 2014-01-23 11:17
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.37E+02	2.6%
Cs-137	661.66	400	3.87E+02	3.3%
Co-1332	1332.5	777	7.33E+02	5.6%

Comments:

Perform Jody Watson Revie 1/23/2014

C:\User\CRpt\17_20140123005_EffVerif.xls

Sample Description: ACVTop-259586;TunaCan2006
Detector: Ge17 SN/11080671
Source Date: 10/1/2006 11:00
Acquired: 1/23/2014 11:17:37
Analyzed: 1/23/2014 13:18

Analyst: JustinL

Efficiency: 17_TunaCan_90099_032612
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.371E+02	0.43
CS-137	3.868E+02	0.60
Co-1332	7.334E+02	0.79
Total	1.557E+03	

TestAmerica, Inc. Spectrum name: 17_20140123005_EffVerif.An1

Sample description
ACVTop-259586;TunaCan2006

Spectrum Filename: C:\User\SPC\Det17\17_20140123005_EffVerif.An1

Acquisition information
Start time: 1/23/2014 11:17:37 AM
Live time: 7200
Real time: 7248
Dead time: 0.66 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Soil_TunaCan.Clb
17_TunaCan_90099_032612

Energy Calibration
Created: 2/29/2012 10:33:23 AM
Zero offset: 0.108 keV
Gain: 0.250 keV/channel
Quadratic: -2.584E-08 keV/channel^2

Efficiency Calibration
Created: 4/12/2012 9:28:42 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.91 %
Log(Eff): -5.264190E-01 + (-4.024164E-01*Log(E)) + (-2.604461E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -2.343889E+01 + (8.582715E+00*Log(E)) + (-9.075430E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.63keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0187

***** 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. GPS/Sour	Nuc
46.59	73432.	0.50	0.76	2.104E-02				
59.58	91985.	0.43	0.76	2.959E-02	59.54	100.000	4.371E+02	AM241
88.06	3451.	4.45	0.83	4.060E-02				
661.65	33946.	0.60	1.33	1.443E-02	661.66	100.000	3.868E+02	CS137
1173.26	19157.	0.83	1.72	9.359E-03				
1332.50	17118.	0.79	1.86	8.481E-03	1332.50	100.000	7.334E+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	
185.85	46.59	17888.	73432.	3.489E+06	0.50	0.760	-	
351.64	88.06	4826.	3451.	8.500E+04	4.45	0.825	-	s
4692.35	1173.26	773.	19157.	2.047E+06	0.83	1.724	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.75	59.58	15258.	91985.	12.776	0.43	0.764
CS-137	2645.46	661.65	1213.	33946.	4.715	0.60	1.331
Co-1332	5329.63	1332.50	157.	17118.	2.377	0.79	1.865

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 GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Code	MDA Value GPS/Source	COMMENTS
AM-241		4.3712E+02				1.58E+05	
			59.54	4.371E+02	(	2.748E+00 4.25E-01 1.00E+02 G	
CS-137		3.8679E+02				1.10E+04	
			661.66	3.868E+02	(	1.880E+00 5.95E-01 1.00E+02 G	
Co-1332		7.3337E+02				1.93E+03	
			1332.50	7.334E+02	(	2.619E+00 7.91E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.3203E+02	4.3712E+02	4.253E-01%	2.75E+00
CS-137	3.2679E+02	3.8679E+02	5.952E-01%	1.88E+00
Co-1332	2.8033E+02	7.3337E+02	7.913E-01%	2.62E+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 1999.5 keV) 1.039E+03 GPS/Source
Total Decayed Activity (37.6 to 1999.5 keV) 1.5572817E+03 GPS/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #18**
SpectrumID: 18_20140123003_EffVerif
Analysis Description: ACVWrap-255911;1LMarn2011
Calibration: 18_1Lmarn_83924-334_120711
Detector: Ge18 SN/11164036

Verification Date: 2014-01-23 11:19
Source Assay Date/Time: 2011-01-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	1830	1.83E+03	0.0%
Cs-137	661.66	1705	1.72E+03	-0.8%
Co-1332	1332.5	3295	3.22E+03	2.2%

Comments:

Perform ___Jody Watson_____ Reviev _____1/23/14_____

C:\User\CRpt\18_20140123003_EffVerif.xls

Sample Description: ACVWrap-255911;1LMarn2011
Detector: Ge18 SN/11164036
Source Date: 1/1/2011 11:00
Acquired: 1/23/2014 11:19:33
Analyzed: 1/23/2014 13:24

Analyst: JustinL

Efficiency: 18_1Lmarn_83924-334_120711
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	1.830E+03	0.17
CS-137	1.719E+03	0.27
Co-1332	3.223E+03	0.28
Total	6.771E+03	

Test America Spectrum name: 18_20140123003_EffVerif.An1

Sample description
ACVWrap-255911;1LMarn2011

Spectrum Filename: C:\User\SPC\Det18\18_20140123003_EffVerif.An1

Acquisition information
Start time: 1/23/2014 11:19:33 AM
Live time: 7200
Real time: 7505
Dead time: 4.06 %
Detector ID: 18

Detector system
Ge18 SN/11164036

Calibration
Filename: 18_1LMarinelli.Clb
18_1Lmarn_83924-334_120711

Energy Calibration
Created: 3/1/2012 1:27:55 PM
Zero offset: 0.007 keV
Gain: 0.250 keV/channel
Quadratic: -3.202E-08 keV/channel^2

Efficiency Calibration
Created: 12/8/2011 10:14:04 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.55 %
Log(Eff): -1.645931E+00 + (3.227669E-02*Log(E)) + (-6.187585E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.90 %
Log(Eff): -1.318185E+01 + (4.538566E+00*Log(E)) + (-5.017483E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.54keV)
Stop channel: 8000 (1999.55keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0532

***** 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. GPS/Sour	Nuc
36.36	4754.	7.02	1.01	3.503E-02				
49.47	27365.	2.65	1.77	4.450E-02				
59.47	643803.	0.17	0.93	4.908E-02	59.54	100.000	1.830E+03	AM241
87.97	188042.	0.33	0.98	5.396E-02				
122.09	31546.	1.22	1.01	5.190E-02				
136.43	3650.	6.77	1.09	4.999E-02				
165.90	2364.	7.36	1.07	4.517E-02				
661.71	201640.	0.27	1.46	1.749E-02	661.66	100.000	1.719E+03	CS137
834.99	27232.	0.76	1.68	1.457E-02				
1115.50	12316.	2.86	1.79	1.149E-02				
1173.31	169390.	0.28	1.81	1.101E-02				
1332.61	153359.	0.28	1.94	9.884E-03	1332.50	100.000	3.223E+03	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Channel	Peak Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.31	36.36	33702.	4754.	1.357E+05	7.02	1.006	-	s
197.69	49.47	142605.	27365.	6.149E+05	2.65	1.769	-	s
351.58	87.97	41737.	188042.	3.485E+06	0.33	0.981	-	
487.96	122.09	25197.	31546.	6.078E+05	1.22	1.011	-	
545.31	136.43	16422.	3650.	7.301E+04	6.77	1.086	-	
663.09	165.86	13935.	2364.	5.234E+04	7.36	1.072	-	D
3338.37	834.91	11424.	27675.	1.900E+06	1.14	1.588	-	
4460.99	1115.50	13178.	12316.	1.072E+06	2.86	1.786	-	s
4692.29	1173.31	7137.	169390.	1.538E+07	0.28	1.814	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.67	59.47	129081.	643803.	89.417	0.17	0.933
CS-137	2645.60	661.71	14472.	201640.	28.006	0.27	1.458
Co-1332	5329.81	1332.61	3424.	153359.	21.300	0.28	1.936

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 GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Code	MDA Value GPS/Source		COMMENTS
AM-241		1.8300E+03				1.58E+05		
			59.54	1.830E+03	(	4.767E+00	1.73E-01	1.00E+02 G
CS-137		1.7187E+03				1.10E+04		
			661.66	1.719E+03	(	4.801E+00	2.73E-01	1.00E+02 G
Co-1332		3.2227E+03				1.93E+03		
			1332.50	3.223E+03	(	5.787E+00	2.80E-01	1.00E+02 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes: Peak 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
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 GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	1.8211E+03	1.8300E+03	1.734E-01%	4.77E+00
CS-137	1.6016E+03	1.7187E+03	2.730E-01%	4.80E+00
Co-1332	2.1548E+03	3.2227E+03	2.798E-01%	5.79E+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 (172.4 to 1999.5 keV) 5.577E+03 GPS/Source
Total Decayed Activity (172.4 to 1999.5 keV) 6.7713540E+03 GPS/Source

Monthly Backgrounds

Test America
St. Louis
Background Check

Spectrum: 4_20140502005_BGLong
Acquired: 5/2/2014 5:55:06 PM
Detector: Ge 4 SN/181
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	1.32	1.20	1.24	1.31	1.39	1.43	PASS

Analyst: April Bean Reviewer: Siobhan Perry

TestAmerica Spectrum name: 4_20140502005_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det4\4_20140502005_BGLong.An1

Acquisition information
Start time:	5/2/2014 5:55:06 PM
Live time:	43200
Real time:	43258
Dead time:	0.13 %
Detector ID:	4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_QC.Clb
4_QA-D_Rad11-0018_032612

Energy Calibration
Created:	2/28/2012 2:55:17 PM
Zero offset:	0.091 keV
Gain:	0.250 keV/channel
Quadratic:	-2.917E-08 keV/channel^2

Efficiency Calibration
Created:	3/27/2012 7:34:55 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 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (1999.44keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 14 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1974

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.61	361.	9.77	0.81	3.538E-02	46.54	4.250	5.565E+00	PB210
63.35	318.	11.39	0.80	4.647E-02	63.29	3.810	4.165E+00	TH234
92.63	440.	8.26	0.78	6.309E-02	92.59	5.584	2.891E+00	TH234
					93.35	5.561	2.901E+00	AC228
185.54	181.	20.51	0.70	5.803E-02	185.72	54.000	1.335E-01	U235
					185.99	3.280	2.199E+00	Ra226
238.37	170.	16.45	1.06	5.340E-02	238.63	43.300	1.703E-01	PB212
510.64	840.	5.89	1.88	2.895E-02	511.86	20.000	3.374E+00	RH106
1187.94	46.	22.67	0.40	8.696E-03	1189.05	16.200	7.641E-01	Ta182
1460.70	46.	22.92	0.98	7.834E-03	1460.83	10.670	1.274E+00	K40

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
2041.42	510.64	276.	840.	2.904E+04	5.89	1.875	-	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	185.98	46.61	294.	361.	0.008	9.77	0.811
TH-234	252.87	63.35	299.	318.	0.007	11.39	0.803
TH-234	369.95	92.63	294.	440.	0.010	8.26	0.782
Ra-226	741.37	185.53	312.	176.	0.004	20.19	0.690s
PB-212	952.63	238.37	204.	170.	0.004	16.45	1.059
Ta-182	4751.12	1187.94	12.	46.	0.001	22.67	0.396s
K-40	5842.84	1460.70	17.	46.	0.001	22.92	0.984s

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 *****

Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	MDA Value DPS	COMMENTS
K-40	N	1.2739E+00				4.66E+11	
			1460.83	1.274E+00	?(	6.072E-01 2.29E+01	1.07E+01 G
PB-210	N	5.5645E+00				8.14E+03	
			46.54	5.565E+00	(	1.273E+00 9.77E+00	4.25E+00 G
PB-212	N	1.7028E-01				6.98E+02	
			238.63	1.703E-01	(	6.938E-02 1.64E+01	4.33E+01 G
			300.03	0.000E+00	%	6.791E-01 1.92E+02	3.28E+00 GA
TH-234	N	4.1655E+00				1.63E+12	
			63.29	4.165E+00	(	1.089E+00 1.14E+01	3.81E+00 G
			92.59	2.891E+00	-	5.429E-01 8.26E+00	5.58E+00 G
Ra-226		2.1479E+00				5.84E+05	
			185.99	2.148E+00	(	1.035E+00 2.02E+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	

- - - -

AG-110M	<	1.2771E-01			
SN-113	<	5.2742E-02			
SB-124	<	4.3326E-02			
SB-125	<	1.5113E-01			
I-131	<	3.8458E-02			
BA-133	<	3.7301E-02			
CS-134	<	5.8008E-02			
CS-137	<	1.0304E-01			
CE-139	<	2.3564E-02			
Ba-140	<	1.8163E-01			
La-140	<	6.9663E-02			
CE-141	<	5.8617E-02			
CE-144	<	3.1117E-01			
PM-144	<	8.3660E-02			
EU-152	<	1.3525E-01			
EU-154	<	6.1325E-01			
EU-155	<	1.3757E-01			
HF-181	<	4.3149E-02			
Ta-182	<	1.8676E-01			
Hg-203	<	2.8130E-02			
TL-208	<	7.5432E-02			
pm-146	<	2.1231E-01			
y-88	<	1.0294E-01			
PB-210		5.5645E+00	9.7663E+00%		1.273E+00
PB-212		1.7028E-01	1.6450E+01%		6.938E-02
PB-214	<	8.7402E-02			
BI-207	<	5.9119E-02			
BI-212	<	4.6519E-01			
BI-214	<	1.6958E-01			
BI-210M	<	6.6773E-02			
RA-224	<	7.1627E-01			
AC-228	<	3.3278E-01			
TH-227	<	2.9382E-01			
TH-229	<	6.8594E-01			
TH-234		4.1655E+00	1.1387E+01%		1.089E+00
PA-231	<	1.0501E+00			
PA-233	<	9.2410E-02			
PA-234	<	1.5356E-01			
PA-234M	<	1.4297E+01			
Ra-226		2.1479E+00	2.0193E+01%		1.035E+00
U-235	<	2.7072E-01			
AM-241	<	1.2299E-01			
Np-237	<	1.5966E-01			

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

--- S U M M A R Y ---

Total Activity	(37.6 to 1999.4 keV)	1.332E+01	DPS

Test America
St. Louis
Background Check

Spectrum: 5_20140502005_BGLong
Acquired: 5/2/2014 5:56:09 PM
Detector: Ge 5 SN/157
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.45	1.30	1.35	1.47	1.55	1.60	PASS

Analyst: April Bean Reviewer: Siobhan Perry

TestAmerica Spectrum name: 5_20140502005_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det5\5_20140502005_BGLong.An1

Acquisition information
Start time: 5/2/2014 5:56:09 PM
Live time: 43200
Real time: 43327
Dead time: 0.29 %
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 G53W4.25
Start channel: 150 (37.62keV)
Stop channel: 8000 (2000.81keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1229

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.60	342.	11.09	0.71	5.684E-02	46.54	4.250	3.285E+00	PB210
59.68	114.	22.53	0.60	7.439E-02	59.54	35.900	9.950E-02	AM241
63.37	364.	10.89	0.62	7.934E-02	63.29	3.810	2.791E+00	TH234
74.92	139.	20.36	0.81	9.479E-02				
77.16	129.	19.76	0.82	9.781E-02				
92.56	494.	9.25	1.11	1.129E-01	92.59	5.584	1.815E+00	TH234
					93.35	5.561	1.822E+00	AC228
143.94	111.	29.76	0.48	1.085E-01	143.79	10.960	2.160E-01	U235
185.82	240.	17.56	0.87	9.605E-02	185.72	54.000	1.071E-01	U235
					185.99	3.280	1.764E+00	Ra226
238.47	139.	23.67	1.09	8.327E-02	238.63	43.300	8.949E-02	PB212
295.14	126.	22.65	1.01	6.952E-02	295.09	19.300	2.179E-01	PB214
351.96	145.	25.61	0.73	5.573E-02	351.93	37.600	1.598E-01	PB214
608.89	155.	17.94	1.47	3.199E-02	609.31	46.090	2.436E-01	BI214
					610.30	5.750	1.956E+00	RU103
661.57	78.	24.26	0.79	2.860E-02	661.66	85.210	7.408E-02	CS137
1120.39	73.	23.20	0.54	1.646E-02	1120.29	15.100	6.766E-01	BI214
1460.95	74.	19.77	0.30	1.300E-02	1460.83	10.670	1.235E+00	K40
1764.63	40.	22.51	1.26	1.105E-02	1764.49	15.400	5.372E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.16	74.88	330.	139.	1.466E+03	23.58	0.632	-	M
308.14	77.13	236.	116.	1.181E+03	22.98	0.871	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.95	46.60	347.	342.	0.008	11.09	0.710
AM-241	238.30	59.68	220.	114.	0.003	22.53	0.598
TH-234	253.07	63.37	345.	364.	0.008	10.89	0.617
TH-234	369.94	92.56	416.	494.	0.011	9.25	1.114s
U-235	575.63	143.94	294.	111.	0.003	29.76	0.476s
U-235	742.85	185.72	313.	228.	0.005	12.09	0.925D
PB-212	953.98	238.47	259.	139.	0.003	23.67	1.088
PB-214	1180.81	295.14	208.	126.	0.003	22.65	1.007
PB-214	1408.19	351.96	283.	145.	0.003	25.61	0.732s
BI-214	2436.27	608.89	149.	155.	0.004	17.94	1.467s
CS-137	2647.00	661.57	80.	78.	0.002	24.26	0.788s
BI-214	4481.92	1120.39	37.	73.	0.002	23.20	0.542s
K-40	5843.24	1460.95	28.	74.	0.002	19.77	0.296s
BI-214	7056.65	1764.63	10.	40.	0.001	22.51	1.265s

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	1.2351E+00				4.66E+11		
			1460.83	1.235E+00	?(	4.568E-01	1.98E+01 1.07E+01	G
CS-137	I	7.4079E-02				1.10E+04		
			661.66	7.408E-02	(	4.216E-02	2.43E+01 8.52E+01	G
PB-210	N	3.2853E+00				8.14E+03		
			46.54	3.285E+00	(	8.587E-01	1.11E+01 4.25E+00	G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
PB-212	N	8.9494E-02						6.98E+02	
			238.63	8.949E-02	(	4.988E-02	2.37E+01	4.33E+01	G
			300.03	0.000E+00		7.612E-02	0.00E+00	3.28E+00	GA
PB-214	N	1.7952E-01						5.84E+05	
			351.93	1.598E-01	(	8.964E-02	2.56E+01	3.76E+01	G
			295.09	2.179E-01	(	1.205E-01	2.26E+01	1.93E+01	G
			242.00	0.000E+00	%	2.355E-01	6.28E+01	7.43E+00	GA
BI-214	N	2.4358E-01						5.84E+05	
			609.31	2.436E-01	*(	9.350E-02	1.79E+01	4.61E+01	G
			1120.29	6.766E-01	+	2.904E-01	2.32E+01	1.51E+01	G
			1764.49	5.372E-01	+	2.322E-01	2.25E+01	1.54E+01	G
TH-234	N	2.7912E+00						1.63E+12	
			63.29	2.791E+00	(	6.845E-01	1.09E+01	3.81E+00	G
			92.59	1.815E+00	-	3.591E-01	9.25E+00	5.58E+00	G
U-235	N	2.1605E-01						2.57E+11	
			185.72	1.016E-01	}	3.799E-02	1.21E+01	5.40E+01	GA
			143.79	2.160E-01	*(	1.608E-01	2.98E+01	1.10E+01	G
			205.33	0.000E+00		3.729E-02	0.00E+00	5.01E+00	G
			163.38	0.000E+00		3.301E-02	0.00E+00	5.08E+00	G
AM-241	T	9.9502E-02						1.58E+05	
			59.54	9.950E-02	?(	6.249E-02	2.25E+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:
T - Thermal Neutron Activation

Peak Codes:
G - Gamma Ray

F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	3.5041E-01		
NA-22	<	5.6681E-02		
K-40	#	1.2351E+00	1.9769E+01%	4.568E-01
Sc-46	<	2.0271E-02		
CR-51	<	1.4129E-01		
MN-54	<	3.9710E-02		
FE-59	<	4.2444E-02		
Co-56	<	4.7094E-02		
CO-57	<	1.4836E-02		
CO-58	<	1.8024E-02		
CO-60	<	4.8356E-02		
ZN-65	<	6.7915E-02		
NB-94	<	4.3284E-02		
ZR-95	<	3.1645E-02		
NB-95	<	5.3655E-02		
RU-103	<	3.1372E-02		
RH-106	<	4.0354E-01		
AG-108M	<	2.4609E-02		
AG-110M	<	5.9120E-02		
SN-113	<	1.9667E-02		
SB-124	<	3.8283E-02		
SB-125	<	4.8930E-02		
I-131	<	1.7306E-02		
BA-133	<	3.4847E-02		
CS-134	<	3.5518E-02		
CS-137		7.4079E-02	2.4258E+01%	4.216E-02
CE-139	<	2.2229E-02		
Ba-140	<	1.6888E-01		
La-140	<	2.1565E-02		

CE-141	<	2.7267E-02		
CE-144	<	1.5985E-01		
PM-144	<	5.0198E-02		
EU-152	<	9.1825E-02		
EU-154	<	3.3832E-01		
EU-155	<	7.4813E-02		
HF-181	<	1.7908E-02		
Ta-182	<	1.2830E-01		
Hg-203	<	2.2247E-02		
TL-208	<	4.5233E-02		
pm-146	<	5.3468E-02		
y-88	<	4.6158E-02		
PB-210		3.2853E+00	1.1085E+01%	8.587E-01
PB-212		8.9494E-02	2.3671E+01%	4.988E-02
PB-214		1.7952E-01	1.7093E+01%	8.964E-02
BI-207	<	4.0047E-02		
BI-212	<	5.0125E-01		
BI-214		2.4358E-01	1.7945E+01%	9.350E-02
BI-210M	<	3.7910E-02		
RA-224	<	2.5669E-01		
AC-228	<	1.4595E-01		
TH-227	<	8.0748E-02		
TH-229	<	3.6918E-01		
TH-234		2.7912E+00	1.0891E+01%	6.845E-01
PA-231	<	7.2765E-01		
PA-233	<	5.5682E-02		
PA-234	<	5.6471E-02		
PA-234M	<	7.8653E+00		
Ra-226	<	7.4283E-01		
U-235		2.1605E-01	2.9757E+01%	1.608E-01
AM-241	#	9.9502E-02	2.2535E+01%	6.249E-02
Np-237	<	1.2579E-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 (205.2 to 2000.8 keV) 8.214E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 7_20140502006_BGLong
Acquired: 5/2/2014 6:11:20 PM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.29	1.40	1.45	PASS

Analyst: April Bean Reviewer: Siobhan Perry

TestAmerica Spectrum name: 7_20140502006_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det7\7_20140502006_BGLong.An1

Acquisition information
Start time:	5/2/2014 6:11:20 PM
Live time:	43200
Real time:	43855
Dead time:	1.49 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_QC.Clb
Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica Spectrum name: 7_20140502006_BGLong.An1

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. 15 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. DPS	Nuc
46.43	444.	10.60	1.05	8.086E-02	46.54	4.250	2.979E+00	PB210
63.26	466.	9.56	0.94	1.228E-01	63.29	3.810	2.303E+00	TH234
92.58	572.	8.83	1.12	1.861E-01	92.59	5.584	1.274E+00	TH234
					93.35	5.561	1.278E+00	AC228
185.57	348.	12.70	1.24	1.634E-01	185.72	54.000	9.143E-02	U235
					185.99	3.280	1.506E+00	Ra226
238.51	149.	20.02	1.08	1.417E-01	238.63	43.300	5.622E-02	PB212
1001.21	42.	29.41	0.68	2.864E-02	1001.00	0.837	4.104E+00	PA234M
1461.44	83.	20.62	0.31	1.997E-02	1460.83	10.670	9.018E-01	K40

No unknown peaks passed sensitivity test.

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	185.09	46.38	348.	426.	0.010	9.52	1.041s
TH-234	252.59	63.26	413.	466.	0.011	9.56	0.938s
TH-234	369.91	92.58	475.	572.	0.013	8.83	1.115s
Ra-226	741.90	185.57	345.	348.	0.008	12.70	1.245s
PB-212	953.67	238.51	234.	149.	0.003	20.02	1.084s
PA-234M	4004.60	1001.21	32.	42.	0.001	29.41	0.678s
K-40	5845.44	1461.44	30.	83.	0.002	20.62	0.312s

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	9.0185E-01				4.66E+11			
			1460.83	9.018E-01	@(	3.068E-01	2.06E+01	1.07E+01	G
PB-210	N	2.8569E+00				8.14E+03			
			46.54	2.857E+00	*(	6.015E-01	9.52E+00	4.25E+00	G
PB-212	N	5.6215E-02				6.98E+02			
			238.63	5.622E-02	(	2.792E-02	2.00E+01	4.33E+01	G
			300.03	0.000E+00		4.460E-02	0.00E+00	3.28E+00	GA
TH-234	N	2.3030E+00				1.63E+12			
			63.29	2.303E+00	@(	4.819E-01	9.56E+00	3.81E+00	G
			92.59	1.274E+00	-	2.323E-01	8.83E+00	5.58E+00	G
PA-234M	N	4.1042E+00				1.63E+12			
			1001.00	4.104E+00	?(	2.827E+00	2.94E+01	8.37E-01	G
			766.41	0.000E+00	%	8.021E+00	3.39E+01	2.94E-01	G
Ra-226		1.5063E+00				5.84E+05			
			185.99	1.506E+00	@(	3.858E-01	1.27E+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:
T - Thermal Neutron Activation
F - Fast Neutron Activation

Peak Codes:
G - Gamma Ray
X - X-Ray

I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	7.3545E-02		
NA-22	<	2.7106E-02		
K-40	#	9.0185E-01	2.0623E+01%	3.068E-01
Sc-46	<	3.6147E-02		
CR-51	<	1.5990E-01		
MN-54	<	3.4859E-02		
FE-59	<	4.6546E-02		
Co-56	<	3.2987E-02		
CO-57	<	1.1328E-02		
CO-58	<	9.4277E-03		
CO-60	<	1.7310E-02		
ZN-65	<	1.9340E-02		
NB-94	<	3.2919E-02		
ZR-95	<	4.7239E-02		
NB-95	<	1.7075E-02		
RU-103	<	1.9993E-02		
RH-106	<	1.9219E-01		
AG-108M	<	1.7340E-02		
AG-110M	<	3.8823E-02		
SN-113	<	3.4077E-02		
SB-124	<	1.7987E-02		
SB-125	<	4.3279E-02		
I-131	<	1.6735E-02		
BA-133	<	2.4751E-02		
CS-134	<	2.1276E-02		
CS-137	<	3.6518E-02		
CE-139	<	6.4559E-03		
Ba-140	<	3.2826E-02		
La-140	<	1.2127E-02		
CE-141	<	1.0495E-02		

CE-144	<	7.7800E-02			
PM-144	<	2.8877E-02			
EU-152	<	2.6489E-02			
EU-154	<	2.2479E-01			
EU-155	<	4.1892E-02			
HF-181	<	9.6853E-03			
Ta-182	<	7.1624E-02			
Hg-203	<	1.4292E-02			
TL-208	<	3.2442E-02			
pm-146	<	4.4427E-02			
y-88	<	3.2083E-02			
PB-210	#	2.8569E+00	9.5226E+00%		6.015E-01
PB-212	#	5.6215E-02	2.0022E+01%		2.792E-02
PB-214	<	4.9383E-02			
BI-207	<	2.2698E-02			
BI-212	<	3.2167E-01			
BI-214	<	4.3445E-02			
BI-210M	<	2.5961E-02			
RA-224	<	3.1805E-01			
AC-228	<	1.1526E-01			
TH-227	<	6.0531E-02			
TH-229	<	2.7847E-01			
TH-234	#	2.3030E+00	9.5585E+00%		4.819E-01
PA-231	<	3.7246E-01			
PA-233	<	3.7039E-02			
PA-234	<	5.2512E-02			
PA-234M	#	4.1042E+00	2.9412E+01%		2.827E+00
Ra-226	#	1.5063E+00	1.2699E+01%		3.858E-01
U-235	<	9.1175E-02			
AM-241	<	4.1512E-02			
Np-237	<	8.3673E-02			

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 1.173E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 9_20140502003_BGLong
Acquired: 5/2/2014 5:57:37 PM
Detector: Ge9 S/N100228730
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	1.82	2.14	2.26	PASS

Analyst: April Bean Reviewer: Siobhan Perry

TestAmerica, Inc Spectrum name: 9_20140502003_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det9\9_20140502003_BGLong.An1

Acquisition information
Start time: 5/2/2014 5:57:37 PM
Live time: 43200
Real time: 43266
Dead time: 0.15 %
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 G53W4.25
Start channel: 150 (37.59keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 14 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.3616

***** 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
295.54	136.	25.96	0.73	1.045E-01	295.09	19.300	1.554E-01	PB214
352.03	208.	18.06	1.29	8.640E-02	351.93	37.600	1.481E-01	PB214
510.85	1265.	5.27	2.40	6.210E-02	511.86	20.000	2.362E+00	RH106
609.15	275.	16.38	1.25	5.260E-02	609.31	46.090	2.625E-01	BI214
					610.30	5.750	2.108E+00	RU103
1120.13	63.	25.64	0.57	2.761E-02	1120.29	15.100	3.479E-01	BI214
					1120.55	99.987	5.255E-02	Sc46
1460.82	198.	9.73	2.08	2.339E-02	1460.83	10.670	1.833E+00	K40
1764.17	63.	19.92	1.01	2.159E-02	1764.49	15.400	4.385E-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	
2042.76	510.85	467.	1265.	2.038E+04	5.27	2.403	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-214	1181.55	295.54	301.	136.	0.003	25.96	0.731s
PB-214	1407.48	352.03	288.	208.	0.005	18.06	1.288s
BI-214	2435.95	609.15	284.	275.	0.006	16.38	1.254s
BI-214	4480.42	1120.13	53.	63.	0.001	25.64	0.573s
K-40	5843.98	1460.82	33.	198.	0.005	9.73	2.081
BI-214	7058.38	1764.17	21.	63.	0.001	19.92	1.015s

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	1.8332E+00				4.66E+11		
			1460.83	1.833E+00	(	2.747E-01	9.73E+00 1.07E+01	G
PB-214	N	1.5058E-01				5.84E+05		
			351.93	1.481E-01	*(	5.830E-02	1.81E+01 3.76E+01	G
			295.09	1.554E-01	(	9.578E-02	2.60E+01 1.93E+01	G
			242.00	0.000E+00	%	2.053E-01	1.13E+02 7.43E+00	GA
BI-214	N	2.8359E-01				5.84E+05		
			609.31	2.625E-01	@(	7.762E-02	1.64E+01 4.61E+01	G
			1120.29	3.479E-01	?(	2.040E-01	2.56E+01 1.51E+01	G
			1764.49	4.385E-01	+	1.675E-01	1.99E+01 1.54E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.

P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	< 1.7676E-01		
NA-22	< 3.2890E-02		
K-40	1.8332E+00	9.7298E+00%	2.747E-01
Sc-46	< 2.1852E-02		
CR-51	< 1.6533E-01		
MN-54	< 3.5245E-02		
FE-59	< 3.8142E-02		
Co-56	< 1.4668E-02		
CO-57	< 9.6996E-03		
CO-58	< 1.3011E-02		
CO-60	< 3.1549E-02		
ZN-65	< 9.0564E-02		
NB-94	< 1.3769E-02		
ZR-95	< 2.4476E-02		
NB-95	< 1.2951E-02		
RU-103	< 1.9419E-02		
RH-106	< 2.9448E-01		
AG-108M	< 2.0472E-02		
AG-110M	< 4.6971E-02		
SN-113	< 3.4670E-02		
SB-124	< 3.8674E-02		
SB-125	< 5.7287E-02		
I-131	< 3.5389E-02		
BA-133	< 2.7272E-02		

CS-134	<	1.9498E-02			
CS-137	<	3.9129E-02			
CE-139	<	1.6604E-02			
Ba-140	<	1.2200E-01			
La-140	<	2.5295E-02			
CE-141	<	3.0749E-02			
CE-144	<	1.0448E-01			
PM-144	<	2.4457E-02			
EU-152	<	8.1343E-02			
EU-154	<	1.1947E-01			
EU-155	<	7.0925E-02			
HF-181	<	1.1319E-02			
Ta-182	<	1.2714E-01			
Hg-203	<	1.7629E-02			
TL-208	<	3.6368E-02			
pm-146	<	8.9440E-02			
y-88	<	4.4592E-02			
PB-210	<	6.5643E-01			
PB-212	<	4.5291E-02			
PB-214		1.5058E-01	1.5812E+01%		5.830E-02
BI-207	<	3.1131E-02			
BI-212	<	1.7176E-01			
BI-214	#	2.8359E-01	1.5214E+01%		7.762E-02
BI-210M	<	3.7125E-02			
RA-224	<	4.0281E-01			
AC-228	<	1.8008E-01			
TH-227	<	9.5188E-02			
TH-229	<	3.2053E-01			
TH-234	<	2.7873E-01			
PA-231	<	6.9572E-01			
PA-233	<	2.3943E-02			
PA-234	<	7.1011E-02			
PA-234M	<	4.7374E+00			
Ra-226	<	4.8009E-01			
U-235	<	1.3466E-01			
AM-241	<	4.6593E-02			
Np-237	<	1.0130E-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	1999.3 keV)	2.267E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 11_20140502005_BGLong
Acquired: 5/2/2014 6:15:44 PM
Detector: Ge11 S/N09363993
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	2.13	2.00	2.04	2.18	2.21	2.25	PASS

Analyst: April Bean Reviewer: Siobhan Perry

TestAmerica, Inc Spectrum name: 11_20140502005_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det11\11_20140502005_BGLong.An1

Acquisition information
Start time: 5/2/2014 6:15:44 PM
Live time: 43200
Real time: 46987
Dead time: 8.06 %
Detector ID: 11

Detector system
Ge11 S/N09363993

Calibration
Filename: 11_QC.Clb
11_QC-G_092511

Energy Calibration
Created: 2/28/2012 1:09:34 PM
Zero offset: 0.055 keV
Gain: 0.250 keV/channel
Quadratic: -2.946E-08 keV/channel^2

Efficiency Calibration
Created: 10/4/2011 1:15:19 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 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.47keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	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. 24 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0978

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
39.68	178.	24.47	0.99	5.488E-02				
46.65	617.	8.77	0.94	6.417E-02	46.54	4.250	5.246E+00	PB210
63.33	500.	11.65	0.74	8.641E-02	63.29	3.810	3.521E+00	TH234
72.69	147.	25.03	0.92	9.888E-02				
74.98	460.	9.13	0.93	1.019E-01				
77.19	242.	15.83	0.93	1.049E-01				
84.61	259.	13.98	0.94	1.149E-01				
87.41	136.	23.42	0.94	1.187E-01				
92.70	735.	8.07	1.16	1.199E-01	92.59	5.584	2.541E+00	TH234
					93.35	5.561	2.549E+00	AC228
185.76	426.	12.87	1.07	1.054E-01	185.72	54.000	1.733E-01	U235
					185.99	3.280	2.855E+00	Ra226
238.65	332.	12.37	0.91	9.259E-02	238.63	43.300	1.917E-01	PB212
294.93	218.	21.53	1.05	7.891E-02	295.09	19.300	3.315E-01	PB214
351.68	280.	16.11	1.42	6.511E-02	351.93	37.600	2.645E-01	PB214
583.31	171.	15.22	1.49	4.159E-02	583.02	84.500	1.129E-01	TL208
609.42	330.	12.75	1.35	3.969E-02	609.31	46.090	4.175E-01	BI214
					610.30	5.750	3.353E+00	RU103
1120.32	110.	17.87	1.05	2.116E-02	1120.29	15.100	7.944E-01	BI214
					1121.30	34.900	3.440E-01	Ta182
1460.97	265.	10.46	1.74	1.711E-02	1460.83	10.670	3.360E+00	K40
1764.64	117.	14.42	1.56	1.467E-02	1764.49	15.400	1.203E+00	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
158.42	39.68	540.	178.	3.234E+03	24.47	0.986	-	
290.35	72.68	608.	147.	1.492E+03	25.03	0.925	-	D
299.50	74.97	651.	460.	4.510E+03	9.13	0.927	-	D
308.36	77.19	610.	242.	2.303E+03	15.83	0.929	-	D
338.50	84.73	533.	291.	2.532E+03	15.29	1.046	-	sM
349.69	87.53	370.	118.	9.901E+02	27.50	0.812	-	M

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.26	46.65	629.	617.	0.014	8.77	0.944
TH-234	252.93	63.33	756.	500.	0.012	11.65	0.743
TH-234	370.36	92.70	696.	735.	0.017	8.07	1.163s
Ra-226	742.41	185.76	597.	426.	0.010	12.87	1.074s
PB-212	953.87	238.65	406.	332.	0.008	12.37	0.914
PB-214	1180.08	295.23	338.	158.	0.004	23.09	1.014
PB-214	1405.81	351.68	388.	280.	0.006	16.11	1.415s
TL-208	2332.14	583.31	139.	171.	0.004	15.22	1.490
BI-214	2436.56	609.42	288.	330.	0.008	12.75	1.353
BI-214	4480.50	1120.32	63.	110.	0.003	17.87	1.052s
K-40	5843.90	1460.97	72.	265.	0.006	10.46	1.741
BI-214	7059.62	1764.64	27.	117.	0.003	14.42	1.565s

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	3.3599E+00					4.66E+11		
			1460.83	3.360E+00	(	5.357E-01	1.05E+01	1.07E+01	G
TL-208	N	1.1285E-01					6.98E+02		
			583.02	1.129E-01	(	3.793E-02	1.52E+01	8.45E+01	G
			277.28	0.000E+00		3.250E-02	0.00E+00	6.31E+00	G
			860.56	0.000E+00		5.093E-02	0.00E+00	1.24E+01	G
PB-210	N	5.2464E+00					8.14E+03		
			46.54	5.246E+00	(	1.018E+00	8.77E+00	4.25E+00	G

Nuclide		Ave activity	Energy	Activity	Code	Peak MDA	Comments
PB-212	N	1.9168E-01				6.98E+02	
			238.63	1.917E-01	(5.578E-02	1.24E+01	4.33E+01 G
			300.03	0.000E+00	6.697E-02	0.00E+00	3.28E+00 GA
PB-214	N	2.5656E-01				5.84E+05	
			351.93	2.645E-01	(8.950E-02	1.61E+01	3.76E+01 G
			295.09	2.410E-01	?(1.343E-01	2.31E+01	1.93E+01 G
			242.00	0.000E+00	% 3.065E-01	5.83E+01	7.43E+00 GA
BI-214	N	4.1753E-01				5.84E+05	
			609.31	4.175E-01	(1.035E-01	1.27E+01	4.61E+01 G
			1120.29	7.944E-01	+ 2.883E-01	1.79E+01	1.51E+01 G
			1764.49	1.203E+00	+ 2.744E-01	1.44E+01	1.54E+01 G
TH-234	N	3.5214E+00				1.63E+12	
			63.29	3.521E+00	(9.209E-01	1.17E+01	3.81E+00 G
			92.59	2.541E+00	- 4.344E-01	8.07E+00	5.58E+00 G
Ra-226		2.8548E+00				5.84E+05	
			185.99	2.855E+00	*(7.804E-01	1.29E+01	3.28E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	< 3.1848E-01		
NA-22	< 6.7477E-02		
K-40	3.3599E+00	1.0464E+01%	5.357E-01
Sc-46	< 4.9040E-02		
CR-51	< 1.4449E-01		
MN-54	< 4.5796E-02		
FE-59	< 1.2065E-01		
Co-56	< 4.5308E-02		
CO-57	< 1.0528E-02		
CO-58	< 3.7964E-02		
CO-60	< 2.0277E-02		
ZN-65	< 7.3129E-02		
NB-94	< 5.9900E-02		
ZR-95	< 2.7061E-02		
NB-95	< 2.3900E-02		
RU-103	< 4.0630E-02		
RH-106	< 3.9723E-01		
AG-108M	< 2.0787E-02		
AG-110M	< 2.2351E-02		
SN-113	< 4.9889E-02		
SB-124	< 1.7987E-02		
SB-125	< 1.0456E-01		
I-131	< 1.8670E-02		
BA-133	< 3.5365E-02		
CS-134	< 4.6034E-02		
CS-137	< 5.4202E-02		
CE-139	< 2.2712E-02		
Ba-140	< 1.1720E-01		
La-140	< 6.0124E-02		
CE-141	< 3.7665E-02		
CE-144	< 1.5000E-01		
PM-144	< 4.3924E-02		
EU-152	< 5.5162E-02		
EU-154	< 3.7801E-01		
EU-155	< 6.0906E-02		

HF-181	<	4.1891E-02			
Ta-182	<	1.1289E-01			
Hg-203	<	2.4509E-02			
TL-208		1.1285E-01	1.5217E+01%		3.793E-02
pm-146	<	9.5325E-02			
y-88	<	5.8781E-02			
PB-210		5.2464E+00	8.7691E+00%		1.018E+00
PB-212		1.9168E-01	1.2365E+01%		5.578E-02
PB-214		2.5656E-01	1.4079E+01%		8.950E-02
BI-207	<	3.6596E-02			
BI-212	<	6.3182E-01			
BI-214		4.1753E-01	1.2749E+01%		1.035E-01
BI-210M	<	4.8132E-02			
RA-224	<	5.7908E-01			
AC-228	<	2.1553E-01			
TH-227	<	1.5389E-01			
TH-229	<	4.5978E-01			
TH-234		3.5214E+00	1.1651E+01%		9.209E-01
PA-231	<	6.9674E-01			
PA-233	<	7.4370E-02			
PA-234	<	1.0047E-01			
PA-234M	<	8.6091E+00			
Ra-226	#	2.8548E+00	1.2873E+01%		7.804E-01
U-235	<	1.6954E-01			
AM-241	<	8.5315E-02			
Np-237	<	1.9954E-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 (84.6 to 1999.5 keV) 1.596E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 12_20140502005_BGLong
Acquired: 5/2/2014 6:16:42 PM
Detector: Ge12 S/N10034336
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	2.16	1.95	2.02	2.14	2.29	2.36	PASS

Analyst: April Bean Reviewer: Siobhan Perry

TestAmerica, Inc Spectrum name: 12_20140502005_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det12\12_20140502005_BGLong.An1

Acquisition information
Start time: 5/2/2014 6:16:42 PM
Live time: 43200
Real time: 43302
Dead time: 0.24 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_QC.Clb
12_QC-H_83725-334_060211

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 6/3/2011 6:41:14 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 20 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.2053

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.56	774.	7.62	1.12	6.300E-02	46.54	4.250	6.699E+00	PB210
63.31	438.	13.37	1.10	8.571E-02	63.29	3.810	3.106E+00	TH234
74.85	183.	20.74	0.92	1.012E-01				
77.29	139.	25.89	0.92	1.045E-01				
92.65	676.	7.34	1.20	1.198E-01	92.59	5.584	2.340E+00	TH234
185.64	444.	13.16	1.25	1.068E-01	185.72	54.000	1.784E-01	U235
					185.99	3.280	2.939E+00	Ra226
238.38	365.	12.89	1.00	9.400E-02	238.63	43.300	2.077E-01	PB212
294.93	212.	21.66	0.86	8.027E-02	295.09	19.300	3.175E-01	PB214
351.89	318.	12.82	1.63	6.651E-02	351.93	37.600	2.944E-01	PB214
510.77	1208.	5.01	2.42	4.821E-02	511.86	20.000	2.906E+00	RH106
583.02	160.	17.60	1.67	4.296E-02	583.02	84.500	1.018E-01	TL208
609.30	213.	20.27	0.78	4.104E-02	609.31	46.090	2.604E-01	BI214
911.04	110.	24.99	1.50	2.567E-02	911.16	29.000	3.420E-01	AC228
1001.14	63.	25.73	0.82	2.403E-02	1001.00	0.837	7.289E+00	PA234M
1119.91	75.	27.50	1.59	2.185E-02	1120.29	15.100	5.274E-01	BI214
1460.36	119.	13.98	2.19	1.768E-02	1460.83	10.670	1.465E+00	K40
1763.90	75.	17.77	0.55	1.522E-02	1764.49	15.400	7.408E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.50	74.74	730.	208.	2.054E+03	24.15	0.978	-	
308.26	77.18	515.	141.	1.349E+03	27.60	0.730	-	
2041.68	510.77	420.	1208.	2.507E+04	5.01	2.420	-	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	185.86	46.56	706.	774.	0.018	7.62	1.122s
TH-234	252.83	63.31	816.	438.	0.010	13.37	1.104s
TH-234	369.85	92.59	678.	524.	0.012	8.27	0.933D
Ra-226	741.76	185.64	687.	444.	0.010	13.16	1.247s
PB-212	952.61	238.38	504.	365.	0.008	12.89	0.996
PB-214	1178.67	294.93	424.	212.	0.005	21.66	0.861s
PB-214	1406.37	351.89	310.	318.	0.007	12.82	1.633s
TL-208	2330.62	583.02	164.	160.	0.004	17.60	1.668s
BI-214	2435.70	609.30	341.	213.	0.005	20.27	0.780s
AC-228	3642.70	911.04	125.	110.	0.003	24.99	1.496s
PA-234M	4003.19	1001.14	61.	63.	0.001	25.73	0.815s
BI-214	4478.50	1119.91	73.	75.	0.002	27.50	1.588
K-40	5841.24	1460.36	37.	119.	0.003	13.98	2.191
BI-214	7056.77	1763.90	22.	75.	0.002	17.77	0.549s

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	1.4646E+00				4.66E+11		
			1460.83	1.465E+00 ?(		3.796E-01	1.40E+01 1.07E+01	G
TL-208	N	1.0182E-01				6.98E+02		
			583.02	1.018E-01 (		3.982E-02	1.76E+01 8.45E+01	G
			277.28	0.000E+00		3.197E-02	0.00E+00 6.31E+00	G
			860.56	0.000E+00		4.958E-02	0.00E+00 1.24E+01	G
PB-210	N	6.6986E+00				8.14E+03		
			46.54	6.699E+00 *(		1.094E+00	7.62E+00 4.25E+00	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	2.0772E-01					6.98E+02	
			238.63	2.077E-01	(	6.108E-02	1.29E+01	4.33E+01 G
			300.03	0.000E+00		6.578E-02	0.00E+00	3.28E+00 GA
PB-214	N	3.0222E-01					5.84E+05	
			351.93	2.944E-01	*(	7.846E-02	1.28E+01	3.76E+01 G
			295.09	3.175E-01	(	1.473E-01	2.17E+01	1.93E+01 G
			242.00	0.000E+00	&	2.684E-01	5.80E+01	7.43E+00 GA
BI-214	N	2.6044E-01					5.84E+05	
			609.31	2.604E-01	(	1.086E-01	2.03E+01	4.61E+01 G
			1120.29	5.274E-01	+	2.980E-01	2.75E+01	1.51E+01 G
			1764.49	7.408E-01	+	2.427E-01	1.78E+01	1.54E+01 G
AC-228	N	3.4200E-01					2.10E+03	
			911.16	3.420E-01	@(	1.704E-01	2.50E+01	2.90E+01 G
			968.97	0.000E+00	%	2.746E-01	3.79E+01	1.75E+01 G
			338.32	0.000E+00	%	2.594E-01	3.27E+01	1.20E+01 G
			93.35	0.000E+00	%	5.074E-01	3.20E+01	5.56E+00 XA
TH-234	N	3.1060E+00					1.63E+12	
			63.29	3.106E+00	*(	9.632E-01	1.34E+01	3.81E+00 G
			92.59	1.813E+00	-	4.291E-01	8.27E+00	5.58E+00 G
PA-234M	N	7.2889E+00					1.63E+12	
			1001.00	7.289E+00	?(	4.489E+00	2.57E+01	8.37E-01 G
			766.41	0.000E+00	%	1.362E+01	3.32E+01	2.94E-01 G
Ra-226		2.9393E+00					5.84E+05	
			185.99	2.939E+00	*(	8.257E-01	1.32E+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.
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& - Calculated peak centroid is not close enough to the
    library energy centroid for positive identification.
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to be found directly.

Nuclide Codes:	Peak Codes:
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P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity DPS	Time of Count Uncertainty 1 Sigma Counting	MDA
BE-7	<	1.9179E-01		
NA-22	<	3.1975E-02		
K-40	#	1.4646E+00	1.3978E+01%	3.796E-01
Sc-46	<	2.6273E-02		
CR-51	<	2.2881E-01		
MN-54	<	3.6943E-02		
FE-59	<	8.7804E-02		
Co-56	<	4.4412E-02		
CO-57	<	2.0491E-02		
CO-58	<	2.0824E-02		
CO-60	<	4.5717E-02		
ZN-65	<	1.2308E-01		
NB-94	<	4.0583E-02		
ZR-95	<	3.4429E-02		
NB-95	<	3.6948E-02		
RU-103	<	3.9377E-02		
RH-106	<	4.8622E-01		
AG-108M	<	1.5126E-02		
AG-110M	<	7.0093E-02		
SN-113	<	2.8227E-02		
SB-124	<	1.9274E-02		
SB-125	<	4.5861E-02		
I-131	<	3.7601E-02		
BA-133	<	3.7041E-02		
CS-134	<	4.6637E-02		

CS-137	<	5.1482E-02		
CE-139	<	2.6489E-02		
Ba-140	<	1.6602E-01		
La-140	<	4.2544E-02		
CE-141	<	3.3048E-02		
CE-144	<	1.4650E-01		
PM-144	<	4.1847E-02		
EU-152	<	1.0275E-01		
EU-154	<	4.0406E-01		
EU-155	<	8.8847E-02		
HF-181	<	4.5720E-02		
Ta-182	<	1.0734E-01		
Hg-203	<	2.0829E-02		
TL-208	#	1.0182E-01	1.7599E+01%	3.982E-02
pm-146	<	6.3011E-02		
y-88	<	4.2070E-02		
PB-210	#	6.6986E+00	7.6155E+00%	1.094E+00
PB-212		2.0772E-01	1.2888E+01%	6.108E-02
PB-214	#	3.0222E-01	1.2584E+01%	7.846E-02
BI-207	<	3.3833E-02		
BI-212	<	4.6784E-01		
BI-214		2.6044E-01	2.0273E+01%	1.086E-01
BI-210M	<	4.3277E-02		
RA-224	<	4.5292E-01		
AC-228	#	3.4200E-01	2.4993E+01%	1.704E-01
TH-227	<	1.5433E-01		
TH-229	<	3.0277E-01		
TH-234		3.1060E+00	1.3371E+01%	9.632E-01
PA-231	<	4.2442E-01		
PA-233	<	6.0767E-02		
PA-234	<	1.1552E-01		
PA-234M	#	7.2889E+00	2.5730E+01%	4.489E+00
Ra-226	#	2.9393E+00	1.3161E+01%	8.257E-01
U-235	<	2.0875E-01		
AM-241	<	9.6635E-02		
Np-237	<	1.7369E-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 (133.7 to 1999.4 keV) 2.271E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 15_20140502004_BGLong
Acquired: 5/2/2014 6:12:41 PM
Detector: Ge15 SN/11012216
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	1.72	1.60	1.64	1.71	1.80	1.84	PASS

Analyst: April Bean Reviewer: Siobhan Perry

TestAmerica, Inc. Spectrum name: 15_20140502004_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det15\15_20140502004_BGLong.An1

Acquisition information
Start time: 5/2/2014 6:12:41 PM
Live time: 43200
Real time: 43214
Dead time: 0.03 %
Detector ID: 15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_20140502004_BGLong.An1
15_QC_83725-334_SOURCE F_2011

Energy Calibration
Created: 2/28/2012 4:29:17 PM
Zero offset: 0.044 keV
Gain: 0.250 keV/channel
Quadratic: -3.267E-08 keV/channel^2

Efficiency Calibration
Created: 8/2/2011 8:55:45 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 G53W4.25
Start channel: 150 (37.57keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	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. 22 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1841

***** 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
46.03	529.	9.45	0.93	5.991E-02	46.54	4.250	4.761E+00	PB210
62.98	471.	11.64	1.07	8.161E-02	63.29	3.810	3.489E+00	TH234
84.22	121.	29.97	0.98	1.090E-01				
92.35	660.	8.71	1.01	1.141E-01	92.59	5.584	2.395E+00	TH234
					93.35	5.561	2.403E+00	AC228
185.54	371.	13.17	1.04	9.785E-02	185.72	54.000	1.626E-01	U235
					185.99	3.280	2.679E+00	Ra226
238.26	245.	17.09	1.04	8.510E-02	238.63	43.300	1.542E-01	PB212
582.10	150.	19.21	1.32	3.411E-02	583.02	84.500	1.205E-01	TL208
609.36	181.	20.07	1.68	3.220E-02	609.31	46.090	2.826E-01	BI214
					610.30	5.750	2.270E+00	RU103
835.35	62.	28.94	0.44	2.270E-02	834.85	99.980	6.324E-02	MN54
1120.08	62.	26.92	1.40	1.693E-02	1120.29	15.100	5.613E-01	BI214
					1120.55	99.987	8.480E-02	Sc46
					1121.30	34.900	2.431E-01	Ta182
1460.26	75.	19.73	1.21	1.314E-02	1460.83	10.670	1.238E+00	K40
1764.33	69.	18.91	0.52	1.107E-02	1764.49	15.400	9.372E-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	
336.98	84.35	699.	191.	1.756E+03	27.42	0.572	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	183.82	46.03	539.	529.	0.012	9.45	0.927
TH-234	251.57	62.98	660.	471.	0.011	11.64	1.071s
TH-234	368.95	92.35	688.	660.	0.015	8.71	1.014s
Ra-226	741.47	185.54	504.	371.	0.009	13.17	1.035s
PB-212	952.23	238.26	394.	245.	0.006	17.09	1.039
TL-208	2327.12	582.10	136.	150.	0.003	19.21	1.319s
BI-214	2436.14	609.36	221.	181.	0.004	20.07	1.675
MN-54	3340.06	835.35	60.	62.	0.001	28.94	0.444s
BI-214	4479.26	1120.08	50.	62.	0.001	26.92	1.397s
K-40	5840.76	1460.26	36.	75.	0.002	19.73	1.209s
BI-214	7058.11	1764.33	16.	69.	0.002	18.91	0.516s

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	Peak MDA Value DPS	Peak COMMENTS
K-40	N	1.2384E+00				4.66E+11	
			1460.83	1.238E+00	(	5.064E-01 1.97E+01	1.07E+01 G
MN-54	C	6.3235E-02				3.12E+02	
			834.85	6.324E-02	?(	3.958E-02 2.89E+01	1.00E+02 G
TL-208	N	1.2047E-01				6.98E+02	
			583.02	1.205E-01	&(	4.582E-02 1.92E+01	8.45E+01 G
			277.28	0.000E+00	%	3.684E-01 8.96E+01	6.31E+00 G
			860.56	0.000E+00		6.285E-02 0.00E+00	1.24E+01 G
PB-210	N	4.7613E+00				8.14E+03	
			46.54	4.761E+00	&(	9.972E-01 9.45E+00	4.25E+00 G
PB-212	N	1.5417E-01				6.98E+02	
			238.63	1.542E-01	(	5.986E-02 1.71E+01	4.33E+01 G
			300.03	0.000E+00		7.413E-02 0.00E+00	3.28E+00 GA
BI-214	N	2.8258E-01				5.84E+05	
			609.31	2.826E-01	(	1.122E-01 2.01E+01	4.61E+01 G
			1120.29	5.613E-01	+	3.229E-01 2.69E+01	1.51E+01 G
			1764.49	9.372E-01	+	2.900E-01 1.89E+01	1.54E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	3.4886E+00					1.63E+12	
			63.29	3.489E+00	*(	9.072E-01	1.16E+01	3.81E+00 G
			92.59	2.395E+00	-	4.539E-01	8.71E+00	5.58E+00 G
Ra-226		2.6788E+00					5.84E+05	
			185.99	2.679E+00	*(	7.749E-01	1.32E+01	3.28E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity DPS	Time of Count Uncertainty 1 Sigma Counting	MDA
BE-7	<	2.8656E-01		
NA-22	<	4.2261E-02		
K-40		1.2384E+00	1.9732E+01%	5.064E-01
Sc-46	<	4.9437E-02		
CR-51	<	2.4638E-01		
MN-54	#	6.3235E-02	2.8943E+01%	3.958E-02
FE-59	<	3.3487E-02		
Co-56	<	3.7028E-02		
CO-57	<	2.1772E-02		
CO-58	<	3.1516E-02		
CO-60	<	6.2599E-02		
ZN-65	<	8.7378E-02		
NB-94	<	3.2578E-02		
ZR-95	<	9.3583E-02		
NB-95	<	3.8992E-02		
RU-103	<	2.9298E-02		
RH-106	<	4.1152E-01		
AG-108M	<	3.6439E-02		
AG-110M	<	5.6360E-02		
SN-113	<	5.1447E-02		
SB-124	<	4.9820E-02		
SB-125	<	8.9284E-02		
I-131	<	3.5185E-02		
BA-133	<	5.3515E-02		
CS-134	<	4.2875E-02		
CS-137	<	4.4174E-02		
CE-139	<	2.7697E-02		
Ba-140	<	1.5350E-01		
La-140	<	1.8474E-02		
CE-141	<	3.1594E-02		
CE-144	<	1.5405E-01		
PM-144	<	5.3532E-02		
EU-152	<	4.5618E-02		
EU-154	<	2.1619E-01		
EU-155	<	1.1342E-01		
HF-181	<	3.8459E-02		
Ta-182	<	1.1071E-01		
Hg-203	<	2.6963E-02		
TL-208	#	1.2047E-01	1.9206E+01%	4.582E-02
pm-146	<	1.3428E-01		
y-88	<	6.3887E-02		
PB-210		4.7613E+00	9.4542E+00%	9.972E-01
PB-212		1.5417E-01	1.7087E+01%	5.986E-02

PB-214	<	1.1176E-01			
BI-207	<	5.0166E-02			
BI-212	<	6.5481E-01			
BI-214		2.8258E-01	2.0071E+01%		1.122E-01
BI-210M	<	4.7295E-02			
RA-224	<	5.7634E-01			
AC-228	<	2.1195E-01			
TH-227	<	1.7073E-01			
TH-229	<	5.4051E-01			
TH-234	#	3.4886E+00	1.1636E+01%		9.072E-01
PA-231	<	3.8863E-01			
PA-233	<	5.9459E-02			
PA-234	<	1.2323E-01			
PA-234M	<	6.0155E+00			
Ra-226	#	2.6788E+00	1.3169E+01%		7.749E-01
U-235	<	1.9974E-01			
AM-241	<	8.9039E-02			
Np-237	<	1.9437E-01			

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

S U M M A R Y

Total Activity (37.6 to 1999.5 keV) 1.279E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 17_20140502006_BGLong
Acquired: 5/2/2014 6:13:22 PM
Detector: Ge17 SN/11080671
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	2.47	2.30	2.35	2.39	2.58	2.63	PASS

Analyst: April Bean Reviewer: Siobhan Perry

TestAmerica, Inc. Spectrum name: 17_20140502006_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det17\17_20140502006_BGLong.An1

Acquisition information
Start time: 5/2/2014 6:13:22 PM
Live time: 43200
Real time: 43336
Dead time: 0.31 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_QC.Clb
17_QC_83725-334_SOURCE H_042211

Energy Calibration
Created: 2/29/2012 10:33:23 AM
Zero offset: 0.108 keV
Gain: 0.250 keV/channel
Quadratic: -2.584E-08 keV/channel^2

Efficiency Calibration
Created: 5/1/2011 11:17:56 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.63keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	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. 22 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1896

***** 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
46.66	834.	5.75	0.76	5.956E-02	46.54	4.250	7.648E+00	PB210
63.33	617.	8.50	0.67	8.042E-02	63.29	3.810	4.665E+00	TH234
75.02	157.	24.91	0.80	9.511E-02				
84.73	188.	22.91	1.29	1.072E-01				
92.63	922.	6.07	1.00	1.119E-01	92.59	5.584	3.417E+00	TH234
					93.35	5.561	3.428E+00	AC228
143.61	178.	19.93	1.36	1.093E-01	143.79	10.960	3.432E-01	U235
163.70	136.	27.65	0.76	1.037E-01	163.38	5.080	5.972E-01	U235
185.55	446.	10.30	0.81	9.860E-02	185.72	54.000	1.942E-01	U235
238.48	289.	16.62	0.95	8.658E-02	238.63	43.300	1.783E-01	PB212
351.91	134.	26.43	0.85	6.081E-02	351.93	37.600	1.352E-01	PB214
510.81	1145.	5.38	2.40	4.374E-02	511.86	20.000	3.034E+00	RH106
583.16	162.	21.61	0.70	3.886E-02	583.02	84.500	1.138E-01	TL208
609.25	126.	22.28	1.10	3.710E-02	609.31	46.090	1.699E-01	BI214
					610.30	5.750	1.364E+00	RU103
1460.54	153.	12.69	1.08	1.608E-02	1460.83	10.670	2.068E+00	K40
1764.05	72.	26.57	1.00	1.381E-02	1764.49	15.400	7.838E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.70	75.07	668.	155.	1.626E+03	28.45	0.613	-	
338.30	84.73	625.	188.	1.754E+03	22.91	1.288	-	s
654.05	163.70	426.	136.	1.312E+03	27.65	0.763	-	sM
2042.14	510.81	454.	1145.	2.617E+04	5.38	2.401	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.12	46.66	519.	834.	0.019	5.75	0.764
TH-234	252.77	63.33	712.	617.	0.014	8.50	0.672
TH-234	369.89	92.63	700.	922.	0.021	6.07	0.998s
U-235	573.75	143.61	403.	178.	0.004	19.93	1.358s
U-235	742.10	185.72	526.	448.	0.010	8.40	0.809D
PB-212	953.06	238.48	549.	289.	0.007	16.62	0.946
PB-214	1406.64	351.91	318.	134.	0.003	26.43	0.854s
TL-208	2331.51	583.16	218.	162.	0.004	21.61	0.698s
BI-214	2435.87	609.25	188.	126.	0.003	22.28	1.096s
K-40	5842.08	1460.54	39.	153.	0.004	12.69	1.084s
BI-214	7057.09	1764.05	42.	72.	0.002	26.57	1.001s

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	2.0681E+00				4.66E+11		
			1460.83	2.068E+00	(	4.274E-01	1.27E+01	1.07E+01 G
TL-208	N	1.1382E-01				6.98E+02		
			583.02	1.138E-01	(	5.045E-02	2.16E+01	8.45E+01 G
			277.28	0.000E+00	%	3.486E-01	8.90E+01	6.31E+00 G
			860.56	0.000E+00		5.423E-02	0.00E+00	1.24E+01 G
PB-210	N	7.6481E+00				8.14E+03		
			46.54	7.648E+00	(	9.980E-01	5.75E+00	4.25E+00 G
PB-212	N	1.7832E-01				6.98E+02		
			238.63	1.783E-01	(	6.914E-02	1.66E+01	4.33E+01 G
			300.03	0.000E+00		7.165E-02	0.00E+00	3.28E+00 GA
PB-214	N	1.3517E-01				5.84E+05		
			351.93	1.352E-01	*(	8.682E-02	2.64E+01	3.76E+01 G
			295.09	0.000E+00	%	1.293E-01	3.14E+01	1.93E+01 G
			242.00	0.000E+00	&	3.364E-01	9.75E+01	7.43E+00 GA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-214	N 1.6990E-01					5.84E+05	
		609.31	1.699E-01	(	9.005E-02	2.23E+01	4.61E+01 G
		1120.29	0.000E+00		5.680E-02	0.00E+00	1.51E+01 G
		1764.49	7.838E-01	+	3.583E-01	2.66E+01	1.54E+01 G
TH-234	N 4.6646E+00					1.63E+12	
		63.29	4.665E+00	(	9.605E-01	8.50E+00	3.81E+00 G
		92.59	3.417E+00	-	4.668E-01	6.07E+00	5.58E+00 G
U-235	N 3.4320E-01					2.57E+11	
		185.72	1.948E-01	}	4.768E-02	8.40E+00	5.40E+01 GA
		143.79	3.432E-01	(	1.860E-01	1.99E+01	1.10E+01 G
		205.33	0.000E+00	%	4.105E-01	9.77E+01	5.01E+00 G
		163.38	0.000E+00		3.236E-02	0.00E+00	5.08E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
    negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
    failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
    library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
    to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	2.4686E-01		
NA-22	<	5.8952E-02		
K-40		2.0681E+00	1.2695E+01%	4.274E-01
Sc-46	<	1.9908E-02		
CR-51	<	2.7136E-01		
MN-54	<	5.1085E-02		
FE-59	<	4.4337E-02		
Co-56	<	2.0104E-02		
CO-57	<	1.9151E-02		
CO-58	<	4.4761E-02		
CO-60	<	2.7361E-02		
ZN-65	<	7.2001E-02		
NB-94	<	5.7539E-02		
ZR-95	<	5.4355E-02		
NB-95	<	4.0547E-02		
RU-103	<	3.9023E-02		
RH-106	<	3.4158E-01		
AG-108M	<	3.3746E-02		
AG-110M	<	7.4422E-02		
SN-113	<	4.6650E-02		
SB-124	<	4.3158E-02		
SB-125	<	1.2295E-01		
I-131	<	3.3625E-02		
BA-133	<	3.8981E-02		
CS-134	<	4.3596E-02		
CS-137	<	3.5923E-02		
CE-139	<	1.9652E-02		
Ba-140	<	1.8533E-01		
La-140	<	2.8091E-02		
CE-141	<	3.7969E-02		
CE-144	<	2.0113E-01		
PM-144	<	4.9940E-02		
EU-152	<	6.1269E-02		
EU-154	<	3.1501E-01		
EU-155	<	1.2650E-01		
HF-181	<	3.2470E-02		

Ta-182	<	2.4026E-01			
Hg-203	<	3.2619E-02			
TL-208		1.1382E-01	2.1606E+01%		5.045E-02
pm-146	<	1.0749E-01			
y-88	<	5.9896E-02			
PB-210		7.6481E+00	5.7545E+00%		9.980E-01
PB-212		1.7832E-01	1.6624E+01%		6.914E-02
PB-214	#	1.3517E-01	2.6428E+01%		8.682E-02
BI-207	<	3.9359E-02			
BI-212	<	2.7195E-01			
BI-214	#	1.6990E-01	2.2279E+01%		9.005E-02
BI-210M	<	4.3237E-02			
RA-224	<	6.3417E-01			
AC-228	<	1.8508E-01			
TH-227	<	1.7870E-01			
TH-229	<	2.7673E-01			
TH-234		4.6646E+00	8.5039E+00%		9.605E-01
PA-231	<	9.2375E-01			
PA-233	<	8.8369E-02			
PA-234	<	1.3896E-01			
PA-234M	<	8.0093E+00			
Ra-226	<	9.9112E-01			
U-235		3.4320E-01	1.9925E+01%		1.860E-01
AM-241	<	1.0150E-01			
Np-237	<	1.3986E-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 (205.2 to 1999.5 keV) 1.532E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 18_20140502003_BGLong
Acquired: 5/2/2014 5:58:59 PM
Detector: Ge18 SN/11164036
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	2.58	2.45	2.50	2.52	2.66	2.71	PASS

Analyst: April Bean Reviewer: Siobhan Perry

Test America Spectrum name: 18_20140502003_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det18\18_20140502003_BGLong.An1

Acquisition information
Start time: 5/2/2014 5:58:59 PM
Live time: 43200
Real time: 43381
Dead time: 0.42 %
Detector ID: 18

Detector system
Ge18 SN/11164036

Calibration
Filename: 18_QC.Clb
Ge18_QA Source E

Energy Calibration
Created: 3/1/2012 1:27:55 PM
Zero offset: 0.007 keV
Gain: 0.250 keV/channel
Quadratic: -3.202E-08 keV/channel^2

Efficiency Calibration
Created: 6/23/2011 2:02:37 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 G53W4.25
Start channel: 150 (37.54keV)
Stop channel: 8000 (1999.55keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	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: 0.0855

***** 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
46.68	644.	9.44	0.88	6.084E-02	46.54	4.250	5.783E+00	PB210
63.27	623.	11.70	1.14	8.302E-02	63.29	3.810	4.557E+00	TH234
74.86	166.	23.41	0.98	9.847E-02				
77.18	169.	25.88	0.98	1.016E-01				
92.57	871.	8.20	1.26	1.168E-01	92.59	5.584	3.090E+00	TH234
					93.35	5.561	3.099E+00	AC228
185.82	492.	8.34	1.09	1.039E-01	185.72	54.000	2.030E-01	U235
					185.99	3.280	3.343E+00	Ra226
238.64	370.	9.96	1.15	9.181E-02	238.63	43.300	2.152E-01	PB212
351.94	188.	20.99	0.50	6.597E-02	351.93	37.600	1.754E-01	PB214
582.90	190.	18.75	0.63	4.106E-02	583.02	84.500	1.265E-01	TL208
609.33	212.	16.40	1.19	3.888E-02	609.31	46.090	2.738E-01	BI214
					610.30	5.750	2.200E+00	RU103
1121.48	91.	27.60	1.76	2.107E-02	1120.29	15.100	6.620E-01	BI214
1461.18	167.	13.09	1.06	1.710E-02	1460.83	10.670	2.117E+00	K40
1764.80	83.	18.33	0.72	1.491E-02	1764.49	15.400	8.368E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.18	74.84	668.	166.	1.681E+03	23.41	0.977	-	D
308.45	77.15	876.	169.	1.667E+03	25.88	0.980	-	D
1406.86	351.94	357.	188.	2.850E+03	20.99	0.501	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.54	46.68	832.	644.	0.015	9.44	0.884
TH-234	252.87	63.27	1124.	623.	0.014	11.70	1.143s
TH-234	369.99	92.57	1102.	871.	0.020	8.20	1.258s
Ra-226	742.80	185.84	785.	456.	0.011	12.90	1.053
PB-212	953.81	238.62	615.	352.	0.008	15.06	1.135
TL-208	2330.40	582.90	222.	190.	0.004	18.75	0.631s
BI-214	2436.11	609.33	230.	212.	0.005	16.40	1.192
BI-214	4484.89	1121.48	90.	91.	0.002	27.60	1.760
K-40	5844.43	1461.18	53.	167.	0.004	13.09	1.059s
BI-214	7059.94	1764.80	27.	83.	0.002	18.33	0.716s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Activity DPS	Code	MDA Value DPS		COMMENTS
K-40	N	2.1170E+00				4.66E+11		
			1460.83	2.117E+00	(	4.656E-01	1.31E+01 1.07E+01	G
TL-208	N	1.2655E-01				6.98E+02		
			583.02	1.265E-01	(	4.817E-02	1.87E+01 8.45E+01	G
			277.28	0.000E+00	%	4.531E-01	1.17E+02 6.31E+00	G
			860.56	0.000E+00		5.074E-02	0.00E+00 1.24E+01	G
PB-210	N	5.7826E+00				8.14E+03		
			46.54	5.783E+00	(	1.231E+00	9.44E+00 4.25E+00	G
PB-212	N	2.0496E-01				6.98E+02		
			238.63	2.050E-01	(	6.887E-02	1.51E+01 4.33E+01	G
			300.03	0.000E+00		6.685E-02	0.00E+00 3.28E+00	GA
BI-214	N	2.7384E-01				5.84E+05		
			609.31	2.738E-01	(	9.479E-02	1.64E+01 4.61E+01	G
			1120.29	6.620E-01	&	3.413E-01	2.76E+01 1.51E+01	G
			1764.49	8.368E-01	+	2.714E-01	1.83E+01 1.54E+01	G
TH-234	N	4.5571E+00				1.63E+12		
			63.29	4.557E+00	(	1.163E+00	1.17E+01 3.81E+00	G
			92.59	3.090E+00	-	5.585E-01	8.20E+00 5.58E+00	G

Test America Spectrum name: 18_20140502003_BGLong.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ra-226	3.1010E+00					5.84E+05	
		185.99	3.101E+00	(	9.059E-01	1.29E+01	3.28E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity DPS	Time of Count Uncertainty 1 Sigma Counting	MDA
BE-7	<	2.2201E-01		
NA-22	<	3.9789E-02		
K-40		2.1170E+00	1.3091E+01%	4.656E-01
Sc-46	<	5.7481E-02		

CR-51	<	2.3335E-01		
MN-54	<	5.9055E-02		
FE-59	<	3.5912E-02		
Co-56	<	1.9772E-02		
CO-57	<	1.3163E-02		
CO-58	<	5.8013E-02		
CO-60	<	7.1482E-02		
ZN-65	<	1.3441E-01		
NB-94	<	4.8077E-02		
ZR-95	<	7.7469E-02		
NB-95	<	3.3811E-02		
RU-103	<	4.5839E-02		
RH-106	<	4.3175E-01		
AG-108M	<	3.7709E-02		
AG-110M	<	8.3721E-02		
SN-113	<	2.1371E-02		
SB-124	<	3.9184E-02		
SB-125	<	1.2841E-01		
I-131	<	3.5723E-02		
BA-133	<	4.0746E-02		
CS-134	<	3.5292E-02		
CS-137	<	3.8958E-02		
CE-139	<	2.9231E-02		
Ba-140	<	1.5333E-01		
La-140	<	4.0523E-02		
CE-141	<	4.1308E-02		
CE-144	<	1.5294E-01		
PM-144	<	2.3899E-02		
EU-152	<	8.4596E-02		
EU-154	<	3.1489E-01		
EU-155	<	1.2724E-01		
HF-181	<	2.7582E-02		
Ta-182	<	1.7333E-01		
Hg-203	<	2.8295E-02		
TL-208		1.2655E-01	1.8747E+01%	4.817E-02
pm-146	<	1.5811E-01		
y-88	<	6.1271E-02		
PB-210		5.7826E+00	9.4385E+00%	1.231E+00
PB-212		2.0496E-01	1.5065E+01%	6.887E-02
PB-214	<	1.0405E-01		
BI-207	<	4.4694E-02		
BI-212	<	6.4132E-01		
BI-214		2.7384E-01	1.6399E+01%	9.479E-02
BI-210M	<	4.8478E-02		
RA-224	<	6.8969E-01		
AC-228	<	2.0884E-01		
TH-227	<	2.0184E-01		
TH-229	<	6.8068E-01		
TH-234		4.5571E+00	1.1696E+01%	1.163E+00

PA-231	<	1.0224E+00			
PA-233	<	8.7458E-02			
PA-234	<	1.1691E-01			
PA-234M	<	7.8858E+00			
Ra-226		3.1010E+00	1.2904E+01%		9.059E-01
U-235	<	2.0688E-01			
AM-241	<	9.2390E-02			
Np-237	<	2.3070E-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 (84.3 to 1999.5 keV) 1.616E+01 DPS

Run Logs

Gamma Spectroscopy Run Log

Detector: GV4

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/30/12 13:58		IC 160-11761/1		11761			JLW
04/02/12 16:50		ICV 160-11761/2		11761			JLW
02/27/13 16:17		ACVTOP 160-38300/1		38300			JLW
05/02/14 17:55		ICB 160-119900/1		119900			SMP
05/21/14 00:00		CCV 160-123327/1		123327			
05/21/14 00:21		CCV 160-123327/2		123327			SMP
05/21/14 00:40		CCB 160-123327/3		123327			SMP
05/21/14 01:49	30	ZZZZZ		123327			
05/21/14 02:30	30	ZZZZZ		123327			
05/21/14 10:51	45	ZZZZZ		123327			
05/21/14 12:20	30	LCS 160-123290/2-A		123327	123290	GA-01-R	SMP
05/21/14 13:07	60	ZZZZZ		123327			
05/21/14 14:20	60	ZZZZZ		123327			
05/21/14 15:46	30	160-6694-5	2222-SD05	123327	123290	GA-01-R	SMP
05/21/14 18:07		TCCLBA 160-123322/1-A		123327			
05/21/14 18:37		TCCLBC 160-123322/3-A		123327			
05/21/14 19:00		TCCLBB 160-123322/2-A		123327			
05/21/14 19:19		ZZZZZ		123327			
05/21/14 19:34		ZZZZZ		123327			
05/21/14 19:45		ZZZZZ		123327			
05/21/14 19:58		ZZZZZ		123327			
05/21/14 20:20		ZZZZZ		123327			
05/21/14 20:34		ZZZZZ		123327			

Detector: GV5

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/26/12 15:05		IC 160-12297/1		12297			JLW
03/27/12 10:12		ICV 160-12297/2		12297			JLW
01/28/14 09:57		ACVTOP 160-101796/1		101796			JLW
05/02/14 17:56		ICB 160-119898/1		119898			SMP
05/21/14 00:00		CCV 160-123298/1		123298			
05/21/14 00:21		CCV 160-123298/2		123298			SMP
05/21/14 00:40		CCB 160-123298/3		123298			SMP
05/21/14 01:49	30	ZZZZZ		123298			
05/21/14 02:30		ZZZZZ		123298			
05/21/14 10:50	45	ZZZZZ		123298			
05/21/14 12:20	30	MB 160-123290/1-A		123298	123290	GA-01-R	SMP
05/21/14 13:07	60	ZZZZZ		123298			
05/21/14 14:57	60	ZZZZZ		123298			
05/21/14 18:07		TCCLBB 160-123322/2-A		123298			
05/21/14 18:36		TCCLBA 160-123322/1-A		123298			
05/21/14 18:59		TCCLBC 160-123322/3-A		123298			
05/21/14 19:17		ZZZZZ		123298			
05/21/14 19:33		ZZZZZ		123298			
05/21/14 19:45		ZZZZZ		123298			
05/21/14 19:57		ZZZZZ		123298			

Gamma Spectroscopy Run Log

Detector: GV5 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/21/14 20:20		ZZZZZ		123298			

Detector: GV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/26/12 06:37		IC 160-12306/1		12306			JLW
03/27/12 08:10		IC 160-12302/1		12302			JLW
03/27/12 15:25		ICV 160-12302/2		12302			JLW
04/02/12 14:43		ICV 160-12306/2		12306			JLW
01/27/14 15:16		ACVRAP 160-101588/1		101588			JLW
01/28/14 18:43		ACVTOP 160-101797/1		101797			JLW
05/02/14 18:11		ICB 160-119899/1		119899			SMP
05/20/14 00:01		CCV 160-123127/1		123127			
05/20/14 00:22		CCV 160-123127/2		123127			
05/20/14 00:43		CCB 160-123127/3		123127			SMP
05/20/14 01:24		CCV 160-123127/4		123127			
05/20/14 01:44		CCV 160-123127/5		123127			SMP
05/20/14 09:46	30	ZZZZZ		123127			
05/20/14 10:45	30	ZZZZZ		123127			
05/20/14 11:25	30	ZZZZZ		123127			
05/20/14 12:35	30	ZZZZZ		123127			
05/20/14 13:25	30	ZZZZZ		123127			
05/20/14 14:29	30	ZZZZZ		123127			
05/20/14 15:18	60	MB 160-122895/1-A		123127	122895	GA-01-R	SMP
05/20/14 17:39	60	ZZZZZ		123127			
05/20/14 18:57	60	ZZZZZ		123127			
05/20/14 20:19	60	ZZZZZ		123127			
05/20/14 21:28	30	ZZZZZ		123127			
05/20/14 22:27	45	ZZZZZ		123127			
05/21/14 00:01		CCV 160-123299/1		123299			
05/21/14 00:22		CCV 160-123299/2		123299			SMP
05/21/14 00:40		CCB 160-123299/3		123299			SMP
05/21/14 01:49	30	ZZZZZ		123299			
05/21/14 02:30		ZZZZZ		123299			
05/21/14 10:49	30	ZZZZZ		123299			
05/21/14 12:11	60	ZZZZZ		123299			
05/21/14 13:45	60	ZZZZZ		123299			
05/21/14 15:45	30	160-6694-6	2222-SD06	123299	123290	GA-01-R	SMP
05/21/14 18:08		TCCLBC 160-123322/3-A		123299			
05/21/14 18:38		TCCLBB 160-123322/2-A		123299			
05/21/14 19:00		TCCLBA 160-123322/1-A		123299			
05/21/14 19:18		ZZZZZ		123299			
05/21/14 19:34		ZZZZZ		123299			
05/21/14 19:46		ZZZZZ		123299			
05/21/14 19:58		ZZZZZ		123299			
05/21/14 20:21		ZZZZZ		123299			

Gamma Spectroscopy Run Log

Detector: GV9

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/03/12 13:37		IC 160-12326/1		12326			JLW
06/14/12 10:54		ICV 160-12326/2		12326			JLW
01/27/14 09:57		ACVTOP 160-101591/1		101591			JLW
05/02/14 17:57		ICB 160-119903/1		119903			SMP
05/21/14 00:01		CCV 160-123245/1		123245			
05/21/14 00:24		CCV 160-123245/2		123245			SMP
05/21/14 00:45		CCB 160-123245/3		123245			SMP
05/21/14 01:46		ZZZZZ		123245			
05/21/14 02:26		ZZZZZ		123245			
05/21/14 10:45	30	ZZZZZ		123245			
05/21/14 12:08	45	ZZZZZ		123245			
05/21/14 13:06	60	ZZZZZ		123245			
05/21/14 14:28	30	160-6694-1 DU	2222-SD01 DU	123245	123290	GA-01-R	SMP
05/21/14 19:07	45	ZZZZZ		123245			
05/21/14 20:12	45	ZZZZZ		123245			

Detector: GV11

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/31/11 13:03		IC 160-45529/1		45529			JLW
11/10/11 02:13		ICV 160-45529/2		45529			JLW
01/27/14 09:59		ACVRAP 160-101594/1		101594			JLW
05/02/14 18:15		ICB 160-119908/1		119908			SMP
05/20/14 00:02		CCV 160-123145/1		123145			
05/20/14 00:25		CCV 160-123145/2		123145			SMP
05/20/14 00:45		CCB 160-123145/3		123145			SMP
05/20/14 09:56	30	ZZZZZ		123145			
05/20/14 10:42	45	ZZZZZ		123145			
05/20/14 11:46	30	ZZZZZ		123145			
05/20/14 12:31	30	ZZZZZ		123145			
05/20/14 13:40	30	ZZZZZ		123145			
05/20/14 14:26	30	ZZZZZ		123145			
05/20/14 15:11	60	LCS 160-122895/2-A		123145	122895	GA-01-R	SMP
05/20/14 17:38	60	ZZZZZ		123145			
05/20/14 18:54	60	ZZZZZ		123145			
05/20/14 20:16	60	ZZZZZ		123145			
05/20/14 21:25	45	ZZZZZ		123145			
05/20/14 22:22	30	ZZZZZ		123145			

Detector: GV12

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/26/12 11:38		IC 160-12342/1		12342			JLW
04/11/12 22:47		ICV 160-12342/2		12342			JLW
10/02/12 10:16		IC 160-13156/1		13156			JLW
10/04/12 09:10		ICV 160-13156/2		13156			JLW
01/27/14 12:08		ACVRAP 160-101592/1		101592			JLW
01/28/14 14:18		ACVTOP 160-101795/1		101795			JLW
05/02/14 18:16		ICB 160-119909/1		119909			SMP
05/20/14 00:03		CCV 160-123147/1		123147			
05/20/14 00:25		CCV 160-123147/2		123147			SMP
05/20/14 00:44		CCB 160-123147/3		123147			SMP
05/20/14 09:57	30	ZZZZZ		123147			

Gamma Spectroscopy Run Log

Detector: GV12 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/20/14 10:43	45	ZZZZZ		123147			
05/20/14 11:47	30	ZZZZZ		123147			
05/20/14 12:31	30	ZZZZZ		123147			
05/20/14 13:41	30	ZZZZZ		123147			
05/20/14 14:26	30	ZZZZZ		123147			
05/20/14 15:11	60	160-6694-7 DU	2222-RIN-01 DU	123147	122895	GA-01-R	SMP
05/20/14 17:39	60	ZZZZZ		123147			
05/20/14 18:56	60	ZZZZZ		123147			
05/20/14 20:18	60	ZZZZZ		123147			
05/20/14 21:26	45	ZZZZZ		123147			
05/20/14 22:23	45	ZZZZZ		123147			
05/21/14 00:03		CCV 160-123247/1		123247			
05/21/14 00:25		CCV 160-123247/2		123247			SMP
05/21/14 00:47		CCB 160-123247/3		123247			SMP
05/21/14 01:47	30	ZZZZZ		123247			
05/21/14 02:29		ZZZZZ		123247			
05/21/14 10:48	45	ZZZZZ		123247			
05/21/14 12:10	120	ZZZZZ		123247			
05/21/14 14:32	30	160-6694-2	2222-SD02	123247	123290	GA-01-R	SMP
05/21/14 15:55	60	ZZZZZ		123247			
05/21/14 19:09	45	ZZZZZ		123247			
05/21/14 20:14	45	ZZZZZ		123247			
05/21/14 22:41	30	ZZZZZ		123247			

Detector: GV15

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/22/12 11:06		IC 160-12362/1		12362			JLW
03/23/12 06:10		ICV 160-12362/2		12362			JLW
01/24/14 15:13		ACVTOP 160-101162/1		101162			JLW
05/02/14 18:12		ICB 160-119911/1		119911			SMP
05/21/14 00:02		CCB 160-123296/1		123296			SMP
05/21/14 00:45		CCV 160-123296/2		123296			
05/21/14 01:07		CCV 160-123296/3		123296			SMP
05/21/14 01:46		ZZZZZ		123296			
05/21/14 02:27		ZZZZZ		123296			
05/21/14 10:44	45	ZZZZZ		123296			
05/21/14 12:22	30	160-6694-1	2222-SD01	123296	123290	GA-01-R	SMP
05/21/14 13:06	60	ZZZZZ		123296			
05/21/14 14:26	30	160-6694-3	2222-SD03	123296	123290	GA-01-R	SMP
05/21/14 15:53	120	ZZZZZ		123296			
05/21/14 19:08	45	ZZZZZ		123296			
05/21/14 20:13	45	ZZZZZ		123296			
05/21/14 21:15	60	ZZZZZ		123296			

Detector: GV17

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/26/12 06:29		IC 160-12390/1		12390			JLW
03/26/12 09:29		ICV 160-12390/2		12390			JLW
01/23/14 11:17		ACVTOP 160-100896/1		100896			JLW
05/02/14 18:13		ICB 160-119912/1		119912			SMP
05/21/14 00:03		CCB 160-123294/1		123294			EMN

Gamma Spectroscopy Run Log

Detector: GV17 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/21/14 00:46		CCV 160-123294/2		123294			
05/21/14 01:08		CCV 160-123294/3		123294			EMN
05/21/14 01:47		ZZZZZ		123294			
05/21/14 02:28		ZZZZZ		123294			
05/21/14 10:42		ZZZZZ		123294			
05/21/14 12:07	60	ZZZZZ		123294			
05/21/14 14:27	30	160-6694-4	2222-SD04	123294	123290	GA-01-R	EMN
05/21/14 15:54	120	ZZZZZ		123294			
05/21/14 19:09	45	ZZZZZ		123294			
05/21/14 20:14	60	ZZZZZ		123294			
05/21/14 21:16	120	ZZZZZ		123294			

Detector: GV18

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
12/07/11 13:13		IC 160-47625/1		47625			JLW
12/09/11 12:09		ICV 160-47625/2		47625			JLW
01/23/14 11:19		ACVRAP 160-100898/1		100898			JLW
05/02/14 17:58		ICB 160-119914/1		119914			SMP
05/20/14 00:03		CCB 160-123230/1		123230			SMP
05/20/14 01:25		CCV 160-123230/2		123230			
05/20/14 01:45		CCV 160-123230/3		123230			SMP
05/20/14 13:46	60	160-6694-7	2222-RIN-01	123230	122895	GA-01-R	SMP
05/20/14 15:17	60	ZZZZZ		123230			
05/20/14 17:34	60	ZZZZZ		123230			
05/20/14 18:55	60	ZZZZZ		123230			
05/20/14 20:17	60	ZZZZZ		123230			
05/20/14 22:25	60	ZZZZZ		123230			

GAS FLOW PROPORTIONAL COUNTER

Method 9315

Total Apha Radium (GFPC) by Method 9315

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122912 Batch Start Date: 05/19/14 13:41 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/21/14 14:54

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Ba_TareWt	Ba_GrossWt	Ba_Mass	IngDecDate1	IngDecDate2
MB 160-122912/1		PrecSep_0, 9315		1000.00 mL	8.6069 g	8.6361 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCS 160-122912/2		PrecSep_0, 9315		1000.00 mL	8.5878 g	8.6169 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCSD 160-122912/3		PrecSep_0, 9315		1000.00 mL	8.6159 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	988.31 mL	8.6163 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40

Lab Sample ID	Client Sample ID	Method Chain	Basis	NativeMassBa	Ba Carrier 00008	RA22609A120 00003			
MB 160-122912/1		PrecSep_0, 9315		0 g	1 mL				
LCS 160-122912/2		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
LCSD 160-122912/3		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	0 g	1 mL				

Batch Notes	
Balance ID	1125330898, 1122021820
Person's name who witnessed reagent drop	TAG
Analyst who added reagent	LEM
SOP Number	ST-RC-0002, ST-RC-0040

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.

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122912 Batch Start Date: 05/19/14 13:41 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/21/14 14:54

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Ba_TareWt	Ba_GrossWt	Ba_Mass	IngDecDate1	IngDecDate2
MB 160-122912/1		PrecSep_0, 9315		1000.00 mL	8.6069 g	8.6361 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCS 160-122912/2		PrecSep_0, 9315		1000.00 mL	8.5878 g	8.6169 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCSD 160-122912/3		PrecSep_0, 9315		1000.00 mL	8.6159 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	988.31 mL	8.6163 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40

Lab Sample ID	Client Sample ID	Method Chain	Basis	NativeMassBa	Ba Carrier 00008	RA22609A120 00003			
MB 160-122912/1		PrecSep_0, 9315		0 g	1 mL				
LCS 160-122912/2		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
LCSD 160-122912/3		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	0 g	1 mL				

Batch Notes	
Balance ID	1125330898, 1122021820
Person's name who witnessed reagent drop	TAG
Analyst who added reagent	LEM
SOP Number	ST-RC-0002, ST-RC-0040

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.

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122912 Batch Start Date: 05/19/14 13:41 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/21/14 14:54

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Ba_TareWt	Ba_GrossWt	Ba_Mass	IngDecDate1	IngDecDate2
MB 160-122912/1		PrecSep_0, 9315		1000.00 mL	8.6069 g	8.6361 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCS 160-122912/2		PrecSep_0, 9315		1000.00 mL	8.5878 g	8.6169 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCSD 160-122912/3		PrecSep_0, 9315		1000.00 mL	8.6159 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	988.31 mL	8.6163 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40

Lab Sample ID	Client Sample ID	Method Chain	Basis	NativeMassBa	Ba Carrier 00008	RA22609A120 00003			
MB 160-122912/1		PrecSep_0, 9315		0 g	1 mL				
LCS 160-122912/2		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
LCSD 160-122912/3		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	0 g	1 mL				

Batch Notes	
Balance ID	1125330898, 1122021820
Person's name who witnessed reagent drop	TAG
Analyst who added reagent	LEM
SOP Number	ST-RC-0002, ST-RC-0040

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.

Prep Batch: 122912

Preparation, Precipitate Separation

Gas Flow Proportional Counter Analysis Detail Report
Prep Batch: 122912

Lab ID: MB 160-122912/1-A | Analyzed: 05/21/14 16:15 | Decay Corrected: No | Ts: 200
Client ID: | Detector: Orange0 | Yield Truncated: No | Tb: 1000
Sigma: 2 | Dil Fac: 1 | Calibration Type: 2

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Cs	Cb	CPMs	CPMb	Eff	Anly Batch
Total Alpha Radium	0.01052	0.0992	0.0992	U	pCi/L	1.00	0.198	12	56	0.060	0.056	0.18158	123289

Carrier	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Ba Carrier	0.02920				g		0.0339	86.1	40 - 110

Lab ID: LCS 160-122912/2-A | Analyzed: 05/21/14 16:15 | Decay Corrected: No | Ts: 200
Client ID: | Detector: Orange1 | Yield Truncated: No | Tb: 1000
Sigma: 2 | Dil Fac: 1 | Calibration Type: 2

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Cs	Cb	CPMs	CPMb	Eff	Anly Batch
Total Alpha Radium	11.86	0.805	1.34		pCi/L	1.00	0.235	905	82	4.525	0.082	0.17947	123289

Carrier	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Ba Carrier	0.02910				g		0.0339	85.8	40 - 110

Lab ID: LCSD 160-122912/3-A | Analyzed: 05/21/14 16:16 | Decay Corrected: No | Ts: 200
Client ID: | Detector: Orange2 | Yield Truncated: No | Tb: 1000
Sigma: 2 | Dil Fac: 1 | Calibration Type: 2

Analyte	LCSD Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Cs	Cb	CPMs	CPMb	Eff	Anly Batch
Total Alpha Radium	11.62	0.790	1.31		pCi/L	1.00	0.346	964	228	4.820	0.228	0.17544	123289

Carrier	LCSD Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Ba Carrier	0.03140				g		0.0339	92.6	40 - 110

Lab ID: 160-6694-7 | Analyzed: 05/21/14 16:16 | Decay Corrected: No | Ts: 200
Client ID: 2222-RIN-01 | Detector: Orange3 | Yield Truncated: No | Tb: 1000
Sigma: 2 | Dil Fac: 1 | Calibration Type: 2

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Cs	Cb	CPMs	CPMb	Eff	Anly Batch
Total Alpha Radium	0.0991	0.130	0.130	U	pCi/L	1.00	0.217	22	72	0.110	0.072	0.17454	123289

Carrier	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Ba Carrier	0.0310				g		0.0339	91.4	40 - 110

Gas Flow Proportional Counter Analysis Detail Report
Prep Batch: 122912

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 160-122912/1-A	Total Alpha Radium			0.01052	U	pCi/L							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-122912/2-A	Total Alpha Radium		11.2	11.86		pCi/L	106	67 - 133	2				

Lab Control Sample Duplicate ID:	Analyte	Parent Result	Spike Added	LCSD Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCSD 160-122912/3-A	Total Alpha Radium		11.2	11.62		pCi/L	103	67 - 133	2	0.09	0.26	1	

Glossary:

Ts = Count Duration, Sample

Tb = Count Duration, Background

Cs = Total Counts, Sample

Cb = Total Counts, Background

CPMs = Counts Per Minute, Sample

CPMb = Counts Per Minute, Background

Eff = Efficiency

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122912 Batch Start Date: 05/19/14 13:41 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/21/14 14:54

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Ba_TareWt	Ba_GrossWt	Ba_Mass	IngDecDate1	IngDecDate2
MB 160-122912/1		PrecSep_0, 9315		1000.00 mL	8.6069 g	8.6361 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCS 160-122912/2		PrecSep_0, 9315		1000.00 mL	8.5878 g	8.6169 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCSD 160-122912/3		PrecSep_0, 9315		1000.00 mL	8.6159 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	988.31 mL	8.6163 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40

Lab Sample ID	Client Sample ID	Method Chain	Basis	NativeMassBa	Ba Carrier 00008	RA22609A120 00003			
MB 160-122912/1		PrecSep_0, 9315		0 g	1 mL				
LCS 160-122912/2		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
LCSD 160-122912/3		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	0 g	1 mL				

Batch Notes	
Balance ID	1125330898, 1122021820
Person's name who witnessed reagent drop	TAG
Analyst who added reagent	LEM
SOP Number	ST-RC-0002, ST-RC-0040

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.

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - A

Addr: 0

Sample ID MB 160-122912/1-A

Repeat 1

Carrier No. 0

Batch ID 122912

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 5/21/2014 4:15:54 PM

Count Ended 5/21/2014 7:36:05 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 200.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.056	12	0.060	0.004
sd	0.000			0.007	3.464	0.017	0.019
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.378	90	0.450	0.072
sd	0.000			0.019	9.487	0.047	0.051

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - B

Addr: 1

Sample ID LCS 160-122912/2-A

Repeat 1

Carrier No. 0

Batch ID 122912

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 5/21/2014 4:15:57 PM

Count Ended 5/21/2014 7:36:10 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 200.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.082	905	4.525	4.443
sd	0.000			0.009	30.083	0.150	0.151
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.302	158	0.790	0.488
sd	0.000			0.017	12.570	0.063	0.065

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - C

Addr: 2

Sample ID LCSD 160-122912/3-A

Repeat 1

Carrier No. 0

Batch ID 122912

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 5/21/2014 4:16:00 PM

Count Ended 5/21/2014 7:36:13 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 200.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.228	964	4.820	4.592
sd	0.000			0.015	31.048	0.155	0.156
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.567	266	1.330	0.763
sd	0.000			0.024	16.310	0.082	0.085

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - D

Addr: 3

Sample ID 160-6694-D-7-A

Repeat 1

Carrier No. 0

Batch ID 122912

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 5/21/2014 4:16:03 PM

Count Ended 5/21/2014 7:36:15 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 200.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.072	22	0.110	0.038
sd	0.000			0.008	4.690	0.023	0.025
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.484	107	0.535	0.051
sd	0.000			0.022	10.344	0.052	0.056

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122912 Batch Start Date: 05/19/14 13:41 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/21/14 14:54

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Ba_TareWt	Ba_GrossWt	Ba_Mass	IngDecDate1	IngDecDate2
MB 160-122912/1		PrecSep_0, 9315		1000.00 mL	8.6069 g	8.6361 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCS 160-122912/2		PrecSep_0, 9315		1000.00 mL	8.5878 g	8.6169 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCSD 160-122912/3		PrecSep_0, 9315		1000.00 mL	8.6159 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	988.31 mL	8.6163 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40

Lab Sample ID	Client Sample ID	Method Chain	Basis	NativeMassBa	Ba Carrier 00008	RA22609A120 00003			
MB 160-122912/1		PrecSep_0, 9315		0 g	1 mL				
LCS 160-122912/2		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
LCSD 160-122912/3		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	0 g	1 mL				

Batch Notes	
Balance ID	1125330898, 1122021820
Person's name who witnessed reagent drop	TAG
Analyst who added reagent	LEM
SOP Number	ST-RC-0002, ST-RC-0040

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.

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122912 Batch Start Date: 05/19/14 13:41 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/21/14 14:54

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Ba_TareWt	Ba_GrossWt	Ba_Mass	IngDecDate1	IngDecDate2
MB 160-122912/1		PrecSep_0, 9315		1000.00 mL	8.6069 g	8.6361 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCS 160-122912/2		PrecSep_0, 9315		1000.00 mL	8.5878 g	8.6169 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCSD 160-122912/3		PrecSep_0, 9315		1000.00 mL	8.6159 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	988.31 mL	8.6163 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40

Lab Sample ID	Client Sample ID	Method Chain	Basis	NativeMassBa	Ba Carrier 00008	RA22609A120 00003			
MB 160-122912/1		PrecSep_0, 9315		0 g	1 mL				
LCS 160-122912/2		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
LCSD 160-122912/3		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	0 g	1 mL				

Batch Notes	
Balance ID	1125330898, 1122021820
Person's name who witnessed reagent drop	TAG
Analyst who added reagent	LEM
SOP Number	ST-RC-0002, ST-RC-0040

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.

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122912 Batch Start Date: 05/19/14 13:41 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/21/14 14:54

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Ba_TareWt	Ba_GrossWt	Ba_Mass	IngDecDate1	IngDecDate2
MB 160-122912/1		PrecSep_0, 9315		1000.00 mL	8.6069 g	8.6361 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCS 160-122912/2		PrecSep_0, 9315		1000.00 mL	8.5878 g	8.6169 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCSD 160-122912/3		PrecSep_0, 9315		1000.00 mL	8.6159 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	988.31 mL	8.6163 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40

Lab Sample ID	Client Sample ID	Method Chain	Basis	NativeMassBa	Ba Carrier 00008	RA22609A120 00003			
MB 160-122912/1		PrecSep_0, 9315		0 g	1 mL				
LCS 160-122912/2		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
LCSD 160-122912/3		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	0 g	1 mL				

Batch Notes	
Balance ID	1125330898, 1122021820
Person's name who witnessed reagent drop	TAG
Analyst who added reagent	LEM
SOP Number	ST-RC-0002, ST-RC-0040

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.

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122912 Batch Start Date: 05/19/14 13:41 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/21/14 14:54

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Ba_TareWt	Ba_GrossWt	Ba_Mass	IngDecDate1	IngDecDate2
MB 160-122912/1		PrecSep_0, 9315		1000.00 mL	8.6069 g	8.6361 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCS 160-122912/2		PrecSep_0, 9315		1000.00 mL	8.5878 g	8.6169 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCSD 160-122912/3		PrecSep_0, 9315		1000.00 mL	8.6159 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	988.31 mL	8.6163 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40

Lab Sample ID	Client Sample ID	Method Chain	Basis	NativeMassBa	Ba Carrier 00008	RA22609A120 00003			
MB 160-122912/1		PrecSep_0, 9315		0 g	1 mL				
LCS 160-122912/2		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
LCSD 160-122912/3		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	0 g	1 mL				

Batch Notes	
Balance ID	1125330898, 1122021820
Person's name who witnessed reagent drop	TAG
Analyst who added reagent	LEM
SOP Number	ST-RC-0002, ST-RC-0040

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.

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122912 Batch Start Date: 05/19/14 13:41 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/21/14 14:54

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Ba_TareWt	Ba_GrossWt	Ba_Mass	IngDecDate1	IngDecDate2
MB 160-122912/1		PrecSep_0, 9315		1000.00 mL	8.6069 g	8.6361 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCS 160-122912/2		PrecSep_0, 9315		1000.00 mL	8.5878 g	8.6169 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCSD 160-122912/3		PrecSep_0, 9315		1000.00 mL	8.6159 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	988.31 mL	8.6163 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40

Lab Sample ID	Client Sample ID	Method Chain	Basis	NativeMassBa	Ba Carrier 00008	RA22609A120 00003			
MB 160-122912/1		PrecSep_0, 9315		0 g	1 mL				
LCS 160-122912/2		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
LCSD 160-122912/3		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	0 g	1 mL				

Batch Notes	
Balance ID	1125330898, 1122021820
Person's name who witnessed reagent drop	TAG
Analyst who added reagent	LEM
SOP Number	ST-RC-0002, ST-RC-0040

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.

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122912 Batch Start Date: 05/19/14 13:41 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/21/14 14:54

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Ba_TareWt	Ba_GrossWt	Ba_Mass	IngDecDate1	IngDecDate2
MB 160-122912/1		PrecSep_0, 9315		1000.00 mL	8.6069 g	8.6361 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCS 160-122912/2		PrecSep_0, 9315		1000.00 mL	8.5878 g	8.6169 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCSD 160-122912/3		PrecSep_0, 9315		1000.00 mL	8.6159 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	988.31 mL	8.6163 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40

Lab Sample ID	Client Sample ID	Method Chain	Basis	NativeMassBa	Ba Carrier 00008	RA22609A120 00003			
MB 160-122912/1		PrecSep_0, 9315		0 g	1 mL				
LCS 160-122912/2		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
LCSD 160-122912/3		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	0 g	1 mL				

Batch Notes	
Balance ID	1125330898, 1122021820
Person's name who witnessed reagent drop	TAG
Analyst who added reagent	LEM
SOP Number	ST-RC-0002, ST-RC-0040

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.

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122912 Batch Start Date: 05/19/14 13:41 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/21/14 14:54

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Ba_TareWt	Ba_GrossWt	Ba_Mass	IngDecDate1	IngDecDate2
MB 160-122912/1		PrecSep_0, 9315		1000.00 mL	8.6069 g	8.6361 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCS 160-122912/2		PrecSep_0, 9315		1000.00 mL	8.5878 g	8.6169 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCSD 160-122912/3		PrecSep_0, 9315		1000.00 mL	8.6159 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	988.31 mL	8.6163 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40

Lab Sample ID	Client Sample ID	Method Chain	Basis	NativeMassBa	Ba Carrier 00008	RA22609A120 00003			
MB 160-122912/1		PrecSep_0, 9315		0 g	1 mL				
LCS 160-122912/2		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
LCSD 160-122912/3		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	0 g	1 mL				

Batch Notes	
Balance ID	1125330898, 1122021820
Person's name who witnessed reagent drop	TAG
Analyst who added reagent	LEM
SOP Number	ST-RC-0002, ST-RC-0040

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.

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122912 Batch Start Date: 05/19/14 13:41 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/21/14 14:54

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Ba_TareWt	Ba_GrossWt	Ba_Mass	IngDecDate1	IngDecDate2
MB 160-122912/1		PrecSep_0, 9315		1000.00 mL	8.6069 g	8.6361 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCS 160-122912/2		PrecSep_0, 9315		1000.00 mL	8.5878 g	8.6169 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
LCSD 160-122912/3		PrecSep_0, 9315		1000.00 mL	8.6159 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	988.31 mL	8.6163 g	8.6473 g	0.0339 g	5/21/14 11:20	5/21/14 13:40

Lab Sample ID	Client Sample ID	Method Chain	Basis	NativeMassBa	Ba Carrier 00008	RA22609A120 00003			
MB 160-122912/1		PrecSep_0, 9315		0 g	1 mL				
LCS 160-122912/2		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
LCSD 160-122912/3		PrecSep_0, 9315		0 g	1 mL	0.25 mL			
160-6694-D-7	2222-RIN-01	PrecSep_0, 9315	T	0 g	1 mL				

Batch Notes	
Balance ID	1125330898, 1122021820
Person's name who witnessed reagent drop	TAG
Analyst who added reagent	LEM
SOP Number	ST-RC-0002, ST-RC-0040

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.

Method 9320

Radium-228 (GFPC) by Method 9320

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122913 Batch Start Date: 05/19/14 13:43 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/23/14 09:21

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Ba_TareWt	Ba_GrossWt	Ba_Mass	Y_TareWt	Y_GrossWt
MB 160-122913/1		PrecSep_0, 9320		1000.00 mL	8.6503 g	8.6890 g	0.0339 g	8.6245 g	8.6477 g
LCS 160-122913/2		PrecSep_0, 9320		1000.00 mL	8.5885 g	8.6251 g	0.0339 g	8.6415 g	8.6649 g
LCSD 160-122913/3		PrecSep_0, 9320		1000.00 mL	8.5894 g	8.6245 g	0.0339 g	8.5947 g	8.6189 g
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T	985.17 mL	8.5752 g	8.6085 g	0.0339 g	8.6119 g	8.6355 g

Lab Sample ID	Client Sample ID	Method Chain	Basis	Y_Mass	IngDecDate1	IngDecDate2	NativeMassBa	NativeMassY	Ba Carrier 00008
MB 160-122913/1		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
LCS 160-122913/2		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
LCSD 160-122913/3		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T	0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL

Lab Sample ID	Client Sample ID	Method Chain	Basis	Ra-228 00007	Y Carrier 00008				
MB 160-122913/1		PrecSep_0, 9320			0.2 mL				
LCS 160-122913/2		PrecSep_0, 9320		1 mL	0.2 mL				
LCSD 160-122913/3		PrecSep_0, 9320		1 mL	0.2 mL				
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T		0.2 mL				

Batch Notes	
Balance ID	1125330898, 1122021820
Person's name who witnessed reagent drop	TAG
Analyst who added reagent	LEM
SOP Number	ST-RC-0002, ST-RC-0041

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.

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122913 Batch Start Date: 05/19/14 13:43 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/23/14 09:21

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.

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122913 Batch Start Date: 05/19/14 13:43 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/23/14 09:21

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Ba_TareWt	Ba_GrossWt	Ba_Mass	Y_TareWt	Y_GrossWt
MB 160-122913/1		PrecSep_0, 9320		1000.00 mL	8.6503 g	8.6890 g	0.0339 g	8.6245 g	8.6477 g
LCS 160-122913/2		PrecSep_0, 9320		1000.00 mL	8.5885 g	8.6251 g	0.0339 g	8.6415 g	8.6649 g
LCSD 160-122913/3		PrecSep_0, 9320		1000.00 mL	8.5894 g	8.6245 g	0.0339 g	8.5947 g	8.6189 g
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T	985.17 mL	8.5752 g	8.6085 g	0.0339 g	8.6119 g	8.6355 g

Lab Sample ID	Client Sample ID	Method Chain	Basis	Y_Mass	IngDecDate1	IngDecDate2	NativeMassBa	NativeMassY	Ba Carrier 00008
MB 160-122913/1		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
LCS 160-122913/2		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
LCSD 160-122913/3		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T	0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL

Lab Sample ID	Client Sample ID	Method Chain	Basis	Ra-228 00007	Y Carrier 00008				
MB 160-122913/1		PrecSep_0, 9320			0.2 mL				
LCS 160-122913/2		PrecSep_0, 9320		1 mL	0.2 mL				
LCSD 160-122913/3		PrecSep_0, 9320		1 mL	0.2 mL				
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T		0.2 mL				

Batch Notes	
Balance ID	1125330898, 1122021820
Person's name who witnessed reagent drop	TAG
Analyst who added reagent	LEM
SOP Number	ST-RC-0002, ST-RC-0041

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.

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122913 Batch Start Date: 05/19/14 13:43 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/23/14 09:21

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.

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122913 Batch Start Date: 05/19/14 13:43 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/23/14 09:21

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Ba_TareWt	Ba_GrossWt	Ba_Mass	Y_TareWt	Y_GrossWt
MB 160-122913/1		PrecSep_0, 9320		1000.00 mL	8.6503 g	8.6890 g	0.0339 g	8.6245 g	8.6477 g
LCS 160-122913/2		PrecSep_0, 9320		1000.00 mL	8.5885 g	8.6251 g	0.0339 g	8.6415 g	8.6649 g
LCSD 160-122913/3		PrecSep_0, 9320		1000.00 mL	8.5894 g	8.6245 g	0.0339 g	8.5947 g	8.6189 g
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T	985.17 mL	8.5752 g	8.6085 g	0.0339 g	8.6119 g	8.6355 g

Lab Sample ID	Client Sample ID	Method Chain	Basis	Y_Mass	IngDecDate1	IngDecDate2	NativeMassBa	NativeMassY	Ba Carrier 00008
MB 160-122913/1		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
LCS 160-122913/2		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
LCSD 160-122913/3		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T	0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL

Lab Sample ID	Client Sample ID	Method Chain	Basis	Ra-228 00007	Y Carrier 00008				
MB 160-122913/1		PrecSep_0, 9320			0.2 mL				
LCS 160-122913/2		PrecSep_0, 9320		1 mL	0.2 mL				
LCSD 160-122913/3		PrecSep_0, 9320		1 mL	0.2 mL				
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T		0.2 mL				

Batch Notes	
Balance ID	1125330898, 1122021820
Person's name who witnessed reagent drop	TAG
Analyst who added reagent	LEM
SOP Number	ST-RC-0002, ST-RC-0041

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.

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122913 Batch Start Date: 05/19/14 13:43 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/23/14 09:21

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.

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122913 Batch Start Date: 05/19/14 13:43 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/23/14 09:21

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Ba_TareWt	Ba_GrossWt	Ba_Mass	Y_TareWt	Y_GrossWt
MB 160-122913/1		PrecSep_0, 9320		1000.00 mL	8.6503 g	8.6890 g	0.0339 g	8.6245 g	8.6477 g
LCS 160-122913/2		PrecSep_0, 9320		1000.00 mL	8.5885 g	8.6251 g	0.0339 g	8.6415 g	8.6649 g
LCSD 160-122913/3		PrecSep_0, 9320		1000.00 mL	8.5894 g	8.6245 g	0.0339 g	8.5947 g	8.6189 g
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T	985.17 mL	8.5752 g	8.6085 g	0.0339 g	8.6119 g	8.6355 g

Lab Sample ID	Client Sample ID	Method Chain	Basis	Y_Mass	IngDecDate1	IngDecDate2	NativeMassBa	NativeMassY	Ba Carrier 00008
MB 160-122913/1		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
LCS 160-122913/2		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
LCSD 160-122913/3		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T	0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL

Lab Sample ID	Client Sample ID	Method Chain	Basis	Ra-228 00007	Y Carrier 00008				
MB 160-122913/1		PrecSep_0, 9320			0.2 mL				
LCS 160-122913/2		PrecSep_0, 9320		1 mL	0.2 mL				
LCSD 160-122913/3		PrecSep_0, 9320		1 mL	0.2 mL				
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T		0.2 mL				

Batch Notes	
Balance ID	1125330898, 1122021820
Person's name who witnessed reagent drop	TAG
Analyst who added reagent	LEM
SOP Number	ST-RC-0002, ST-RC-0041

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.

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122913 Batch Start Date: 05/19/14 13:43 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/23/14 09:21

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.

Prep Batch: 122913

Preparation, Precipitate Separation

Gas Flow Proportional Counter Analysis Detail Report
Prep Batch: 122913

Lab ID: MB 160-122913/1-A | Analyzed: 05/23/14 09:50 | Decay Corrected: No | Ts: 200
Client ID: | Detector: Orange4 | Yield Truncated: No | Tb: 1000
Sigma: 2 | Dil Fac: 1 | Calibration Type: 1

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Cs	Cb	CPMs	CPMb	Eff	Anly Batch
Radium-228	0.2086	0.162	0.163	U	pCi/L	1.00	0.254	97	349	0.485	0.349	0.44188	123737

Carrier	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Ba Carrier	0.03870			X	g		0.0339	114	40 - 110
Y Carrier	0.02320				g		0.0268	86.7	40 - 110

Lab ID: LCS 160-122913/2-A | Analyzed: 05/23/14 09:50 | Decay Corrected: No | Ts: 200
Client ID: | Detector: Orange6 | Yield Truncated: No | Tb: 1000
Sigma: 2 | Dil Fac: 1 | Calibration Type: 1

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Cs	Cb	CPMs	CPMb	Eff	Anly Batch
Radium-228	3.751	0.389	0.520		pCi/L	1.00	0.312	564	492	2.820	0.492	0.44107	123737

Carrier	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Ba Carrier	0.03660				g		0.0339	108	40 - 110
Y Carrier	0.02340				g		0.0268	87.5	40 - 110

Lab ID: LCSD 160-122913/3-A | Analyzed: 05/23/14 09:50 | Decay Corrected: No | Ts: 200
Client ID: | Detector: Orange8 | Yield Truncated: No | Tb: 1000
Sigma: 2 | Dil Fac: 1 | Calibration Type: 1

Analyte	LCSD Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Cs	Cb	CPMs	CPMb	Eff	Anly Batch
Radium-228	3.208	0.356	0.462		pCi/L	1.00	0.276	474	376	2.370	0.376	0.44551	123737

Carrier	LCSD Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Ba Carrier	0.03510				g		0.0339	104	40 - 110
Y Carrier	0.02420				g		0.0268	90.5	40 - 110

Lab ID: 160-6694-7 | Analyzed: 05/23/14 09:50 | Decay Corrected: No | Ts: 200
Client ID: 2222-RIN-01 | Detector: Orange9 | Yield Truncated: No | Tb: 1000
Sigma: 2 | Dil Fac: 1 | Calibration Type: 1

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Cs	Cb	CPMs	CPMb	Eff	Anly Batch
Radium-228	0.0584	0.181	0.181	U	pCi/L	1.00	0.314	88	407	0.440	0.407	0.44430	123737

Carrier	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Ba Carrier	0.0333				g		0.0339	98.2	40 - 110
Y Carrier	0.0236				g		0.0268	88.2	40 - 110

Gas Flow Proportional Counter Analysis Detail Report
Prep Batch: 122913

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 160-122913/1-A	Radium-228			0.2086	U	pCi/L							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-122913/2-A	Radium-228		3.85	3.751		pCi/L	97	56 - 140	16				

Lab Control Sample Duplicate ID:	Analyte	Parent Result	Spike Added	LCSD Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCSD 160-122913/3-A	Radium-228		3.85	3.208		pCi/L	83	56 - 140	16	0.55	1.56	1	

Glossary:

Ts = Count Duration, Sample

Tb = Count Duration, Background

Cs = Total Counts, Sample

Cb = Total Counts, Background

CPMs = Counts Per Minute, Sample

CPMb = Counts Per Minute, Background

Eff = Efficiency

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122913 Batch Start Date: 05/19/14 13:43 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/23/14 09:21

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Ba_TareWt	Ba_GrossWt	Ba_Mass	Y_TareWt	Y_GrossWt
MB 160-122913/1		PrecSep_0, 9320		1000.00 mL	8.6503 g	8.6890 g	0.0339 g	8.6245 g	8.6477 g
LCS 160-122913/2		PrecSep_0, 9320		1000.00 mL	8.5885 g	8.6251 g	0.0339 g	8.6415 g	8.6649 g
LCSD 160-122913/3		PrecSep_0, 9320		1000.00 mL	8.5894 g	8.6245 g	0.0339 g	8.5947 g	8.6189 g
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T	985.17 mL	8.5752 g	8.6085 g	0.0339 g	8.6119 g	8.6355 g

Lab Sample ID	Client Sample ID	Method Chain	Basis	Y_Mass	IngDecDate1	IngDecDate2	NativeMassBa	NativeMassY	Ba Carrier 00008
MB 160-122913/1		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
LCS 160-122913/2		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
LCSD 160-122913/3		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T	0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL

Lab Sample ID	Client Sample ID	Method Chain	Basis	Ra-228 00007	Y Carrier 00008				
MB 160-122913/1		PrecSep_0, 9320			0.2 mL				
LCS 160-122913/2		PrecSep_0, 9320		1 mL	0.2 mL				
LCSD 160-122913/3		PrecSep_0, 9320		1 mL	0.2 mL				
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T		0.2 mL				

Batch Notes	
Balance ID	1125330898, 1122021820
Person's name who witnessed reagent drop	TAG
Analyst who added reagent	LEM
SOP Number	ST-RC-0002, ST-RC-0041

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.

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122913 Batch Start Date: 05/19/14 13:43 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/23/14 09:21

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.

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID MB 160-122913/1-A

Repeat 1

Carrier No. 0

Batch ID 122913

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 5/23/2014 9:50:09 AM

Count Ended 5/23/2014 1:10:20 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 *days*

Decay Factor 1.000

Sample Count Time 200.00 *mins*

Background Count Time 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.072	21	0.105	0.033
sd	0.000			0.008	4.583	0.023	0.024
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.349	97	0.485	0.136
sd	0.000			0.019	9.849	0.049	0.053

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID LCS 160-122913/2-A

Repeat 1

Carrier No. 0

Batch ID 122913

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 5/23/2014 9:50:15 AM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 5/23/2014 1:10:25 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 200.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.106	31	0.155	0.049
sd	0.000			0.010	5.568	0.028	0.030
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.492	564	2.820	2.328
sd	0.000			0.022	23.749	0.119	0.121

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID LCSD 160-122913/3-A

Repeat 1

Carrier No. 0

Batch ID 122913

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 5/23/2014 9:50:18 AM

Collection Date 1 1/1/1900

Half Life 0.00 ***days***

Count Ended 5/23/2014 1:10:30 PM

Collection Date 2 1/1/1900

Decay Factor 1.000

Sample Count Time 200.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.045	17	0.085	0.040
sd	0.000			0.007	4.123	0.021	0.022
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.376	474	2.370	1.994
sd	0.000			0.019	21.772	0.109	0.111

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID 160-6694-E-7-A

Repeat 1

Carrier No. 0

Batch ID 122913

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 5/23/2014 9:50:22 AM

Collection Date 1 1/1/1900

Half Life 0.00 ***days***

Count Ended 5/23/2014 1:10:32 PM

Collection Date 2 1/1/1900

Decay Factor 1.000

Sample Count Time 200.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.122	26	0.130	0.008
sd	0.000			0.011	5.099	0.025	0.028
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.407	88	0.440	0.033
sd	0.000			0.020	9.381	0.047	0.051

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

GAS FLOW PROPORTIONAL COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-6694-1

SDG No.:

Batch Number: 122913 Batch Start Date: 05/19/14 13:43 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/23/14 09:21

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Ba_TareWt	Ba_GrossWt	Ba_Mass	Y_TareWt	Y_GrossWt
MB 160-122913/1		PrecSep_0, 9320		1000.00 mL	8.6503 g	8.6890 g	0.0339 g	8.6245 g	8.6477 g
LCS 160-122913/2		PrecSep_0, 9320		1000.00 mL	8.5885 g	8.6251 g	0.0339 g	8.6415 g	8.6649 g
LCSD 160-122913/3		PrecSep_0, 9320		1000.00 mL	8.5894 g	8.6245 g	0.0339 g	8.5947 g	8.6189 g
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T	985.17 mL	8.5752 g	8.6085 g	0.0339 g	8.6119 g	8.6355 g

Lab Sample ID	Client Sample ID	Method Chain	Basis	Y_Mass	IngDecDate1	IngDecDate2	NativeMassBa	NativeMassY	Ba Carrier 00008
MB 160-122913/1		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
LCS 160-122913/2		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
LCSD 160-122913/3		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T	0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL

Lab Sample ID	Client Sample ID	Method Chain	Basis	Ra-228 00007	Y Carrier 00008				
MB 160-122913/1		PrecSep_0, 9320			0.2 mL				
LCS 160-122913/2		PrecSep_0, 9320		1 mL	0.2 mL				
LCSD 160-122913/3		PrecSep_0, 9320		1 mL	0.2 mL				
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T		0.2 mL				

Batch Notes	
Balance ID	1125330898, 1122021820
Person's name who witnessed reagent drop	TAG
Analyst who added reagent	LEM
SOP Number	ST-RC-0002, ST-RC-0041

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.

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SDG No.:

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Batch Method: PrecSep_0 Batch End Date: 05/23/14 09:21

Basis	Basis Description
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LCS 160-122913/2		PrecSep_0, 9320		1000.00 mL	8.5885 g	8.6251 g	0.0339 g	8.6415 g	8.6649 g
LCSD 160-122913/3		PrecSep_0, 9320		1000.00 mL	8.5894 g	8.6245 g	0.0339 g	8.5947 g	8.6189 g
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T	985.17 mL	8.5752 g	8.6085 g	0.0339 g	8.6119 g	8.6355 g

Lab Sample ID	Client Sample ID	Method Chain	Basis	Y_Mass	IngDecDate1	IngDecDate2	NativeMassBa	NativeMassY	Ba Carrier 00008
MB 160-122913/1		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
LCS 160-122913/2		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
LCSD 160-122913/3		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T	0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL

Lab Sample ID	Client Sample ID	Method Chain	Basis	Ra-228 00007	Y Carrier 00008				
MB 160-122913/1		PrecSep_0, 9320			0.2 mL				
LCS 160-122913/2		PrecSep_0, 9320		1 mL	0.2 mL				
LCSD 160-122913/3		PrecSep_0, 9320		1 mL	0.2 mL				
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T		0.2 mL				

Batch Notes	
Balance ID	1125330898, 1122021820
Person's name who witnessed reagent drop	TAG
Analyst who added reagent	LEM
SOP Number	ST-RC-0002, ST-RC-0041

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SDG No.:

Batch Number: 122913 Batch Start Date: 05/19/14 13:43 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/23/14 09:21

Basis	Basis Description
T	Total/NA

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MB 160-122913/1		PrecSep_0, 9320		1000.00 mL	8.6503 g	8.6890 g	0.0339 g	8.6245 g	8.6477 g
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LCSD 160-122913/3		PrecSep_0, 9320		1000.00 mL	8.5894 g	8.6245 g	0.0339 g	8.5947 g	8.6189 g
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T	985.17 mL	8.5752 g	8.6085 g	0.0339 g	8.6119 g	8.6355 g

Lab Sample ID	Client Sample ID	Method Chain	Basis	Y_Mass	IngDecDate1	IngDecDate2	NativeMassBa	NativeMassY	Ba Carrier 00008
MB 160-122913/1		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
LCS 160-122913/2		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
LCSD 160-122913/3		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T	0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL

Lab Sample ID	Client Sample ID	Method Chain	Basis	Ra-228 00007	Y Carrier 00008				
MB 160-122913/1		PrecSep_0, 9320			0.2 mL				
LCS 160-122913/2		PrecSep_0, 9320		1 mL	0.2 mL				
LCSD 160-122913/3		PrecSep_0, 9320		1 mL	0.2 mL				
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T		0.2 mL				

Batch Notes	
Balance ID	1125330898, 1122021820
Person's name who witnessed reagent drop	TAG
Analyst who added reagent	LEM
SOP Number	ST-RC-0002, ST-RC-0041

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SDG No.:

Batch Number: 122913 Batch Start Date: 05/19/14 13:43 Batch Analyst: Mewes, Leah E

Batch Method: PrecSep_0 Batch End Date: 05/23/14 09:21

Basis	Basis Description
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MB 160-122913/1		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
LCS 160-122913/2		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
LCSD 160-122913/3		PrecSep_0, 9320		0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL
160-6694-E-7	2222-RIN-01	PrecSep_0, 9320	T	0.02675 g	5/20/14 12:23	5/23/14 7:55	0 g	0 g	1 mL

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Batch Notes	
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Daily Checks

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Gas Proportional Counter Daily Quality Control Checks

APPROVED
By Siobhan Perry at 10:02 pm, May 21, 2014

Wednesday, May 21, 2014

Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
Detector 0											
12:13 AM	**Efficiency**	10735.11	10961.91	328.86	-226.80	**Pass**					
	Background										
	Crosstalk	3362.500	3302.588	96.137	59.912	**Pass**					
12:17 AM	**Efficiency**						33720.25	33739.55	1012.19	-19.30	**Pass**
	Background										
	Crosstalk						89.932	237.400	143.963	-147.468	**Pass**
3:52 AM	**Efficiency**										
	Background	0.050	0.134	0.042	-0.084	**Pass**	0.535	0.474	0.121	0.061	**Pass**
	Crosstalk										
Detector 1											
12:14 AM	**Efficiency**	10146.30	10173.40	305.20	-27.10	**Pass**					
	Background										
	Crosstalk	3006.500	3028.900	109.715	-22.400	**Pass**					
12:17 AM	**Efficiency**						33385.95	33478.80	1004.36	-92.85	**Pass**
	Background										
	Crosstalk						16.083	42.975	30.711	-26.892	**Pass**
3:52 AM	**Efficiency**										
	Background	0.085	0.142	0.063	-0.057	**Pass**	0.415	0.416	0.134	-0.001	**Pass**
	Crosstalk										
Detector 2											
12:14 AM	**Efficiency**	10913.47	10972.86	329.19	-59.39	**Pass**					
	Background										
	Crosstalk	3362.000	3366.220	137.933	-4.220	**Pass**					
12:17 AM	**Efficiency**						23227.19	23193.20	695.80	33.99	**Pass**
	Background										
	Crosstalk						15.580	37.375	27.717	-21.795	**Pass**

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Gas Proportional Counter Daily Quality Control Checks

Wednesday, May 21, 2014

Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
3:52 AM	**Efficiency**										
	Background	0.245	0.165	0.116	0.080	**Pass**	0.620	0.686	0.494	-0.066	**Pass**
	Crosstalk										
Detector 3											
12:14 AM	**Efficiency**	10539.16	10703.24	321.10	-164.08	**Pass**					
	Background										
	Crosstalk	3482.500	3488.780	118.326	-6.280	**Pass**					
12:17 AM	**Efficiency**						30319.58	30620.69	918.62	-301.11	**Pass**
	Background										
	Crosstalk						14.072	43.524	34.997	-29.452	**Pass**
3:52 AM	**Efficiency**										
	Background	0.070	0.136	0.041	-0.066	**Pass**	0.480	0.553	0.099	-0.073	**Pass**
	Crosstalk										
Detector 4											
12:14 AM	**Efficiency**	10480.61	10616.58	318.50	-135.97	**Pass**					
	Background										
	Crosstalk	4068.500	4041.960	93.896	26.540	**Pass**					
12:17 AM	**Efficiency**						26090.12	26048.10	781.44	42.02	**Pass**
	Background										
	Crosstalk						8.041	8.525	2.042	-0.484	**Pass**
3:52 AM	**Efficiency**										
	Background	0.090	0.105	0.031	-0.015	**Pass**	0.505	0.386	0.065	0.119	**Pass**
	Crosstalk										
Detector 5											
12:14 AM	**Efficiency**	10762.86	10779.16	323.37	-16.30	**Pass**					
	Background										
	Crosstalk	3983.500	3963.700	62.110	19.800	**Pass**					

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Gas Proportional Counter Daily Quality Control Checks

Wednesday, May 21, 2014

Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
12:17 AM	**Efficiency**						21570.59	21843.90	655.32	-273.32	**Pass**
	Background										
	Crosstalk						5.528	5.095	1.480	0.433	**Pass**
3:52 AM	**Efficiency**										
	Background	0.175	0.169	0.053	0.006	**Pass**	0.400	0.448	0.102	-0.048	**Pass**
	Crosstalk										
Detector 6											
12:14 AM	**Efficiency**	10632.75	10768.46	323.05	-135.71	**Pass**					
	Background										
	Crosstalk	3902.500	3929.080	151.831	-26.580	**Pass**					
12:17 AM	**Efficiency**						29099.14	29157.55	874.73	-58.41	**Pass**
	Background										
	Crosstalk						4.523	5.750	1.400	-1.227	**Pass**
3:52 AM	**Efficiency**										
	Background	0.130	0.107	0.023	0.023	**Pass**	0.585	0.498	0.080	0.087	**Pass**
	Crosstalk										
Detector 7											
12:14 AM	**Efficiency**	11679.66	11415.50	342.47	264.16	**Pass**					
	Background										
	Crosstalk	4356.500	4055.000	78.818	301.500	**DOEF**					
12:17 AM	**Efficiency**						27867.91	27782.35	833.47	85.56	**Pass**
	Background										
	Crosstalk						3.015	4.600	1.392	-1.585	**Pass**
3:52 AM	**Efficiency**										
	Background	0.075	0.102	0.037	-0.027	**Pass**	0.405	0.391	0.058	0.014	**Pass**
	Crosstalk										
Detector 8											

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Wednesday, May 21, 2014

Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
12:14 AM	**Efficiency**						33492.42	33564.38	1006.93	-71.96	**Pass**
	Background										
	Crosstalk						18.596	16.400	3.440	2.196	**Pass**
12:17 AM	**Efficiency**	10769.86	10932.62	327.98	-162.76	**Pass**					
	Background										
	Crosstalk	3515.000	3644.120	113.075	-129.120	**Pass**					
3:52 AM	**Efficiency**										
	Background	0.075	0.096	0.039	-0.021	**Pass**	0.490	0.411	0.066	0.079	**Pass**
	Crosstalk										
Detector 9											
12:14 AM	**Efficiency**						33973.44	33894.25	1016.83	79.19	**Pass**
	Background										
	Crosstalk						19.098	14.000	4.085	5.098	**Pass**
12:17 AM	**Efficiency**	9963.15	10270.92	308.13	-307.77	**Pass**					
	Background										
	Crosstalk	3287.000	3336.480	71.578	-49.480	**Pass**					
3:52 AM	**Efficiency**										
	Background	0.080	0.141	0.053	-0.061	**Pass**	0.435	0.454	0.117	-0.019	**Pass**
	Crosstalk										
Detector 10											
12:14 AM	**Efficiency**						23247.61	23268.15	698.04	-20.54	**Pass**
	Background										
	Crosstalk						9.549	5.525	1.626	4.024	**WARNING**
12:17 AM	**Efficiency**	9051.87	9314.42	279.43	-262.55	**Pass**					
	Background										
	Crosstalk	5569.000	5412.260	206.903	156.740	**Pass**					
3:52 AM	**Efficiency**										
	Background	0.110	0.117	0.045	-0.007	**Pass**	0.395	0.469	0.118	-0.074	**Pass**
	Crosstalk										

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Instrument: Orange

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
Detector 11											
12:14 AM	**Efficiency**						30731.73	29987.20	899.62	744.53	**Pass**
	Background										
	Crosstalk						12.565	15.700	2.687	-3.135	**Pass**
12:17 AM	**Efficiency**	10871.94	10755.42	322.66	116.52	**Pass**					
	Background										
	Crosstalk	3368.500	3246.680	84.085	121.820	**Pass**					
3:52 AM	**Efficiency**										
	Background	0.085	0.122	0.042	-0.037	**Pass**	0.700	0.532	0.085	0.168	**Pass**
	Crosstalk										
Detector 12											
12:14 AM	**Efficiency**						25699.07	25927.73	777.83	-228.65	**Pass**
	Background										
	Crosstalk						12.062	12.950	1.629	-0.888	**Pass**
12:17 AM	**Efficiency**	11019.03	11039.74	331.19	-20.71	**Pass**					
	Background										
	Crosstalk	3697.000	3628.500	68.433	68.500	**Pass**					
3:52 AM	**Efficiency**										
	Background	0.135	0.119	0.050	0.016	**Pass**	0.515	0.498	0.092	0.017	**Pass**
	Crosstalk										
Detector 13											
12:14 AM	**Efficiency**						22110.85	22266.53	668.00	-155.68	**Pass**
	Background										
	Crosstalk						15.580	14.975	3.432	0.605	**Pass**
12:17 AM	**Efficiency**	12387.72	11233.00	336.99	1154.72	**FAIL**					
	Background										
	Crosstalk	4229.500	3521.820	75.777	707.680	**DOEF**					

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Wednesday, May 21, 2014

Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
12:30 AM	**Efficiency**	11233.22	11233.00	336.99	0.22	**Pass**					
	Background										
	Crosstalk	3532.500	3521.820	75.777	10.680	**Pass**					
3:52 AM	**Efficiency**										
	Background	0.150	0.163	0.058	-0.013	**Pass**	0.550	0.499	0.101	0.051	**Pass**
	Crosstalk										
Detector 14											
3:52 AM	**Efficiency**										
	Background	0.000	0.138	0.037	-0.138	**FAIL**	0.000	0.432	0.047	-0.432	**FAIL**
	Crosstalk										
Detector 15											
12:14 AM	**Efficiency**						27629.25	27467.78	824.03	161.47	**Pass**
	Background										
	Crosstalk						27.139	21.400	5.218	5.739	**Pass**
12:18 AM	**Efficiency**	11714.68	11797.00	353.91	-82.32	**Pass**					
	Background										
	Crosstalk	3566.500	3542.000	85.963	24.500	**Pass**					
3:52 AM	**Efficiency**										
	Background	0.125	0.137	0.054	-0.012	**Pass**	0.470	0.437	0.083	0.033	**Pass**
	Crosstalk										
Detector 16											
12:20 AM	**Efficiency**						33580.17	33491.33	1004.74	88.84	**Pass**
	Background										
	Crosstalk						25.129	32.800	8.069	-7.671	**Pass**
12:24 AM	**Efficiency**	10702.78	10824.14	324.72	-121.36	**Pass**					
	Background										
	Crosstalk	3427.500	3496.320	67.571	-68.820	**Pass**					

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Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
3:52 AM	**Efficiency**										
	Background	0.150	0.128	0.037	0.022	**Pass**	0.595	0.442	0.061	0.153	**Pass**
	Crosstalk										
Detector 17											
12:20 AM	**Efficiency**						33314.43	33457.18	1003.72	-142.75	**Pass**
	Background										
	Crosstalk						13.570	13.975	2.967	-0.405	**Pass**
12:24 AM	**Efficiency**	10043.22	10056.48	301.69	-13.26	**Pass**					
	Background										
	Crosstalk	3459.500	3425.740	60.289	33.760	**Pass**					
3:52 AM	**Efficiency**										
	Background	0.110	0.151	0.048	-0.041	**Pass**	0.440	0.438	0.089	0.002	**Pass**
	Crosstalk										
Detector 18											
12:20 AM	**Efficiency**						23274.71	23209.68	696.29	65.04	**Pass**
	Background										
	Crosstalk						14.575	16.100	4.093	-1.525	**Pass**
12:24 AM	**Efficiency**	10968.51	11053.86	331.62	-85.35	**Pass**					
	Background										
	Crosstalk	3624.500	3611.520	52.801	12.980	**Pass**					
3:52 AM	**Efficiency**										
	Background	0.105	0.109	0.050	-0.004	**Pass**	0.505	0.426	0.077	0.079	**Pass**
	Crosstalk										
Detector 19											
12:21 AM	**Efficiency**						31249.47	30982.63	929.48	266.85	**Pass**
	Background										
	Crosstalk						15.580	16.650	4.107	-1.070	**Pass**

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Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
12:24 AM	**Efficiency**	10937.91	11009.96	330.30	-72.05	**Pass**					
	Background										
	Crosstalk	3770.500	3716.300	50.984	54.200	**Pass**					
3:52 AM	**Efficiency**										
	Background	0.130	0.092	0.031	0.038	**Pass**	0.600	0.380	0.083	0.221	**Pass**
	Crosstalk										
Detector 20											
12:21 AM	**Efficiency**						25728.87	25820.98	774.63	-92.11	**Pass**
	Background										
	Crosstalk						22.114	20.300	5.444	1.814	**Pass**
12:24 AM	**Efficiency**	10663.25	10934.68	328.04	-271.43	**Pass**					
	Background										
	Crosstalk	3583.500	3574.300	107.105	9.200	**Pass**					
3:52 AM	**Efficiency**										
	Background	0.105	0.097	0.035	0.008	**Pass**	0.340	0.375	0.071	-0.035	**Pass**
	Crosstalk										
Detector 21											
12:21 AM	**Efficiency**						22001.66	22199.20	665.98	-197.54	**Pass**
	Background										
	Crosstalk						13.570	13.000	2.763	0.570	**Pass**
12:24 AM	**Efficiency**	11044.10	11170.12	335.10	-126.02	**Pass**					
	Background										
	Crosstalk	3694.500	3672.660	78.069	21.840	**Pass**					
3:52 AM	**Efficiency**										
	Background	0.130	0.101	0.032	0.029	**Pass**	0.410	0.325	0.064	0.085	**Pass**
	Crosstalk										
Detector 22											

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Wednesday, May 21, 2014

Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
12:21 AM	**Efficiency**						29049.76	29331.13	879.93	-281.37	**Pass**
	Background										
	Crosstalk						14.575	13.075	3.867	1.500	**Pass**
12:24 AM	**Efficiency**	10909.99	10918.70	327.56	-8.71	**Pass**					
	Background										
	Crosstalk	3563.000	3612.240	230.452	-49.240	**Pass**					
3:52 AM	**Efficiency**										
	Background	0.100	0.100	0.032	0.001	**Pass**	0.465	0.381	0.079	0.084	**Pass**
	Crosstalk										
Detector 23											
12:21 AM	**Efficiency**						27484.72	27644.68	829.34	-159.95	**Pass**
	Background										
	Crosstalk						7.036	13.125	3.128	-6.089	**Pass**
12:24 AM	**Efficiency**	11493.61	11544.58	346.34	-50.96	**Pass**					
	Background										
	Crosstalk	3684.000	3809.981	484.264	-125.981	**Pass**					
3:52 AM	**Efficiency**										
	Background	0.130	0.105	0.049	0.026	**Pass**	0.505	0.446	0.115	0.059	**Pass**
	Crosstalk										

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Gas Proportional Counter Daily Quality Control Checks

APPROVED
By Jody Watson at 6:34 am, May 23, 2014

Friday, May 23, 2014

Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
Detector 0											
12:15 AM	**Efficiency**	10733.20	10961.91	328.86	-228.71	**Pass**					
	Background										
	Crosstalk	3445.000	3302.588	96.137	142.413	**Pass**					
12:19 AM	**Efficiency**						33419.16	33739.55	1012.19	-320.39	**Pass**
	Background										
	Crosstalk						76.377	237.400	143.963	-161.023	**Pass**
3:54 AM	**Efficiency**										
	Background	0.090	0.134	0.042	-0.044	**Pass**	0.375	0.474	0.121	-0.099	**Pass**
	Crosstalk										
Detector 1											
12:15 AM	**Efficiency**	10189.92	10173.40	305.20	16.52	**Pass**					
	Background										
	Crosstalk	3022.500	3028.900	109.715	-6.400	**Pass**					
12:19 AM	**Efficiency**						33253.02	33478.80	1004.36	-225.78	**Pass**
	Background										
	Crosstalk						12.064	42.975	30.711	-30.911	**Pass**
3:54 AM	**Efficiency**										
	Background	0.125	0.142	0.063	-0.017	**Pass**	0.375	0.416	0.134	-0.041	**Pass**
	Crosstalk										
Detector 2											
12:15 AM	**Efficiency**	10877.04	10972.86	329.19	-95.82	**Pass**					
	Background										
	Crosstalk	3382.500	3366.220	137.933	16.280	**Pass**					
12:19 AM	**Efficiency**						23045.60	23193.20	695.80	-147.60	**Pass**
	Background										
	Crosstalk						14.577	37.375	27.717	-22.798	**Pass**

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Friday, May 23, 2014

Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
3:54 AM	**Efficiency**										
	Background	0.200	0.165	0.116	0.035	**Pass**	0.490	0.686	0.494	-0.196	**Pass**
	Crosstalk										
Detector 3											
12:15 AM	**Efficiency**	10617.33	10703.24	321.10	-85.91	**Pass**					
	Background										
	Crosstalk	3490.500	3488.780	118.326	1.720	**Pass**					
12:19 AM	**Efficiency**						30560.47	30620.69	918.62	-60.22	**Pass**
	Background										
	Crosstalk						9.550	43.524	34.997	-33.973	**Pass**
3:54 AM	**Efficiency**										
	Background	0.090	0.136	0.041	-0.046	**Pass**	0.610	0.553	0.099	0.058	**Pass**
	Crosstalk										
Detector 4											
12:16 AM	**Efficiency**	10510.73	10616.58	318.50	-105.85	**Pass**					
	Background										
	Crosstalk	3991.000	4041.960	93.896	-50.960	**Pass**					
12:19 AM	**Efficiency**						26182.56	26048.10	781.44	134.46	**Pass**
	Background										
	Crosstalk						9.048	8.525	2.042	0.523	**Pass**
3:54 AM	**Efficiency**										
	Background	0.120	0.105	0.031	0.016	**Pass**	0.435	0.386	0.065	0.049	**Pass**
	Crosstalk										
Detector 5											
12:16 AM	**Efficiency**	10674.38	10779.16	323.37	-104.78	**Pass**					
	Background										
	Crosstalk	4099.000	3963.700	62.110	135.300	**WARNING**					

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Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
12:19 AM	**Efficiency**						21538.41	21843.90	655.32	-305.49	**Pass**
	Background										
	Crosstalk						1.508	5.095	1.480	-3.587	**WARNING**
3:54 AM	**Efficiency**										
	Background	0.160	0.169	0.053	-0.009	**Pass**	0.455	0.448	0.102	0.007	**Pass**
	Crosstalk										
Detector 6											
12:16 AM	**Efficiency**	10535.75	10768.46	323.05	-232.71	**Pass**					
	Background										
	Crosstalk	3922.500	3929.080	151.831	-6.580	**Pass**					
12:19 AM	**Efficiency**						29118.42	29157.55	874.73	-39.13	**Pass**
	Background										
	Crosstalk						5.529	5.750	1.400	-0.221	**Pass**
3:54 AM	**Efficiency**										
	Background	0.110	0.107	0.023	0.003	**Pass**	0.620	0.498	0.080	0.122	**Pass**
	Crosstalk										
Detector 7											
12:16 AM	**Efficiency**	11595.18	11415.50	342.47	179.68	**Pass**					
	Background										
	Crosstalk	4206.500	4055.000	78.818	151.500	**Pass**					
12:19 AM	**Efficiency**						27844.84	27782.35	833.47	62.49	**Pass**
	Background										
	Crosstalk						6.534	4.600	1.392	1.934	**Pass**
3:54 AM	**Efficiency**										
	Background	0.085	0.102	0.037	-0.017	**Pass**	0.345	0.391	0.058	-0.046	**Pass**
	Crosstalk										
Detector 8											

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Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
12:16 AM	**Efficiency**						33689.73	33564.38	1006.93	125.36	**Pass**
	Background										
	Crosstalk						16.587	16.400	3.440	0.187	**Pass**
12:19 AM	**Efficiency**	10739.43	10932.62	327.98	-193.19	**Pass**					
	Background										
	Crosstalk	3565.500	3644.120	113.075	-78.620	**Pass**					
3:54 AM	**Efficiency**										
	Background	0.135	0.096	0.039	0.039	**Pass**	0.385	0.411	0.066	-0.026	**Pass**
	Crosstalk										
Detector 9											
12:16 AM	**Efficiency**						33772.71	33894.25	1016.83	-121.54	**Pass**
	Background										
	Crosstalk						12.064	14.000	4.085	-1.936	**Pass**
12:19 AM	**Efficiency**	10124.88	10270.92	308.13	-146.04	**Pass**					
	Background										
	Crosstalk	3331.500	3336.480	71.578	-4.980	**Pass**					
3:54 AM	**Efficiency**										
	Background	0.150	0.141	0.053	0.009	**Pass**	0.470	0.454	0.117	0.016	**Pass**
	Crosstalk										
Detector 10											
12:16 AM	**Efficiency**						23229.07	23268.15	698.04	-39.08	**Pass**
	Background										
	Crosstalk						6.032	5.525	1.626	0.507	**Pass**
12:19 AM	**Efficiency**	8968.88	9314.42	279.43	-345.54	**FAIL**					
	Background										
	Crosstalk	5573.500	5412.260	206.903	161.240	**Pass**					
12:32 AM	**Efficiency**	8973.38	9314.42	279.43	-341.04	**FAIL**					
	Background										
	Crosstalk	5659.000	5412.260	206.903	246.740	**Pass**					

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Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
3:54 AM	**Efficiency**										
	Background	0.100	0.117	0.045	-0.017	**Pass**	0.450	0.469	0.118	-0.019	**Pass**
	Crosstalk										
Detector 11											
12:16 AM	**Efficiency**						30557.74	29987.20	899.62	570.54	**Pass**
	Background										
	Crosstalk						10.053	15.700	2.687	-5.647	**WARNING**
12:19 AM	**Efficiency**	10777.45	10755.42	322.66	22.03	**Pass**					
	Background										
	Crosstalk	3335.000	3246.680	84.085	88.320	**Pass**					
3:54 AM	**Efficiency**										
	Background	0.160	0.122	0.042	0.038	**Pass**	0.505	0.532	0.085	-0.027	**Pass**
	Crosstalk										
Detector 12											
12:16 AM	**Efficiency**						25920.56	25927.73	777.83	-7.16	**Pass**
	Background										
	Crosstalk						14.577	12.950	1.629	1.627	**Pass**
12:19 AM	**Efficiency**	10838.47	11039.74	331.19	-201.27	**Pass**					
	Background										
	Crosstalk	3574.500	3628.500	68.433	-54.000	**Pass**					
3:54 AM	**Efficiency**										
	Background	0.100	0.119	0.050	-0.019	**Pass**	0.515	0.498	0.092	0.017	**Pass**
	Crosstalk										
Detector 13											
12:16 AM	**Efficiency**						22071.08	22266.53	668.00	-195.45	**Pass**
	Background										
	Crosstalk						13.069	14.975	3.432	-1.906	**Pass**

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Gas Proportional Counter Daily Quality Control Checks

Friday, May 23, 2014

Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
12:19 AM	**Efficiency**	11077.18	11233.00	336.99	-155.82	**Pass**					
	Background										
	Crosstalk	3561.500	3521.820	75.777	39.680	**Pass**					
3:54 AM	**Efficiency**										
	Background	0.155	0.163	0.058	-0.008	**Pass**	0.520	0.499	0.101	0.021	**Pass**
	Crosstalk										
Detector 15											
12:16 AM	**Efficiency**						27359.25	27467.78	824.03	-108.53	**Pass**
	Background										
	Crosstalk						17.090	21.400	5.218	-4.310	**Pass**
12:19 AM	**Efficiency**	11678.25	11797.00	353.91	-118.75	**Pass**					
	Background										
	Crosstalk	3487.500	3542.000	85.963	-54.500	**Pass**					
3:54 AM	**Efficiency**										
	Background	0.135	0.137	0.054	-0.002	**Pass**	0.555	0.437	0.083	0.118	**Pass**
	Crosstalk										
Detector 16											
12:22 AM	**Efficiency**						33549.11	33491.33	1004.74	57.79	**Pass**
	Background										
	Crosstalk						22.619	32.800	8.069	-10.181	**Pass**
12:26 AM	**Efficiency**	10599.79	10824.14	324.72	-224.35	**Pass**					
	Background										
	Crosstalk	3427.500	3496.320	67.571	-68.820	**Pass**					
3:54 AM	**Efficiency**										
	Background	0.130	0.128	0.037	0.002	**Pass**	0.555	0.442	0.061	0.113	**Pass**
	Crosstalk										
Detector 17											

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Gas Proportional Counter Daily Quality Control Checks

Friday, May 23, 2014

Instrument: Orange

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
12:22 AM	**Efficiency**						33190.23	33457.18	1003.72	-266.94	**Pass**
	Background										
	Crosstalk						15.079	13.975	2.967	1.104	**Pass**
12:26 AM	**Efficiency**	10003.78	10056.48	301.69	-52.70	**Pass**					
	Background										
	Crosstalk	3420.500	3425.740	60.289	-5.240	**Pass**					
3:54 AM	**Efficiency**										
	Background	0.130	0.151	0.048	-0.021	**Pass**	0.360	0.438	0.089	-0.078	**Pass**
	Crosstalk										
Detector 18											
12:22 AM	**Efficiency**						23119.88	23209.68	696.29	-89.79	**Pass**
	Background										
	Crosstalk						12.566	16.100	4.093	-3.534	**Pass**
12:26 AM	**Efficiency**	10836.49	11053.86	331.62	-217.37	**Pass**					
	Background										
	Crosstalk	3613.000	3611.520	52.801	1.480	**Pass**					
3:54 AM	**Efficiency**										
	Background	0.095	0.109	0.050	-0.014	**Pass**	0.355	0.426	0.077	-0.071	**Pass**
	Crosstalk										
Detector 19											
12:22 AM	**Efficiency**						31034.99	30982.63	929.48	52.36	**Pass**
	Background										
	Crosstalk						13.572	16.650	4.107	-3.078	**Pass**
12:26 AM	**Efficiency**	10948.02	11009.96	330.30	-61.94	**Pass**					
	Background										
	Crosstalk	3753.500	3716.300	50.984	37.200	**Pass**					
3:54 AM	**Efficiency**										
	Background	0.055	0.092	0.031	-0.037	**Pass**	0.335	0.380	0.083	-0.045	**Pass**
	Crosstalk										

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Gas Proportional Counter Daily Quality Control Checks

Friday, May 23, 2014

Instrument: Orange

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
Detector 20											
12:22 AM	**Efficiency**						25842.34	25820.98	774.63	21.37	**Pass**
	Background										
	Crosstalk						15.079	20.300	5.444	-5.221	**Pass**
12:26 AM	**Efficiency**	10789.45	10934.68	328.04	-145.23	**Pass**					
	Background										
	Crosstalk	3616.000	3574.300	107.105	41.700	**Pass**					
3:54 AM	**Efficiency**										
	Background	0.085	0.097	0.035	-0.012	**Pass**	0.380	0.375	0.071	0.005	**Pass**
	Crosstalk										
Detector 21											
12:22 AM	**Efficiency**						22051.38	22199.20	665.98	-147.82	**Pass**
	Background										
	Crosstalk						10.556	13.000	2.763	-2.444	**Pass**
12:26 AM	**Efficiency**	11067.22	11170.12	335.10	-102.90	**Pass**					
	Background										
	Crosstalk	3762.500	3672.660	78.069	89.840	**Pass**					
3:54 AM	**Efficiency**										
	Background	0.070	0.101	0.032	-0.031	**Pass**	0.350	0.325	0.064	0.025	**Pass**
	Crosstalk										
Detector 22											
12:22 AM	**Efficiency**						29118.92	29331.13	879.93	-212.20	**Pass**
	Background										
	Crosstalk						10.053	13.075	3.867	-3.022	**Pass**
12:26 AM	**Efficiency**	10748.94	10918.70	327.56	-169.76	**Pass**					
	Background										
	Crosstalk	3536.000	3612.240	230.452	-76.240	**Pass**					

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Gas Proportional Counter Daily Quality Control Checks

Friday, May 23, 2014

Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
3:54 AM	**Efficiency**										
	Background	0.125	0.100	0.032	0.026	**Pass**	0.355	0.381	0.079	-0.026	**Pass**
	Crosstalk										
Detector 23											
12:22 AM	**Efficiency**						27563.97	27644.68	829.34	-80.71	**Pass**
	Background										
	Crosstalk						4.021	13.125	3.128	-9.104	**WARNING**
12:26 AM	**Efficiency**	11544.76	11544.58	346.34	0.19	**Pass**					
	Background										
	Crosstalk	3663.500	3809.981	484.264	-146.481	**Pass**					
3:54 AM	**Efficiency**										
	Background	0.120	0.105	0.049	0.016	**Pass**	0.505	0.446	0.115	0.059	**Pass**
	Crosstalk										

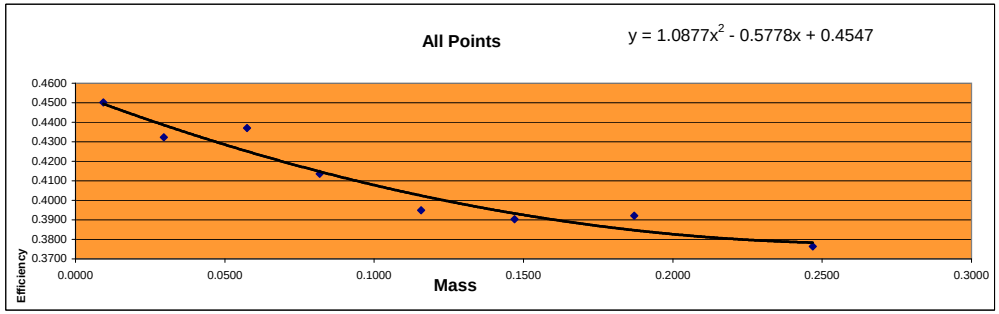
Alpha Beta Calibrations

Curve is for Gross Beta
Strontium 90
and
Total Strontium

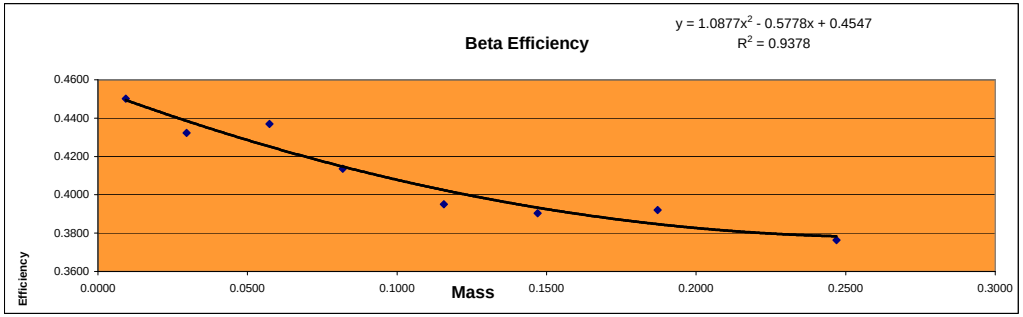
Orange 4

Detector ID	Std ID	Count Date	Sample Wt	Count Time	Beta Counts	DPM 41588.469 CPM	Sr-90 Eff	Standard Aliquot
4	B1	1/23/2013 15:18	0.0093	5	93592	18718.400	0.4501	1mL
4	B2	1/23/2013 15:09	0.0296	5	89877	17975.400	0.4322	1mL
4	B3	1/23/2013 15:00	0.0574	5	90869	18173.800	0.4370	1mL
4	B4	1/23/2013 14:53	0.0818	5	86007	17201.400	0.4136	1mL
4	B5	1/23/2013 14:45	0.1157	5	82135	16427.000	0.3950	1mL
4	B6	1/23/2013 15:46	0.1470	5	81161	16232.200	0.3903	1mL
4	B7	1/23/2013 15:37	0.1871	5	81527	16305.400	0.3921	1mL
4	B8	1/23/2013 15:27	0.2469	5	78270	15654.000	0.3764	1mL

Mass	Measured Efficiency	Theoretical Efficiency	Percent Δ Efficiency
0.0093	0.4501	0.4494	0.15%
0.0296	0.4322	0.4386	-1.44%
0.0574	0.4370	0.4251	2.79%
0.0818	0.4136	0.4147	-0.27%
0.1157	0.3950	0.4024	-1.84%
0.1470	0.3903	0.3933	-0.75%
0.1871	0.3921	0.3847	1.92%
0.2469	0.3764	0.3783	-0.51%



Mass	Efficiency
0.0093	0.4501
0.0296	0.4322
0.0574	0.4370
0.0818	0.4136
0.1157	0.3950
0.1470	0.3903
0.1871	0.3921
0.2469	0.3764



Standard ID
Strontium 90
Sr-90_00004 #6322
Cert# 80573-334 Ref. date 9/172009

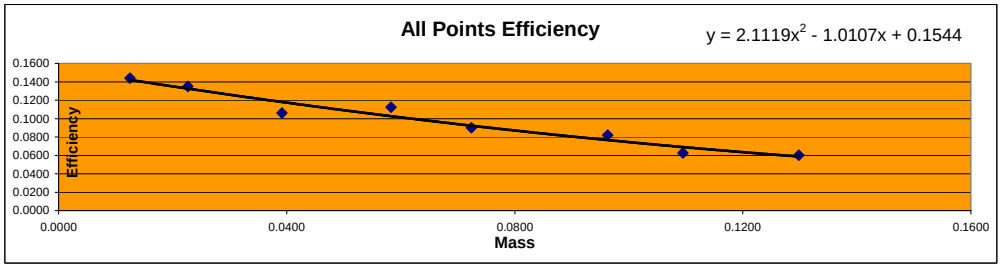
Initial Activity:	22560	dpm/mL
Reference Date:	9/17/2009	
Count Date:	1/23/2013	
Elapsed Time:	1224.000	days
Half Life:	10409.625	days
Exponential Term:	0.921730256	
Corrected Activity:	20794.23458	dpm/mL
Decay Activity (Sr/Y-90)	41588.46916	dpm

Curve is for Gross Alpha

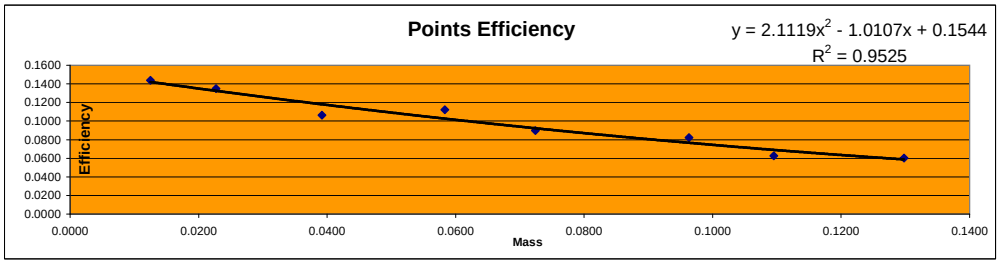
Orange 4

Detector ID	Sample ID	Count Date	Mass	Count Time	Alpha Counts	Net CPM	DPM	Th-230 Efficiency	Standard Aliquot
4	A1	7/18/2013 19:58	0.0125	40	13668	341.700	2374.5	0.1439	1mL
4	A2	7/18/2013 18:30	0.0227	40	12813	320.325	2374.5	0.1349	1mL
4	A3	7/18/2013 17:29	0.0392	40	10088	252.200	2374.5	0.1062	1mL
4	A4	7/23/2013 16:41	0.0583	50	13318	266.360	2374.5	0.1122	1mL
4	A5	7/18/2013 15:43	0.0724	40	17085	427.125	4749.0	0.0899	2mL
4	A6	7/18/2013 22:47	0.0963	40	15616	390.400	4749.0	0.0822	2mL
4	A7	7/18/2013 21:52	0.1095	40	11874	296.850	4749.0	0.0625	2mL
4	A8	7/18/2013 21:01	0.1298	40	11426	285.650	4749.0	0.0601	2mL

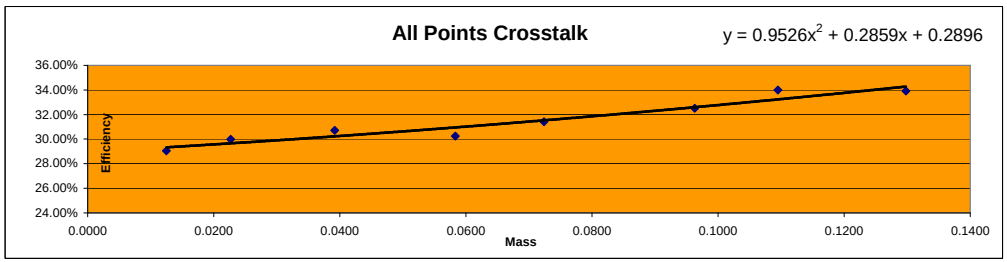
Mass	Measured Efficiency	Theoretical Efficiency	Percent Δ Efficiency
0.0125	0.1439	0.1421	1.27%
0.0227	0.1349	0.1325	1.78%
0.0392	0.1062	0.1180	-10.01%
0.0583	0.1122	0.1027	9.28%
0.0724	0.0899	0.0923	-2.55%
0.0963	0.0822	0.0766	7.25%
0.1095	0.0625	0.0690	-9.46%
0.1298	0.0601	0.0588	2.33%



Mass	Efficiency
0.0125	0.1439
0.0227	0.1349
0.0392	0.1062
0.0583	0.1122
0.0724	0.0899
0.0963	0.0822
0.1095	0.0625
0.1298	0.0601



Detector ID	Sample ID	Mass	Count Time	Alpha Counts	Beta Counts	Alpha CPM	Beta CPM	% α into β	
4	A1	0.0125	40.00	13668	5598	341.70	139.95	29.06%	Min
4	A2	0.0227	40.00	12813	5488	320.33	137.20	29.99%	29.06%
4	A3	0.0392	40.00	10088	4470	252.20	111.75	30.70%	
4	A4	0.0583	40.00	13318	5772	332.95	144.30	30.24%	Max
4	A5	0.0724	40.00	17085	7826	427.13	195.65	31.42%	34.00%
4	A6	0.0963	40.00	15616	7519	390.40	187.98	32.50%	
4	A7	0.1095	40.00	11874	6117	296.85	152.93	34.00%	Mean
4	A8	0.1298	40.00	11426	5864	285.65	146.60	33.92%	31.48%



Standard ID
Thorium-230
Th-230_00016 #51465
Cert # 92523 Ref. date 11/29/2012
Activity 2374.5 dpm/mL

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICABT-6322;B5

Repeat 39

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 2:45:11 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 2:50:20 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.049	0	0.000	-0.049
sd	0.000			0.007	0.000	0.000	0.140
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.380	82,135	16,427.000	16,426.620
sd	0.000			0.019	286.592	57.318	57.318

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICABT-6322;B4

Repeat 41

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 2:53:19 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 2:58:29 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.049	0	0.000	-0.049
sd	0.000			0.007	0.000	0.000	0.140
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.380	86,007	17,201.400	17,201.020
sd	0.000			0.019	293.270	58.654	58.654

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICABT-6322;B3 **Repeat** 42

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 1/23/2013 3:00:53 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 1/23/2013 3:06:03 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.049	3	0.600	0.551
sd	0.000			0.007	1.732	0.346	0.346
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.380	90,869	18,173.800	18,173.420
sd	0.000			0.019	301.445	60.289	60.289

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICABT-6322;B2

Repeat 43

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 3:09:08 PM

Count Ended 1/23/2013 3:14:17 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 *days*

Decay Factor 1.000

Sample Count Time 5.00 *mins*

Background Count Time 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.049	1	0.200	0.151
sd	0.000			0.007	1.000	0.200	0.200
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.380	89,877	17,975.400	17,975.020
sd	0.000			0.019	299.795	59.959	59.959

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICABT-6322;B1 **Repeat** 44

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 1/23/2013 3:18:54 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 1/23/2013 3:24:03 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.049	3	0.600	0.551
sd	0.000			0.007	1.732	0.346	0.346
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.380	93,592	18,718.400	18,718.020
sd	0.000			0.019	305.928	61.186	61.186

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICABT-6322;B8 **Repeat** 44

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 1/23/2013 3:27:10 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 1/23/2013 3:32:17 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.049	1	0.200	0.151
sd	0.000			0.007	1.000	0.200	0.200
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.380	78,270	15,654.000	15,653.620
sd	0.000			0.019	279.768	55.954	55.954

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICABT-6322;B7

Repeat 45

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 3:37:27 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 3:42:36 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.049	1	0.200	0.151
sd	0.000			0.007	1.000	0.200	0.200
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.380	81,527	16,305.400	16,305.020
sd	0.000			0.019	285.529	57.106	57.106

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICABT-6322;B6 **Repeat** 46

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 3:46:21 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 3:51:30 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.049	1	0.200	0.151
sd	0.000			0.007	1.000	0.200	0.200
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.380	81,161	16,232.200	16,231.820
sd	0.000			0.019	284.888	56.978	56.978

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICABT-51465;A5 **Repeat** 9

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/18/2013 3:43:52 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/18/2013 4:23:58 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.068	17,085	427.125	427.057
sd	0.000			0.008	130.710	3.268	3.268
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.386	7,826	195.650	195.264
sd	0.000			0.020	88.465	2.212	2.212

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICABT-51465;A3 **Repeat** 11

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/18/2013 5:29:23 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/18/2013 6:09:28 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.068	10,088	252.200	252.132
sd	0.000			0.008	100.439	2.511	2.511
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.386	4,470	111.750	111.364
sd	0.000			0.020	66.858	1.671	1.672

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICABT-51465;A2

Repeat 12

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 7/18/2013 6:30:54 PM

Count Ended 7/18/2013 7:10:59 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 40.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.068	12,813	320.325	320.257
sd	0.000			0.008	113.195	2.830	2.830
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.386	5,488	137.200	136.814
sd	0.000			0.020	74.081	1.852	1.852

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICABT-51465;A1 **Repeat** 13

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/18/2013 7:58:42 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/18/2013 8:38:46 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.068	13,668	341.700	341.632
sd	0.000			0.008	116.910	2.923	2.923
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.386	5,598	139.950	139.564
sd	0.000			0.020	74.820	1.870	1.871

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICABT-51465;A8 **Repeat** 14

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/18/2013 9:01:01 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/18/2013 9:41:05 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.068	11,426	285.650	285.582
sd	0.000			0.008	106.892	2.672	2.672
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.386	5,864	146.600	146.214
sd	0.000			0.020	76.577	1.914	1.915

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICABT-51465;A7

Repeat 15

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/18/2013 9:52:28 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/18/2013 10:32:33 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.068	11,874	296.850	296.782
sd	0.000			0.008	108.968	2.724	2.724
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.386	6,117	152.925	152.539
sd	0.000			0.020	78.211	1.955	1.955

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICABT-51465;A6

Repeat 16

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/18/2013 10:47:01 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/18/2013 11:27:07 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.068	15,616	390.400	390.332
sd	0.000			0.008	124.964	3.124	3.124
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.386	7,519	187.975	187.589
sd	0.000			0.020	86.712	2.168	2.168

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICABT-51465;A4 **Repeat** 18

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/23/2013 4:41:18 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/23/2013 5:31:23 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 50.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.068	13,318	266.360	266.292
sd	0.000			0.008	115.404	2.308	2.308
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.386	5,772	115.440	115.054
sd	0.000			0.020	75.974	1.519	1.520

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

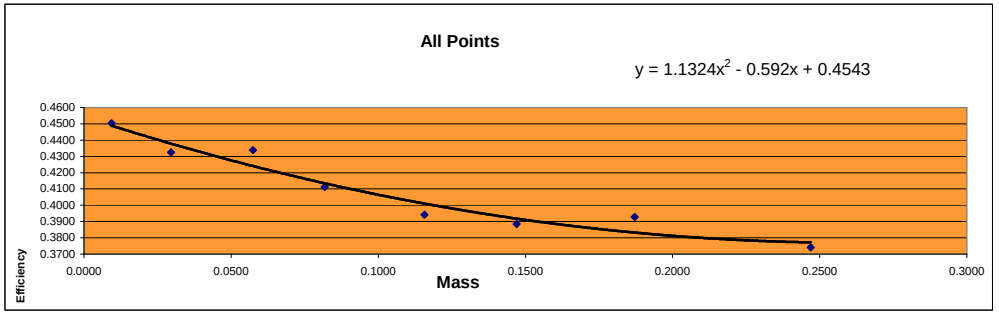
*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Curve is for Gross Beta
Strontium 90
and
Total Strontium

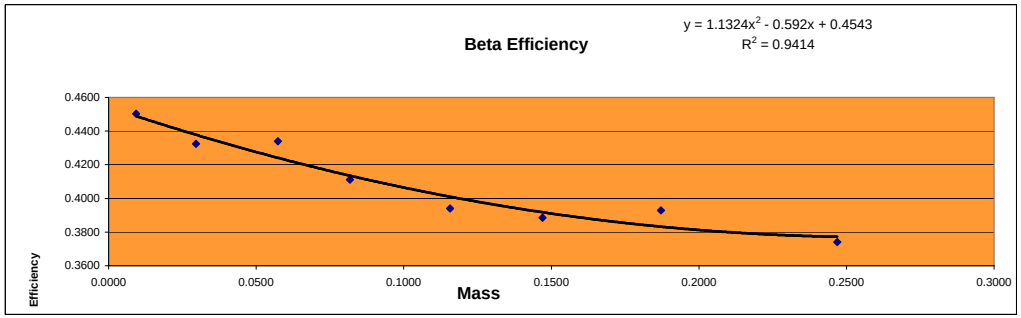
Orange 6

Detector ID	Std ID	Count Date	Sample Wt	Count Time	Beta Counts	DPM 41588.469 CPM	Sr-90 Eff	Standard Aliquot
6	B1	1/23/2013 15:37	0.0093	5	93641	18728.200	0.4503	1mL
6	B2	1/23/2013 15:26	0.0296	5	89937	17987.400	0.4325	1mL
6	B3	1/23/2013 15:19	0.0574	5	90226	18045.200	0.4339	1mL
6	B4	1/23/2013 15:09	0.0818	5	85509	17101.800	0.4112	1mL
6	B5	1/23/2013 15:01	0.1157	5	81949	16389.800	0.3941	1mL
6	B6	1/23/2013 14:53	0.1470	5	80794	16158.800	0.3885	1mL
6	B7	1/23/2013 14:45	0.1871	5	81699	16339.800	0.3929	1mL
6	B8	1/23/2013 15:46	0.2469	5	77798	15559.600	0.3741	1mL

Mass	Measured Efficiency	Theoretical Efficiency	Percent Δ Efficiency
0.0093	0.4503	0.4489	0.32%
0.0296	0.4325	0.4378	-1.20%
0.0574	0.4339	0.4241	2.32%
0.0818	0.4112	0.4135	-0.54%
0.1157	0.3941	0.4010	-1.71%
0.1470	0.3885	0.3917	-0.82%
0.1871	0.3929	0.3832	2.54%
0.2469	0.3741	0.3772	-0.80%



Mass	Efficiency
0.0093	0.4503
0.0296	0.4325
0.0574	0.4339
0.0818	0.4112
0.1157	0.3941
0.1470	0.3885
0.1871	0.3929
0.2469	0.3741



Standard ID
Strontium 90
Sr-90_00004 #6322
Cert# 80573-334 Ref. date 9/172009

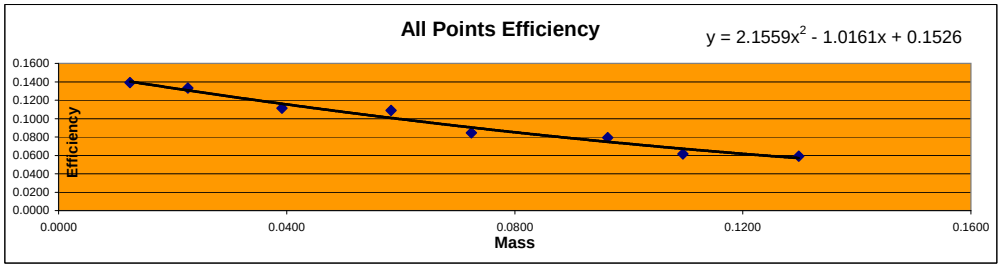
Initial Activity:	22560 dpm/mL
Reference Date:	9/17/2009
Count Date:	1/23/2013
Elapsed Time:	1224.000 days
Half Life:	10409.625 days
Exponential Term:	0.921730256
Corrected Activity:	20794.23458 dpm/mL
Decay Activity (Sr/Y-90)	41588.46916 dpm

Curve is for Gross Alpha

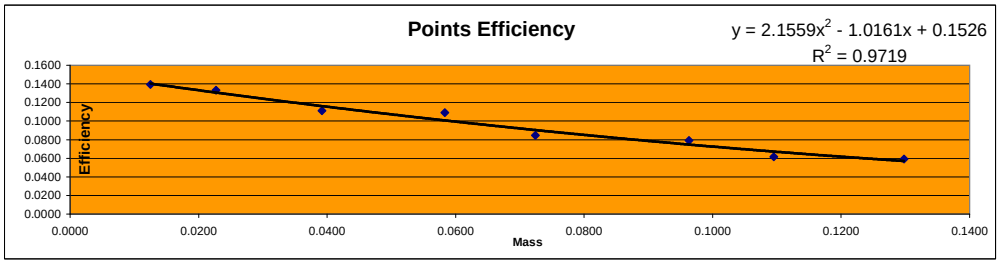
Orange 6

Detector ID	Sample ID	Count Date	Mass	Count Time	Alpha Counts	Net CPM	DPM	Th-230 Efficiency	Standard Aliquot
6	A1	7/18/2013 21:52	0.0125	40	13222	330.550	2374.5	0.1392	1mL
6	A2	7/18/2013 21:01	0.0227	40	12646	316.150	2374.5	0.1331	1mL
6	A3	7/23/2013 16:41	0.0392	50	13208	264.160	2374.5	0.1112	1mL
6	A4	7/23/2013 18:58	0.0583	50	12933	258.660	2374.5	0.1089	1mL
6	A5	7/18/2013 17:29	0.0724	40	16087	402.175	4749.0	0.0847	2mL
6	A6	7/18/2013 16:37	0.0963	40	15054	376.350	4749.0	0.0792	2mL
6	A7	7/18/2013 15:44	0.1095	40	11713	292.825	4749.0	0.0617	2mL
6	A8	7/18/2013 22:47	0.1298	40	11212	280.300	4749.0	0.0590	2mL

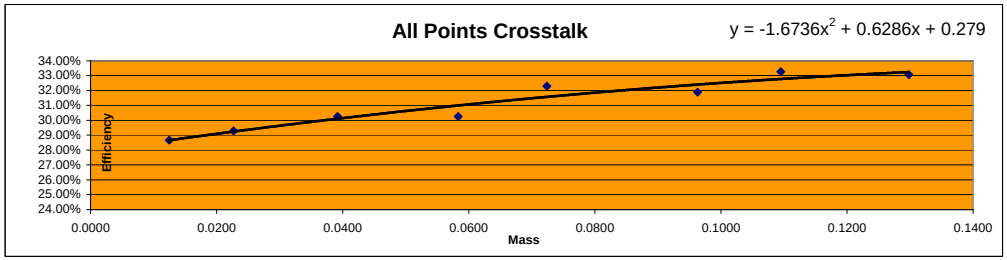
Mass	Measured Efficiency	Theoretical Efficiency	Percent Δ Efficiency
0.0125	0.1392	0.1402	-0.73%
0.0227	0.1331	0.1306	1.91%
0.0392	0.1112	0.1161	-4.16%
0.0583	0.1089	0.1007	8.19%
0.0724	0.0847	0.0903	-6.25%
0.0963	0.0792	0.0747	6.03%
0.1095	0.0617	0.0672	-8.23%
0.1298	0.0590	0.0570	3.49%



Mass	Efficiency
0.0125	0.1392
0.0227	0.1331
0.0392	0.1112
0.0583	0.1089
0.0724	0.0847
0.0963	0.0792
0.1095	0.0617
0.1298	0.0590



Detector ID	Sample ID	Mass	Count Time	Alpha Counts	Beta Counts	Alpha CPM	Beta CPM	% α into β	
6	A1	0.0125	40.00	13222	5313	330.55	132.83	28.66%	Min
6	A2	0.0227	40.00	12646	5241	316.15	131.03	29.30%	28.66%
6	A3	0.0392	40.00	13208	5728	330.20	143.20	30.25%	
6	A4	0.0583	40.00	12933	5609	323.33	140.23	30.25%	Max
6	A5	0.0724	40.00	16087	7677	402.18	191.93	32.31%	33.28%
6	A6	0.0963	40.00	15054	7051	376.35	176.28	31.90%	
6	A7	0.1095	40.00	11713	5842	292.83	146.05	33.28%	Mean
6	A8	0.1298	40.00	11212	5542	280.30	138.55	33.08%	31.13%



Standard ID
Thorium-230
Th-230_00016 #51465
Cert # 92523 Ref. date 11/29/2012
Activity 2374.5 dpm/mL

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICABT-6322;B7

Repeat 39

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 2:45:20 PM

Count Ended 1/23/2013 2:50:29 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 *days*

Decay Factor 1.000

Sample Count Time 5.00 *mins*

Background Count Time 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.073	0	0.000	-0.073
sd	0.000			0.009	0.000	0.000	0.171
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.346	81,699	16,339.800	16,339.454
sd	0.000			0.019	285.830	57.166	57.166

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICABT-6322;B6

Repeat 40

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 2:53:29 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 2:58:38 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.073	1	0.200	0.127
sd	0.000			0.009	1.000	0.200	0.200
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.346	80,794	16,158.800	16,158.454
sd	0.000			0.019	284.243	56.849	56.849

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICABT-6322;B5

Repeat 41

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 3:01:02 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 3:06:12 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.073	2	0.400	0.327
sd	0.000			0.009	1.414	0.283	0.283
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.346	81,949	16,389.800	16,389.454
sd	0.000			0.019	286.267	57.253	57.253

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICABT-6322;B4 **Repeat** 43

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 3:09:16 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 3:14:26 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.073	4	0.800	0.727
sd	0.000			0.009	2.000	0.400	0.400
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.346	85,509	17,101.800	17,101.454
sd	0.000			0.019	292.419	58.484	58.484

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICABT-6322;B3 **Repeat** 44

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 ***l*** **sd** 0 ***l***

Residual Wt 0 ***mg*** **sd** 0 ***mg***

Count Began 1/23/2013 3:19:05 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 1/23/2013 3:24:15 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.073	2	0.400	0.327
sd	0.000			0.009	1.414	0.283	0.283
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.346	90,226	18,045.200	18,044.854
sd	0.000			0.019	300.376	60.075	60.075

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICABT-6322;B2

Repeat 45

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 3:26:42 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 3:31:52 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.073	1	0.200	0.127
sd	0.000			0.009	1.000	0.200	0.200
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.346	89,937	17,987.400	17,987.054
sd	0.000			0.019	299.895	59.979	59.979

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICABT-6322;B1 **Repeat** 46

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 3:37:38 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 3:42:48 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.073	0	0.000	-0.073
sd	0.000			0.009	0.000	0.000	0.171
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.346	93,641	18,728.200	18,727.854
sd	0.000			0.019	306.008	61.202	61.202

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICABT-6322;B8

Repeat 46

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 3:46:31 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 3:51:39 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.073	1	0.200	0.127
sd	0.000			0.009	1.000	0.200	0.200
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.346	77,798	15,559.600	15,559.254
sd	0.000			0.019	278.923	55.785	55.785

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICABT-51465;A7 **Repeat** 9

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/18/2013 3:44:02 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/18/2013 4:24:07 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.081	11,713	292.825	292.744
sd	0.000			0.009	108.227	2.706	2.706
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.461	5,842	146.050	145.589
sd	0.000			0.021	76.433	1.911	1.911

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICABT-51465;A6

Repeat 10

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/18/2013 4:37:49 PM

Count Ended 7/18/2013 5:17:54 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 *days*

Decay Factor 1.000

Sample Count Time 40.00 *mins*

Background Count Time 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.081	15,054	376.350	376.269
sd	0.000			0.009	122.695	3.067	3.067
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.461	7,051	176.275	175.814
sd	0.000			0.021	83.970	2.099	2.099

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICABT-51465;A5 **Repeat** 11

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/18/2013 5:29:34 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/18/2013 6:09:40 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.081	16,087	402.175	402.094
sd	0.000			0.009	126.835	3.171	3.171
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.461	7,677	191.925	191.464
sd	0.000			0.021	87.618	2.190	2.191

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICABT-51465;A2

Repeat 14

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/18/2013 9:01:09 PM

Count Ended 7/18/2013 9:41:14 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 *days*

Decay Factor 1.000

Sample Count Time 40.00 *mins*

Background Count Time 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.081	12,646	316.150	316.069
sd	0.000			0.009	112.454	2.811	2.811
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.461	5,241	131.025	130.564
sd	0.000			0.021	72.395	1.810	1.810

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICABT-51465;A1

Repeat 15

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 7/18/2013 9:52:37 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 7/18/2013 10:32:42 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.081	13,222	330.550	330.469
sd	0.000			0.009	114.987	2.875	2.875
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.461	5,313	132.825	132.364
sd	0.000			0.021	72.890	1.822	1.822

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICABT-51465;A8 **Repeat** 16

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/18/2013 10:47:10 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/18/2013 11:27:14 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.081	11,212	280.300	280.219
sd	0.000			0.009	105.887	2.647	2.647
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.461	5,542	138.550	138.089
sd	0.000			0.021	74.445	1.861	1.861

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICABT-51465;A3 **Repeat** 18

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/23/2013 4:41:28 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/23/2013 5:31:33 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 50.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.081	13,208	264.160	264.079
sd	0.000			0.009	114.926	2.299	2.299
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.461	5,728	114.560	114.099
sd	0.000			0.021	75.684	1.514	1.514

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICABT-51465;A4

Repeat 20

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/23/2013 6:58:19 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/23/2013 7:48:24 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 50.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.081	12,933	258.660	258.579
sd	0.000			0.009	113.723	2.274	2.274
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.461	5,609	112.180	111.719
sd	0.000			0.021	74.893	1.498	1.498

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

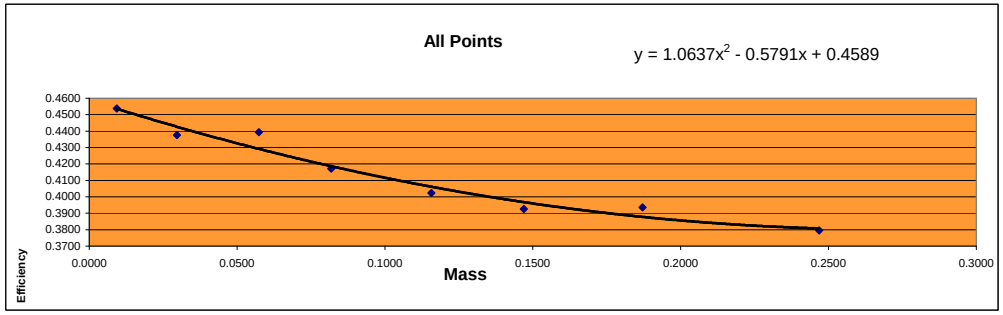
*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Curve is for Gross Beta
Strontium 90
and
Total Strontium

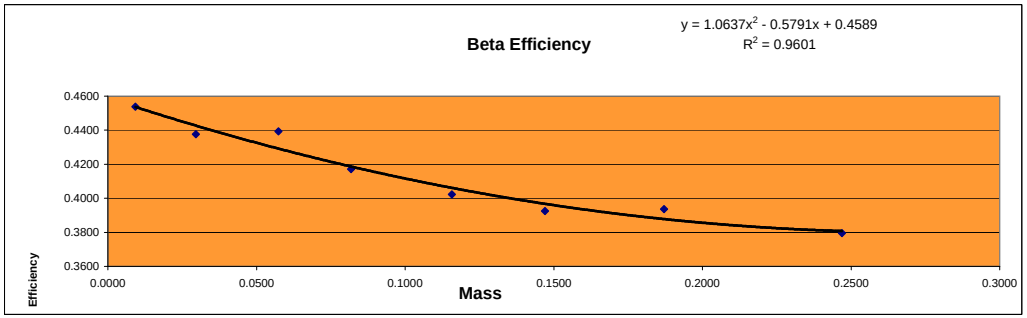
Orange 8

Detector ID	Std ID	Count Date	Sample Wt	Count Time	Beta Counts	DPM 41588.469 CPM	Sr-90 Eff	Standard Aliquot
8	B1	1/23/2013 14:27	0.0093	5	94371	18874.200	0.4538	1mL
8	B2	1/23/2013 17:27	0.0296	5	90984	18196.800	0.4375	1mL
8	B3	1/23/2013 17:19	0.0574	5	91341	18268.200	0.4393	1mL
8	B4	1/23/2013 17:12	0.0818	5	86724	17344.800	0.4171	1mL
8	B5	1/23/2013 17:05	0.1157	5	83645	16729.000	0.4023	1mL
8	B6	1/23/2013 16:58	0.1470	5	81633	16326.600	0.3926	1mL
8	B7	1/23/2013 16:47	0.1871	5	81845	16369.000	0.3936	1mL
8	B8	1/23/2013 14:37	0.2469	5	78908	15781.600	0.3795	1mL

Mass	Measured Efficiency	Theoretical Efficiency	Percent Δ Efficiency
0.0093	0.4538	0.4536	0.05%
0.0296	0.4375	0.4427	-1.16%
0.0574	0.4393	0.4292	2.35%
0.0818	0.4171	0.4186	-0.38%
0.1157	0.4023	0.4061	-0.96%
0.1470	0.3926	0.3968	-1.05%
0.1871	0.3936	0.3878	1.50%
0.2469	0.3795	0.3808	-0.34%



Mass	Efficiency
0.0093	0.4538
0.0296	0.4375
0.0574	0.4393
0.0818	0.4171
0.1157	0.4023
0.1470	0.3926
0.1871	0.3936
0.2469	0.3795



Standard ID
Strontium 90
Sr-90_00004 #6322
Cert# 80573-334 Ref. date 9/172009

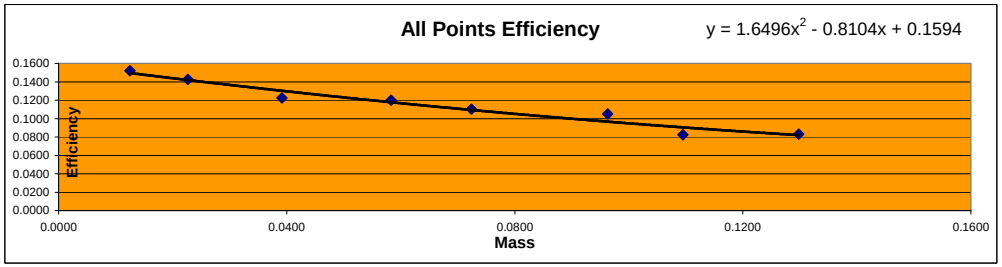
Initial Activity:	22560 dpm/mL
Reference Date:	9/17/2009
Count Date:	1/23/2013
Elapsed Time:	1224.000 days
Half Life:	10409.625 days
Exponential Term:	0.921730256
Corrected Activity:	20794.23458 dpm/mL
Decay Activity (Sr/Y-90)	41588.46916 dpm

Curve is for Gross Alpha

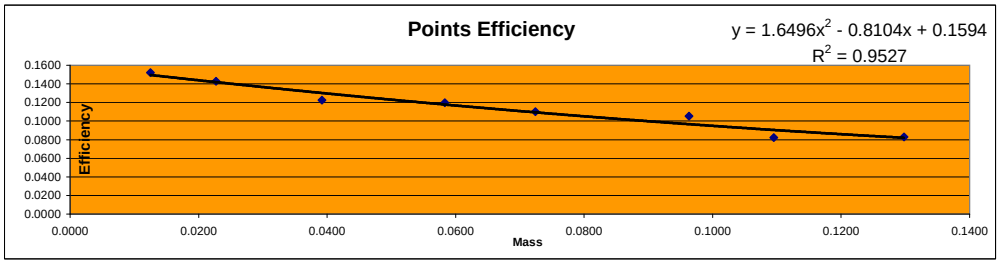
Orange 8

Detector ID	Sample ID	Count Date	Mass	Count Time	Alpha Counts	Net CPM	DPM	Th-230 Efficiency	Standard Aliquot
8	A1	7/24/2013 8:46	0.0125	50	18041	360.820	2374.5	0.1520	1mL
8	A2	7/24/2013 18:31	0.0227	50	16948	338.960	2374.5	0.1428	1mL
8	A3	7/24/2013 17:29	0.0392	50	14549	290.980	2374.5	0.1225	1mL
8	A4	7/24/2013 16:36	0.0583	50	14235	284.700	2374.5	0.1199	1mL
8	A5	7/24/2013 15:14	0.0724	50	26144	522.880	4749.0	0.1101	2mL
8	A6	7/24/2013 11:45	0.0963	50	24983	499.660	4749.0	0.1052	2mL
8	A7	7/24/2013 10:46	0.1095	50	19565	391.300	4749.0	0.0824	2mL
8	A8	7/24/2013 9:53	0.1298	50	19719	394.380	4749.0	0.0830	2mL

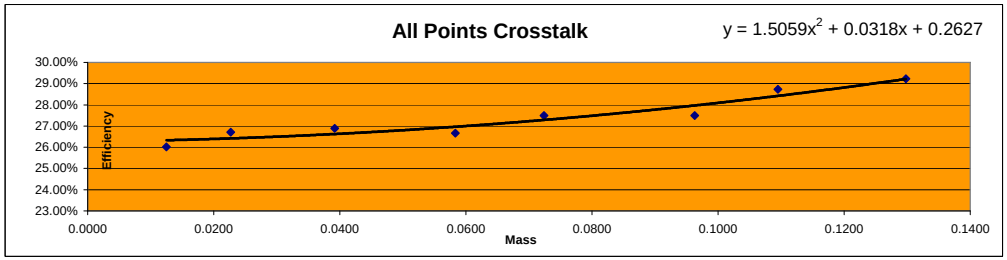
Mass	Measured Efficiency	Theoretical Efficiency	Percent Δ Efficiency
0.0125	0.1520	0.1495	1.62%
0.0227	0.1428	0.1419	0.63%
0.0392	0.1225	0.1302	-5.86%
0.0583	0.1199	0.1178	1.82%
0.0724	0.1101	0.1094	0.67%
0.0963	0.1052	0.0967	8.85%
0.1095	0.0824	0.0904	-8.89%
0.1298	0.0830	0.0820	1.27%



Mass	Efficiency
0.0125	0.1520
0.0227	0.1428
0.0392	0.1225
0.0583	0.1199
0.0724	0.1101
0.0963	0.1052
0.1095	0.0824
0.1298	0.0830



Detector ID	Sample ID	Mass	Count Time	Alpha Counts	Beta Counts	Alpha CPM	Beta CPM	% α into β	
8	A1	0.0125	40.00	18041	6343	451.03	158.58	26.01%	Min
8	A2	0.0227	40.00	16948	6179	423.70	154.48	26.72%	26.01%
8	A3	0.0392	40.00	14549	5352	363.73	133.80	26.89%	
8	A4	0.0583	40.00	14235	5176	355.88	129.40	26.67%	Max
8	A5	0.0724	40.00	26144	9918	653.60	247.95	27.50%	29.22%
8	A6	0.0963	40.00	24983	9474	624.58	236.85	27.50%	
8	A7	0.1095	40.00	19565	7888	489.13	197.20	28.73%	Mean
8	A8	0.1298	40.00	19719	8142	492.98	203.55	29.22%	27.41%



Standard ID
Thorium-230
Th-230_00016 #51465
Cert # 92523 Ref. date 11/29/2012
Activity 2374.5 dpm/mL

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICABT-6322;B1

Repeat 38

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 1/23/2013 2:27:39 PM

Count Ended 1/23/2013 2:32:50 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 5.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.030	16	3.200	3.170
sd	0.000			0.005	4.000	0.800	0.800
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.315	94,371	18,874.200	18,873.885
sd	0.000			0.018	307.199	61.440	61.440

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICABT-6322;B8

Repeat 38

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 1/23/2013 2:37:24 PM

Count Ended 1/23/2013 2:42:33 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 5.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.030	11	2.200	2.170
sd	0.000			0.005	3.317	0.663	0.663
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.315	78,908	15,781.600	15,781.285
sd	0.000			0.018	280.906	56.181	56.181

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICABT-6322;B7

Repeat 47

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 4:47:23 PM

Count Ended 1/23/2013 4:52:32 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 *days*

Decay Factor 1.000

Sample Count Time 5.00 *mins*

Background Count Time 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.030	16	3.200	3.170
sd	0.000			0.005	4.000	0.800	0.800
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.315	81,845	16,369.000	16,368.685
sd	0.000			0.018	286.086	57.217	57.217

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICABT-6322;B6

Repeat 48

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 1/23/2013 4:58:41 PM

Count Ended 1/23/2013 5:03:49 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 5.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.030	18	3.600	3.570
sd	0.000			0.005	4.243	0.849	0.849
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.315	81,633	16,326.600	16,326.285
sd	0.000			0.018	285.715	57.143	57.143

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICABT-6322;B5

Repeat 49

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 5:05:41 PM

Count Ended 1/23/2013 5:10:50 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 *days*

Decay Factor 1.000

Sample Count Time 5.00 *mins*

Background Count Time 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.030	20	4.000	3.970
sd	0.000			0.005	4.472	0.894	0.894
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.315	83,645	16,729.000	16,728.685
sd	0.000			0.018	289.214	57.843	57.843

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICABT-6322;B4

Repeat 51

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 1/23/2013 5:12:28 PM

Count Ended 1/23/2013 5:17:39 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 5.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.030	10	2.000	1.970
sd	0.000			0.005	3.162	0.632	0.632
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.315	86,724	17,344.800	17,344.485
sd	0.000			0.018	294.489	58.898	58.898

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICABT-6322;B3

Repeat 52

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 1/23/2013 5:19:14 PM

Count Ended 1/23/2013 5:24:23 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 5.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.030	8	1.600	1.570
sd	0.000			0.005	2.828	0.566	0.566
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.315	91,341	18,268.200	18,267.885
sd	0.000			0.018	302.227	60.445	60.445

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICABT-6322;B2

Repeat 53

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 5:27:46 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 5:32:58 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.030	18	3.600	3.570
sd	0.000			0.005	4.243	0.849	0.849
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.315	90,984	18,196.800	18,196.485
sd	0.000			0.018	301.636	60.327	60.327

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICABT-51465;A1 **Repeat** 17

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/24/2013 8:46:46 AM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/24/2013 9:36:52 AM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 50.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.034	18,041	360.820	360.786
sd	0.000			0.006	134.317	2.686	2.686
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.344	6,343	126.860	126.516
sd	0.000			0.019	79.643	1.593	1.593

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICABT-51465;A8 **Repeat** 18

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/24/2013 9:53:57 AM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/24/2013 10:44:03 AM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 50.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.034	19,719	394.380	394.346
sd	0.000			0.006	140.424	2.808	2.808
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.344	8,142	162.840	162.496
sd	0.000			0.019	90.233	1.805	1.805

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICABT-51465;A7 **Repeat** 19

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/24/2013 10:46:00 AM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/24/2013 11:36:05 AM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 50.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.034	19,565	391.300	391.266
sd	0.000			0.006	139.875	2.797	2.798
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.344	7,888	157.760	157.416
sd	0.000			0.019	88.814	1.776	1.776

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICABT-51465;A6

Repeat 20

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 7/24/2013 11:45:59 AM

Collection Date 1 1/1/1900

Half Life 0.00 ***days***

Count Ended 7/24/2013 12:36:06 PM

Collection Date 2 1/1/1900

Decay Factor 1.000

Sample Count Time 50.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.034	24,983	499.660	499.626
sd	0.000			0.006	158.060	3.161	3.161
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.344	9,474	189.480	189.136
sd	0.000			0.019	97.334	1.947	1.947

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICABT-51465;A5

Repeat 21

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 7/24/2013 3:14:15 PM

Count Ended 7/24/2013 4:04:22 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 50.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.034	26,144	522.880	522.846
sd	0.000			0.006	161.691	3.234	3.234
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.344	9,918	198.360	198.016
sd	0.000			0.019	99.589	1.992	1.992

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICABT-51465;A4 **Repeat** 27

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/24/2013 4:36:56 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/24/2013 5:27:03 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 50.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.034	14,235	284.700	284.666
sd	0.000			0.006	119.311	2.386	2.386
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.344	5,176	103.520	103.176
sd	0.000			0.019	71.944	1.439	1.439

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICABT-51465;A3

Repeat 26

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 7/24/2013 5:29:38 PM

Count Ended 7/24/2013 6:19:42 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 50.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.034	14,549	290.980	290.946
sd	0.000			0.006	120.619	2.412	2.412
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.344	5,352	107.040	106.696
sd	0.000			0.019	73.157	1.463	1.463

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICABT-51465;A2

Repeat 24

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 7/24/2013 6:31:42 PM

Count Ended 7/24/2013 7:21:47 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 50.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.034	16,948	338.960	338.926
sd	0.000			0.006	130.184	2.604	2.604
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.344	6,179	123.580	123.236
sd	0.000			0.019	78.607	1.572	1.572

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

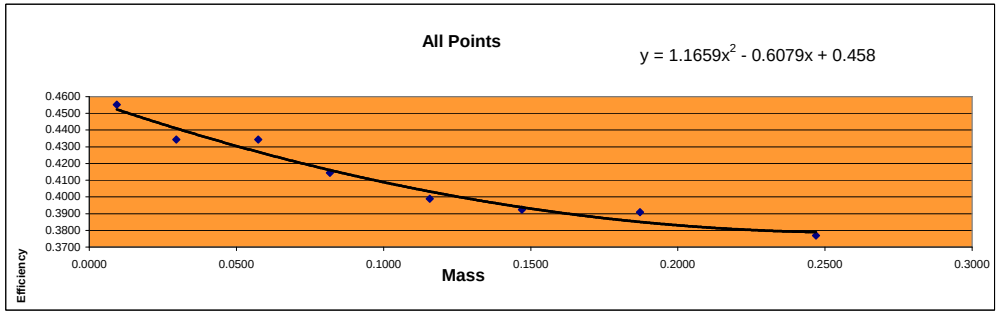
Error = .00 **x sd**

Curve is for Gross Beta
Strontium 90
and
Total Strontium

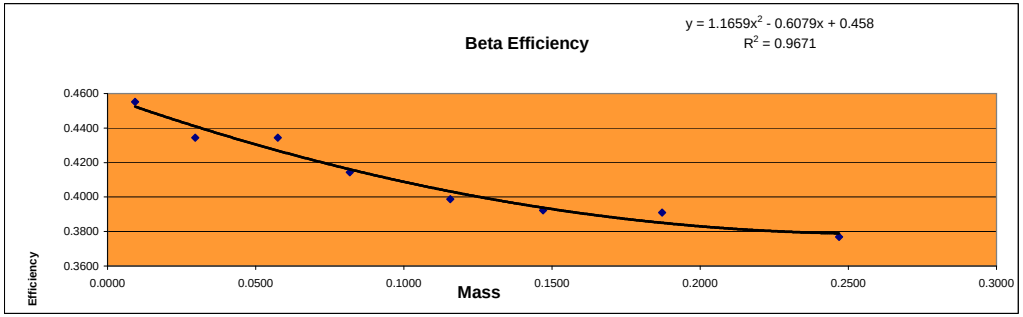
Orange 9

Detector ID	Std ID	Count Date	Sample Wt	Count Time	Beta Counts	DPM 41588.469 CPM	Sr-90 Eff	Standard Aliquot
9	B1	1/23/2013 14:36	0.0093	5	94656	18931.200	0.4552	1mL
9	B2	1/23/2013 14:27	0.0296	5	90334	18066.800	0.4344	1mL
9	B3	1/23/2013 17:27	0.0574	5	90313	18062.600	0.4343	1mL
9	B4	1/23/2013 17:19	0.0818	5	86182	17236.400	0.4145	1mL
9	B5	1/23/2013 17:12	0.1157	5	82941	16588.200	0.3989	1mL
9	B6	1/23/2013 17:05	0.1470	5	81581	16316.200	0.3923	1mL
9	B7	1/23/2013 16:58	0.1871	5	81283	16256.600	0.3909	1mL
9	B8	1/23/2013 16:47	0.2469	5	78385	15677.000	0.3770	1mL

Mass	Measured Efficiency	Theoretical Efficiency	Percent Δ Efficiency
0.0093	0.4552	0.4524	0.61%
0.0296	0.4344	0.4410	-1.50%
0.0574	0.4343	0.4269	1.73%
0.0818	0.4145	0.4161	-0.39%
0.1157	0.3989	0.4033	-1.09%
0.1470	0.3923	0.3938	-0.38%
0.1871	0.3909	0.3851	1.51%
0.2469	0.3770	0.3790	-0.53%



Mass	Efficiency
0.0093	0.4552
0.0296	0.4344
0.0574	0.4343
0.0818	0.4145
0.1157	0.3989
0.1470	0.3923
0.1871	0.3909
0.2469	0.3770



Standard ID
Strontium 90
Sr-90_00004 #6322
Cert# 80573-334 Ref. date 9/172009

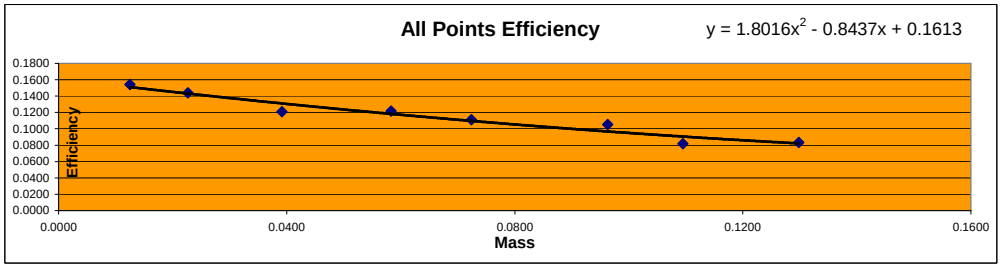
Initial Activity:	22560	dpm/mL
Reference Date:	9/17/2009	
Count Date:	1/23/2013	
Elapsed Time:	1224.000	days
Half Life:	10409.625	days
Exponential Term:	0.921730256	
Corrected Activity:	20794.23458	dpm/mL
Decay Activity (Sr/Y-90)	41588.46916	dpm

Curve is for Gross Alpha

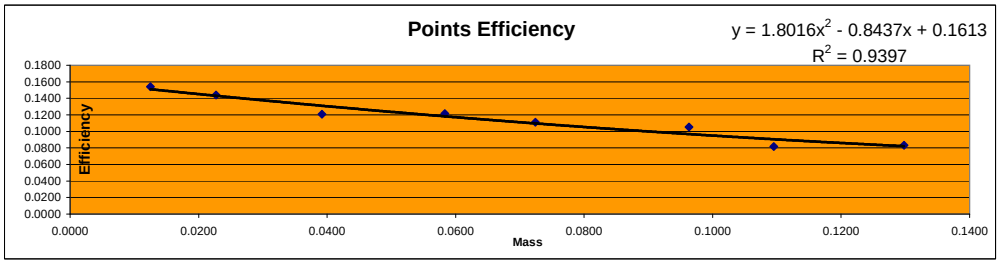
Orange 9

Detector ID	Sample ID	Count Date	Mass	Count Time	Alpha Counts	Net CPM	DPM	Th-230 Efficiency	Standard Aliquot
9	A1	7/24/2013 9:53	0.0125	50	18299	365.980	2374.5	0.1541	1mL
9	A2	7/24/2013 8:46	0.0227	50	17114	342.280	2374.5	0.1441	1mL
9	A3	7/24/2013 18:31	0.0392	50	14351	287.020	2374.5	0.1209	1mL
9	A4	7/24/2013 17:29	0.0583	50	14446	288.920	2374.5	0.1217	1mL
9	A5	7/24/2013 16:37	0.0724	50	26402	528.040	4749.0	0.1112	2mL
9	A6	7/24/2013 15:14	0.0963	50	25033	500.660	4749.0	0.1054	2mL
9	A7	7/24/2013 11:46	0.1095	50	19397	387.940	4749.0	0.0817	2mL
9	A8	7/24/2013 10:46	0.1298	50	19797	395.940	4749.0	0.0834	2mL

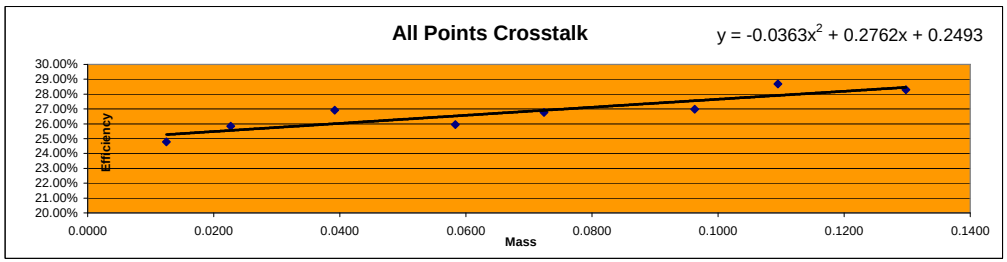
Mass	Measured Efficiency	Theoretical Efficiency	Percent Δ Efficiency
0.0125	0.1541	0.1510	2.05%
0.0227	0.1441	0.1431	0.75%
0.0392	0.1209	0.1310	-7.73%
0.0583	0.1217	0.1182	2.91%
0.0724	0.1112	0.1097	1.40%
0.0963	0.1054	0.0968	8.96%
0.1095	0.0817	0.0905	-9.75%
0.1298	0.0834	0.0821	1.50%



Mass	Efficiency
0.0125	0.1541
0.0227	0.1441
0.0392	0.1209
0.0583	0.1217
0.0724	0.1112
0.0963	0.1054
0.1095	0.0817
0.1298	0.0834



Detector ID	Sample ID	Mass	Count Time	Alpha Counts	Beta Counts	Alpha CPM	Beta CPM	% α into β	
9	A1	0.0125	40.00	18299	6027	457.48	150.68	24.78%	Min
9	A2	0.0227	40.00	17114	5961	427.85	149.03	25.83%	24.78%
9	A3	0.0392	40.00	14351	5286	358.78	132.15	26.92%	
9	A4	0.0583	40.00	14446	5062	361.15	126.55	25.95%	Max
9	A5	0.0724	40.00	26402	9646	660.05	241.15	26.76%	28.68%
9	A6	0.0963	40.00	25033	9253	625.83	231.33	26.99%	
9	A7	0.1095	40.00	19397	7800	484.93	195.00	28.68%	Mean
9	A8	0.1298	40.00	19797	7813	494.93	195.33	28.30%	26.77%



Standard ID
Thorium-230
Th-230_00016 #51465
Cert # 92523 Ref. date 11/29/2012
Activity 2374.5 dpm/mL

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICABT-6322;B2

Repeat 38

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 2:27:43 PM

Count Ended 1/23/2013 2:32:52 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 *days*

Decay Factor 1.000

Sample Count Time 5.00 *mins*

Background Count Time 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.075	17	3.400	3.325
sd	0.000			0.009	4.123	0.825	0.825
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.363	90,334	18,066.800	18,066.437
sd	0.000			0.019	300.556	60.111	60.111

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICABT-6322;B1

Repeat 39

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 1/23/2013 2:36:41 PM

Count Ended 1/23/2013 2:41:50 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 5.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.075	17	3.400	3.325
sd	0.000			0.009	4.123	0.825	0.825
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.363	94,656	18,931.200	18,930.837
sd	0.000			0.019	307.662	61.532	61.532

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICABT-6322;B8

Repeat 47

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 4:47:27 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 4:52:37 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.075	13	2.600	2.525
sd	0.000			0.009	3.606	0.721	0.721
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.363	78,385	15,677.000	15,676.637
sd	0.000			0.019	279.973	55.995	55.995

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICABT-6322;B7

Repeat 48

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 4:58:46 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 5:03:54 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.075	17	3.400	3.325
sd	0.000			0.009	4.123	0.825	0.825
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.363	81,283	16,256.600	16,256.237
sd	0.000			0.019	285.102	57.020	57.020

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICABT-6322;B6 **Repeat** 49

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 5:05:46 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 5:10:56 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.075	15	3.000	2.925
sd	0.000			0.009	3.873	0.775	0.775
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.363	81,581	16,316.200	16,315.837
sd	0.000			0.019	285.624	57.125	57.125

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICABT-6322;B5

Repeat 50

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 5:12:35 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 5:17:44 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.075	16	3.200	3.125
sd	0.000			0.009	4.000	0.800	0.800
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.363	82,941	16,588.200	16,587.837
sd	0.000			0.019	287.995	57.599	57.599

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICABT-6322;B4

Repeat 52

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 5:19:19 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 5:24:29 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.075	21	4.200	4.125
sd	0.000			0.009	4.583	0.917	0.917
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.363	86,182	17,236.400	17,236.037
sd	0.000			0.019	293.568	58.714	58.714

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICABT-6322;B3

Repeat 53

Carrier No. 0

Batch ID m122627

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 5:27:50 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 5:33:01 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.075	13	2.600	2.525
sd	0.000			0.009	3.606	0.721	0.721
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.363	90,313	18,062.600	18,062.237
sd	0.000			0.019	300.521	60.104	60.104

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICABT-51465;A2 **Repeat** 17

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/24/2013 8:46:52 AM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/24/2013 9:36:59 AM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 50.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.074	17,114	342.280	342.206
sd	0.000			0.009	130.820	2.616	2.616
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.397	5,961	119.220	118.823
sd	0.000			0.020	77.208	1.544	1.544

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICABT-51465;A1

Repeat 18

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/24/2013 9:53:20 AM

Count Ended 7/24/2013 10:43:26 AM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 *days*

Decay Factor 1.000

Sample Count Time 50.00 *mins*

Background Count Time 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.074	18,299	365.980	365.906
sd	0.000			0.009	135.274	2.705	2.705
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.397	6,027	120.540	120.143
sd	0.000			0.020	77.634	1.553	1.553

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICABT-51465;A8

Repeat 19

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 7/24/2013 10:46:04 AM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 7/24/2013 11:36:10 AM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 50.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.074	19,797	395.940	395.866
sd	0.000			0.009	140.702	2.814	2.814
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.397	7,813	156.260	155.863
sd	0.000			0.020	88.391	1.768	1.768

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICABT-51465;A7

Repeat 20

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 7/24/2013 11:46:03 AM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 7/24/2013 12:36:08 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 50.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.074	19,397	387.940	387.866
sd	0.000			0.009	139.273	2.785	2.785
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.397	7,800	156.000	155.603
sd	0.000			0.020	88.318	1.766	1.766

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICABT-51465;A6

Repeat 21

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/24/2013 3:14:19 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/24/2013 4:04:25 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 50.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.074	25,033	500.660	500.586
sd	0.000			0.009	158.218	3.164	3.164
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.397	9,253	185.060	184.663
sd	0.000			0.020	96.193	1.924	1.924

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICABT-51465;A5 **Repeat** 22

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/24/2013 4:37:01 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/24/2013 5:27:07 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 50.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.074	26,402	528.040	527.966
sd	0.000			0.009	162.487	3.250	3.250
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.397	9,646	192.920	192.523
sd	0.000			0.020	98.214	1.964	1.964

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICABT-51465;A4 **Repeat** 28

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/24/2013 5:29:43 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/24/2013 6:19:49 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 50.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.074	14,446	288.920	288.846
sd	0.000			0.009	120.192	2.404	2.404
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.397	5,062	101.240	100.843
sd	0.000			0.020	71.148	1.423	1.423

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICABT-51465;A3 **Repeat** 27

Carrier No. 0

Batch ID M132731

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/24/2013 6:31:50 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/24/2013 7:21:56 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 50.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.074	14,351	287.020	286.946
sd	0.000			0.009	119.796	2.396	2.396
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.397	5,286	105.720	105.323
sd	0.000			0.020	72.705	1.454	1.454

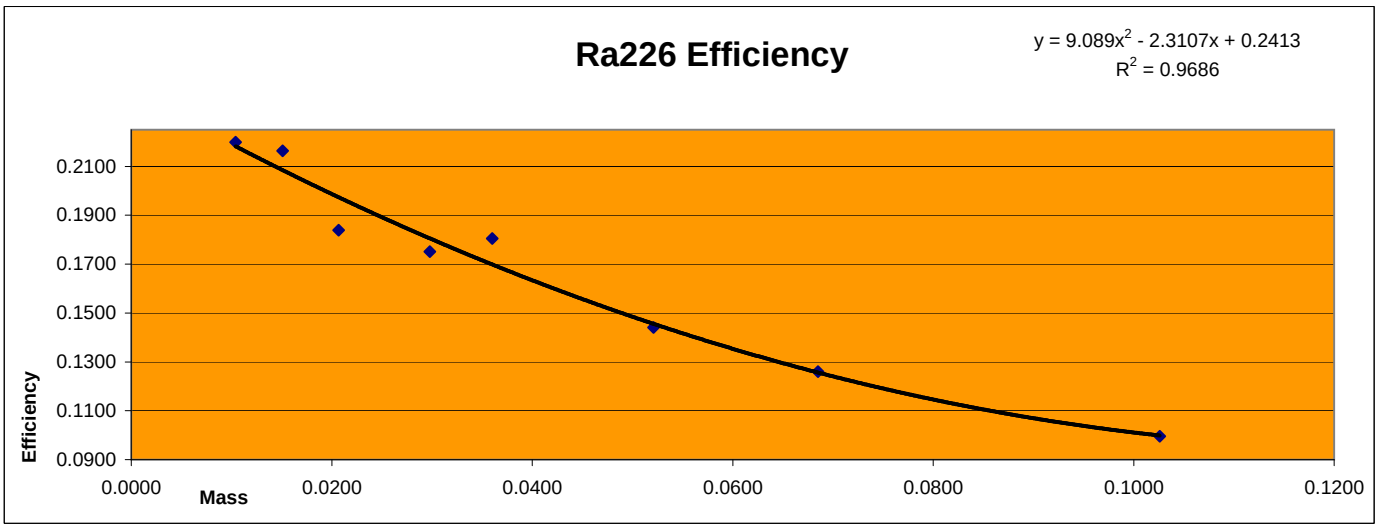
	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Ra-226 Calibrations

Orange 0

Std #	Mass	Count Time	Sample Time	Alpha Counts	DPM	CPM	Efficiency
T11	0.0104	40.00	1/23/2013 16:47	40185	4567.9	1004.6250	0.2199
T12	0.0151	40.00	1/23/2013 22:27	39540	4567.9	988.5000	0.2164
T13	0.0207	40.00	1/23/2013 21:28	33589	4567.9	839.7250	0.1838
T14	0.0298	40.00	1/23/2013 20:30	32005	4567.9	800.1250	0.1752
T15	0.0360	40.00	1/23/2013 19:45	32984	4567.9	824.6000	0.1805
T16	0.0521	40.00	1/23/2013 19:04	26314	4567.9	657.8500	0.1440
T17	0.0685	40.00	1/23/2013 18:18	23031	4567.9	575.7750	0.1260
T18	0.1026	40.00	1/23/2013 17:29	18200	4567.9	455.0000	0.0996



Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - A

Addr: 0

Sample ID ICRA6-10734;T1 **Repeat** 28

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 4:47:37 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 5:27:45 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.078	40,185	1,004.625	1,004.547
sd	0.000			0.009	200.462	5.012	5.012
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.403	11,638	290.950	290.547
sd	0.000			0.020	107.880	2.697	2.697

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - A

Addr: 0

Sample ID ICRA6-10734;T8 **Repeat** 29

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 5:29:59 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 6:10:04 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.078	18,200	455.000	454.922
sd	0.000			0.009	134.907	3.373	3.373
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.403	5,899	147.475	147.072
sd	0.000			0.020	76.805	1.920	1.920

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - A

Addr: 0

Sample ID ICRA6-10734;T7

Repeat 30

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 6:18:38 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 6:58:43 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.078	23,031	575.775	575.697
sd	0.000			0.009	151.760	3.794	3.794
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.403	7,277	181.925	181.522
sd	0.000			0.020	85.305	2.133	2.133

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - A

Addr: 0

Sample ID ICRA6-10734;T6 **Repeat** 31

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 7:04:03 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 7:44:10 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.078	26,314	657.850	657.772
sd	0.000			0.009	162.216	4.055	4.055
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.403	8,076	201.900	201.497
sd	0.000			0.020	89.867	2.247	2.247

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - A

Addr: 0

Sample ID ICRA6-10734;T5 **Repeat** 32

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 7:45:34 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 8:25:41 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.078	32,984	824.600	824.522
sd	0.000			0.009	181.615	4.540	4.540
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.403	9,559	238.975	238.572
sd	0.000			0.020	97.770	2.444	2.444

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - A

Addr: 0

Sample ID ICRA6-10734;T4 **Repeat** 33

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 8:30:26 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 9:10:33 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.078	32,005	800.125	800.047
sd	0.000			0.009	178.899	4.472	4.472
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.403	9,460	236.500	236.097
sd	0.000			0.020	97.263	2.432	2.432

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - A

Addr: 0

Sample ID ICRA6-10734;T3 **Repeat** 34

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 9:28:47 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 10:08:55 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.078	33,589	839.725	839.647
sd	0.000			0.009	183.273	4.582	4.582
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.403	10,170	254.250	253.847
sd	0.000			0.020	100.846	2.521	2.521

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - A

Addr: 0

Sample ID ICRA6-10734;T2 **Repeat** 35

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 10:27:18 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 11:07:26 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

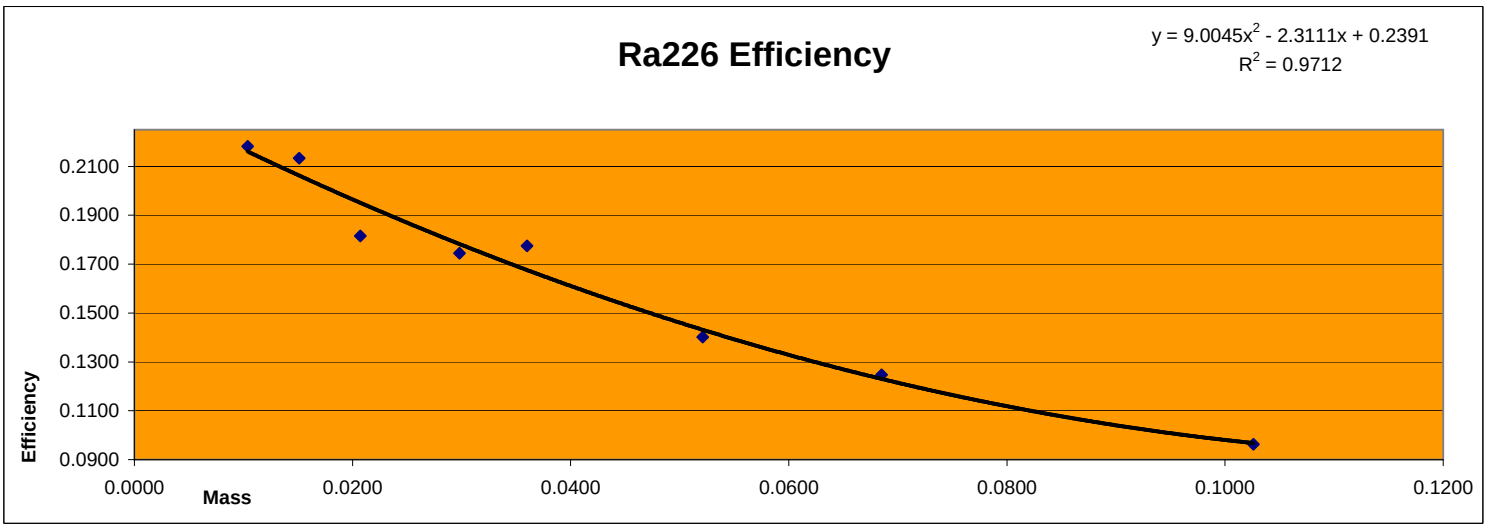
	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.078	39,540	988.500	988.422
sd	0.000			0.009	198.847	4.971	4.971
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.403	11,625	290.625	290.222
sd	0.000			0.020	107.819	2.695	2.696

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Orange 1

Std #	Mass	Count Time	Sample Time	Alpha Counts	DPM	CPM	Efficiency
T11	0.0104	40.00	1/23/2013 17:29	39871	4567.9	996.7750	0.2182
T12	0.0151	40.00	1/23/2013 16:47	38981	4567.9	974.5250	0.2133
T13	0.0207	40.00	1/23/2013 22:27	33172	4567.9	829.3000	0.1815
T14	0.0298	40.00	1/23/2013 21:28	31881	4567.9	797.0250	0.1745
T15	0.0360	40.00	1/23/2013 20:30	32438	4567.9	810.9500	0.1775
T16	0.0521	40.00	1/23/2013 19:45	25605	4567.9	640.1250	0.1401
T17	0.0685	40.00	1/23/2013 19:04	22779	4567.9	569.4750	0.1247
T18	0.1026	40.00	1/23/2013 18:18	17596	4567.9	439.9000	0.0963



Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - B

Addr: 1

Sample ID ICRA6-10734;T2 **Repeat** 28

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 4:47:40 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 5:27:47 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.057	38,981	974.525	974.468
sd	0.000			0.008	197.436	4.936	4.936
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.299	11,203	280.075	279.776
sd	0.000			0.017	105.844	2.646	2.646

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - B

Addr: 1

Sample ID ICRA6-10734;T1 **Repeat** 29

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 5:29:35 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 6:09:42 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.057	39,871	996.775	996.718
sd	0.000			0.008	199.677	4.992	4.992
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.299	11,562	289.050	288.751
sd	0.000			0.017	107.527	2.688	2.688

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - B

Addr: 1

Sample ID ICRA6-10734;T8 **Repeat** 30

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 6:18:41 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 6:58:48 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.057	17,596	439.900	439.843
sd	0.000			0.008	132.650	3.316	3.316
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.299	5,936	148.400	148.101
sd	0.000			0.017	77.045	1.926	1.926

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - B

Addr: 1

Sample ID ICRA6-10734;T7 **Repeat** 31

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 7:04:06 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 7:44:13 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.057	22,779	569.475	569.418
sd	0.000			0.008	150.927	3.773	3.773
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.299	7,272	181.800	181.501
sd	0.000			0.017	85.276	2.132	2.132

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - B

Addr: 1

Sample ID ICRA6-10734;T6 **Repeat** 32

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 7:45:37 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 8:25:43 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.057	25,605	640.125	640.068
sd	0.000			0.008	160.016	4.000	4.000
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.299	7,867	196.675	196.376
sd	0.000			0.017	88.696	2.217	2.217

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - B

Addr: 1

Sample ID ICRA6-10734;T5 **Repeat** 33

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 8:30:30 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 9:10:38 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.057	32,438	810.950	810.893
sd	0.000			0.008	180.106	4.503	4.503
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.299	9,280	232.000	231.701
sd	0.000			0.017	96.333	2.408	2.408

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - B

Addr: 1

Sample ID ICRA6-10734;T4 **Repeat** 34

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 9:28:50 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 10:08:58 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.057	31,881	797.025	796.968
sd	0.000			0.008	178.553	4.464	4.464
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.299	9,018	225.450	225.151
sd	0.000			0.017	94.963	2.374	2.374

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - B

Addr: 1

Sample ID ICRA6-10734;T3 **Repeat** 35

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 10:27:22 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 11:07:29 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

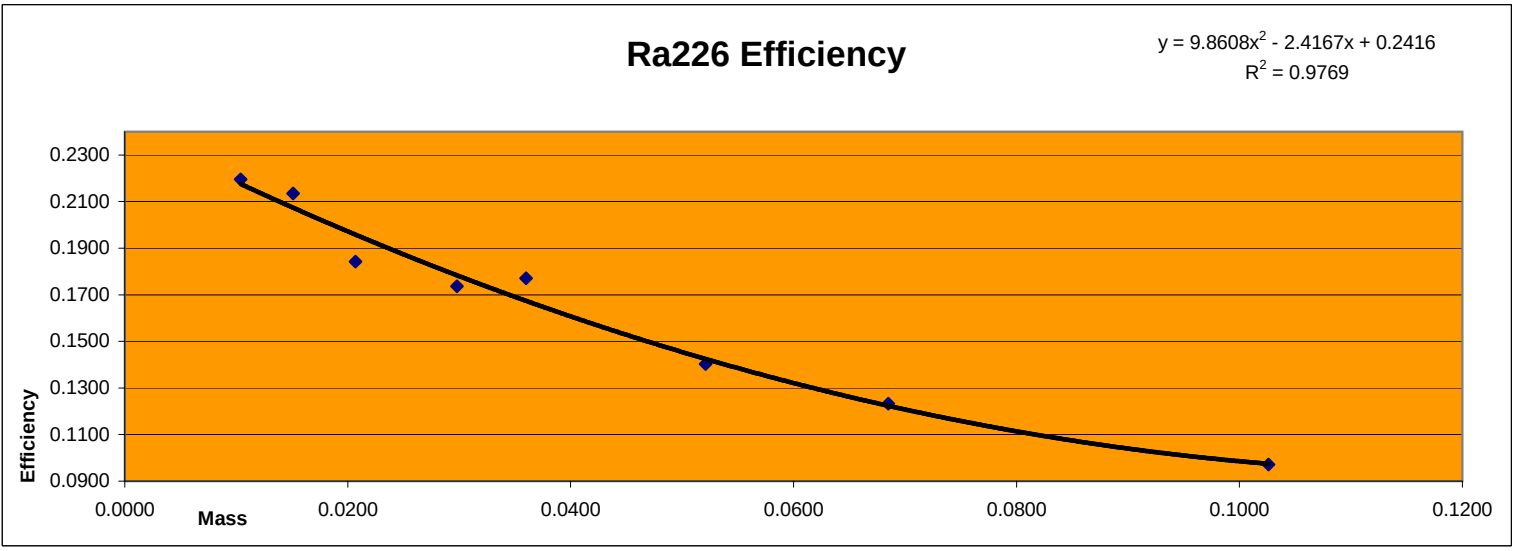
	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.057	33,172	829.300	829.243
sd	0.000			0.008	182.132	4.553	4.553
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.299	9,775	244.375	244.076
sd	0.000			0.017	98.869	2.472	2.472

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Orange 2

Std #	Mass	Count Time	Sample Time	Alpha Counts	DPM	CPM	Efficiency
T11	0.0104	40.00	1/23/2013 18:18	40109	4567.9	1002.7250	0.2195
T12	0.0151	40.00	1/23/2013 17:29	39008	4567.9	975.2000	0.2135
T13	0.0207	40.00	1/23/2013 16:47	33673	4567.9	841.8250	0.1843
T14	0.0298	40.00	1/23/2013 22:27	31731	4567.9	793.2750	0.1737
T15	0.0360	40.00	1/23/2013 21:28	32364	4567.9	809.1000	0.1771
T16	0.0521	40.00	1/23/2013 20:30	25630	4567.9	640.7500	0.1403
T17	0.0685	40.00	1/23/2013 19:45	22527	4567.9	563.1750	0.1233
T18	0.1026	40.00	1/23/2013 19:04	17746	4567.9	443.6500	0.0971



Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - C

Addr: 2

Sample ID ICRA6-10734;T3 **Repeat** 28

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 4:47:43 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 5:27:51 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.070	33,673	841.825	841.755
sd	0.000			0.008	183.502	4.588	4.588
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.286	10,101	252.525	252.239
sd	0.000			0.017	100.504	2.513	2.513

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - C

Addr: 2

Sample ID ICRA6-10734;T2

Repeat 29

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 5:29:39 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 6:09:47 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.070	39,008	975.200	975.130
sd	0.000			0.008	197.504	4.938	4.938
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.286	11,392	284.800	284.514
sd	0.000			0.017	106.733	2.668	2.668

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - C

Addr: 2

Sample ID ICRA6-10734;T1

Repeat 30

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 6:18:45 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 6:58:53 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.070	40,109	1,002.725	1,002.655
sd	0.000			0.008	200.272	5.007	5.007
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.286	12,086	302.150	301.864
sd	0.000			0.017	109.936	2.748	2.748

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - C

Addr: 2

Sample ID ICRA6-10734;T8 **Repeat** 31

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 7:04:09 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 7:44:15 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.070	17,746	443.650	443.580
sd	0.000			0.008	133.214	3.330	3.330
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.286	6,098	152.450	152.164
sd	0.000			0.017	78.090	1.952	1.952

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - C

Addr: 2

Sample ID ICRA6-10734;T7 **Repeat** 32

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 7:45:53 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 8:25:59 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.070	22,527	563.175	563.105
sd	0.000			0.008	150.090	3.752	3.752
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.286	7,347	183.675	183.389
sd	0.000			0.017	85.715	2.143	2.143

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - C

Addr: 2

Sample ID ICRA6-10734;T6 **Repeat** 33

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 8:30:33 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 9:10:40 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.070	25,630	640.750	640.680
sd	0.000			0.008	160.094	4.002	4.002
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.286	8,200	205.000	204.714
sd	0.000			0.017	90.554	2.264	2.264

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - C

Addr: 2

Sample ID ICRA6-10734;T5 **Repeat** 34

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 9:28:54 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 10:09:02 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.070	32,364	809.100	809.030
sd	0.000			0.008	179.900	4.497	4.498
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.286	9,713	242.825	242.539
sd	0.000			0.017	98.555	2.464	2.464

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - C

Addr: 2

Sample ID ICRA6-10734;T4 **Repeat** 35

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 10:27:25 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 11:07:33 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

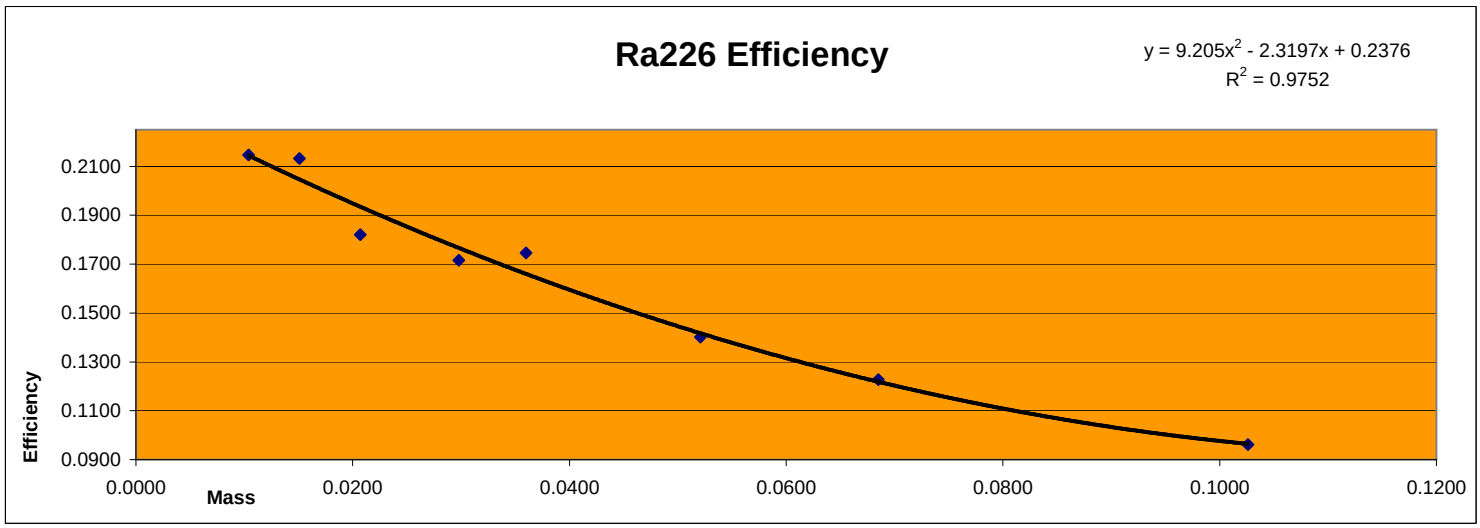
	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.070	31,731	793.275	793.205
sd	0.000			0.008	178.132	4.453	4.453
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.286	9,480	237.000	236.714
sd	0.000			0.017	97.365	2.434	2.434

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Orange 3

Std #	Mass	Count Time	Sample Time	Alpha Counts	DPM	CPM	Efficiency
T11	0.0104	40.00	1/23/2013 19:04	39224	4567.9	980.6000	0.2147
T12	0.0151	40.00	1/23/2013 18:18	38959	4567.9	973.9750	0.2132
T13	0.0207	40.00	1/23/2013 17:29	33274	4567.9	831.8500	0.1821
T14	0.0298	40.00	1/23/2013 16:47	31347	4567.9	783.6750	0.1716
T15	0.0360	40.00	1/23/2013 22:27	31907	4567.9	797.6750	0.1746
T16	0.0521	40.00	1/23/2013 21:28	25614	4567.9	640.3500	0.1402
T17	0.0685	40.00	1/23/2013 20:30	22419	4567.9	560.4750	0.1227
T18	0.1026	40.00	1/23/2013 19:45	17562	4567.9	439.0500	0.0961



Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - D

Addr: 3

Sample ID ICRA6-10734;T4 **Repeat** 28

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 4:47:47 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 5:27:53 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.065	31,347	783.675	783.610
sd	0.000			0.008	177.051	4.426	4.426
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.356	9,967	249.175	248.819
sd	0.000			0.019	99.835	2.496	2.496

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - D

Addr: 3

Sample ID ICRA6-10734;T3 **Repeat** 29

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 5:29:42 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 6:09:49 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.065	33,274	831.850	831.785
sd	0.000			0.008	182.412	4.560	4.560
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.356	10,508	262.700	262.344
sd	0.000			0.019	102.509	2.563	2.563

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - D

Addr: 3

Sample ID ICRA6-10734;T2

Repeat 30

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 6:18:48 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 6:58:57 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.065	38,959	973.975	973.910
sd	0.000			0.008	197.380	4.935	4.935
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.356	12,088	302.200	301.844
sd	0.000			0.019	109.945	2.749	2.749

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - D

Addr: 3

Sample ID ICRA6-10734;T1 **Repeat** 31

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 7:04:13 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 7:44:20 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.065	39,224	980.600	980.535
sd	0.000			0.008	198.050	4.951	4.951
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.356	12,381	309.525	309.169
sd	0.000			0.019	111.270	2.782	2.782

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - D

Addr: 3

Sample ID ICRA6-10734;T8

Repeat 32

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 7:45:56 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 8:26:01 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.065	17,562	439.050	438.985
sd	0.000			0.008	132.522	3.313	3.313
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.356	6,327	158.175	157.819
sd	0.000			0.019	79.542	1.989	1.989

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - D

Addr: 3

Sample ID ICRA6-10734;T7 **Repeat** 33

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 8:30:36 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 9:10:43 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.065	22,419	560.475	560.410
sd	0.000			0.008	149.730	3.743	3.743
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.356	7,700	192.500	192.144
sd	0.000			0.019	87.750	2.194	2.194

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - D

Addr: 3

Sample ID ICRA6-10734;T6 **Repeat** 34

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 9:28:57 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 10:09:03 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.065	25,614	640.350	640.285
sd	0.000			0.008	160.044	4.001	4.001
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.356	8,644	216.100	215.744
sd	0.000			0.019	92.973	2.324	2.324

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - D

Addr: 3

Sample ID ICRA6-10734;T5 **Repeat** 35

Carrier No. 0

Batch ID m122573

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/23/2013 10:27:28 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/23/2013 11:07:36 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 40.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.065	31,907	797.675	797.610
sd	0.000			0.008	178.625	4.466	4.466
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.356	10,067	251.675	251.319
sd	0.000			0.019	100.334	2.508	2.508

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha Beta Calibration Verifications

ICV is for Gross Beta
Strontium 90
and
Total Strontium

Orange Beta ICV 2013						
Detector	Low Mass Recovery	Medium Mass Recovery	High Mass Recovery	Mean Recovery	Beta Activity	2009.34 pCi
4	99.78%	99.98%	101.63%	100.46%		

Standard ID

Strontium 90
Sr-90_00018 #51512 (Rad12-0043)
Cert# 92352 Ref. date 11/29/12

Initial Activity:	2238.7	dpm	
Reference Date:	11/29/2012		
Current Date:	1/24/2013		(or date at which you wish to determine activity)
Elapsed Time:	56.000	days	
Half Life:	10409.625	days	
Exponential Term:	0.996278064		
Corrected Activity:	2230.367701	dpm	
Decay Activity (Sr/Y-90)	4460.735402	dpm	2009.34 pCi

ICV is for Gross Alpha

Orange Alpha ICV 2013				
	Low	Medium	High	Mean
	Mass	Mass	Mass	Recovery
Detector	Recovery	Recovery	Recovery	
4	120.12%	102.53%	87.34%	103.33%

Standard ID

Thorium-230
Th-230_00003 #6340
Cert # 84460-334 Ref. date 4/11/11
Activity 1079.73 pCi/mL

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICV-51512;Beta 1 **Repeat** 1

Carrier No. 0

Batch ID m122640

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 1/24/2013 6:10:26 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 1/24/2013 6:15:29 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.049	4	0.800	0.751
sd	0.000			0.007	2.000	0.400	0.400
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.380	9,525	1,905.000	1,904.620
sd	0.000			0.019	97.596	19.519	19.519

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICV-51512;Beta 3 **Repeat** 3

Carrier No. 0

Batch ID m122640

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 1/24/2013 6:25:15 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 1/24/2013 6:30:18 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.049	2	0.400	0.351
sd	0.000			0.007	1.414	0.283	0.283
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.380	8,745	1,749.000	1,748.620
sd	0.000			0.019	93.515	18.703	18.703

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICV-51512;Beta 2

Repeat 4

Carrier No. 0

Batch ID m122640

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 1/24/2013 6:33:12 PM

Count Ended 1/24/2013 6:38:15 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 5.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.049	1	0.200	0.151
sd	0.000			0.007	1.000	0.200	0.200
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.380	9,009	1,801.800	1,801.420
sd	0.000			0.019	94.916	18.983	18.983

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICVABT-6340;A2 **Repeat** 9

Carrier No. 0

Batch ID m132736

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 ***l*** **sd** 0 ***l***

Residual Wt 0 ***mg*** **sd** 0 ***mg***

Count Began 7/24/2013 8:56:57 AM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 7/24/2013 9:27:00 AM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 30.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.068	7,806	260.200	260.132
sd	0.000			0.008	88.352	2.945	2.945
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.386	3,455	115.167	114.781
sd	0.000			0.020	58.779	1.959	1.959

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICVABT-6340;A1 **Repeat** 10

Carrier No. 0

Batch ID m132736

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 7/24/2013 9:49:41 AM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 7/24/2013 10:19:46 AM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 30.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.068	11,505	383.500	383.432
sd	0.000			0.008	107.261	3.575	3.575
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.386	4,581	152.700	152.314
sd	0.000			0.020	67.683	2.256	2.256

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ICVABT-6340;A3 **Repeat** 11

Carrier No. 0

Batch ID m132736

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 7/24/2013 10:43:44 AM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 7/24/2013 11:13:47 AM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 30.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.068	5,825	194.167	194.099
sd	0.000			0.008	76.322	2.544	2.544
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.386	2,933	97.767	97.381
sd	0.000			0.020	54.157	1.805	1.805

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

ICV is for Gross Beta
Strontium 90
and
Total Strontium

Orange Beta ICV 2013				
Detector	Low Mass Recovery	Medium Mass Recovery	High Mass Recovery	Mean Recovery
6	97.99%	98.74%	99.88%	98.87%

Beta Activity 2009.34 pCi

Standard ID

Strontium 90
Sr-90_00018 #51512 (Rad12-0043)
Cert# 92352 Ref. date 11/29/12

Initial Activity:	2238.7	dpm	
Reference Date:	11/29/2012		
Current Date:	1/24/2013		(or date at which you wish to determine activity)
Elapsed Time:	56.000	days	
Half Life:	10409.625	days	
Exponential Term:	0.996278064		
Corrected Activity:	2230.367701	dpm	
Decay Activity (Sr/Y-90)	4460.735402	dpm	2009.34 pCi

ICV is for Gross Alpha

Orange Alpha ICV 2013				
	Low	Medium	High	Mean
	Mass	Mass	Mass	Recovery
Detector	Recovery	Recovery	Recovery	
6	118.18%	101.41%	84.66%	101.42%

Standard ID

Thorium-230
Th-230_00003 #6340
Cert # 84460-334 Ref. date 4/11/11
Activity 1079.73 pCi/mL

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICV-51512;Beta 3 **Repeat** 1

Carrier No. 0

Batch ID m122640

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 1/24/2013 6:10:34 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 1/24/2013 6:15:36 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.073	1	0.200	0.127
sd	0.000			0.009	1.000	0.200	0.200
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.346	8,560	1,712.000	1,711.654
sd	0.000			0.019	92.520	18.504	18.504

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICV-51512;Beta 2 **Repeat** 2

Carrier No. 0

Batch ID m122640

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/24/2013 6:16:59 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/24/2013 6:22:02 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.073	0	0.000	-0.073
sd	0.000			0.009	0.000	0.000	0.171
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.346	8,863	1,772.600	1,772.254
sd	0.000			0.019	94.144	18.829	18.829

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICV-51512;Beta 1 **Repeat** 3

Carrier No. 0

Batch ID m122640

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/24/2013 6:25:24 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/24/2013 6:30:26 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.073	1	0.200	0.127
sd	0.000			0.009	1.000	0.200	0.200
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.346	9,330	1,866.000	1,865.654
sd	0.000			0.019	96.592	19.318	19.318

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICVABT-6340;A1 **Repeat** 12

Carrier No. 0

Batch ID m132736

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/24/2013 11:45:14 AM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/24/2013 12:15:19 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 30.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.081	11,162	372.067	371.986
sd	0.000			0.009	105.650	3.522	3.522
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.461	4,391	146.367	145.906
sd	0.000			0.021	66.265	2.209	2.209

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICVABT-6340;A2 **Repeat** 12

Carrier No. 0

Batch ID m132736

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/24/2013 3:13:39 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/24/2013 3:43:42 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 30.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.081	7,577	252.567	252.486
sd	0.000			0.009	87.046	2.902	2.902
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.461	3,454	115.133	114.672
sd	0.000			0.021	58.771	1.959	1.959

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ICVABT-6340;A3 **Repeat** 13

Carrier No. 0

Batch ID m132736

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/24/2013 3:46:36 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/24/2013 4:16:39 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 30.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.081	5,528	184.267	184.186
sd	0.000			0.009	74.351	2.478	2.478
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.461	2,829	94.300	93.839
sd	0.000			0.021	53.188	1.773	1.773

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

ICV is for Gross Beta
Strontium 90
and
Total Strontium

Orange Beta ICV 2013						
Detector	Low Mass Recovery	Medium Mass Recovery	High Mass Recovery	Mean Recovery	Beta Activity	2009.34 pCi
8	96.30%	98.79%	100.83%	98.64%		

Standard ID

Strontium 90
Sr-90_00018 #51512 (Rad12-0043)
Cert# 92352 Ref. date 11/29/12

Initial Activity:	2238.7	dpm	
Reference Date:	11/29/2012		
Current Date:	1/24/2013		(or date at which you wish to determine activity)
Elapsed Time:	56.000	days	
Half Life:	10409.625	days	
Exponential Term:	0.996278064		
Corrected Activity:	2230.367701	dpm	
Decay Activity (Sr/Y-90)	4460.735402	dpm	2009.34 pCi

ICV is for Gross Alpha

Orange Alpha ICV 2013				
	Low	Medium	High	Mean
	Mass	Mass	Mass	Recovery
Detector	Recovery	Recovery	Recovery	
8	117.44%	96.51%	82.72%	98.89%

Standard ID

Thorium-230
Th-230_00003 #6340
Cert # 84460-334 Ref. date 4/11/11
Activity 1079.73 pCi/mL

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICV-51512;Beta 1 **Repeat** 10

Carrier No. 0

Batch ID m122640

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 1/24/2013 7:31:58 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 1/24/2013 7:37:01 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.030	3	0.600	0.570
sd	0.000			0.005	1.732	0.346	0.346
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.315	9,278	1,855.600	1,855.285
sd	0.000			0.018	96.322	19.264	19.264

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICV-51512;Beta 3 **Repeat** 11

Carrier No. 0

Batch ID m122640

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 1/24/2013 7:38:23 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 1/24/2013 7:43:27 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.030	2	0.400	0.370
sd	0.000			0.005	1.414	0.283	0.283
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.315	8,746	1,749.200	1,748.885
sd	0.000			0.018	93.520	18.704	18.704

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICV-51512;Beta 2 **Repeat** 12

Carrier No. 0

Batch ID m122640

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 1/24/2013 7:49:41 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 1/24/2013 7:54:44 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.030	1	0.200	0.170
sd	0.000			0.005	1.000	0.200	0.200
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.315	8,980	1,796.000	1,795.685
sd	0.000			0.018	94.763	18.953	18.953

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICVABT-6340;A1 **Repeat** 14

Carrier No. 0

Batch ID m132736

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/24/2013 7:26:15 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/24/2013 7:56:20 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 30.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.034	12,028	400.933	400.899
sd	0.000			0.006	109.672	3.656	3.656
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.344	4,093	136.433	136.089
sd	0.000			0.019	63.977	2.133	2.133

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICVABT-6340;A3

Repeat 20

Carrier No. 0

Batch ID m132736

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 7/24/2013 11:21:48 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 7/24/2013 11:51:51 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 30.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.034	6,528	217.600	217.566
sd	0.000			0.006	80.796	2.693	2.693
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.344	2,682	89.400	89.056
sd	0.000			0.019	51.788	1.726	1.726

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ICVABT-6340;A2

Repeat 21

Carrier No. 0

Batch ID m132736

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 7/24/2013 11:54:33 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 7/25/2013 12:24:37 AM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 30.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.034	8,355	278.500	278.466
sd	0.000			0.006	91.406	3.047	3.047
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.344	3,035	101.167	100.823
sd	0.000			0.019	55.091	1.836	1.836

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

ICV is for Gross Beta
Strontium 90
and
Total Strontium

Orange Beta ICV 2013						
Detector	Low Mass Recovery	Medium Mass Recovery	High Mass Recovery	Mean Recovery	Beta Activity	2009.34 pCi
9	98.49%	100.38%	98.79%	99.22%		

Standard ID

Strontium 90
Sr-90_00018 #51512 (Rad12-0043)
Cert# 92352 Ref. date 11/29/12

Initial Activity:	2238.7	dpm	
Reference Date:	11/29/2012		
Current Date:	1/24/2013		(or date at which you wish to determine activity)
Elapsed Time:	56.000	days	
Half Life:	10409.625	days	
Exponential Term:	0.996278064		
Corrected Activity:	2230.367701	dpm	
Decay Activity (Sr/Y-90)	4460.735402	dpm	2009.34 pCi

ICV is for Gross Alpha

Orange Alpha ICV 2013				
	Low	Medium	High	Mean
	Mass	Mass	Mass	Recovery
Detector	Recovery	Recovery	Recovery	
9	118.46%	97.52%	81.39%	99.12%

Standard ID

Thorium-230
Th-230_00003 #6340
Cert # 84460-334 Ref. date 4/11/11
Activity 1079.73 pCi/mL

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICV-51512;Beta 2 **Repeat** 10

Carrier No. 0

Batch ID m122640

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 1/24/2013 7:32:03 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 1/24/2013 7:37:06 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.075	1	0.200	0.125
sd	0.000			0.009	1.000	0.200	0.200
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.363	9,062	1,812.400	1,812.037
sd	0.000			0.019	95.195	19.039	19.039

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICV-51512;Beta 1 **Repeat** 11

Carrier No. 0

Batch ID m122640

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 1/24/2013 7:38:33 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 1/24/2013 7:43:35 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.075	2	0.400	0.325
sd	0.000			0.009	1.414	0.283	0.283
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.363	9,446	1,889.200	1,888.837
sd	0.000			0.019	97.191	19.438	19.438

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICV-51512;Beta 3

Repeat 12

Carrier No. 0

Batch ID m122640

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 1/24/2013 7:50:14 PM

Count Ended 1/24/2013 7:55:17 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 5.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.075	0	0.000	-0.075
sd	0.000			0.009	0.000	0.000	0.173
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.363	8,509	1,701.800	1,701.437
sd	0.000			0.019	92.244	18.449	18.449

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICVABT-6340;A2

Repeat 14

Carrier No. 0

Batch ID m132736

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/24/2013 7:26:21 PM

Count Ended 7/24/2013 7:56:26 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 *days*

Decay Factor 1.000

Sample Count Time 30.00 *mins*

Background Count Time 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.074	8,476	282.533	282.459
sd	0.000			0.009	92.065	3.069	3.069
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.397	2,993	99.767	99.370
sd	0.000			0.020	54.708	1.824	1.824

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICVABT-6340;A1

Repeat 15

Carrier No. 0

Batch ID m132736

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 7/24/2013 8:19:10 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 7/24/2013 8:49:15 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 30.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.074	12,239	407.967	407.893
sd	0.000			0.009	110.630	3.688	3.688
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.397	3,997	133.233	132.836
sd	0.000			0.020	63.222	2.107	2.107

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ICVABT-6340;A3

Repeat 21

Carrier No. 0

Batch ID m132736

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 7/24/2013 11:54:38 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 7/25/2013 12:24:41 AM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 30.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.074	6,441	214.700	214.626
sd	0.000			0.009	80.256	2.675	2.675
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.397	2,504	83.467	83.070
sd	0.000			0.020	50.040	1.668	1.668

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Ra-226 Calibration Verifications

Radium-226 Verification Orange 2013

Detector	Barium Yield	Results of Calibration
0	99.12%	105.46%

Standard ID

Radium 226
Ra-226_00008 #34981
Cert # SRM 4967 Ref. date 9/9/1991
Activity 25.018 dpm/mL

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - A

Addr: 0

Sample ID ICVRA6-34981;045C

Repeat 1

Carrier No. 0

Batch ID 2335045

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/27/2013 5:37:16 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/27/2013 11:37:39 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 360.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.078	6,561	18.225	18.147
sd	0.000			0.009	81.000	0.225	0.225
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.403	8,882	24.672	24.269
sd	0.000			0.020	94.244	0.262	0.263

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Radium-226 Verification Orange 2013

Detector	Barium Yield	Results of Calibration
1	100.59%	97.48%

Standard ID

Radium 226
Ra-226_00008 #34981
Cert # SRM 4967 Ref. date 9/9/1991
Activity 25.018 dpm/mL

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - B

Addr: 1

Sample ID ICVRA6-34981;029C

Repeat 2

Carrier No. 0

Batch ID 2341029

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 1/27/2013 5:37:44 PM

Count Ended 1/27/2013 11:38:08 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 360.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.057	6,042	16.783	16.726
sd	0.000			0.008	77.730	0.216	0.216
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.299	8,508	23.633	23.334
sd	0.000			0.017	92.239	0.256	0.257

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Radium-226 Verification Orange 2013

Detector	Barium Yield	Results of Calibration
2	101.18%	97.63%

Standard ID

Radium 226
Ra-226_00008 #34981
Cert # SRM 4967 Ref. date 9/9/1991
Activity 25.018 dpm/mL

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - C

Addr: 2

Sample ID ICVRA6-34981;018C

Repeat 2

Carrier No. 0

Batch ID 2342018

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/27/2013 5:38:22 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/27/2013 11:38:44 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 360.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.070	6,077	16.881	16.811
sd	0.000			0.008	77.955	0.217	0.217
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.286	8,646	24.017	23.731
sd	0.000			0.017	92.984	0.258	0.259

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Radium-226 Verification Orange 2013

Detector	Barium Yield	Results of Calibration
3	100.88%	97.31%

Standard ID

Radium 226
Ra-226_00008 #34981
Cert # SRM 4967 Ref. date 9/9/1991
Activity 25.018 dpm/mL

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - D

Addr: 3

Sample ID ICVRA6-34981;054C

Repeat 2

Carrier No. 0

Batch ID 2345054

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 1/27/2013 5:38:51 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 1/27/2013 11:39:14 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 360.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.065	5,980	16.611	16.546
sd	0.000			0.008	77.330	0.215	0.215
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.356	8,576	23.822	23.466
sd	0.000			0.019	92.607	0.257	0.258

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha Beta Annual Calibration Verifications

Orange Alpha ACV 2014				
	Low	Medium	High	Mean
	Mass	Mass	Mass	Recovery
Detector	Recovery	Recovery	Recovery	
4	122.44%	107.34%	94.84%	108.21%

Standard ID

Thorium-230

Th-230_00003 #6340

Cert # 84460-334 Ref. date 4/11/11

Activity 1079.73 pCi/mL

Orange Beta ACV 2014						
Detector	Low Mass Recovery	Medium Mass Recovery	High Mass Recovery	Mean Recovery	Beta Activity	1958.744 pCi
4	96.85%	99.40%	97.66%	97.97%		

Standard ID

Strontium 90
Sr-90_00018 #51512
Cert# 92352 Ref. date 11/29/12

Initial Activity:	2238.7	dpm	
Reference Date:	11/29/2012		
Current Date:	2/11/2014		(or date at which you wish to determine activity)
Elapsed Time:	439.000	days	
Half Life:	10409.625	days	
Exponential Term:	0.971191359		
Corrected Activity:	2174.206097	dpm	
Decay Activity (Sr/Y-90)	4348.412193	dpm	1958.744 pCi

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ACVABT-51512;B3 **Repeat** 3

Carrier No. 0

Batch ID M142810

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 2/11/2014 5:41:21 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 2/11/2014 5:46:24 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.067	0	0.000	-0.067
sd	0.000			0.008	0.000	0.000	0.164
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.357	8,191	1,638.200	1,637.843
sd	0.000			0.019	90.504	18.101	18.101

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ACVABT-51512;B2

Repeat 4

Carrier No. 0

Batch ID M142810

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 2/11/2014 5:47:26 PM

Count Ended 2/11/2014 5:52:27 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 *days*

Decay Factor 1.000

Sample Count Time 5.00 *mins*

Background Count Time 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.067	0	0.000	-0.067
sd	0.000			0.008	0.000	0.000	0.164
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.357	8,730	1,746.000	1,745.643
sd	0.000			0.019	93.434	18.687	18.687

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ACVABT-51512;B1 **Repeat** 5

Carrier No. 0

Batch ID M142810

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 2/11/2014 5:54:45 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 2/11/2014 5:59:47 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.067	0	0.000	-0.067
sd	0.000			0.008	0.000	0.000	0.164
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.357	9,013	1,802.600	1,802.243
sd	0.000			0.019	94.937	18.987	18.987

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ACVABT-6340;A3 **Repeat** 3

Carrier No. 0

Batch ID M142808

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 2/11/2014 7:39:44 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 2/11/2014 8:09:47 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 30.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.067	6,326	210.867	210.800
sd	0.000			0.008	79.536	2.651	2.651
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.357	3,274	109.133	108.776
sd	0.000			0.019	57.219	1.907	1.907

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ACVABT-6340;A2

Repeat 4

Carrier No. 0

Batch ID M142808

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 2/11/2014 8:19:19 PM

Count Ended 2/11/2014 8:49:22 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 30.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.067	8,171	272.367	272.300
sd	0.000			0.008	90.394	3.013	3.013
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.357	3,801	126.700	126.343
sd	0.000			0.019	61.652	2.055	2.055

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - A

Addr: 4

Sample ID ACVABT-6340;A1

Repeat 5

Carrier No. 0

Batch ID M142808

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 2/11/2014 8:51:32 PM

Count Ended 2/11/2014 9:21:36 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 30.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.067	11,727	390.900	390.833
sd	0.000			0.008	108.291	3.610	3.610
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.357	4,709	156.967	156.610
sd	0.000			0.019	68.622	2.287	2.287

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Orange Alpha ACV 2014				
	Low	Medium	High	Mean
	Mass	Mass	Mass	Recovery
Detector	Recovery	Recovery	Recovery	
6	121.88%	107.43%	95.02%	108.11%

Standard ID

Thorium-230

Th-230_00003 #6340

Cert # 84460-334 Ref. date 4/11/11

Activity 1079.73 pCi/mL

Orange Beta ACV 2014						
Detector	Low Mass Recovery	Medium Mass Recovery	High Mass Recovery	Mean Recovery	Beta Activity	1958.744 pCi
6	97.66%	95.01%	96.64%	96.44%		

Standard ID

Strontium 90

Sr-90_00018 #51512

Cert# 92352 Ref. date 11/29/12

Initial Activity:	2238.7	dpm	
Reference Date:	11/29/2012		
Current Date:	2/11/2014		(or date at which you wish to determine activity)
Elapsed Time:	439.000	days	
Half Life:	10409.625	days	
Exponential Term:	0.971191359		
Corrected Activity:	2174.206097	dpm	
Decay Activity (Sr/Y-90)	4348.412193	dpm	1958.744 pCi

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ACVABT-51512;B3 **Repeat** 5

Carrier No. 0

Batch ID M142810

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 2/11/2014 5:54:54 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 2/11/2014 5:59:57 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.095	1	0.200	0.105
sd	0.000			0.010	1.000	0.200	0.200
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.466	8,073	1,614.600	1,614.134
sd	0.000			0.022	89.850	17.970	17.970

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ACVABT-51512;B2

Repeat 6

Carrier No. 0

Batch ID M142810

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 2/11/2014 6:01:08 PM

Count Ended 2/11/2014 6:06:09 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 5.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.095	0	0.000	-0.095
sd	0.000			0.010	0.000	0.000	0.195
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.466	8,316	1,663.200	1,662.734
sd	0.000			0.022	91.192	18.238	18.238

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ACVABT-51512;B1 **Repeat** 7

Carrier No. 0

Batch ID M142810

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 2/11/2014 6:09:32 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 2/11/2014 6:14:35 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.095	1	0.200	0.105
sd	0.000			0.010	1.000	0.200	0.200
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.466	9,069	1,813.800	1,813.334
sd	0.000			0.022	95.231	19.046	19.046

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ACVABT-6340;A3 **Repeat** 5

Carrier No. 0

Batch ID M142808

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 2/11/2014 8:51:42 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 2/11/2014 9:21:45 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 30.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.095	6,203	206.767	206.672
sd	0.000			0.010	78.759	2.625	2.625
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.466	3,126	104.200	103.734
sd	0.000			0.022	55.911	1.864	1.864

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ACVABT-6340;A2

Repeat 6

Carrier No. 0

Batch ID M142808

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 2/11/2014 9:24:12 PM

Count Ended 2/11/2014 9:54:16 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 30.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.095	8,026	267.533	267.438
sd	0.000			0.010	89.588	2.986	2.986
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.466	3,737	124.567	124.101
sd	0.000			0.022	61.131	2.038	2.038

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 4-7 - C

Addr: 6

Sample ID ACVABT-6340;A1 **Repeat** 7

Carrier No. 0

Batch ID M142808

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 2/11/2014 9:55:17 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 2/11/2014 10:25:21 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 30.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.095	11,513	383.767	383.672
sd	0.000			0.010	107.299	3.577	3.577
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.466	4,587	152.900	152.434
sd	0.000			0.022	67.727	2.258	2.258

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Orange Alpha ACV 2014				
	Low	Medium	High	Mean
	Mass	Mass	Mass	Recovery
Detector	Recovery	Recovery	Recovery	
8	118.92%	103.54%	90.81%	104.42%

Standard ID

Thorium-230

Th-230_00003 #6340

Cert # 84460-334 Ref. date 4/11/11

Activity 1079.73 pCi/mL

Orange Beta ACV 2014						
Detector	Low Mass Recovery	Medium Mass Recovery	High Mass Recovery	Mean Recovery	Beta Activity	1958.744 pCi
8	96.59%	95.88%	98.02%	96.83%		

Standard ID

Strontium 90

Sr-90_00018 #51512

Cert# 92352 Ref. date 11/29/12

Initial Activity:	2238.7	dpm	
Reference Date:	11/29/2012		
Current Date:	2/11/2014		(or date at which you wish to determine activity)
Elapsed Time:	439.000	days	
Half Life:	10409.625	days	
Exponential Term:	0.971191359		
Corrected Activity:	2174.206097	dpm	
Decay Activity (Sr/Y-90)	4348.412193	dpm	1958.744 pCi

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ACVABT-51512;B1 **Repeat** 9

Carrier No. 0

Batch ID M142810

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 2/11/2014 6:29:08 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 2/11/2014 6:34:10 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.045	2	0.400	0.355
sd	0.000			0.007	1.414	0.283	0.283
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.381	9,076	1,815.200	1,814.819
sd	0.000			0.020	95.268	19.054	19.054

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ACVABT-51512;B3 **Repeat** 15

Carrier No. 0

Batch ID M142810

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 2/11/2014 7:38:40 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 2/11/2014 7:43:43 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.045	0	0.000	-0.045
sd	0.000			0.007	0.000	0.000	0.134
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.381	8,290	1,658.000	1,657.619
sd	0.000			0.020	91.049	18.210	18.210

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ACVABT-51512;B2

Repeat 16

Carrier No. 0

Batch ID M142810

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 2/11/2014 7:46:12 PM

Count Ended 2/11/2014 7:51:14 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 5.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.045	5	1.000	0.955
sd	0.000			0.007	2.236	0.447	0.447
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.381	8,500	1,700.000	1,699.619
sd	0.000			0.020	92.195	18.439	18.439

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ACVABT-6340;A1 **Repeat** 9

Carrier No. 0

Batch ID M142808

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 2/11/2014 10:58:50 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 2/11/2014 11:28:54 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 30.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.045	12,177	405.900	405.855
sd	0.000			0.007	110.349	3.678	3.678
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.381	4,303	143.433	143.052
sd	0.000			0.020	65.597	2.187	2.187

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ACVABT-6340;A2

Repeat 11

Carrier No. 0

Batch ID M142808

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 2/12/2014 9:26:33 AM

Count Ended 2/12/2014 9:56:36 AM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 30.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.045	8,962	298.733	298.688
sd	0.000			0.007	94.668	3.156	3.156
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.381	3,274	109.133	108.752
sd	0.000			0.020	57.219	1.907	1.907

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - A

Addr: 8

Sample ID ACVABT-6340;A3

Repeat 12

Carrier No. 0

Batch ID M142808

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 2/12/2014 11:36:39 AM

Collection Date 1 1/1/1900

Half Life 0.00 ***days***

Count Ended 2/12/2014 12:06:44 PM

Collection Date 2 1/1/1900

Decay Factor 1.000

Sample Count Time 30.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.045	12,472	415.733	415.688
sd	0.000			0.007	111.678	3.723	3.723
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.381	4,247	141.567	141.186
sd	0.000			0.020	65.169	2.172	2.172

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Orange Alpha ACV 2014				
	Low	Medium	High	Mean
	Mass	Mass	Mass	Recovery
Detector	Recovery	Recovery	Recovery	
9	121.05%	101.41%	89.24%	103.90%

Standard ID

Thorium-230

Th-230_00003 #6340

Cert # 84460-334 Ref. date 4/11/11

Activity 1079.73 pCi/mL

Orange Beta ACV 2014						
Detector	Low Mass Recovery	Medium Mass Recovery	High Mass Recovery	Mean Recovery	Beta Activity	1958.744 pCi
9	97.05%	96.80%	95.98%	96.61%		

Standard ID

Strontium 90

Sr-90_00018 #51512

Cert# 92352 Ref. date 11/29/12

Initial Activity:	2238.7	dpm	
Reference Date:	11/29/2012		
Current Date:	2/11/2014		(or date at which you wish to determine activity)
Elapsed Time:	439.000	days	
Half Life:	10409.625	days	
Exponential Term:	0.971191359		
Corrected Activity:	2174.206097	dpm	
Decay Activity (Sr/Y-90)	4348.412193	dpm	1958.744 pCi

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ACVABT-51512;B2

Repeat 9

Carrier No. 0

Batch ID M142810

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 2/11/2014 6:29:13 PM

Count Ended 2/11/2014 6:34:14 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 5.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.090	2	0.400	0.310
sd	0.000			0.009	1.414	0.283	0.283
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.427	8,519	1,703.800	1,703.373
sd	0.000			0.021	92.298	18.460	18.460

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ACVABT-51512;B1 **Repeat** 10

Carrier No. 0

Batch ID M142810

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 2/11/2014 6:35:24 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 2/11/2014 6:40:26 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 5.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.090	4	0.800	0.710
sd	0.000			0.009	2.000	0.400	0.400
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.427	9,075	1,815.000	1,814.573
sd	0.000			0.021	95.263	19.053	19.053

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ACVABT-51512;B3

Repeat 16

Carrier No. 0

Batch ID M142810

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 2/11/2014 7:46:20 PM

Count Ended 2/11/2014 7:51:22 PM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 5.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.090	4	0.800	0.710
sd	0.000			0.009	2.000	0.400	0.400
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.427	8,059	1,611.800	1,611.373
sd	0.000			0.021	89.772	17.954	17.954

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ACVABT-6340;A2 **Repeat** 9

Carrier No. 0

Batch ID M142808

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 2/11/2014 10:58:54 PM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 2/11/2014 11:28:58 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 30.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.090	8,820	294.000	293.910
sd	0.000			0.009	93.915	3.130	3.131
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.427	3,263	108.767	108.340
sd	0.000			0.021	57.123	1.904	1.904

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ACVABT-6340;A1

Repeat 10

Carrier No. 0

Batch ID M142808

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 2/11/2014 11:29:57 PM

Count Ended 2/12/2014 12:00:02 AM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 30.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.090	12,507	416.900	416.810
sd	0.000			0.009	111.835	3.728	3.728
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.427	4,287	142.900	142.473
sd	0.000			0.021	65.475	2.183	2.183

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Alpha/Beta Count Results

Sample Activity Report

Orange 8-11 - B

Addr: 9

Sample ID ACVABT-6340;A3

Repeat 11

Carrier No. 0

Batch ID M142808

Count Method Gross Alpha Beta

Detector Volts 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 2/12/2014 9:26:43 AM

Count Ended 2/12/2014 9:56:47 AM

Collection Date 1 1/1/1900

Collection Date 2 1/1/1900

Half Life 0.00 ***days***

Decay Factor 1.000

Sample Count Time 30.00 ***mins***

Background Count Time 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.090	7,062	235.400	235.310
sd	0.000			0.009	84.036	2.801	2.801
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.427	2,763	92.100	91.673
sd	0.000			0.021	52.564	1.752	1.752

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected**

MDC Method Tb = Ts < 10

Error = .00 **x sd**

Ra-226 Annual Calibration Verifications

Orange Radium-226 ACV 2014

Detector	Barium Yield	Results of Calibration
0	95.87%	113.70%

Standard ID

Radium 226

Ra-226_00008 #34981

Cert # SRM 4967 Ref. date 9/9/1991

Activity 25.018 dpm/mL

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - A

Addr: 0

Sample ID ACVRA6-228337;LCS5 **Repeat** 1

Carrier No. 0

Batch ID 100681

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 2/13/2014 4:03:41 AM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 2/13/2014 2:37:15 PM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 360.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.130	6,643	18.453	18.323
sd	0.000			0.011	81.505	0.226	0.227
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.451	7,246	20.128	19.677
sd	0.000			0.021	85.123	0.236	0.237

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Orange Radium-226 ACV 2014

Detector	Barium Yield	Results of Calibration
1	79.35%	114.96%

Standard ID

Radium 226
Ra-226_00008 #34981
Cert # SRM 4967 Ref. date 9/9/1991
Activity 25.018 dpm/mL

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - B

Addr: 1

Sample ID ACVRA6-228337;LCS4 **Repeat** 1

Carrier No. 0

Batch ID 97902

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 2/13/2014 4:03:49 AM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 2/13/2014 10:04:11 AM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 360.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.112	5,933	16.481	16.369
sd	0.000			0.011	77.026	0.214	0.214
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.296	5,867	16.297	16.001
sd	0.000			0.017	76.596	0.213	0.213

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Orange Radium-226 ACV 2014

Detector	Barium Yield	Results of Calibration
2	88.50%	121.84%

Standard ID

Radium 226

Ra-226_00008 #34981

Cert # SRM 4967 Ref. date 9/9/1991

Activity 25.018 dpm/mL

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - C

Addr: 2

Sample ID ACVRA6-228337;LCS1 **Repeat** 1

Carrier No. 0

Batch ID 98098

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty 0 *l* **sd** 0 *l*

Residual Wt 0 *mg* **sd** 0 *mg*

Count Began 2/13/2014 4:03:54 AM **Collection Date 1** 1/1/1900 **Half Life** 0.00 *days*

Count Ended 2/13/2014 10:04:16 AM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 360.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.275	6,878	19.106	18.831
sd	0.000			0.017	82.934	0.230	0.231
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.571	6,574	18.261	17.690
sd	0.000			0.024	81.080	0.225	0.226

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Orange Radium-226 ACV 2014

Detector	Barium Yield	Results of Calibration
3	84.37%	105.37%

Standard ID

Radium 226

Ra-226_00008 #34981

Cert # SRM 4967 Ref. date 9/9/1991

Activity 25.018 dpm/mL

Alpha/Beta Count Results

Sample Activity Report

Orange 0-3 - D

Addr: 3

Sample ID ACVRA6-228337;LCSD1 **Repeat** 1

Carrier No. 0

Batch ID 98098

Count Method Gross Alpha Beta **Detector Volts** 1515

Sample Qty	0 ***l***	**sd**	0 ***l***
Residual Wt	0 ***mg***	**sd**	0 ***mg***

Count Began 2/13/2014 4:04:00 AM **Collection Date 1** 1/1/1900 **Half Life** 0.00 ***days***

Count Ended 2/13/2014 10:04:23 AM **Collection Date 2** 1/1/1900 **Decay Factor** 1.000

Sample Count Time 360.00 ***mins*** **Background Count Time** 1,000.00 ***mins***

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.107	5,653	15.703	15.596
sd	0.000			0.010	75.186	0.209	0.209
A to B	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.487	6,025	16.736	16.249
sd	0.000			0.022	77.621	0.216	0.217

	Net Activity dpm	LLD dpm	MDC pCi/l	MPC pCi/l	Net Concentration * pCi/l	Conc / MPC Ratio
Alpha	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	
Beta	0.000	0.000	0.000	1.000	0.000 ± 0.000	0.000
sd	0.000				0.000	

*** Note: Decay Corrected** **MDC Method** Tb = Ts < 10 **Error =** .00 **x sd**

Monthly Backgrounds

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Gas Proportional Counter Daily Quality Control Checks

Monday, May 12, 2014

Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
Detector 0											
12:13 AM	**Efficiency**	10715.66	10961.91	328.86	-246.25	**Pass**					
	Background										
	Crosstalk	3360.000	3302.588	96.137	57.412	**Pass**					
12:20 AM	**Efficiency**						33733.11	33739.55	1012.19	-6.44	**Pass**
	Background										
	Crosstalk						76.824	237.400	143.963	-160.576	**Pass**
3:56 AM	**Efficiency**										
	Background	0.070	0.134	0.042	-0.064	**Pass**	0.340	0.474	0.121	-0.134	**Pass**
	Crosstalk										
Detector 1											
12:13 AM	**Efficiency**	9956.24	10173.40	305.20	-217.16	**Pass**					
	Background										
	Crosstalk	3083.000	3028.900	109.715	54.100	**Pass**					
12:20 AM	**Efficiency**						33315.74	33478.80	1004.36	-163.06	**Pass**
	Background										
	Crosstalk						10.548	42.975	30.711	-32.427	**Pass**
3:56 AM	**Efficiency**										
	Background	0.120	0.142	0.063	-0.022	**Pass**	0.260	0.416	0.134	-0.156	**Pass**
	Crosstalk										
Detector 2											
12:13 AM	**Efficiency**	11061.16	10972.86	329.19	88.30	**Pass**					
	Background										
	Crosstalk	3461.500	3366.220	137.933	95.280	**Pass**					
12:20 AM	**Efficiency**						23150.17	23193.20	695.80	-43.03	**Pass**
	Background										
	Crosstalk						16.073	37.375	27.717	-21.302	**Pass**

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THE LEADER IN ENVIRONMENTAL TESTING

Gas Proportional Counter Daily Quality Control Checks

Monday, May 12, 2014

Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
3:56 AM	**Efficiency**										
	Background	0.345	0.165	0.116	0.180	**Pass**	0.480	0.686	0.494	-0.206	**Pass**
	Crosstalk										
Detector 3											
12:13 AM	**Efficiency**	10544.75	10703.24	321.10	-158.49	**Pass**					
	Background										
	Crosstalk	3489.000	3488.780	118.326	0.220	**Pass**					
12:20 AM	**Efficiency**						30326.26	30620.69	918.62	-294.43	**Pass**
	Background										
	Crosstalk						14.566	43.524	34.997	-28.958	**Pass**
3:56 AM	**Efficiency**										
	Background	0.075	0.136	0.041	-0.061	**Pass**	0.505	0.553	0.099	-0.048	**Pass**
	Crosstalk										
Detector 4											
12:13 AM	**Efficiency**	10623.32	10616.58	318.50	6.74	**Pass**					
	Background										
	Crosstalk	4096.000	4041.960	93.896	54.040	**Pass**					
12:20 AM	**Efficiency**						25905.00	26048.10	781.44	-143.10	**Pass**
	Background										
	Crosstalk						7.032	8.525	2.042	-1.493	**Pass**
3:56 AM	**Efficiency**										
	Background	0.105	0.105	0.031	0.000	**Pass**	0.540	0.386	0.065	0.154	**Pass**
	Crosstalk										
Detector 5											
12:13 AM	**Efficiency**	10707.89	10779.16	323.37	-71.27	**Pass**					
	Background										
	Crosstalk	3996.500	3963.700	62.110	32.800	**Pass**					

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Monday, May 12, 2014

Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
12:20 AM	**Efficiency**						21619.54	21843.90	655.32	-224.36	**Pass**
	Background										
	Crosstalk						8.539	5.095	1.480	3.444	**WARNING**
3:56 AM	**Efficiency**										
	Background	0.140	0.169	0.053	-0.029	**Pass**	0.465	0.448	0.102	0.017	**Pass**
	Crosstalk										
Detector 6											
12:13 AM	**Efficiency**	10686.37	10768.46	323.05	-82.09	**Pass**					
	Background										
	Crosstalk	3959.000	3929.080	151.831	29.920	**Pass**					
12:20 AM	**Efficiency**						28932.79	29157.55	874.73	-224.76	**Pass**
	Background										
	Crosstalk						10.046	5.750	1.400	4.296	**DOEF**
3:56 AM	**Efficiency**										
	Background	0.115	0.107	0.023	0.008	**Pass**	0.595	0.498	0.080	0.097	**Pass**
	Crosstalk										
Detector 7											
12:13 AM	**Efficiency**	11678.69	11415.50	342.47	263.19	**Pass**					
	Background										
	Crosstalk	4297.500	4055.000	78.818	242.500	**DOEF**					
12:20 AM	**Efficiency**						27769.11	27782.35	833.47	-13.24	**Pass**
	Background										
	Crosstalk						5.525	4.600	1.392	0.925	**Pass**
3:56 AM	**Efficiency**										
	Background	0.030	0.102	0.037	-0.072	**Pass**	0.460	0.391	0.058	0.069	**Pass**
	Crosstalk										
Detector 8											

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Gas Proportional Counter Daily Quality Control Checks

Monday, May 12, 2014

Instrument: Orange

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
12:13 AM	**Efficiency**						33390.79	33564.38	1006.93	-173.58	**Pass**
	Background										
	Crosstalk						15.571	16.400	3.440	-0.829	**Pass**
12:19 AM	**Efficiency**	10724.40	10932.62	327.98	-208.22	**Pass**					
	Background										
	Crosstalk	3623.500	3644.120	113.075	-20.620	**Pass**					
3:56 AM	**Efficiency**										
	Background	0.085	0.096	0.039	-0.011	**Pass**	0.325	0.411	0.066	-0.086	**Pass**
	Crosstalk										
Detector 9											
12:13 AM	**Efficiency**						33864.85	33894.25	1016.83	-29.40	**Pass**
	Background										
	Crosstalk						13.562	14.000	4.085	-0.438	**Pass**
12:19 AM	**Efficiency**	10088.36	10270.92	308.13	-182.56	**Pass**					
	Background										
	Crosstalk	3249.500	3336.480	71.578	-86.980	**Pass**					
3:56 AM	**Efficiency**										
	Background	0.085	0.141	0.053	-0.056	**Pass**	0.510	0.454	0.117	0.056	**Pass**
	Crosstalk										
Detector 10											
12:13 AM	**Efficiency**						23287.76	23268.15	698.04	19.61	**Pass**
	Background										
	Crosstalk						5.023	5.525	1.626	-0.502	**Pass**
12:19 AM	**Efficiency**	9144.09	9314.42	279.43	-170.33	**Pass**					
	Background										
	Crosstalk	5559.000	5412.260	206.903	146.740	**Pass**					
3:56 AM	**Efficiency**										
	Background	0.090	0.117	0.045	-0.027	**Pass**	0.550	0.469	0.118	0.081	**Pass**
	Crosstalk										

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Gas Proportional Counter Daily Quality Control Checks

Monday, May 12, 2014

Instrument: Orange

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
Detector 11											
12:14 AM	**Efficiency**						30522.66	29987.20	899.62	535.46	**Pass**
	Background										
	Crosstalk						11.050	15.700	2.687	-4.650	**Pass**
12:19 AM	**Efficiency**	10823.47	10755.42	322.66	68.05	**Pass**					
	Background										
	Crosstalk	3278.500	3246.680	84.085	31.820	**Pass**					
3:56 AM	**Efficiency**										
	Background	0.075	0.122	0.042	-0.047	**Pass**	0.645	0.532	0.085	0.113	**Pass**
	Crosstalk										
Detector 12											
12:14 AM	**Efficiency**						25905.85	25927.73	777.83	-21.87	**Pass**
	Background										
	Crosstalk						17.078	12.950	1.629	4.128	**WARNING**
12:19 AM	**Efficiency**	10940.03	11039.74	331.19	-99.71	**Pass**					
	Background										
	Crosstalk	3571.000	3628.500	68.433	-57.500	**Pass**					
3:56 AM	**Efficiency**										
	Background	0.100	0.119	0.050	-0.019	**Pass**	0.455	0.498	0.092	-0.043	**Pass**
	Crosstalk										
Detector 13											
12:14 AM	**Efficiency**						22127.01	22266.53	668.00	-139.51	**Pass**
	Background										
	Crosstalk						16.073	14.975	3.432	1.098	**Pass**
12:19 AM	**Efficiency**	11120.18	11233.00	336.99	-112.82	**Pass**					
	Background										
	Crosstalk	3492.000	3521.820	75.777	-29.820	**Pass**					

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THE LEADER IN ENVIRONMENTAL TESTING

Gas Proportional Counter Daily Quality Control Checks

Monday, May 12, 2014

Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
3:56 AM	**Efficiency**										
	Background	0.125	0.163	0.058	-0.038	**Pass**	0.525	0.499	0.101	0.026	**Pass**
	Crosstalk										
Detector 14											
12:14 AM	**Efficiency**						29032.00	29008.58	870.26	23.42	**Pass**
	Background										
	Crosstalk						45.205	36.750	9.105	8.455	**Pass**
12:19 AM	**Efficiency**	10970.60	11064.70	331.94	-94.10	**Pass**					
	Background										
	Crosstalk	3541.000	3646.460	71.414	-105.460	**Pass**					
3:56 AM	**Efficiency**										
	Background	0.065	0.138	0.037	-0.073	**Pass**	0.515	0.432	0.047	0.083	**Pass**
	Crosstalk										
Detector 15											
12:14 AM	**Efficiency**						27477.13	27467.78	824.03	9.36	**Pass**
	Background										
	Crosstalk						18.584	21.400	5.218	-2.816	**Pass**
12:19 AM	**Efficiency**	11698.20	11797.00	353.91	-98.80	**Pass**					
	Background										
	Crosstalk	3514.000	3542.000	85.963	-28.000	**Pass**					
3:56 AM	**Efficiency**										
	Background	0.115	0.137	0.054	-0.022	**Pass**	0.475	0.437	0.083	0.038	**Pass**
	Crosstalk										
Detector 16											
12:22 AM	**Efficiency**	10563.75	10824.14	324.72	-260.39	**Pass**					
	Background										
	Crosstalk	3415.000	3496.320	67.571	-81.320	**Pass**					

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Gas Proportional Counter Daily Quality Control Checks

Monday, May 12, 2014

Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
12:26 AM	**Efficiency**						33479.01	33491.33	1004.74	-12.32	**Pass**
	Background										
	Crosstalk						32.146	32.800	8.069	-0.654	**Pass**
3:56 AM	**Efficiency**										
	Background	0.100	0.128	0.037	-0.028	**Pass**	0.475	0.442	0.061	0.033	**Pass**
	Crosstalk										
Detector 17											
12:22 AM	**Efficiency**	10137.41	10056.48	301.69	80.93	**Pass**					
	Background										
	Crosstalk	3378.500	3425.740	60.289	-47.240	**Pass**					
12:27 AM	**Efficiency**						33458.09	33457.18	1003.72	0.91	**Pass**
	Background										
	Crosstalk						13.562	13.975	2.967	-0.413	**Pass**
3:56 AM	**Efficiency**										
	Background	0.130	0.151	0.048	-0.021	**Pass**	0.350	0.438	0.089	-0.088	**Pass**
	Crosstalk										
Detector 18											
12:22 AM	**Efficiency**	10880.50	11053.86	331.62	-173.36	**Pass**					
	Background										
	Crosstalk	3660.500	3611.520	52.801	48.980	**Pass**					
12:27 AM	**Efficiency**						23451.57	23209.68	696.29	241.90	**Pass**
	Background										
	Crosstalk						20.594	16.100	4.093	4.494	**Pass**
3:56 AM	**Efficiency**										
	Background	0.120	0.109	0.050	0.011	**Pass**	0.375	0.426	0.077	-0.051	**Pass**
	Crosstalk										
Detector 19											

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Gas Proportional Counter Daily Quality Control Checks

Monday, May 12, 2014

Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
12:22 AM	**Efficiency**	10985.52	11009.96	330.30	-24.44	**Pass**					
	Background										
	Crosstalk	3643.000	3716.300	50.984	-73.300	**Pass**					
12:27 AM	**Efficiency**						31251.47	30982.63	929.48	268.84	**Pass**
	Background										
	Crosstalk						21.096	16.650	4.107	4.446	**Pass**
3:56 AM	**Efficiency**										
	Background	0.065	0.092	0.031	-0.027	**Pass**	0.325	0.380	0.083	-0.055	**Pass**
	Crosstalk										
Detector 20											
12:23 AM	**Efficiency**	10901.03	10934.68	328.04	-33.65	**Pass**					
	Background										
	Crosstalk	3529.500	3574.300	107.105	-44.800	**Pass**					
12:27 AM	**Efficiency**						25657.56	25820.98	774.63	-163.42	**Pass**
	Background										
	Crosstalk						21.096	20.300	5.444	0.796	**Pass**
3:57 AM	**Efficiency**										
	Background	0.105	0.097	0.035	0.008	**Pass**	0.335	0.375	0.071	-0.040	**Pass**
	Crosstalk										
Detector 21											
12:23 AM	**Efficiency**	10975.61	11170.12	335.10	-194.51	**Pass**					
	Background										
	Crosstalk	3585.500	3672.660	78.069	-87.160	**Pass**					
12:27 AM	**Efficiency**						21871.91	22199.20	665.98	-327.29	**Pass**
	Background										
	Crosstalk						12.557	13.000	2.763	-0.443	**Pass**
3:57 AM	**Efficiency**										
	Background	0.060	0.101	0.032	-0.041	**Pass**	0.320	0.325	0.064	-0.005	**Pass**
	Crosstalk										

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Gas Proportional Counter Daily Quality Control Checks

Monday, May 12, 2014

Instrument: ***Orange***

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha +/- limit	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta +/- limit	Beta Deviation	Beta Flag
Detector 22											
12:23 AM	**Efficiency**	10816.98	10918.70	327.56	-101.72	**Pass**					
	Background										
	Crosstalk	3624.500	3612.240	230.452	12.260	**Pass**					
12:27 AM	**Efficiency**						29260.20	29331.13	879.93	-70.92	**Pass**
	Background										
	Crosstalk						8.539	13.075	3.867	-4.536	**Pass**
3:57 AM	**Efficiency**										
	Background	0.075	0.100	0.032	-0.025	**Pass**	0.435	0.381	0.079	0.054	**Pass**
	Crosstalk										
Detector 23											
12:23 AM	**Efficiency**	11327.51	11544.58	346.34	-217.07	**Pass**					
	Background										
	Crosstalk	3685.000	3809.981	484.264	-124.981	**Pass**					
12:27 AM	**Efficiency**						27437.04	27644.68	829.34	-207.64	**Pass**
	Background										
	Crosstalk						8.539	13.125	3.128	-4.586	**Pass**
3:57 AM	**Efficiency**										
	Background	0.075	0.105	0.049	-0.030	**Pass**	0.440	0.446	0.115	-0.006	**Pass**
	Crosstalk										

Alpha/Beta Count Results

Source Count Report

Orange 0-3 - A

Addr: 0

Sample ID ICB
ICB;Monthly Background Check

Repeat 605

Carrier No. 0

Batch ID ICB;Monthly Background

Detector Volts 1515

Residual Wt 0 ***mg***

Half Life 0.00 ***Years***

Count Began 5/9/2014 11:07:40 AM

Calibration Date 8/4/2012 9:20:16 AM

Decay Factor 1.000

Count Ended 5/10/2014 3:48:36 AM

Backgrounds From

Sample Count Time 1,000.00 ***mins***

Background Count Time 0.00

	Gross counts	Gross cpm	Background cpm	Net cpm
Alpha	56	0.056	0.000	0.056
sd	7.483	0.007	0.000	0.007
Beta	378	0.378	0.000	0.378
sd	19.442	0.019	0.000	0.019

	Uncorrected DPM	Corrected DPM	Corrected dpm	Efficiency %
Alpha	0.000	0.000	0.000	0.000
sd	0.000	0.000	0.000	0.000
Alpha to Beta				0.000
sd				0.000
Beta	0.000	0.000	0.000	0.000
sd	0.000	0.000	0.000	0.000

Alpha/Beta Count Results

Source Count Report

Orange 0-3 - B

Addr: 1

Sample ID ICB
ICB;Monthly Background Check

Repeat 606

Carrier No. 0

Batch ID ICB;Monthly Background

Detector Volts 1515

Residual Wt 0 ***mg***

Half Life 0.00 ***Years***

Count Began 5/9/2014 11:07:42 AM

Calibration Date 8/4/2012 9:20:16 AM

Decay Factor 1.000

Count Ended 5/10/2014 3:48:38 AM

Backgrounds From

Sample Count Time 1,000.00 ***mins***

Background Count Time 0.00

	Gross counts	Gross cpm	Background cpm	Net cpm
Alpha	82	0.082	0.000	0.082
sd	9.055	0.009	0.000	0.009
Beta	302	0.302	0.000	0.302
sd	17.378	0.017	0.000	0.017

	Uncorrected DPM	Corrected DPM	Corrected dpm	Efficiency %
Alpha	0.000	0.000	0.000	0.000
sd	0.000	0.000	0.000	0.000
Alpha to Beta				0.000
sd				0.000
Beta	0.000	0.000	0.000	0.000
sd	0.000	0.000	0.000	0.000

Alpha/Beta Count Results

Source Count Report

Orange 0-3 - C

Addr: 2

Sample ID ICB
ICB;Monthly Background Check

Repeat 607

Carrier No. 0

Batch ID ICB;Monthly Background

Detector Volts 1515

Residual Wt 0 ***mg***

Half Life 0.00 ***Years***

Count Began 5/9/2014 11:07:50 AM

Calibration Date 8/4/2012 9:20:16 AM

Decay Factor 1.000

Count Ended 5/10/2014 3:48:47 AM

Backgrounds From

Sample Count Time 1,000.00 ***mins***

Background Count Time 0.00

	Gross counts	Gross cpm	Background cpm	Net cpm
Alpha	228	0.228	0.000	0.228
sd	15.100	0.015	0.000	0.015
Beta	567	0.567	0.000	0.567
sd	23.812	0.024	0.000	0.024

	Uncorrected DPM	Corrected DPM	Corrected dpm	Efficiency %
Alpha	0.000	0.000	0.000	0.000
sd	0.000	0.000	0.000	0.000
Alpha to Beta				0.000
sd				0.000
Beta	0.000	0.000	0.000	0.000
sd	0.000	0.000	0.000	0.000

Alpha/Beta Count Results

Source Count Report

Orange 0-3 - D

Addr: 3

Sample ID ICB
ICB;Monthly Background Check

Repeat 608

Carrier No. 0

Batch ID ICB;Monthly Background

Detector Volts 1515

Residual Wt 0 ***mg***

Half Life 0.00 ***Years***

Count Began 5/9/2014 11:07:53 AM

Calibration Date 8/4/2012 9:20:16 AM

Decay Factor 1.000

Count Ended 5/10/2014 3:48:50 AM

Backgrounds From

Sample Count Time 1,000.00 ***mins***

Background Count Time 0.00

	Gross counts	Gross cpm	Background cpm	Net cpm
Alpha	72	0.072	0.000	0.072
sd	8.485	0.008	0.000	0.008
Beta	484	0.484	0.000	0.484
sd	22.000	0.022	0.000	0.022

	Uncorrected DPM	Corrected DPM	Corrected dpm	Efficiency %
Alpha	0.000	0.000	0.000	0.000
sd	0.000	0.000	0.000	0.000
Alpha to Beta				0.000
sd				0.000
Beta	0.000	0.000	0.000	0.000
sd	0.000	0.000	0.000	0.000

Alpha/Beta Count Results

Source Count Report

Orange 4-7 - A

Addr: 4

Sample ID ICB
ICB;Monthly Background Check

Repeat 609

Carrier No. 0

Batch ID ICB;Monthly Background

Detector Volts 1515

Residual Wt 0 ***mg***

Half Life 0.00 ***Years***

Count Began 5/9/2014 11:08:27 AM

Calibration Date 8/4/2012 9:20:16 AM

Decay Factor 1.000

Count Ended 5/10/2014 3:49:22 AM

Backgrounds From

Sample Count Time 1,000.00 ***mins***

Background Count Time 0.00

	Gross counts	Gross cpm	Background cpm	Net cpm
Alpha	72	0.072	0.000	0.072
sd	8.485	0.008	0.000	0.008
Beta	349	0.349	0.000	0.349
sd	18.682	0.019	0.000	0.019

	Uncorrected DPM	Corrected DPM	Corrected dpm	Efficiency %
Alpha	0.000	0.000	0.000	0.000
sd	0.000	0.000	0.000	0.000
Alpha to Beta				0.000
sd				0.000
Beta	0.000	0.000	0.000	0.000
sd	0.000	0.000	0.000	0.000

Alpha/Beta Count Results

Source Count Report

Orange 4-7 - C

Addr: 6

Sample ID ICB
ICB;Monthly Background Check

Repeat 611

Carrier No. 0

Batch ID ICB;Monthly Background

Detector Volts 1515

Residual Wt 0 ***mg***

Half Life 0.00 ***Years***

Count Began 5/9/2014 11:08:39 AM

Calibration Date 8/4/2012 9:20:16 AM

Decay Factor 1.000

Count Ended 5/10/2014 3:49:34 AM

Backgrounds From

Sample Count Time 1,000.00 ***mins***

Background Count Time 0.00

	Gross counts	Gross cpm	Background cpm	Net cpm
Alpha	106	0.106	0.000	0.106
sd	10.296	0.010	0.000	0.010
Beta	492	0.492	0.000	0.492
sd	22.181	0.022	0.000	0.022

	Uncorrected DPM	Corrected DPM	Corrected dpm	Efficiency %
Alpha	0.000	0.000	0.000	0.000
sd	0.000	0.000	0.000	0.000
Alpha to Beta				0.000
sd				0.000
Beta	0.000	0.000	0.000	0.000
sd	0.000	0.000	0.000	0.000

Alpha/Beta Count Results

Source Count Report

Orange 8-11 - A

Addr: 8

Sample ID ICB
ICB;Monthly Background Check

Batch ID ICB;Monthly Background

Repeat 625
Carrier No. 0
Detector Volts 1515

Residual Wt 0 ***mg***
Count Began 5/9/2014 11:09:36 AM
Count Ended 5/10/2014 3:50:29 AM
Calibration Date 8/4/2012 9:20:16 AM
Backgrounds From
Half Life 0.00 ***Years***
Decay Factor 1.000

Sample Count Time 1,000.00 ***mins***
Background Count Time 0.00

	Gross counts	Gross cpm	Background cpm	Net cpm
Alpha	45	0.045	0.000	0.045
sd	6.708	0.007	0.000	0.007
Beta	376	0.376	0.000	0.376
sd	19.391	0.019	0.000	0.019

	Uncorrected DPM	Corrected DPM	Corrected dpm	Efficiency %
Alpha	0.000	0.000	0.000	0.000
sd	0.000	0.000	0.000	0.000
Alpha to Beta				0.000
sd				0.000
Beta	0.000	0.000	0.000	0.000
sd	0.000	0.000	0.000	0.000

Alpha/Beta Count Results

Source Count Report

Orange 8-11 - B

Addr: 9

Sample ID ICB
ICB;Monthly Background Check

Repeat 628

Carrier No. 0

Batch ID ICB;Monthly Background

Detector Volts 1515

Residual Wt 0 ***mg***

Half Life 0.00 ***Years***

Count Began 5/12/2014 6:30:06 PM

Calibration Date 8/4/2012 9:20:16 AM

Decay Factor 1.000

Count Ended 5/13/2014 11:11:03 AM

Backgrounds From

Sample Count Time 1,000.00 ***mins***

Background Count Time 0.00

	Gross counts	Gross cpm	Background cpm	Net cpm
Alpha	122	0.122	0.000	0.122
sd	11.045	0.011	0.000	0.011
Beta	407	0.407	0.000	0.407
sd	20.174	0.020	0.000	0.020

	Uncorrected DPM	Corrected DPM	Corrected dpm	Efficiency %
Alpha	0.000	0.000	0.000	0.000
sd	0.000	0.000	0.000	0.000
Alpha to Beta				0.000
sd				0.000
Beta	0.000	0.000	0.000	0.000
sd	0.000	0.000	0.000	0.000

Run Logs

Gas Flow Proportional Counter Run Log

Detector: Orange0

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
01/23/13 16:47	40	ICRA6 160-30868/1		30868			JLW
01/23/13 17:29	40	ICRA6 160-30868/8		30868			JLW
01/23/13 18:18	40	ICRA6 160-30868/7		30868			JLW
01/23/13 19:04	40	ICRA6 160-30868/6		30868			JLW
01/23/13 19:45	40	ICRA6 160-30868/5		30868			JLW
01/23/13 20:30	40	ICRA6 160-30868/4		30868			JLW
01/23/13 21:28	40	ICRA6 160-30868/3		30868			JLW
01/23/13 22:27	40	ICRA6 160-30868/2		30868			JLW
01/27/13 17:37	360	ICVRA6 160-30868/9		30868			JLW
02/13/14 04:03	360	ACVRA6 160-106547/1		106547			LES
05/09/14 11:07	1000	ICB 160-121359/1		121359			PS
05/21/14 00:11	2	CCVA 160-123289/1		123289			MLK
05/21/14 00:15	2	CCVB 160-123289/16		123289			MLK
05/21/14 00:32	200	CCB 160-123289/48		123289			MLK
05/21/14 11:28	60	ZZZZZ		123289			
05/21/14 16:15	200	MB 160-122912/1-A		123289	122912	9315	MLK

Detector: Orange1

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
01/23/13 16:47	40	ICRA6 160-30875/2		30875			JLW
01/23/13 17:29	40	ICRA6 160-30875/1		30875			JLW
01/23/13 18:18	40	ICRA6 160-30875/8		30875			JLW
01/23/13 19:04	40	ICRA6 160-30875/7		30875			JLW
01/23/13 19:45	40	ICRA6 160-30875/6		30875			JLW
01/23/13 20:30	40	ICRA6 160-30875/5		30875			JLW
01/23/13 21:28	40	ICRA6 160-30875/4		30875			JLW
01/23/13 22:27	40	ICRA6 160-30875/3		30875			JLW
01/27/13 17:37	360	ICVRA6 160-30875/9		30875			JLW
02/13/14 04:03	360	ACVRA6 160-106548/1		106548			LES
05/09/14 11:07	1000	ICB 160-121359/2		121359			PS
05/21/14 00:11	2	CCVA 160-123289/2		123289			MLK
05/21/14 00:15	2	CCVB 160-123289/17		123289			MLK
05/21/14 00:32	200	CCB 160-123289/49		123289			MLK
05/21/14 11:28	60	ZZZZZ		123289			
05/21/14 16:15	200	LCS 160-122912/2-A		123289	122912	9315	MLK

Detector: Orange2

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
01/23/13 16:47	40	ICRA6 160-30876/3		30876			JLW
01/23/13 17:29	40	ICRA6 160-30876/2		30876			JLW
01/23/13 18:18	40	ICRA6 160-30876/1		30876			JLW
01/23/13 19:04	40	ICRA6 160-30876/8		30876			JLW
01/23/13 19:45	40	ICRA6 160-30876/7		30876			JLW
01/23/13 20:30	40	ICRA6 160-30876/6		30876			JLW
01/23/13 21:28	40	ICRA6 160-30876/5		30876			JLW
01/23/13 22:27	40	ICRA6 160-30876/4		30876			JLW
01/27/13 17:38	360	ICVRA6 160-30876/9		30876			JLW
02/13/14 04:03	360	ACVRA6 160-106549/1		106549			LES
05/09/14 11:07	1000	ICB 160-121359/3		121359			PS
05/21/14 00:11	2	CCVA 160-123289/3		123289			MLK
05/21/14 00:15	2	CCVB 160-123289/18		123289			MLK

Gas Flow Proportional Counter Run Log

Detector: Orange2 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/21/14 00:32	200	CCB 160-123289/50		123289			MLK
05/21/14 11:28	60	ZZZZZ		123289			
05/21/14 12:40	60	ZZZZZ		123289			
05/21/14 16:16	200	LCSD 160-122912/3-A		123289	122912	9315	MLK

Detector: Orange3

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
01/23/13 16:47	40	ICRA6 160-30877/4		30877			JLW
01/23/13 17:29	40	ICRA6 160-30877/3		30877			JLW
01/23/13 18:18	40	ICRA6 160-30877/2		30877			JLW
01/23/13 19:04	40	ICRA6 160-30877/1		30877			JLW
01/23/13 19:45	40	ICRA6 160-30877/8		30877			JLW
01/23/13 20:30	40	ICRA6 160-30877/7		30877			JLW
01/23/13 21:28	40	ICRA6 160-30877/6		30877			JLW
01/23/13 22:27	40	ICRA6 160-30877/5		30877			JLW
01/27/13 17:38	360	ICVRA6 160-30877/9		30877			JLW
02/13/14 04:04	360	ACVRA6 160-106550/1		106550			LES
05/09/14 11:07	1000	ICB 160-121359/4		121359			PS
05/21/14 00:12	2	CCVA 160-123289/4		123289			MLK
05/21/14 00:15	2	CCVB 160-123289/19		123289			MLK
05/21/14 00:32	200	CCB 160-123289/51		123289			MLK
05/21/14 11:30	60	ZZZZZ		123289			
05/21/14 16:16	200	160-6694-7	2222-RIN-01	123289	122912	9315	MLK

Detector: Orange4

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
01/23/13 14:45	5	ICABT 160-63209/15		63209			JLW
01/23/13 14:53	5	ICABT 160-63209/16		63209			JLW
01/23/13 15:00	5	ICABT 160-63209/17		63209			JLW
01/23/13 15:09	5	ICABT 160-63209/18		63209			JLW
01/23/13 15:18	5	ICABT 160-63209/19		63209			JLW
01/23/13 15:27	5	ICABT 160-63209/20		63209			JLW
01/23/13 15:37	5	ICABT 160-63209/21		63209			JLW
01/23/13 15:46	5	ICABT 160-63209/22		63209			JLW
01/24/13 18:10	5	ICVABT 160-63209/23		63209			JLW
01/24/13 18:25	5	ICVABT 160-63209/24		63209			JLW
01/24/13 18:33	5	ICVABT 160-63209/25		63209			JLW
07/18/13 07:30	40	ZZZZZ		63209			
07/18/13 09:23	40	ZZZZZ		63209			
07/18/13 15:43	40	ICABT 160-63209/3		63209			JLW
07/18/13 16:37	40	ZZZZZ		63209			
07/18/13 17:29	40	ICABT 160-63209/5		63209			JLW
07/18/13 18:30	40	ICABT 160-63209/6		63209			JLW
07/18/13 19:58	40	ICABT 160-63209/7		63209			JLW
07/18/13 21:01	40	ICABT 160-63209/8		63209			JLW
07/18/13 21:52	40	ICABT 160-63209/9		63209			JLW
07/18/13 22:47	40	ICABT 160-63209/10		63209			JLW
07/23/13 16:41	50	ICABT 160-63209/11		63209			JLW
07/24/13 08:56	30	ICVABT 160-63209/12		63209			JLW
07/24/13 09:49	30	ICVABT 160-63209/13		63209			JLW
07/24/13 10:43	30	ICVABT 160-63209/14		63209			JLW

Gas Flow Proportional Counter Run Log

Detector: Orange4 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
02/11/14 17:41	5	ACVABT 160-106019/1		106019			LES
02/11/14 17:47	5	ACVABT 160-106019/2		106019			LES
02/11/14 17:54	5	ACVABT 160-106019/3		106019			LES
02/11/14 19:39	30	ACVABT 160-106019/4		106019			LES
02/11/14 20:19	30	ACVABT 160-106019/5		106019			LES
02/11/14 20:51	30	ACVABT 160-106019/6		106019			LES
05/09/14 11:08	1000	ICB 160-121359/5		121359			PS
05/23/14 00:13	2	CCVA 160-123737/5		123737			SMP
05/23/14 00:17	2	CCVB 160-123737/20		123737			SMP
05/23/14 00:34	200	CCB 160-123737/52		123737			SMP
05/23/14 09:50	200	MB 160-122913/1-A		123737	122913	9320	SMP

Detector: Orange6

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
01/23/13 14:45	5	ICABT 160-63211/16		63211			JLW
01/23/13 14:53	5	ICABT 160-63211/17		63211			JLW
01/23/13 15:01	5	ICABT 160-63211/18		63211			JLW
01/23/13 15:09	5	ICABT 160-63211/19		63211			JLW
01/23/13 15:19	5	ICABT 160-63211/20		63211			JLW
01/23/13 15:26	5	ICABT 160-63211/21		63211			JLW
01/23/13 15:37	5	ICABT 160-63211/22		63211			JLW
01/23/13 15:46	5	ICABT 160-63211/23		63211			JLW
01/24/13 18:10	5	ICVABT 160-63211/24		63211			JLW
01/24/13 18:16	5	ICVABT 160-63211/25		63211			JLW
01/24/13 18:25	5	ICVABT 160-63211/26		63211			JLW
07/18/13 07:30	40	ZZZZZ		63211			
07/18/13 09:23	40	ZZZZZ		63211			
07/18/13 15:44	40	ICABT 160-63211/3		63211			JLW
07/18/13 16:37	40	ICABT 160-63211/4		63211			JLW
07/18/13 17:29	40	ICABT 160-63211/5		63211			JLW
07/18/13 18:31	40	ZZZZZ		63211			
07/18/13 19:58	40	ZZZZZ		63211			
07/18/13 21:01	40	ICABT 160-63211/8		63211			JLW
07/18/13 21:52	40	ICABT 160-63211/9		63211			JLW
07/18/13 22:47	40	ICABT 160-63211/10		63211			JLW
07/23/13 16:41	50	ICABT 160-63211/11		63211			JLW
07/23/13 18:58	50	ICABT 160-63211/12		63211			JLW
07/24/13 11:45	30	ICVABT 160-63211/13		63211			JLW
07/24/13 15:13	30	ICVABT 160-63211/14		63211			JLW
07/24/13 15:46	30	ICVABT 160-63211/15		63211			JLW
02/11/14 17:54	5	ACVABT 160-106021/1		106021			LES
02/11/14 18:01	5	ACVABT 160-106021/2		106021			LES
02/11/14 18:09	5	ACVABT 160-106021/3		106021			LES
02/11/14 20:51	30	ACVABT 160-106021/4		106021			LES
02/11/14 21:24	30	ACVABT 160-106021/5		106021			LES
02/11/14 21:55	30	ACVABT 160-106021/6		106021			LES
05/09/14 11:08	1000	ICB 160-121359/7		121359			PS
05/23/14 00:14	2	CCVA 160-123737/7		123737			SMP
05/23/14 00:17	2	CCVB 160-123737/22		123737			SMP
05/23/14 00:34	200	CCB 160-123737/54		123737			SMP
05/23/14 09:50	200	LCS 160-122913/2-A		123737	122913	9320	SMP

Gas Flow Proportional Counter Run Log

Detector: Orange8

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
01/23/13 14:27	5	ICABT 160-63213/12		63213			JLW
01/23/13 14:37	5	ICABT 160-63213/13		63213			JLW
01/23/13 16:47	5	ICABT 160-63213/14		63213			JLW
01/23/13 16:58	5	ICABT 160-63213/15		63213			JLW
01/23/13 17:05	5	ICABT 160-63213/16		63213			JLW
01/23/13 17:12	5	ICABT 160-63213/17		63213			JLW
01/23/13 17:19	5	ICABT 160-63213/18		63213			JLW
01/23/13 17:27	5	ICABT 160-63213/19		63213			JLW
01/24/13 19:31	5	ICVABT 160-63213/20		63213			JLW
01/24/13 19:38	5	ICVABT 160-63213/21		63213			JLW
01/24/13 19:49	5	ICVABT 160-63213/22		63213			JLW
07/24/13 08:46	50	ICABT 160-63213/1		63213			JLW
07/24/13 09:53	50	ICABT 160-63213/2		63213			JLW
07/24/13 10:46	50	ICABT 160-63213/3		63213			JLW
07/24/13 11:45	50	ICABT 160-63213/4		63213			JLW
07/24/13 15:14	50	ICABT 160-63213/5		63213			JLW
07/24/13 16:36	50	ICABT 160-63213/6		63213			JLW
07/24/13 17:29	50	ICABT 160-63213/7		63213			JLW
07/24/13 18:31	50	ICABT 160-63213/8		63213			JLW
07/24/13 19:26	30	ICVABT 160-63213/9		63213			JLW
07/24/13 23:21	30	ICVABT 160-63213/10		63213			JLW
07/24/13 23:54	30	ICVABT 160-63213/11		63213			JLW
02/11/14 18:29	5	ACVABT 160-106023/1		106023			LES
02/11/14 19:38	5	ACVABT 160-106023/2		106023			LES
02/11/14 19:46	5	ACVABT 160-106023/3		106023			LES
02/11/14 22:58	30	ACVABT 160-106023/4		106023			LES
02/12/14 09:26	30	ACVABT 160-106023/5		106023			LES
02/12/14 11:36	30	ACVABT 160-106023/6		106023			LES
05/09/14 11:09	1000	ICB 160-121359/21		121359			PS
05/23/14 00:14	2	CCVB 160-123737/9		123737			SMP
05/23/14 00:17	2	CCVA 160-123737/24		123737			SMP
05/23/14 00:34	200	CCB 160-123737/56		123737			SMP
05/23/14 09:50	200	LCSD 160-122913/3-A		123737	122913	9320	SMP

Detector: Orange9

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
01/23/13 14:27	5	ICABT 160-63214/12		63214			JLW
01/23/13 14:36	5	ICABT 160-63214/13		63214			JLW
01/23/13 16:47	5	ICABT 160-63214/14		63214			JLW
01/23/13 16:58	5	ICABT 160-63214/15		63214			JLW
01/23/13 17:05	5	ICABT 160-63214/16		63214			JLW
01/23/13 17:12	5	ICABT 160-63214/17		63214			JLW
01/23/13 17:19	5	ICABT 160-63214/18		63214			JLW
01/23/13 17:27	5	ICABT 160-63214/19		63214			JLW
01/24/13 19:32	5	ICVABT 160-63214/20		63214			JLW
01/24/13 19:38	5	ICVABT 160-63214/21		63214			JLW
01/24/13 19:50	5	ICVABT 160-63214/22		63214			JLW
07/24/13 08:46	50	ICABT 160-63214/1		63214			JLW
07/24/13 09:53	50	ICABT 160-63214/2		63214			JLW
07/24/13 10:46	50	ICABT 160-63214/3		63214			JLW
07/24/13 11:46	50	ICABT 160-63214/4		63214			JLW
07/24/13 15:14	50	ICABT 160-63214/5		63214			JLW

Gas Flow Proportional Counter Run Log

Detector: Orange9 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
07/24/13 16:37	50	ICABT 160-63214/6		63214			JLW
07/24/13 17:29	50	ICABT 160-63214/7		63214			JLW
07/24/13 18:31	50	ICABT 160-63214/8		63214			JLW
07/24/13 19:26	30	ICVABT 160-63214/9		63214			JLW
07/24/13 20:19	30	ICVABT 160-63214/10		63214			JLW
07/24/13 23:54	30	ICVABT 160-63214/11		63214			JLW
02/11/14 18:29	5	ACVABT 160-106025/1		106025			LES
02/11/14 18:35	5	ACVABT 160-106025/2		106025			LES
02/11/14 19:46	5	ACVABT 160-106025/3		106025			LES
02/11/14 22:58	30	ACVABT 160-106025/4		106025			LES
02/11/14 23:29	30	ACVABT 160-106025/5		106025			LES
02/12/14 09:26	30	ACVABT 160-106025/6		106025			LES
05/12/14 00:11	2	CCVB 160-121498/10		121498			
05/12/14 00:17	2	CCVA 160-121498/18		121498			
05/12/14 00:36	200	CCB 160-121498/58		121498			
05/12/14 07:13	200	ZZZZZ		121498			
05/12/14 11:52	200	ZZZZZ		121498			
05/12/14 18:30	0	ICB 160-121498/108		121498			MLK
05/12/14 18:30	1000	ICB 160-121981/1		121981			PS
05/23/14 00:14	2	CCVB 160-123737/10		123737			SMP
05/23/14 00:17	2	CCVA 160-123737/25		123737			SMP
05/23/14 00:34	200	CCB 160-123737/57		123737			SMP
05/23/14 09:50	200	160-6694-7	2222-RIN-01	123737	122913	9320	SMP

Subcontract Data

MCLinc Project No. TAM002845A
May 20, 2014 Sample Delivery
Isotopic Lead Analysis

CERTIFICATE OF ANALYSIS

May 28, 2014

Erika K. Gish
Test America
St. Louis

Certificate of Analysis
MCLinc Project No. TAM002845A
Analysis of Samples for Isotopic Lead

On May 20, 2014, Materials and Chemistry Laboratory, Inc. (MCLinc) received six solid samples and one water sample in good condition for isotopic lead analysis. Upon receipt, sample 2222-SD03 (160-6694-3) had a loose lid and leaked onto the other five samples it was packaged with. The client was contacted, and we proceeded with the analysis. The sampling date was identified as May 15, 2014.

The samples were prepared by acid digestion using MCLinc SOP-7746 and then analyzed by Inductively Coupled Plasma Mass Spectroscopy using MCLinc SOP MCL-7768. The results are including QC are presented in the attached tables.

All QC was acceptable.

Thank you for choosing MCLinc. This report reviewed and approved by:

Jack Hall
Quality Assurance Manager

Mike Tutor
Senior Chemist

Materials and Chemistry Laboratory, Inc.
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Oak Ridge, Tennessee 37830-1702
Telephone: (865) 576-4138 Fax: (865) 576-8558
www.MCL-inc.com

Metal Analysis of Solid/Liquid Samples by ICP-MS
Analysis Date: 05/27/2014
MCL Project ID: TAM002845A

	Metal:	*Pb Total*			*Pb 204*	*Pb 206*	*Pb 207*	*Pb 208*
Client Sample ID	**MCL Sample ID**	**Concentration**	**Qualifier**	**Units**	**Mass %**	**Mass %**	**Mass %**	**Mass %**
2222-SD01 (160-6694-1)	14-0922	66	D	mg/Kg	1.3223	25.4754	21.3582	51.8441
2222-SD02 (160-6694-2)	14-0923	26	D	mg/Kg	1.3308	25.3594	21.5656	51.7442
2222-SD03 (160-6694-3)	14-0924	120	D	mg/Kg	1.3372	25.4202	21.5542	51.6883
2222-SD04 (160-6694-4)	14-0925	20	D	mg/Kg	1.3273	25.3967	21.4878	51.7882
2222-SD05 (160-6694-5)	14-0926	110	D	mg/Kg	1.3175	25.8765	21.2824	51.5236
2222-SD06 (160-6694-6)	14-0927	96	D	mg/Kg	1.3321	25.3774	21.4585	51.8321
2222-RIN-01 (160-6694-7)	14-0928	0.0035	U	mg/L	NA	NA	NA	NA

Notes:

-U qualifier indicates no analytes above the reported values were detected in the sample

- D qualifier indicates dilution of sample was necessary to remain within the calibration range; concentration calculation includes dilution factor.

- NA = The measured concentration was below the reporting level. No Mass % can be calculated.

Analysis Date: 05/27/2014
MCL Project ID: TAM002845A
QC Data Table

Metal:	*Pb 204*	*Pb 206*	*Pb 207*	*Pb 208*	
QC Sample ID	Result	Result	Result	Result	Units
CCV-1	105	104	106	104	%R
CCV-2	106	105	106	105	%R
CCV-3	104	102	104	101	%R
Blank 1	<0.0393	<0.672	<0.618	<1.47	µg/L
Blank 2	<0.0393	<0.672	<0.618	<1.47	µg/L
Blank 3	<0.0393	<0.672	<0.618	<1.47	µg/L
LCS052314N-2	102	103	104	101	%R
MB052314	<0.00098	<0.017	<0.015	<0.037	mg/Kg

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METALS PREP SHEET

METALS DIGESTION SAMPLE PREPARATION for ICP or ICP/MS ICP MS Page 8

Procedure: MCL-7746 or Be MCL-7756, App. UU Sample Type: Air Filters, Wipes, Solids, Soils, Oils

Date: 05-23-14 Prepared By: RJJ Project ID: TAM002845A

Spike ID(s): A Pb Iso 052214 B _____ C _____ D _____

Used (check one): Class A Glass Pipets? ☐ Autopipet? ☐ Autopipet #: _____ Verification Wt. _____ (DI H_2O) (g)

QA/QC Information

QC Sample ID	Matrix (soil, wipe, filter, DI H_2O)	Aliquot (g) or (mL)	Volume (mL) & Spike ID	Final Vol. (mL)	Comments
MB 052314-2	DI H_2O	2g		50ml	
LCS052314N-2			A: 0.6ml	↓	

Sample Information

MCL Sample ID	Matrix (soil, wipe, filter, etc.)	Aliquot (g) or (mL)	Final Vol. (mL)	Digestion Temp (°C)	Comments	Chemicals Used (include Manufacturer and Lot #)
14-0922	SOIL	2.3645g	50 ml	96	very wet	HCl - 1ml
0923	↓	2.8759g	↓	↓	↓	BDH
0924		2.1827g				4112120
0925		2.6682g				
0926		2.2051g				HNO_3 - 3 ml
0927	↓	2.6698g			↓	EMD
0928	WATER	40 ml	↓	↓		53157

Balance ID	AF 260	Weight (g)	10.0000	5.0000	0.1000	0.0500
Calibration ID	94-060733	Actual (g)	10.0004	5.0010	0.0999	0.0500
Weight Set ID	130124	Actual (g)	10.0001	5.0010	0.1000	0.0500
		Avg (g)	10.00025	5.0010	0.09995	0.0508

Hot Block Used (circle one): A B C (D)

Temp. Blank Location: D 8 Signature RJJ

SAMPLE/QC DATA

Metal Analysis of Solid/Liquid Samples by ICP-MS
Analysis Date: 05/27/2014
MCL Project ID: TAM002845A

	Metal:	Pb Total			Pb 204	Pb 206	Pb 207	Pb 208
Client Sample ID	MCL Sample ID	Concentration	Qualifier	Units	Mass %	Mass %	Mass %	Mass %
2222-SD01 (160-6694-1)	14-0922	66	D	mg/Kg	1.3223	25.4754	21.3582	51.8441
2222-SD02 (160-6694-2)	14-0923	26	D	mg/Kg	1.3308	25.3594	21.5656	51.7442
2222-SD03 (160-6694-3)	14-0924	120	D	mg/Kg	1.3372	25.4202	21.5542	51.6883
2222-SD04 (160-6694-4)	14-0925	20	D	mg/Kg	1.3273	25.3967	21.4878	51.7882
2222-SD05 (160-6694-5)	14-0926	110	D	mg/Kg	1.3175	25.8765	21.2824	51.5236
2222-SD06 (160-6694-6)	14-0927	96	D	mg/Kg	1.3321	25.3774	21.4585	51.8321
2222-RIN-01 (160-6694-7)	14-0928	0.0035	U	mg/L	NA	NA	NA	NA

Notes:

-U qualifier indicates no analytes above the reported values were detected in the sample

- D qualifier indicates dilution of sample was necessary to remain within the calibration range; concentration calculation includes dilution factor.

- NA = The measured concentration was below the reporting level. No Mass % can be calculated.

Analysis Date: 05/27/2014
MCL Project ID: TAM002845A
QC Data Table

Metal:	*Pb 204*	*Pb 206*	*Pb 207*	*Pb 208*	
QC Sample ID	Result	Result	Result	Result	Units
CCV-1	105	104	106	104	%R
CCV-2	106	105	106	105	%R
CCV-3	104	102	104	101	%R
Blank 1	<0.0393	<0.672	<0.618	<1.47	µg/L
Blank 2	<0.0393	<0.672	<0.618	<1.47	µg/L
Blank 3	<0.0393	<0.672	<0.618	<1.47	µg/L
LCS052314N-2	102	103	104	101	%R
MB052314	<0.00098	<0.017	<0.015	<0.037	mg/Kg

	Pb 204 measured conc	Pb 206 measured conc	Pb 207 measured conc	Pb 208 measured conc	Pb Total measured conc	sample wt (g or ml)	Pb Tot mg/Kg	Pb 204 Mass %	Pb 206 Mass %	Pb 207 Mass %	Pb 208 Mass %
14-0922	8.2858	159.6354	133.8361	324.8689	626.6262	2.3645	66.3	1.3223	25.4754	21.3582	51.8441
14-0923	4.0006	76.2335	64.829	155.5495	300.5126	2.8759	26.1	1.3308	25.3594	21.5656	51.7442
14-0924	7.1488	135.8966	115.229	276.326	534.6004	2.1827	122.5	1.3372	25.4202	21.5542	51.6883
14-0925	2.7705	53.0113	44.8521	108.099	208.7329	2.6682	19.6	1.3273	25.3967	21.4878	51.7882
14-0926	6.2411	122.5789	100.8166	244.0714	473.708	2.2051	107.4	1.3175	25.8765	21.2824	51.5236
14-0927	6.8489	130.4799	110.3308	266.4992	514.1588	2.6698	96.3	1.3321	25.3774	21.4585	51.8321
14-0928	<	<	<	<	0	40	<0.0035	NA	NA	NA	NA
lowest std	0.0393	0.6725	0.6181	1.4723	2.8022						

REVIEWED AND APPROVED

5/28/04

Sample Report

Sample ID: 14-922-X5

Sample Date/Time: Tuesday, May 27, 2014 13:31:02
Sample Type: Sample
Sample Description:
Batch ID: 052714_TAM2845A
Autosampler Position: 14
Dataset File: C:\Elandata\Dataset\052714-01\14-922-X5.014
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Calibration File: C:\Elandata\Calibration\052714-01.cal
Current Dead Time (ns): 55

Concentration Results

	Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
[	Hg	202		ug/L		4644.9	1126.4	3.2
|	Pb	204	8.2858	ug/L	2.2	570843.9	448.4	1.3
|	Pb	206	159.6354	ug/L	2.0	11101136.5	7642.2	1.9
|	Pb	207	133.8361	ug/L	1.7	9260689.3	6372.9	2.2
|	Pb	208	324.8689	ug/L	1.5	22904449.1	16135.3	2.2
[>	Bi	209		ug/L		1345230.1	1376714.5	2.2

QC Calculated Values

	Analyte	Mass	QC Std % Recovery	Int Std % Recovery
[	Hg	202		
|	Pb	204		
|	Pb	206		
|	Pb	207		
|	Pb	208		
[>	Bi	209		97.7

Sample Report

Sample ID: 14-923-X5

Sample Date/Time: Tuesday, May 27, 2014 13:34:09
Sample Type: Sample
Sample Description:
Batch ID: 052714_TAM2845A
Autosampler Position: 15
Dataset File: C:\Elandata\Dataset\052714-01\14-923-X5.015
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Calibration File: C:\Elandata\Calibration\052714-01.cal
Current Dead Time (ns): 55

Concentration Results

	Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
	Hg	202		ug/L		2183.3	1126.4	2.8
	Pb	204	4.0006	ug/L	1.0	259578.5	448.4	1.1
	Pb	206	76.2335	ug/L	1.3	4991544.9	7642.2	1.0
	Pb	207	64.8290	ug/L	2.0	4223691.6	6372.9	2.4
	Pb	208	155.5495	ug/L	1.1	10326016.4	16135.3	1.7
>	Bi	209		ug/L		1265630.4	1376714.5	1.7

QC Calculated Values

	Analyte	Mass	QC Std % Recovery	Int Std % Recovery
	Hg	202		
	Pb	204		
	Pb	206		
	Pb	207		
	Pb	208		
>	Bi	209		91.9

Sample Report

Sample ID: 14-0924-X10

Sample Date/Time: Tuesday, May 27, 2014 14:13:46
Sample Type: Sample
Sample Description:
Batch ID: 052714_TAM2845A
Autosampler Position: 21
Dataset File: C:\Elandata\Dataset\052714-01\14-0924-X10.026
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Calibration File: C:\Elandata\Calibration\052714-01.cal
Current Dead Time (ns): 55

Concentration Results

	Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
[	Hg	202		ug/L		3056.8	1126.4	3.0
|	Pb	204	7.1488	ug/L	1.9	506579.2	448.4	1.6
|	Pb	206	135.8966	ug/L	3.4	9718697.5	7642.2	3.2
|	Pb	207	115.2290	ug/L	2.4	8199123.5	6372.9	2.3
|	Pb	208	276.3260	ug/L	1.2	20034617.1	16135.3	1.4
[>	Bi	209		ug/L		1383112.5	1376714.5	1.0

QC Calculated Values

	Analyte	Mass	QC Std % Recovery	Int Std % Recovery
[	Hg	202		
|	Pb	204		
|	Pb	206		
|	Pb	207		
|	Pb	208		
[>	Bi	209		100.5

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Sample Report

Sample ID: 14-925-X5

Sample Date/Time: Tuesday, May 27, 2014 13:40:21
Sample Type: Sample
Sample Description:
Batch ID: 052714_TAM2845A
Autosampler Position: 17
Dataset File: C:\Elandata\Dataset\052714-01\14-925-X5.017
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Calibration File: C:\Elandata\Calibration\052714-01.cal
Current Dead Time (ns): 55

Concentration Results

	Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
	Hg	202		ug/L		1366.8	1126.4	5.0
	Pb	204	2.7705	ug/L	1.5	167325.6	448.4	1.0
	Pb	206	53.0113	ug/L	1.1	3230760.6	7642.2	0.8
	Pb	207	44.8521	ug/L	1.5	2719635.7	6372.9	1.4
	Pb	208	108.0990	ug/L	0.5	6679193.2	16135.3	1.1
>	Bi	209		ug/L		1177194.7	1376714.5	1.1

QC Calculated Values

	Analyte	Mass	QC Std % Recovery	Int Std % Recovery
	Hg	202		
	Pb	204		
	Pb	206		
	Pb	207		
	Pb	208		
>	Bi	209		85.5

Sample Report

Sample ID: 14-0926-X10

Sample Date/Time: Tuesday, May 27, 2014 14:16:53
Sample Type: Sample
Sample Description:
Batch ID: 052714_TAM2845A
Autosampler Position: 22
Dataset File: C:\Elandata\Dataset\052714-01\14-0926-X10.027
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Callbration File: C:\Elandata\Calibration\052714-01.cal
Current Dead Time (ns): 55

Concentration Results

	Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
⌜	Hg	202		ug/L		3133.9	1126.4	3.1
|	Pb	204	6.2411	ug/L	1.7	469417.4	448.4	1.3
|	Pb	206	122.5789	ug/L	2.1	9305233.8	7642.2	2.3
|	Pb	207	100.8166	ug/L	2.1	7615658.3	6372.9	2.9
|	Pb	208	244.0714	ug/L	1.9	18785313.1	16135.3	2.7
⌞>	Bi	209		ug/L		1467938.9	1376714.5	1.4

QC Calculated Values

	Analyte	Mass	QC Std % Recovery	Int Std % Recovery
⌜	Hg	202		
|	Pb	204		
|	Pb	206		
|	Pb	207		
|	Pb	208		
⌞>	Bi	209		106.6

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Sample Report

Sample ID: 14-0927-X10

Sample Date/Time: Tuesday, May 27, 2014 14:20:01
Sample Type: Sample
Sample Description:
Batch ID: 052714_TAM2845A
Autosampler Position: 23
Dataset File: C:\Elandata\Dataset\052714-01\14-0927-X10.028
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Calibration File: C:\Elandata\Calibration\052714-01.cal
Current Dead Time (ns): 55

Concentration Results

	Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
[	Hg	202		ug/L		3354.0	1126.4	2.2
|	Pb	204	6.8489	ug/L	3.3	494137.2	448.4	3.0
|	Pb	206	130.4799	ug/L	2.1	9501190.3	7642.2	1.8
|	Pb	207	110.3308	ug/L	1.8	7993968.8	6372.9	2.0
|	Pb	208	266.4992	ug/L	1.6	19672659.4	16135.3	1.3
[>	Bi	209		ug/L		1408528.8	1376714.5	2.4

QC Calculated Values

	Analyte	Mass	QC Std % Recovery	Int Std % Recovery
[	Hg	202		
|	Pb	204		
|	Pb	206		
|	Pb	207		
|	Pb	208		
[>	Bi	209		102.3

Sample Report

Sample ID: 14-0928-X1

Sample Date/Time: Tuesday, May 27, 2014 14:02:36
Sample Type: Sample
Sample Description:
Batch ID:
Autosampler Position: 20
Dataset File: C:\Elandata\Dataset\052714-01\14-0928-X1.024
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Calibration File: C:\Elandata\Calibration\052714-01.cal
Current Dead Time (ns): 55

Concentration Results

Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
Hg	202		ug/L		281.7	1126.4	9.8
Pb	204	0.0057	ug/L	33.2	851.6	448.4	16.0
Pb	206	0.1106	ug/L	22.6	15570.5	7642.2	12.1
Pb	207	0.1113	ug/L	25.7	14308.5	6372.9	15.0
Pb	208	0.2396	ug/L	27.5	33545.6	16135.3	14.7
Bi	209		ug/L		1381623.5	1376714.5	3.7

QC Calculated Values

Analyte	Mass	QC Std % Recovery	Int Std % Recovery
Hg	202		
Pb	204		
Pb	206		
Pb	207		
Pb	208		
Bi	209		100.4

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Sample Report

Sample ID: CCV_052714

Sample Date/Time: Tuesday, May 27, 2014 13:11:47
Sample Type: Sample
Sample Description:
Batch ID:
Autosampler Position: 6
Dataset File: C:\Elandata\Dataset\052714-01\CCV_052714.008
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Calibration File:
Current Dead Time (ns): 55

Concentration Results

	Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
[	Hg	202		ug/L		1070.7	1126.4	5.5
|	Pb	204	3.4321	ug/L	2.2	236622.1	448.4	1.4
|	Pb	206	58.5081	ug/L	1.9	4071672.4	7642.2	1.5
|	Pb	207	54.5036	ug/L	2.5	3772611.8	6372.9	1.3
|	Pb	208	127.7075	ug/L	2.2	9008245.6	16135.3	1.7
[>	Bi	209		ug/L		1344579.0	1376714.5	1.5

QC Calculated Values

	Analyte	Mass	QC Std % Recovery	Int Std % Recovery
[	Hg	202		
|	Pb	204	104.7	
|	Pb	206	104.4	
|	Pb	207	105.8	
|	Pb	208	104.1	
[>	Bi	209		97.7

Sample Report

Sample ID: Inst_Blk

Sample Date/Time: Tuesday, May 27, 2014 13:15:23
Sample Type: Sample
Sample Description:
Batch ID:
Autosampler Position: 1
Dataset File: C:\Elandata\Dataset\052714-01\Inst_Blk.009
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Calibration File: C:\Elandata\Calibration\052714-01.cal
Current Dead Time (ns): 55

Concentration Results

	Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
	Hg	202		ug/L		869.4	1126.4	9.1
	Pb	204	0.0016	ug/L	54.6	536.3	448.4	11.7
	Pb	206	0.0247	ug/L	40.6	9042.5	7642.2	9.1
	Pb	207	0.0258	ug/L	39.9	7884.1	6372.9	9.8
	Pb	208	0.0634	ug/L	33.7	19922.3	16135.3	9.5
>	Bi	209		ug/L		1323757.1	1376714.5	3.8

QC Calculated Values

	Analyte	Mass	QC Std % Recovery	Int Std % Recovery
	Hg	202		
	Pb	204	3.9	
	Pb	206	3.7	
	Pb	207	4.2	
	Pb	208	4.3	
>	Bi	209		96.2

Sample Report

Sample ID: CCV_052714

Sample Date/Time: Tuesday, May 27, 2014 13:49:41
Sample Type: Sample
Sample Description:
Batch ID:
Autosampler Position: 6
Dataset File: C:\Elandata\Dataset\052714-01\CCV_052714.020
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Calibration File: C:\Elandata\Calibration\052714-01.cal
Current Dead Time (ns): 55

Concentration Results

	Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
	Hg	202		ug/L		307.0	1126.4	14.2
	Pb	204	3.4659	ug/L	4.6	245898.3	448.4	2.4
	Pb	206	58.9147	ug/L	5.9	4216733.3	7642.2	2.5
	Pb	207	54.7723	ug/L	3.8	3901897.2	6372.9	0.8
	Pb	208	128.9839	ug/L	5.3	9359296.7	16135.3	2.1
>	Bi	209		ug/L		1384984.8	1376714.5	3.6

QC Calculated Values

	Analyte	Mass	QC Std % Recovery	Int Std % Recovery
	Hg	202		
	Pb	204	105.8	
	Pb	206	105.1	
	Pb	207	106.3	
	Pb	208	105.1	
>	Bi	209		100.6

Sample Report

Sample ID: Inst_Blk

Sample Date/Time: Tuesday, May 27, 2014 13:53:17
Sample Type: Sample
Sample Description:
Batch ID:
Autosampler Position: 1
Dataset File: C:\Elandata\Dataset\052714-01\Inst_Blk.021
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Calibration File: C:\Elandata\Calibration\052714-01.cal
Current Dead Time (ns): 55

Concentration Results

	Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
	Hg	202		ug/L		273.0	1126.4	9.7
	Pb	204	0.0020	ug/L	36.1	592.7	448.4	7.9
	Pb	206	0.0362	ug/L	24.3	10290.2	7642.2	5.5
	Pb	207	0.0354	ug/L	28.7	8936.1	6372.9	7.2
	Pb	208	0.0746	ug/L	31.5	21655.5	16135.3	6.9
>	Bi	209		ug/L		1386752.2	1376714.5	1.3

QC Calculated Values

	Analyte	Mass	QC Std % Recovery	Int Std % Recovery
	Hg	202		
	Pb	204	5.1	
	Pb	206	5.4	
	Pb	207	5.7	
	Pb	208	5.1	
>	Bi	209		100.7

Sample Report

Sample ID: CCV_052714

Sample Date/Time: Tuesday, May 27, 2014 14:23:08
Sample Type: Sample
Sample Description:
Batch ID:
Autosampler Position: 6
Dataset File: C:\Elandata\Dataset\052714-01\CCV_052714.029
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Calibration File: C:\Elandata\Calibration\052714-01.cal
Current Dead Time (ns): 55

Concentration Results

	Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
	Hg	202		ug/L		217.7	1126.4	8.5
	Pb	204	3.3958	ug/L	2.1	244579.5	448.4	1.4
	Pb	206	57.3332	ug/L	2.1	4168118.8	7642.2	1.6
	Pb	207	53.4593	ug/L	0.7	3866887.0	6372.9	1.9
	Pb	208	124.4210	ug/L	1.7	9170392.8	16135.3	2.3
>	Bi	209		ug/L		1404684.3	1376714.5	1.9

QC Calculated Values

	Analyte	Mass	QC Std % Recovery	Int Std % Recovery
	Hg	202		
	Pb	204	103.6	
	Pb	206	102.3	
	Pb	207	103.8	
	Pb	208	101.4	
>	Bi	209		102.0

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Sample Report

Sample ID: Inst_Blk

Sample Date/Time: Tuesday, May 27, 2014 14:26:44
Sample Type: Sample
Sample Description:
Batch ID:
Autosampler Position: 1
Dataset File: C:\Elandata\Dataset\052714-01\Inst_Blk.030
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Calibration File: C:\Elandata\Calibration\052714-01.cal
Current Dead Time (ns): 55

Concentration Results

	Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
	Hg	202		ug/L		210.0	1126.4	21.3
	Pb	204	0.0009	ug/L	87.2	524.0	448.4	16.8
	Pb	206	0.0215	ug/L	42.3	9415.3	7642.2	12.1
	Pb	207	0.0208	ug/L	25.1	8045.6	6372.9	10.2
	Pb	208	0.0422	ug/L	33.7	19666.8	16135.3	9.9
>	Bi	209		ug/L		1413982.2	1376714.5	9.9

QC Calculated Values

	Analyte	Mass	QC Std % Recovery	Int Std % Recovery
	Hg	202		
	Pb	204	2.2	
	Pb	206	3.2	
	Pb	207	3.4	
	Pb	208	2.9	
>	Bi	209		102.7

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Sample Report

Sample ID: LCS052314N-2

Sample Date/Time: Tuesday, May 27, 2014 13:18:30
Sample Type: Sample
Sample Description:
Batch ID:
Autosampler Position: 9
Dataset File: C:\Elandata\Dataset\052714-01\LCS052314N-2.010
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Calibration File: C:\Elandata\Calibration\052714-01.cal
Current Dead Time (ns): 55

Concentration Results

	Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
[	Hg	202		ug/L		848.7	1126.4	3.5
|	Pb	204	3.9965	ug/L	1.8	281073.0	448.4	1.6
|	Pb	206	69.2157	ug/L	2.5	4912748.2	7642.2	2.0
|	Pb	207	64.4988	ug/L	1.7	4554557.8	6372.9	1.7
|	Pb	208	149.3942	ug/L	1.6	10750354.1	16135.3	2.0
[>	Bi	209		ug/L		1371760.6	1376714.5	1.2

QC Calculated Values

	Analyte	Mass	QC Std % Recovery	Int Std % Recovery
[	Hg	202		
|	Pb	204	101.6	
|	Pb	206	102.9	
|	Pb	207	104.3	
|	Pb	208	101.5	
[>	Bi	209		99.6

Sample Report

Sample ID: MB052314-2

Sample Date/Time: Tuesday, May 27, 2014 13:21:37
Sample Type: Sample
Sample Description:
Batch ID:
Autosampler Position: 10
Dataset File: C:\Elandata\Dataset\052714-01\MB052314-2.011
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Calibration File: C:\Elandata\Calibration\052714-01.cal
Current Dead Time (ns): 55

Concentration Results

	Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
	Hg	202		ug/L		776.4	1126.4	11.6
	Pb	204	0.0015	ug/L	55.6	557.9	448.4	9.5
	Pb	206	0.0306	ug/L	15.6	9859.3	7642.2	3.0
	Pb	207	0.0284	ug/L	18.2	8420.2	6372.9	4.0
	Pb	208	0.0591	ug/L	13.9	20477.0	16135.3	1.8
>	Bi	209		ug/L		1382998.6	1376714.5	2.6

QC Calculated Values

	Analyte	Mass	QC Std % Recovery	Int Std % Recovery
	Hg	202		
	Pb	204	3.9	
	Pb	206	4.5	
	Pb	207	4.6	
	Pb	208	4.0	
>	Bi	209		100.5

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Sample Report

Sample ID: 052714 Pb-Iso-CCV2

Sample Date/Time: Tuesday, May 27, 2014 13:56:23
Sample Type: Sample
Sample Description:
Batch ID: 052714_TAM2845A
Autosampler Position: 7
Dataset File: C:\Elandata\Dataset\052714-01\052714 Pb-Iso-CCV2.022
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Calibration File: C:\Elandata\Calibration\052714-01.cal
Current Dead Time (ns): 55

Concentration Results

	Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
	Hg	202		ug/L		255.7	1126.4	19.9
	Pb	204	0.0019	ug/L	52.4	574.2	448.4	16.3
	Pb	206	2.2889	ug/L	17.2	165829.6	7642.2	6.0
	Pb	207	44.1876	ug/L	17.7	3042597.4	6372.9	5.5
	Pb	208	0.4332	ug/L	22.8	46267.2	16135.3	8.8
>	Bi	209		ug/L		1368954.9	1376714.5	17.0

QC Calculated Values

	Analyte	Mass	QC Std % Recovery	Int Std % Recovery
	Hg	202		
	Pb	204		
	Pb	206	114%R	
	Pb	207	110%R	
	Pb	208		
>	Bi	209		99.4

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Sample Report

Sample ID: 052714 Pb-Tot CCV

Sample Date/Time: Tuesday, May 27, 2014 13:59:29
Sample Type: Sample
Sample Description:
Batch ID: 052714_TAM2845A
Autosampler Position: 8
Dataset File: C:\Elandata\Dataset\052714-01\052714 Pb-Tot CCV.023
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Calibration File: C:\Elandata\Calibration\052714-01.cal
Current Dead Time (ns): 55

Concentration Results

Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
Hg	202		ug/L		249.0	1126.4	4.8
Pb	204	5.5472	ug/L	4.1	371188.6	448.4	2.7
Pb	206	98.4922	ug/L	4.1	6652419.3	7642.2	3.1
Pb	207	88.2792	ug/L	3.9	5932238.1	6372.9	3.1
Pb	208	210.9317	ug/L	2.0	14447167.1	16135.3	2.4
Bi	209		ug/L		1306415.5	1376714.5	2.2

4032

QC Calculated Values

Analyte	Mass	QC Std % Recovery	Int Std % Recovery
Hg	202		
Pb	204		
Pb	206		
Pb	207		
Pb	208		
Bi	209		94.9

Pb tot : $\frac{4032}{400} \times 100 = 101\%$ R

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Calibration Report

Analyte	Mass	Curve Type	Slope	Intercept	Corr Coeff
Hg	201.971	Linear Thru Zero	0.000000	0.000	0.000000
Pb	203.973	Linear Thru Zero	0.051192	0.000	1.000000
Pb	205.975	Linear Thru Zero	0.051670	0.000	0.999999
Pb	206.976	Linear Thru Zero	0.051409	0.000	1.000000
Pb	207.977	Linear Thru Zero	0.052379	0.000	1.000000
Bi	208.980	Linear Thru Zero	0.000000	0.000	0.000000

Method File Name

File Name 052714-01.mth

Tuning File Name

Tuning File Name default.tun

Calibration File Name

File Name 052714-01.cal

Optimization File Name

File Name c:\elandata\optimize\default.dac

Sample Report

Sample ID: Calibration Blank

Sample Date/Time: Tuesday, May 27, 2014 12:57:18
Sample Type: Sample
Sample Description:
Batch ID:
Autosampler Position: 1
Dataset File: C:\Elandata\Dataset\052714-01\Calibration Blank.003
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Calibration File:
Current Dead Time (ns): 55

Concentration Results

Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
Hg	202		ug/L		1126.4		3.3
Pb	204		ug/L		448.4		3.9
Pb	206		ug/L		7642.2		2.9
Pb	207		ug/L		6372.9		2.5
Pb	208		ug/L		16135.3		2.3
Bi	209		ug/L		1376714.5		1.4

QC Calculated Values

Analyte	Mass	QC Std % Recovery	Int Std % Recovery
Hg	202		
Pb	204		
Pb	206		
Pb	207		
Pb	208		
Bi	209		

Sample Report

Sample ID: 052714-01

Sample Date/Time: Tuesday, May 27, 2014 12:59:16
Sample Type: Sample
Sample Description:
Batch ID:
Autosampler Position: 2
Dataset File: C:\Elandata\Dataset\052714-01\052714-01 .004
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Calibration File:
Current Dead Time (ns): 55

Concentration Results

	Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
	Hg	202		ug/L		1303.4	1126.4	4.2
	Pb	204	0.0393	ug/L	3.9	3280.3	448.4	2.5
	Pb	206	0.6725	ug/L	4.7	56192.2	7642.2	2.1
	Pb	207	0.6181	ug/L	3.6	51478.4	6372.9	1.9
	Pb	208	1.4723	ug/L	1.4	124312.7	16135.3	1.6
>	Bi	209		ug/L		1409536.1	1376714.5	2.3

QC Calculated Values

	Analyte	Mass	QC Std % Recovery	Int Std % Recovery
	Hg	202		
	Pb	204		
	Pb	206		
	Pb	207		
	Pb	208		
>	Bi	209		

Sample Report

Sample ID: 052714-02

Sample Date/Time: Tuesday, May 27, 2014 13:02:23
Sample Type: Sample
Sample Description:
Batch ID:
Autosampler Position: 3
Dataset File: C:\Elandata\Dataset\052714-01\052714-02.005
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Calibration File:
Current Dead Time (ns): 55

Concentration Results

Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
Hg	202		ug/L		1454.8	1126.4	4.9
Pb	204	0.0787	ug/L	1.5	6574.8	448.4	2.1
Pb	206	1.3445	ug/L	1.2	111745.4	7642.2	1.8
Pb	207	1.2359	ug/L	1.9	103163.0	6372.9	2.5
Pb	208	2.9476	ug/L	1.3	249430.2	16135.3	2.5
> Bi	209		ug/L		1507943.5	1376714.5	1.3

QC Calculated Values

Analyte	Mass	QC Std % Recovery	Int Std % Recovery
Hg	202		
Pb	204		
Pb	206		
Pb	207		
Pb	208		
> Bi	209		

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Sample Report

Sample ID: 052714-03

Sample Date/Time: Tuesday, May 27, 2014 13:05:31
Sample Type: Sample
Sample Description:
Batch ID:
Autosampler Position: 4
Dataset File: C:\Elandata\Dataset\052714-01\052714-03 .006
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Calibration File:
Current Dead Time (ns): 55

Concentration Results

	Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
⌈	Hg	202		ug/L		1261.8	1126.4	8.3
|	Pb	204	0.7863	ug/L	1.9	59011.6	448.4	2.5
|	Pb	206	13.4511	ug/L	2.1	1012703.5	7642.2	2.4
|	Pb	207	12.3616	ug/L	3.1	932370.7	6372.9	3.3
|	Pb	208	29.4534	ug/L	2.9	2285102.5	16135.3	2.7
⌊>	Bi	209		ug/L		1463778.4	1376714.5	2.0

QC Calculated Values

	Analyte	Mass	QC Std % Recovery	Int Std % Recovery
⌈	Hg	202		
|	Pb	204		
|	Pb	206		
|	Pb	207		
|	Pb	208		
⌊>	Bi	209		

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Sample Report

Sample ID: 052714-04

Sample Date/Time: Tuesday, May 27, 2014 13:08:40
Sample Type: Sample
Sample Description:
Batch ID:
Autosampler Position: 5
Dataset File: C:\Elandata\Dataset\052714-01\052714-04 .007
Sample File: C:\Elandata\Sample\052714-01.sam
Method File: C:\Elandata\Method\052714-01.mth
Calibration File:
Current Dead Time (ns): 55

Concentration Results

	Analyte	Mass	Conc. Mean	Units	Conc. RSD	Intens. Mean	Blank Intensity	Intens. RSD
	Hg	202		ug/L		1196.1	1126.4	2.6
	Pb	204	9.8314	ug/L	1.9	715644.0	448.4	2.2
	Pb	206	168.1536	ug/L	2.9	12351943.3	7642.2	2.1
	Pb	207	154.5349	ug/L	4.3	11291174.0	6372.9	3.1
	Pb	208	368.0892	ug/L	3.1	27406523.2	16135.3	2.1
>	Bi	209		ug/L		1421316.3	1376714.5	2.5

QC Calculated Values

	Analyte	Mass	QC Std % Recovery	Int Std % Recovery
	Hg	202		
	Pb	204		
	Pb	206		
	Pb	207		
	Pb	208		
>	Bi	209		

COC(S)

TAM002845A

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Phone (314) 298-8566 Fax (314) 298-8757

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Gish, Erika K	Carrier Tracking No(s):	COC No: 160-30207.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: erika.gish@testamericainc.com		Page: Page 1 of 1
Company: Materials and Chemistry Laboratory Inc				Job #: 160-6694-1
Address: PO BOX 5808, ,	Due Date Requested: 5/30/2014			
City: Oak Ridge	TAT Requested (days):			
State, Zip: TN, 37831				
Phone:	PO #:			
Email:	WO #:			
Project Name: EPA Region 5 START 3 Contract	Project #: 16002800			
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 - Na2S2SO3, 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)	SUB (Stable Isotopic Lead)/ Lead to MCL	SUB (Stable Isotopic Lead)/ Lead sub to MCL	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
2222-SD01 (160-6694-1) 14-0922	5/15/14	08:25 Eastern		Solid			X		1	
2222-SD02 (160-6694-2) 14-0923	5/15/14	09:45 Eastern		Solid			X		1	
2222-SD03 (160-6694-3) 14-0924	5/15/14	08:50 Eastern		Solid			X		1	
2222-SD04 (160-6694-4) 14-0925	5/15/14	09:05 Eastern		Solid			X		1	
2222-SD05 (160-6694-5) 14-0926	5/15/14	09:15 Eastern		Solid			X		1	
2222-SD06 (160-6694-6) 14-0927	5/15/14	08:45 Eastern		Solid			X		1	
2222-RIN-01 (160-6694-7) 14-0928	5/15/14	08:10 Eastern		Water				X	1	

Sample # 2222-SD03 (160-6694-3) was received with a loose lid and leaked onto the other 5 samples it was packaged with. ag 5/20/14.

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)	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: Jeff Clarke	Date/Time: 5.19.14 1430	Company TA STL	Received by:	Date/Time:	Company
Relinquished by: Angela Grainger	Date/Time: 5-20-14 1137	Company MCL	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Shipping and Receiving Documents

USEPA CLP COC (LAB COPY)
DateShipped: 05/15/14
CarrierName: FedEx
AirbillNo: 803786477258

CHAIN OF CUSTODY RECORD

Case #:
Cooler #: 1

160-6694 Chain of Custody

2-051514-121625-0003
Lab: TestAmerica Inc.
Lab Contact: Erika Gish
Lab Phone: 314-298-8566

Sample Identifier	CLP Sample No.	Matrix/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
2222- SD01		Sediment/ Weston	Grab	Stable Isotopic Lead, TAL Metals + Hg, Radioisotopes by gamma spec, Iso Th and Iso U by alpha spec	A (4 C), B (4 C), C (4 C), D (4 C) (4)	SD01	05/15/2014 08:25	
2222-SD02		Sediment/ Weston	Grab	Stable Isotopic Lead, TAL Metals + Hg, Radioisotopes by gamma spec, Iso Th and Iso U by alpha spec	A (4 C), B (4 C), C (4 C), D (4 C) (4)	SD02	05/15/2014 09:45	
2222-SD03		Sediment/ Weston	Grab	Stable Isotopic Lead, TAL Metals + Hg, Radioisotopes by gamma spec, Iso Th and Iso U by alpha spec	A (4 C), B (4 C), C (4 C), D (4 C) (4)	SD03	05/15/2014 08:50	
2222-SD04		Sediment/ Weston	Grab	Stable Isotopic Lead, TAL Metals + Hg, Radioisotopes by gamma spec, Iso Th and Iso U by alpha spec	A (4 C), B (4 C), C (4 C), D (4 C) (4)	SD04	05/15/2014 09:05	

Sample(s) to be used for Lab QC: 2222- SD01 Tag A, 2222- SD01 Tag B, 2222- SD01 Tag C, 2222- SD01 Tag D - Special Instructions: 10-day TAT
Sample 2222-SD01 MS/MSD

Shipment for Case Complete? N

Samples Transferred From Chain of Custody #

Analysis Key

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
Sampling	Jennifer Green (Weston)	5/15/14 13:00	FedEx		
	Fed EX	5-16-14 0645	Jill Clarke TA STL		

USEPA CLP COC (LAB COPY)

DateShipped: 05/15/14
CarrierName: FedEx
AirbillNo: 803786477258

CHAIN OF CUSTODY RECORD

Case #:
Cooler #: 1

No: 2-051514-121625-0003

Lab: TestAmerica Inc.
Lab Contact: Erika Gish
Lab Phone: 314-298-8566

Sample Identifier	CLP Sample No.	Matrix/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
2222-SD05		Sediment/ Weston	Grab	Stable Isotopic Lead, TAL Metals + Hg, Radioisotopes by gamma spec, Iso Th and Iso U by alpha spec	A (4 C), B (4 C), C (4 C), D (4 C) (4)	SD05	05/15/2014 09:15	
2222-SD06		Sediment/ Weston	Grab	Stable Isotopic Lead, TAL Metals + Hg, Radioisotopes by gamma spec, Iso Th and Iso U by alpha spec	A (4 C), B (4 C), C (4 C), D (4 C) (4)	SD06	05/15/2014 08:45	

Special Instructions: 10-day TAT
Sample 2222-SD01 MS/MSD

Shipment for Case Complete? N

Samples Transferred From Chain of Custody #

Analysis Key

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
Sampling	Denise Breen (Weston)	5/15/14 13:00	Fed Ex		
	Fed Ex	5-16-14 0645	Jill Clarke TA STL		

USEPA CLP COC (LAB COPY)

DateShipped: 05/15/14
CarrierName: FedEx
AirbillNo: 803786477258

CHAIN OF CUSTODY RECORD

Case #:
Cooler #: 2

No: 2-051514-122735-0004

Lab: TestAmerica Inc.
Lab Contact: Erika Gish
Lab Phone: 314-298-8566

Sample Identifier	CLP Sample No.	Matrix/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
2222-RIN-01		Water/ Weston	Grab	TAL Metals + Hg, Ra 228, Stable Isotopic Lead, Radioisotopes by Gamma spectroscopy, Iso U, Iso Th, Total Alpha Radium	A (HNO3 pH<2), B (HNO3 pH<2), C (HNO3 pH<2), D (HNO3 pH<2), E (HNO3 pH<2), F (HNO3 pH<2), G (HNO3 pH<2) (7)	Rinsate Blank	05/15/2014 08:10	

Sample(s) to be used for Lab QC: 2222-RIN-01 Tag A, 2222-RIN-01 Tag B, 2222-RIN-01 Tag C, 2222-RIN-01 Tag D, 2222-RIN-01 Tag E, 2222-RIN-01 Tag F, 2222-RIN-01 Tag G

Shipment for Case Complete? N

Samples Transferred From Chain of Custody #

Analysis Key

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
Sampling	Denise Breen (Weston)	5/15/14 13:00	FedEx		
	FedEx	5-16-14 0645	Jill Clarke TASTL		

Login Sample Receipt Checklist

Client: Weston Solutions, Inc.

Job Number: 160-6694-1

Login Number: 6694

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	